

The Application of GIS to the Reconstruction of the Slave-Plantation Economy of St. Croix, Danish West Indies

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The project of developing a historical-geographical understanding of slavery and the economic and social systems that supported it requires the exploration of primary data sources that have otherwise not received significant attention. This paper focuses on a remarkable series of maps, cadastral records, and censuses of the island of St. Croix, in the Danish West Indies (now the United States Virgin Islands) which provide uniquely rich materials for the analysis of the workings of an eighteenth-century slave-plantation society. These Danish records are so susceptible to demographic, economic, and cultural analysis, and the information they convey can be so precisely placed within the mapped physical realities of the landscapes of St. Croix, that they may represent a benchmark for studies of the geography of New World plantation society in general.

Atlantic slavery dominated huge agricultural areas, and its profits permeated the European, African, and American economies, to say nothing of its cultural implications,¹ and research on this tremendously important subject has proliferated enormously. Most of this work has been published by historians,² but the dividing line between history—and especially economic history—and geography can of course not be very sharply drawn in the case of the slave-plantation system. Some very solid historical geography of plantation slavery in the Caribbean has been written, but the field remains quite open.³ The source material is widely scattered and by no means uniform or easy to handle, and a great deal of the fundamental record of the geography of slavery doubtless remains to be reconstructed and interpreted.

Denmark also maintained slave-trading establishments on the west coast of Africa and commercial enclaves in India. The rich archival record of these ventures—extraordinary projections, by any measure, of northern European culture and economic ambition into the tropics, but at the same time quite typical of the experiences of the other colonial

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nations—has by no means been exhaustively examined by historians and historical geographers.⁴

The authors of this paper are constructing a geographic information system based on these exceptional maps and records of the plantation society of St. Croix. Both the maps and the tabular records are unusually conducive to statistical study and fresh cartographic visualization: a great range of historical-geographical questions can be put to such a system. Our intent here is to place these records in the political and economic contexts in which they were generated and to outline some of the possibilities for their analysis. We expect that the concrete and highly detailed local correlations between the data and the maps and the longer-term socio-economic trends that emerge from these analyses will be found exceedingly useful in regional and inter-regional comparative work.

The archival record of the Danish colonization of St. Croix

At least as early as the 1660s, Denmark established a colonial presence on St. Thomas, 35 miles east of Puerto Rico. The colony expanded to encompass St. John in 1716, and in 1733, the Danish West India and Guinea Company purchased the island of St. Croix from the crown of France.⁵ St. Croix is about 23 miles long and six wide at the widest (almost exactly half the size of Barbados, but only a fiftieth the size of Jamaica); it is larger, less mountainous, and better suited to extensive plantation agriculture than St. Thomas and St. John, and its occupation represented a significant expansion of the Danish position in the Caribbean.

When the Danes occupied St. Croix, they divided large portions of the island into a strikingly uniform numbered grid of rectangular properties, each two thousand by three thousand Danish feet, or 150 St. Croix acres (of 40,000 square Danish feet each, or about 146 English acres), which was held at the time to represent the ideal size for a sugar plantation.⁶ About four hundred parcels were organized into nine variously shaped quarters, or rural districts. Long before the survey was complete, the Company placed the plantation lots on the market at favorable rates to attract settlers.⁷

Company administrators in Copenhagen were operating very much in the dark as they set about the development of St. Croix, as is inherent in the geography of early colonial undertakings. They ordered a map of the island be made immediately, but its survey and compilation proved difficult: many years passed before local officials could produce a map. Despite the regular arrangement of rectangular properties, the cadastral record of landholdings and tax obligations, which is preserved essentially complete, was in various respects rather confused.⁸ The work of a series of surveyors and officers in charge of the cadastral record culminated in 1750 in the compilation of a topographic and cadastral map of the



Figure 1. Detail of Johann Cronenberg and Johann Christoph von Jægersberg, "Charte over Eilandet St. Crox", 1750. Copenhagen, National Cadastre and Survey-Denmark, Hydrographic Division, manuscript map no. A/18-49, showing Prince's (Printzens) Quarter and portions of adjacent quarters in the western part of the island. Reproduced by permission of the National Cadastre and Survey-Denmark.

whole island. This spectacular colonial image appears to have been mainly the work of a military officer named Johan Cronenberg.⁹

Now, suddenly, after almost twenty years, it was as if a window on the island had opened (Figure 1). The crucial matter here is that Cronenberg's map purports to show actual land use everywhere on the island: plantings of sugar cane, cotton, and provisions or pasture—and areas still in woods and bush—are shown in their specific situations in the island's landscapes. The acreage of each planter's crops can be measured, field by field, directly from the map. Cronenberg marked the locations of all major rural buildings, including mills for crushing the canes, plantation houses, and slave

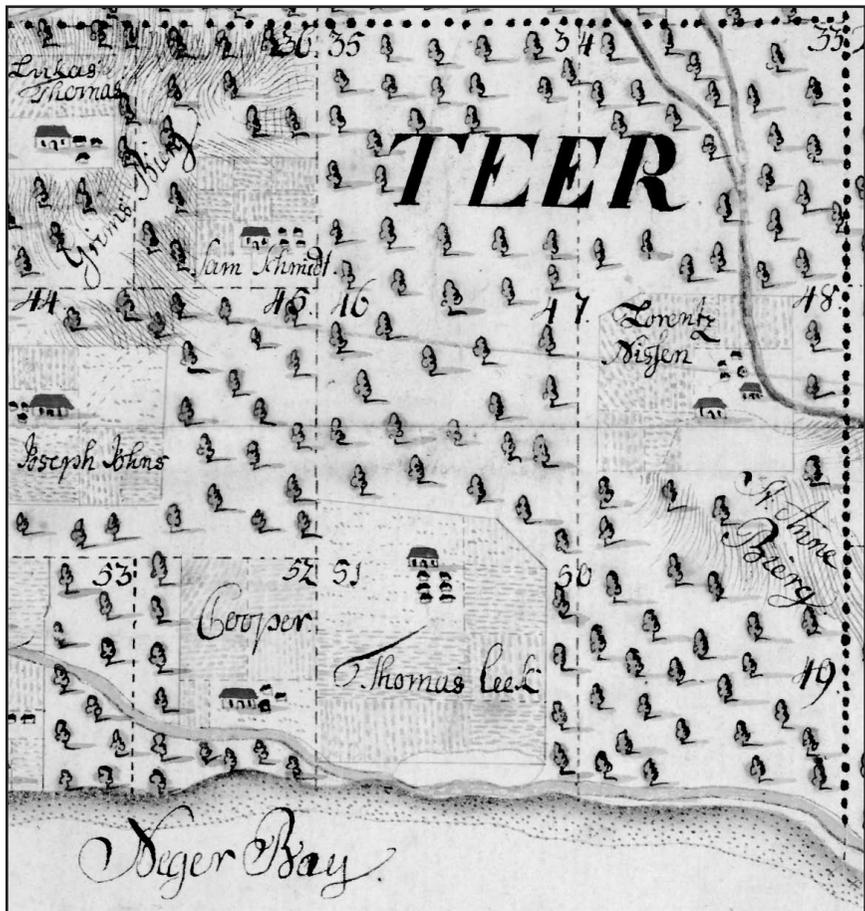


Figure 2. Detail of Cronenberg's map, showing the southeast corner of Prince's Quarter. The distinction between cotton and sugar cane cannot be seen in black and white, but the planter Cooper, in lot number 52, is seen to have been growing a large amount of cotton, with an area of provisions and pasture southeast of the plantation buildings. To the east, Thomas Leek was growing sugar cane, with provisions and pasture mainly north and west of the buildings. Quite large areas of Prince's Quarter remained uncultivated in 1749. Reproduced by permission of the National Cadastre and Survey-Denmark.

quarters. Plantation boundaries, water courses, roads, reefs, and anchorages are shown, and the terrain is delineated in faint and rather sketchy hachuring. There were still very large extents of woods on the island almost twenty years after the Danes had taken possession of it (Figure 2).¹⁰

In all this the map is a unique record: we know of no other island-wide public record of the state of agricultural affairs on St. Croix at this period.¹¹ And while excellent maps were being made elsewhere in the

Antilles in the eighteenth century, we are not aware of any comparable rendering of the actual agricultural pattern on an entire island.¹²

The geometric outlines of Cronenberg's map were improved upon somewhat in another map by his successor in the office of the public surveyor, Jens Beck, particularly on the steep northwestern coast, which Cronenberg had been unable to complete and had rendered simply as a tentative, wavering line. Compared to Cronenberg's lively image, Beck's is highly schematic, but he arranged to have his map of St. Croix engraved and published in Copenhagen in 1754, while Cronenberg's manuscript map disappeared into the obscurity of the Danish government's collection of nautical charts. It survives only in one manuscript copy.¹³

The cadastral record otherwise took the form of annually prepared ledgers of land- and slaveholdings.¹⁴ The entries in these lists at this time included the names of land-owners; the date of the land's alienation from the Company; the length and breadth of the lots; the land's original classification as suitable for the cultivation of sugar cane, cotton, or other less valuable uses; and the numbers of slaves. This last figure was broken down into columns for fully capable field slaves, slaves whose ability to work in the fields was in one way or another limited, and children.

GIS and the plantations of St. Croix

The persistently rectilinear shape of the plantations, arising out of the underlying grid of 150-acre lots created by the original cadastral system, which in time imprinted itself in the network of public roads, invites the development and use of a geographic information system to map correlations between specific plots of land and slave populations. The work of entering the demographic data available for each of the island's quarters into computer spreadsheets and of digitizing the cadastral pattern and land use depicted on Cronenberg's map is presently in hand.¹⁵ We are concentrating first on Prince's Quarter, in the western part of the island, where sugar cane cultivation became dominant, and contrasting it with East End Quarter A, where cotton was prevalent.

Once the basic pattern of consolidated and subdivided landholdings is established, and the outlines of the fields themselves are digitized, it becomes a relatively straightforward matter to link these cartographic units to the data extracted from the tabular cadastral record. It is then possible to map the numbers of slaves of various capacities and ages onto each plantation and to relate those numbers to the digitally calculable acreages of sugar cane or cotton. These correlations permit close study of the working lives of the slaves. The island's physical geographic characteristics and cultural features—towns, roads, churches—can thereafter be drawn from modern United States Geological Survey topographical maps and

superimposed on these eighteenth- and nineteenth-century agricultural and demographic outlines. Rapidly ramifying spatial and statistical analyses of the relationship between workforce and cultivation and the physical and cultural geography in each quarter and, indeed, on each plantation will then be possible.

Because the precise situation of the fields in the landscape can be read from Cronenberg's map, it should be possible to assess planters' decisions about how best to work with the terrain and local variations in climate and soils, which are not inconsiderable. Although the islands were Danish, most of St. Croix's slave-holders were British and Dutch planters from other islands where the soils (or other opportunities) may have been played out by the early eighteenth century.¹⁶ These were immigrants with financial resources, with slaves, and, above all, with experience, and their decisions about where to plant which crops can be taken to reflect not only their appraisals of the local geography but also well-worked-through Antillean agricultural understandings.¹⁷ A great deal of regional history can be read among and between the lines of Cronenberg's map.

The highest land elevations on St. Croix are just over 1,000 feet, but substantial portions of the island are quite dissected and steep. The planters may have taken their land's aspect to the sun and prevailing winds into account, at least for the cultivation of certain crops; they preferred to plant cotton, for example, on well-drained lee slopes out of northerly winds.¹⁸ The steepness of the land and its susceptibility to erosion were obviously significant matters. The workings of the daily sea breeze and of convectional and orographic uplift create substantial variations in rainfall on the island: the East End is rather dry, and here, it can be seen on Cronenberg's map, the planters found the land most suitable for the cultivation of cotton and provisions. The hills of the west end and north side are considerably wetter,¹⁹ and the planters grew a great deal of sugar cane there. Access to fresh water in the landscape is certain to have been an important consideration for the planters and their workforces; domestic life on the island depends to this day on rainwater cisterns.

It may prove possible to correlate variations in soils with the early patterns of cropping depicted on Cronenberg's map.²⁰ The trade winds blow with great strength and regularity, and island residents speak of the salt blast, which probably influenced the distribution of crops. The wind across the terrain no doubt dictated the placement of the great stone windmills with which the sugar canes were crushed.²¹ Woods, both as obstacles to cultivation and as a valuable commercial resource here in the Lesser Antilles, which were starved for timber,²² were very important, especially in the early days of clearing and settlement.²³ Distances to main roads, anchorages, and towns presumably had an effect on rates of production and on the size and make-up of the labor force and its disposition in the working landscape.

The analysis of the interplay of all these geographic factors on the pattern of cultivation on the island is highly complex, of course, and the tangible result in the landscape was naturally further governed by the skill, pecuniary resources, personalities, and life histories of the individuals involved, essentially all of which remains beyond reach. Nevertheless, valuable generalizations about Antillean slave-plantation agriculture can be expected to emerge from this remarkable mid-eighteenth-century record.

Abolition of slave trade and generation of new census records

For forty years after Cronenberg completed his startlingly detailed image, the slave population, as recorded in the annual tax records of land and slaveholdings, grew rapidly as the sugar economy boomed. A number of annotated copies of Beck's engraved map record the changing pattern of landholdings at various junctures in the second half of the eighteenth century, and, by reading these maps against the annual tax lists – and against modern topographic maps – a fair amount can be surmised about the disposition of the labor force on St. Croix.²⁴

Almost a half century after the benchmark left by Cronenberg, another highly unusual archival opportunity presents itself. Two extraordinary sets of agricultural statistics gathered around the turn of the nineteenth century are preserved at the Danish National Archives in Copenhagen. These two censuses were taken in the context of Denmark's abolition of the Atlantic slave trade.²⁵

In the late 1780s, Atlantic plantation societies and the slave trade that supported them came under intense public scrutiny. Abolitionist voices made themselves heard in Denmark, as everywhere.²⁶ In 1791, the Danish regent, Crown Prince Frederik, appointed a high-ranking commission to study the question. A ban on the Danish slave trade – although not, at this juncture, of slavery itself – appears to have been a foregone conclusion. However, apparently to allay the misgivings of the wealthy planters of the Danish West Indies, the Slave-trade Commission (as it was commonly referred to) constructed an elaborate demographic case that the population of enslaved people on St. Croix could reasonably be expected to maintain itself naturally even after fresh imports of slaves ceased. In this regard the commission professed a great deal of faith in the amelioration of the slaves' working lives. The lot of pregnant women should be eased, the commission recommended, and formal and lasting marital relations among the slaves encouraged to promote a healthy child-rearing environment.²⁷

In March, 1792, on the Slave-trade Commission's recommendation, Prince Frederik decreed that the trade in slaves to his West Indian Islands

must cease in ten years, on the first day of 1803. In the meantime, however, he ordered his government to take measures to increase the slave population to permanently stable levels.²⁸ The state undertook to provide loans at favorable rates of interest toward new purchases of slaves, and in particular of women, to correct a demographic preponderance of males. To ascertain how many new slaves were really needed to maximize production on the island and, no doubt, to keep this loan program within manageable bounds, the central colonial administration in Copenhagen ordered a special agricultural census taken. The result of this 1792 census is preserved, in the manuscript original submitted by the local Danish West Indian government, among the Slave-trade Commission's papers.²⁹

One of the Danish West Indian officials placed in charge of this census was Peter Oxholm, a former military engineer who had been sent out to map the islands' defenses in the charged Atlantic atmosphere of the American Revolutionary War. He had settled on St. Croix and married into the life of a planter and local administrator. He is best known for the excellent topographic map of St. Croix he completed in 1794, two years after the census was taken: Oxholm's representation of the landholdings on the island is thus almost exactly contemporaneous with the census, and, together, they constitute a priceless historical geographical record for the period (Figure 3). Oxholm justly regarded the map as exceptionally fine: the Danish national topographic program declined to incorporate it in its series on the grounds that the cost of engraving so large and detailed a map would be too great, and he published it at his own expense in Copenhagen in 1799.³⁰ And as Oxholm himself wrote in a treatise on the Danish West Indies and their economic significance – and on the indispensability of slavery there – the statistics he gathered for the Slave-trade Commission provided “a more exact knowledge of the internal condition of the colonies (especially the most important, which is St. Croix) than is yet available, as far as can be determined, for any province in Denmark.”³¹

Oxholm's map corrected some of Cronenberg's and Beck's coastlines, and the representation of the terrain, in vigorous, woolly hachures, and of the hydrography of the main anchorages, is handled with authority. On the other hand, Oxholm made no attempt to depict the pattern of cultivated fields, although he represents areas still in bush, if rather imprecisely. Furthermore, Oxholm's line-work makes it more difficult to determine the boundaries of the estates than is the case with Cronenberg's map, but these can in most cases be ascertained with confidence from the dimensions and acreages recorded in the census taken in 1792 and in the annual tax lists.

In 1802, the planters and the local administration of St. Croix, faced at last with the closing of the slave trade, began to bring considerable pressure to bear on the Danish government to rescind or postpone the ban.

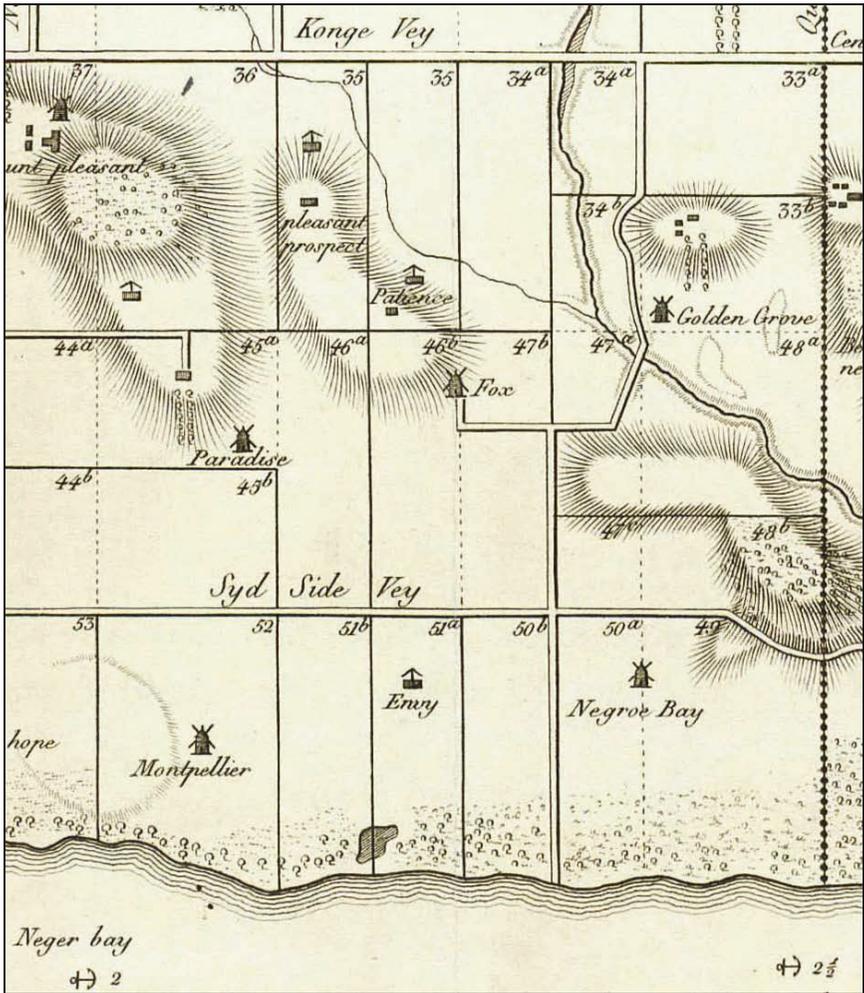


Figure 3. Detail of P. L. Oxholm, *Charte over den danske Øe St. Crox i America Forfærdiget i Aaret 1794, og Udgivet i Aaret 1799* (Copenhagen: engraved by G. N. Angelo, 1799), showing the same area of Prince's Quarter as in Figure 1. The areas in the various crops cannot now be seen, except for the distinction between cultivated areas and bush, which had been much reduced by 1794. Reproduced by permission of the Royal Library, Copenhagen, Department of Maps, Prints, and Photographs.

Prince Frederik, finding himself in a tight political spot, ordered still more demographic information gathered, although he allowed the ban on the slave trade to stand in the meantime. A fresh census was completed in 1805 and sent to Copenhagen, but the Danish government never again took up the question of the slave trade.³²

The slave-plantation system through a half-century of economic growth

Together, these censuses of 1792 and 1805 paint a uniquely informative picture of the workings of an Antillean slave-plantation society at the height of its prosperity. Here again, this time using Oxholm's map as a base, we are constructing a GIS dataset incorporating the highly detailed and localized information recorded in these censuses. Between them, the two censuses enumerate, for each of about two hundred plantations on the island, the numbers of male and female slaves, in five or ten year age intervals; the slaves' formal or informal conjugal circumstances; their religious observation (for it was believed that Christian slaves were the best laborers, and the most likely to marry and raise healthy offspring); recent births and deaths; the numbers of slaves born in the islands and those actually imported from Africa; acreages in sugar cane and cotton, as well as in pasture, provisions, and slave gardens; plantation holdings of cattle, sheep, horses, mules, donkeys, and sheep and goats; and the situation of slave quarters on high or low ground (which was taken to be a factor in mortality).³³ The censuses record for each plantation the number of capable field slaves, and the supporting population of craftsmen, sugar boilers, rum distillers, watchmen, and cattle herders, as well as of infirm slaves. They also list average production totals for sugar, cotton, and rum in the seven years up to 1792.³⁴

The GIS mapping and analysis of the figures for 1749 and 1750 and of those for 1792 and 1805, each based on its own remarkable map, can stand alone, but the ratios of slaves to crops extrapolated from the acreages shown on Cronenberg's map and the populations recorded in the tax lists in 1749 can also be compared to the far richer figures for 1792 and 1805, and the pace of development of many aspects of the island's economy and social structures over a booming half-century can thus be reconstructed in unusual detail.

The late eighteenth century was a period of both explosive growth and revolutionary upheaval in the plantation societies of the Caribbean. From the 1740s on, Jamaica and Saint Domingue became the leading producers, while the slave populations in some of the older islands of the Lesser Antilles, such as Barbados, actually contracted.³⁵ The Treaty of Paris

in 1763 gave the British new islands for the expansion of the plantation complex, and capital poured into the region to support the clearing of land, the construction of sugar mills, and the acquisition of slaves. Of all slaves who disembarked in the Caribbean, 67 percent arrived after 1750 when St. Croix began its most sustained growth.³⁶ Productivity per slave on sugar plantations also increased significantly in this period; the planters applied new technology and labor management methods.³⁷ The American Revolution, which disrupted ties between the sugar islands and the British mainland colonies, checked the growth of the plantation complex, and a series of unprecedented hurricanes in the 1780s and early 1790s wreaked havoc in the islands. The overall expansion continued unabated, however, and, by the end of the eighteenth century, the forced migration of slaves into the Caribbean was more intense than ever. In the 1790s, the Haitian Revolution destroyed the largest sugar producer in the Caribbean. This created an economic vacuum that other sugar islands were able to fill as sugar prices rose, even as momentum toward abolition increased.³⁸

This growth is clearly mirrored in the economy and demography of St. Croix as a whole. It is our ambition, however, to be able to examine these developments at a finer scale, and to relate these regional generalizations to changes in every corner and valley of the island over the course of these two or three generations. Unfortunately, the correlation of the grid-like cadastral pattern depicted in the maps with the tabular population and economic data is not entirely as simple as it at first appears. To take the example of Prince's Quarter, the comparison across the decades is complicated by the fact that although almost all of the land in the quarter was originally divided neatly into 56 lots of almost entirely uniform dimensions, only a limited number of plantation properties, even at the very beginning, fell exactly within the bounds of any one of the original 150-acre lots: many of these were consolidated into larger properties, and others were subdivided. The market for land was apparently quite brisk, and the pattern of landholding was in constant flux.

From that beginning, no more than eight of the thirty estates in Prince's Quarter remained unchanged in size and shape between 1749 and the 1790s, so direct longitudinal comparison of the state of cultivation on individual estates is only possible in these cases. However, although the shapes and sizes of most individual plantations changed over the years, developments within blocks of land taken together as statistical aggregates can be studied, although not with quite the same precision as is possible for the eight unchanged land-holdings.³⁹ Such comparisons are further complicated by the fact that the categories of information collected in the censuses of 1792 and 1805 were not exactly the same. Since the two special censuses were taken only thirteen years apart, some of the numerical trends that can be distilled from those statistics may not represent much

more than normal churn in the markets or individual planters' differing personal circumstances and acumen. Besides that, the inevitable error and fraud in the returns and in the annual tax lists will remain a central concern.⁴⁰

Some trends, however, are quite clear. For example, a dramatic rise in the acreage in sugar cane and in the numbers of slaves working it can be observed between 1749, when Cronenberg compiled his map, and 1792. On the other hand, cotton, which predominated in the dry East End of the island in the late 1740s, was vanishing from the landscape by the turn of the century.⁴¹ Otaheite or Bourbon cane, which was more drought-tolerant — but more labor intensive — than the varieties customarily planted, appears to have been introduced just between the years in which the two special censuses were taken, and the cultivation of sugar cane spread into areas previously dominated by cotton, at a time when expanding cotton production elsewhere in the United States was doubtless affecting markets for cotton grown on St. Croix.⁴² In general, from the mid-eighteenth century until Denmark's abolition of the slave trade in 1803, the rate of growth of the slave population of St. Croix was comparable to increases for Jamaica and Saint Domingue in the last half of the eighteenth century: these populations all essentially tripled in size.⁴³

Cronenberg's map and the cadastral list for 1749 show that the hills of the two North Side quarters and large areas of the adjacent northern sections of Prince's and West End Quarters had not yet been alienated by the state or brought under cultivation in 1749. By 1792, 32 new plantations in the North Side quarters were cultivating an average of well over a hundred acres of sugar cane each. The numbers of slaves rose from none at all to over 2,500, and the planters themselves estimated, in response to one of the census queries, that a thousand more slaves could profitably be employed there; by 1805, the slave population in those hilly quarters had in fact risen by about another five hundred.

In Prince's quarter, comparison of Cronenberg's depiction of land use in 1749 and the census of 1805 shows that the acreage devoted to sugar cane rose from almost 1,400 acres to over 6,000 acres, while the slave population increased more than sixfold, from a little over six hundred to almost four thousand. Fields used for the cultivation of sugar cane in East End A expanded from a little over a hundred acres in 1749 to over 2,400 acres in 1805, while the slave population tripled, from about 550 to almost 1,700. On the island as a whole, the slave population grew from about 4,500 to just over 22,000 in that half century. The acreage in provisions fell from 4,000 acres to somewhat over half that.

Further questions

These are simple and preliminary calculations, but many other questions – of more than local application – can be asked of Cronenberg's map, the tax lists and census data, and the new GIS maps that can be generated from them.⁴⁴ For example, the census data should allow a quantitative calculation of the cosmopolitan St. Croix planters' views of the relative merits of creole and African-born slaves, which could then be compared to ideas in other slave societies in the Americas.⁴⁵ The proportion of creoles and of skilled workers in plantations' slave forces may vary by crop (sugar requiring greater technical ability than cotton) but also perhaps by the overall size of the property or proximity to towns or busy anchorages where the slaves' services for hire might be in greater daily demand than in remoter locations. The planters' attitudes about the demographic composition of their slave workforces probably did not in fact reflect the concerns that had led the government in Copenhagen to encourage the purchase of female slaves in the ten-year grace period beginning in 1792.

Did the distance from work buildings to the outermost plantings of sugar cane, as measured from Cronenberg's map, fall within predictable ranges? Did environmental factors clearly dominate planters' cropping decisions, or were two different crops sometimes cultivated immediately on either side of a property line? Since planters were, by and large, obliged to buy land from the state only in 150-acre rectangles, even if they were primarily interested in a relatively narrow strip up a valley, for example, was there an unusual proportion of waste land (depicted as woods on both Cronenberg's and Oxholm's maps) within the properties, compared to the situation on other islands? Can the numbers of windmills, which are represented on Cronenberg's and Oxholm's maps, as well as on annotated copies of Beck's map dating to the 1760s, be correlated more or less directly with acreages of sugar cane and the numbers of slaves?⁴⁶ Can it be confirmed that the sizes and shapes of sugar plantations, because of the larger investment in buildings required, and because it was so important to situate the works centrally, tended to remain stable longer than the boundaries of cotton plantations?⁴⁷ Can the size of cattle herds be correlated with crop types and with the size of the work force? Were increases in the density of cropping and of the labor force between 1749 and 1792 concentrated along water courses, along main roads, near the coast, or mainly in previously uncleared land? There is scarcely any end to the possibilities, and the data can be expected to generate new questions as fast as others are addressed; each new map, upon examination of the patterns it reveals, is likely to lead to the design of new ways to visualize the data.

The end of an era

The special censuses taken in 1792 and 1805 allow an extraordinarily close focus on plantation slavery on St. Croix. At another scale altogether, they should also be read as part of the record of the changing geography not only of the slave trade but of the plantation Atlantic in general in this era of abolitionism. Despite the Danish government's official stance that the slave population and the plantation system would be able to maintain itself in the islands even after the end of the slave trade, the decline of the Danish West Indian economy could be foreseen in Copenhagen years before the edict banning the slave trade in 1792. Even as it legislated against the trade, the Danish government was actively studying the feasibility of transferring plantation production from the Antilles back across the Atlantic to West Africa, where Denmark had a string of slave forts.⁴⁸

A centuries-old geographic pattern of Atlantic commerce was beginning to be stood on its head. Denmark's new interest in African plantation colonies at this period was not an isolated case: much of the thrust of the international abolitionist movement revolved around the development of profitable export agriculture in West Africa. Abolitionists argued that precisely the same commodities that had made the West Indies so rich could be grown in similar tropical climates and soils in West Africa, thus eliminating the need for the Atlantic slave trade altogether.⁴⁹

At a still broader scale, the Danish government's interest in plantation colonies in fertile new territories in the East Indies can also be attributed in large part to the closing of the Atlantic slave trade. As late as the 1840s, King Christian VIII of Denmark was seriously entertaining schemes to found a plantation colony and commercial entrepôt in the Nicobar Islands, on the main sea route from Calcutta to the Strait of Malacca.⁵⁰ He was not alone in indulging himself in such dreams, for colonial agricultural production in the East was developing apace.

The geography of the whole colonial world was changing. The political realities of the day forced late eighteenth-century abolitionism to concentrate its efforts on ending the horrors of the Atlantic middle passage, but behind this goal lay the abolition of slavery altogether. The predictable collapse of the slave-based economies of the Americas helped direct the schemes of European colonial administrators and speculators to other parts of the globe, to the tropical zones of Africa and the East.⁵¹ The extraordinarily informative slave censuses taken in the Danish West Indies at the turn of the nineteenth century in fact record the situation there at the closing of an era.

Notes

1. See, for example, the discussion of the importance to Great Britain of the West Indian slave plantations in Richard Drayton's *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World* (New Haven: Yale University Press, 2000), 61-63. In a note [no. 86, p. 288], Drayton, citing Eric Williams's *Capitalism and Slavery*, published in the 1940s, writes: "After two generations of denial, British historians are gradually coming to terms with Williams's vision of the eighteenth-century economy," but see Seymour Drescher's two essays on Williams in *From Slavery to Freedom* (New York: New York University Press, 1999), 355-398. See also Drescher, *Abolition: A History of Slavery and Antislavery* (Cambridge: Cambridge University Press, 2009).
2. See Joseph C. Miller, *Slavery and Slaving in World History: A Bibliography* (Armonk, N. Y.: M. E. Sharpe, 1999 [Vol. 1, of two, originally published in 1993]), which is now being kept up to date online at <http://www.vcdh.virginia.edu/bibliographyofslavery/>; and the journal *Slavery and Abolition*, esp. the annual bibliographies (for example, 31:4 [Dec. 2010]).
3. The index entries for *slavery* and *slaves* in Michael P. Conzen, Thomas Rumney, and Graeme Wynn, eds., *A Scholar's Guide to Geographical Writing on the American and Canadian Past* (Chicago: University of Chicago Press, 1993), are indicative that the field of slavery studies has not traditionally been well represented within American historical geography. A number of strongly geographical works, by both historians and geographers, deserve mention in this connection, however: David Watts, *The West Indies, Patterns of Development, Culture and Environmental Change since 1492* (Cambridge: Cambridge University Press, 1987); J. H. Galloway, *The Sugar Cane Industry: An Historical Geography from Its Origins to 1914* (Cambridge: Cambridge University Press, 1989); B. W. Higman, "The Sugar Revolution," *Economic History Review* 53:2 (2000): 213-236, and other works cited below; various works on the Danish West Indies by Daniel Hopkins, including several cited below; Ira Berlin and Philip D. Morgan, eds., *Cultivation and Culture: Labor and the Shaping of Slave Life in the Americas* (Charlottesville: University Press of Virginia, 1993); Oostindie, Gert and Alex van Stipriaan, "Slavery and Slave Cultures in a Hydraulic Society," in Stephan Palmie, ed., *Slave Cultures and the Cultures of Slavery* (Knoxville: University of Tennessee Press, 1995), 78-99; B. J. Barickman, *A Bahian Counterpoint: Sugar, Tobacco, Cassava, and Slavery in the Recôncavo, 1780-1860* (Stanford: Stanford University Press, 1998); Philip D. Morgan, *Slave Counterpoint: Black Culture in the Eighteenth-century Chesapeake and Lowcountry* (Chapel Hill: University of North Carolina Press, 1998); Stuart B. Schwartz, ed., *Tropical Babylons* (Chapel Hill: University of North Carolina Press, 1998); Jason W. Moore, "Sugar and the Expansion of the Early Modern World Economy: Commodity Frontiers, Ecological Transformation, and Industrialization," *Review: A Journal of the Fernand Braudel Center* 23:3 (2000): 409-433; Justin Roberts, "Working Between the Lines: Labor and Agriculture on Two Barbadian Sugar Plantations, 1796-1797," *William and Mary Quarterly* 63:3 (July, 2006): 551-586; S. Max Edelson, *Plantation Enterprise in Colonial South Carolina* (Cambridge, Mass.: Harvard University Press, 2006); Verene A. Shepherd, *Livestock, Sugar and Slavery: Contested Terrain*

- in Colonial Jamaica* (Kingston, Jamaica: Ian Randle Publishers, 2009); and David Eltis and David Richardson, *Atlas of the Transatlantic Slave Trade* (New Haven: Yale University Press, 2010).
4. The standard scholarly history remains Johannes Brøndsted, ed., *Vore Gamle Tropekolonier*, 2nd edition (Copenhagen: Fremad, 1966–68 [Westermann, 1952–1953]), the first four of whose eight volumes deal with the Danish West Indies.
 5. Waldemar Westergaard, *The Danish West Indies under Company Rule 1671-1754* (New York: MacMillan Company, 1917), 199–207.
 6. See Daniel Price Hopkins, “The Danish Cadastral Survey of St. Croix, 1733–1754,” (unpublished dissertation, Louisiana State University, 1987). On the acre of St. Croix, see Daniel Hopkins, “The Eighteenth-century Invention of a Measure in the Caribbean: the Danish Acre of St. Croix,” *Journal of Historical Geography* 18:2 (1992): 158–173.
 7. Hopkins, “Danish Cadastral Survey of St. Croix,” 47–50, 51–52; Westergaard, 215, 217.
 8. See Hopkins, “Danish Cadastral Survey of St. Croix” and “An Eighteenth-century Cadastral Audit in the Danish West Indies,” *Cartography and Geographic Information Systems* 19:2 (1992): 69–79.
 9. Johann Cronenberg and Johann Christoph von Jægersberg, “Charte over Eilandet St. Croix,” 1750, Copenhagen, National Cadastre and Survey – Denmark, Hydrographic Division, manuscript map no. A/18-49. See Daniel Hopkins, “An Extraordinary Eighteenth-century Map of the Danish Sugar-plantation Island St. Croix,” *Imago Mundi* 41 (1989): 44–58, esp. 50–51, and Daniel P. Hopkins, “Peter Lotharius Oxholm and Late Eighteenth-century Danish West Indian Cartography,” in Svend E. Holsoe and John H. McCollum, eds., *The Danish Presence and Legacy in the Virgin Islands* (Frederiksted, St. Croix: St. Croix Landmarks Society, 1993), 29–56. esp. 47–48, 51.
 10. Hopkins, “An Extraordinary Eighteenth-century Map,” esp. 45, 51–52.
 11. Probate and mortgage inventories and other legal records preserved over the years, in substantial numbers, provide other avenues, rather difficult of access, into the reconstruction of the agricultural life of the island: see the groundbreaking work of George F. Tyson, Jr., “On the Periphery of the Peripheries: the Cotton Plantations of St. Croix, Danish West Indies, 1735–1815,” in George Tyson, ed., *Bondmen and Freedmen in the Danish West Indies, Scholarly Perspectives* (St. Thomas: Virgin Islands Humanities Council, 1996 [1991]), 1–36; Neville A. T. Hall, *Slave Society in the Danish West Indies: St. Thomas, St. John, and St. Croix* (edited by B. W. Higman) (Baltimore: Johns Hopkins Press, 1992); and Virgin Islands Social History Associates, “Virgin Island Roots,” [http:// stx.visharoots.org/](http://stx.visharoots.org/) (accessed November, 2010).
 12. See, for example, Kenneth G. Kelly. “Archaeology of the Creole Cultures of the French West Indies” in Basil Reid, Henri Petitjean Roget, and Antonio Curet, eds., *Proceedings of the Twenty-First Congress of the International Association for Caribbean Archaeology* (St. Augustine, Trinidad, 2007), Vol. 2, 588–595, on 589, regarding a large scale topographic map of Guadeloupe.
 13. Daniel Hopkins, “Jens Michelsen Beck’s Map of a Danish West Indian Sugar-plantation Island: Eighteenth-century Colonial Cartography, Administration, Land Speculation, and Fraud,” *Terrae Incognitae* 25 (1993): 99–114.
 14. See Erik Gøbel, *A Guide to Sources for the History of the Danish West Indies* (U. S.

- Virgin Islands*) 1671-1917 (Odense: Danish National Archives, University Press of Southern Denmark, 2002), 245, entries 862-865.
15. Other scholars have applied GIS techniques to the study of the historical geography of St. Croix: Bo Ejstrud, "Maroons and Landscapes," *Journal of Caribbean Archaeology* 8 (2008): 1-14; and Niels C. Nielsen and Bo Ejstrud, "The Salt River Bay Area, St. Croix: Combining Archival Data and Historical Maps in a GIS," research report, online at <http://130.226.56.246/dk/Menu/Forskning/St.+Croix+i+fortid+og+nutid/Materiale/tekster/Salt+River+Bay+Database+and+GIS> (accessed December, 2010). For work with GIS on the island of St. John, see Douglas V. Armstrong, Mark W. Hauser, David W. Knight, and Stephen Lenik, "Maps, *Matricals*, and Material Remains: an Archaeological GIS of Late-eighteenth Century Historic Sites on St. John, Danish West Indies" in Basil A. Reid, ed., *Archaeology and Geoinformatics: Case Studies from the Caribbean* (Tuscaloosa: University of Alabama Press, 2008), 99-126.
 16. J. O. Bro-Jørgensen, *Dansk Vestindien indtil 1755*, Vol. 1 of *Vore Gamle Tropekolonier*, 255-256.
 17. See Ward Barrett, "Caribbean Sugar-Production Standards in the Seventeenth and Eighteenth Centuries" in John Parker, ed., *Merchants and Scholars: Essays in the History of Exploration and Trade* (Minneapolis: University of Minnesota Press, 1965), 145-170; and Roberts, "Working Between the Lines: Labor and Agriculture on Two Barbadian Sugar Plantations, 1796-1797."
 18. Tyson, "On the Periphery of the Peripheries: the Cotton Plantations of St. Croix, Danish West Indies, 1735-1815," 18.
 19. See Earl B. Shaw, "St. Croix: A Marginal Sugar-producing Island," *Geographical Review* 23:3 (1933): 414-422; Robert B. Stone, "Meteorology of the Virgin Islands" in *Scientific Survey of Porto Rico and the Virgin Islands* (New York: New York Academy of Sciences, 1942), 19:1, 1-138; Martyn J. Bowden et al., "Water Balance of a Dry Island: the Hydroclimatology of St. Croix, Virgin Islands, and Potential for Agriculture and Urban Growth" (Geography Publications at Dartmouth:6), mimeograph, 1968; and Watts, *The West Indies, Patterns of Development, Culture and Environmental Change since 1492*, 17-19.
 20. See Luis H. Rivera, et. al., *Soil Survey of the Virgin Islands of the United States* (Washington: United States Department of Agriculture, Soil Conservation Service, 1970).
 21. See Frederik C. Gjessing, *The Tower Windmill for Grinding Sugar Cane* (U. S. Virgin Islands: Government of the Virgin Islands, Bureau of Libraries, Museums, & Archaeological Services, 1977).
 22. See, for example, Watts, *The West Indies, Patterns of Development, Culture and Environmental Change since 1492*, 186, 277, and 393-395.
 23. Hopkins, "The Danish Cadastral Survey of St. Croix," 35, 221.
 24. These records are drawn upon in Per Nielsen, "Den Vestindiske Forbindelse: Øregaards Bygherre Johannes Søbøtker og hans Slægt," in *Øregaard: Tiden, Kunsten & den Vestindiske Forbindelse* (Copenhagen, 2010), 56-111, on the West Indian plantation roots of a prominent Danish family's wealth. See Hopkins, "Jens Michelsen Beck's Map," 111-113, and, for example, a copy of J. M. Beck, *Tilforladelig Kort over Eylandet St. Croix udi America* (Copenhagen: O. H. De Lode, 1754), annotated in 1767, Library of Congress, Geography and Map Division, G5012.S2G46 1767 .B4 Vault: 980.

25. See Erik Gøbel, *Det Danske Slavehandelsforbud 1792: Studier og Kilder til Forhistorien, Forordningen og Følgerne* (Odense: Syddansk Universitetsforlag, 2008).
26. See Daniel P. Hopkins, "The Danish Ban on the Atlantic Slave Trade and Denmark's African Colonial Ambitions, 1787-1807," *Itinerario* 25, nos. 3-4 (2001): 154-84, esp. 154 and 164-167.
27. See Joseph Evans Loftin Jr., "The Abolition of the Danish Atlantic Slave Trade" (unpublished dissertation, Louisiana State University, 1977).
28. Gøbel, *Det Danske Slavehandelsforbud 1792*.
29. Rigsarkivet (The Danish National Archives), Generaltoldkammeret, Dok. vedrørende Kommissionen for Negerhandelens bedre Indretning & Ophævelse m. m. 1783-1806, I, an agricultural census, St. Croix, December 31, 1792.
30. P. L. Oxholm, *Charte over den Danske Øe St. Croix i America Forfærdiget i Aaret 1794, og Udgivet i Aaret 1799* (Copenhagen: engraved by G. N Angelo and published by Oxholm, 1799); see Hopkins, "Peter Lotharius Oxholm," 50-51.
31. Peter Lotharius Oxholm, *De Danske Vestindiske Øers Tilstand i Henseende til Population, Cultur og Finance-Forfatning* (Copenhagen: printed by Johan Frederik Schultz, 1797), 36; Hopkins, "Peter Lotharius Oxholm," 52-53 (where the translation of the passage differs slightly).
32. Dok. vedrørende Kommissionen for Negerhandelens bedre Indretning & Ophævelse m. m. 1783-1806, I, a new agricultural census, marked *ad* No. 2495 V. J. p. 1805; Hopkins, "The Danish Ban on the Atlantic Slave Trade," 171 and 174-175.
33. See William Chapman, "Slave Villages in the Danish West Indies: Changes of the Late Eighteenth and Early Nineteenth Centuries" in George Tyson, ed., *Bondmen and Freedmen in the Danish West Indies* (St. Thomas: Virgin Islands Humanities Council, 1996 [1991]), 125-141, esp. 133-134.
34. In a couple of prominently placed articles by Danish historians, the analysis of the data is rather strictly limited to a consideration of the same demographic questions—rates of mortality and fertility, the structure of the slave population, and its ability to maintain itself naturally after the cessation of the slave trade across the Atlantic—that had concerned the Slave-trade Commission in 1791: Hans Chr. Johansen, "Slave Demography of the Danish West Indian Islands," *Scandinavian Economic History Review* 29: 1 (1981): 1-20; Hans Christian Johansen, "The Reality behind the Demographic Arguments to Abolish the Danish Slave Trade" in David Eltis and James Walvin, eds., *The Abolition of the Atlantic Slave Trade: Origins and Effects in Europe, Africa, and the Americas* (Madison: University of Wisconsin Press, 1981), 221-230; and Svend E. Green-Pedersen, "Slave demography in the Danish West Indies and the Abolition of the Danish Slave Trade," in *The Abolition of the Atlantic Slave Trade*, 231-257.
35. David Eltis, *The Rise of African Slavery in the Americas* (New York: Cambridge University Press, 2000), 193-223; John McCusker, "British West Indies Economy, 1763-1790," in McCusker, *Essays in the Economic History of the Atlantic World* (London: Routledge, 1997), 312.
36. Voyages: The Trans-Atlantic Slave Trade Database, <http://www.slavevoyages.org> (accessed August 12, 2010).
37. McCusker, *Essays in the Economic History of the Atlantic World*, 324.
38. Matthew Mulcahy, *Hurricanes and Society in the Greater British Caribbean, 1624-*

- 1783 (Baltimore: Johns Hopkins University Press, 2006); St. Croix was visited by a hurricane in 1791; Tyson, "On the Periphery of the Peripheries: the Cotton Plantations of St. Croix, Danish West Indies, 1735-1815," 35; David Beck Ryden, *West Indian Slavery and British Abolition, 1783-1807* (Cambridge: Cambridge University Press, 2009).
39. See Ian N. Gregory and Paul S. Ell, *Historical GIS: Technologies, Methodologies and Scholarship* (Cambridge: Cambridge University Press, 2007), 165. The relatively neat blocks provided by the quarter boundaries are to a certain degree illusory: quite a number of plantations extend across quarter lines into the adjacent King's, West End, and the two North Side quarters, and the same is true everywhere on the island.
 40. Loftin, "The Abolition of the Danish Atlantic Slave Trade," 168; Johansen, "Slave Demography of the Danish West Indian Islands," 3.
 41. See Tyson, "On the Periphery of the Peripheries: the Cotton Plantations of St. Croix, Danish West Indies, 1735-1815," 14.
 42. According to Oxholm, *Charte over den Danske Øe St. Croix i America Forfærdiget i Aaret 1794, og Udgivet i Aaret 1799*, 50, the new strain was introduced on St. Croix from the Windward Islands; see G. C. Stevenson, "Sugar Cane Varieties in Barbados: An Historical Review," *Journal of the Barbados Museum and Historical Society* 26:2 (1959): 67-93; Galloway, *The Sugar Cane Industry: An Historical Geography from Its Origins to 1914*, 96; and Otis P. Starkey, *The Economic Geography of Barbados: A Study of the Relationships between Environmental Variations and Economic Development* (New York: Columbia University Press, 1939), 108-9. On the merits of the different species of cane and the kinds of lands they were grown on in Jamaica, see Gilbert Farquhar Mathison, *Notices Respecting Jamaica, in 1809-1810-1811* (London: printed for J. Stockdale, 1811), 57-67. On competition from the American South, see Tyson, "On the Periphery of the Peripheries: the Cotton Plantations of St. Croix, Danish West Indies, 1735-1815," 1.
 43. Laurent Dubois, *Avengers of the New World: The Story of the Haitian Revolution* (Cambridge, Mass: Belknap Press of Harvard University Press, 2004), 19, 30; Trevor G. Burnard, *Mastery, Tyranny and Desire: Thomas Thistlewood and his Slaves in the Anglo-Jamaican World* (Chapel Hill: University of North Carolina Press, 2004), 16; McCusker, *Essays in the Economic History of the Atlantic World*, 312; Michael Craton, *Searching for the Invisible Man: Slaves and Plantation Life in Jamaica* (Cambridge, Mass.: Harvard University Press, 1978), esp. "Prologue," 1-48; B. W. Higman, *Slave Population and Economy in Jamaica, 1807-1834* (Kingston: The Press, University of the West Indies, 1995), 61; Hall, *Slave Society in the Danish West Indies: St. Thomas, St. John, and St. Croix*, especially table 1.1, 5.
 44. B. W. Higman articulated quite a number of such questions in "The Spatial Economy of Jamaican Sugar Plantations: Cartographic Evidence from the Eighteenth and Nineteenth Centuries," *Journal of Historical Geography* 13:1 (1987): 17-39, and *Jamaica Surveyed: Plantation Maps and Plans of the Eighteenth and Nineteenth Centuries* (Kingston: Institute of Jamaica Publications Limited, 1988).
 45. See Ira Berlin and Philip D. Morgan, "Labor and the Shaping of Slave Life in the Americas," in *Cultivation and Culture: Labor and the Shaping of Slave Life in the Americas*, 1-45, on 11-13. As Berlin and Morgan state (11), "Masters constructed their labor forces with care."

46. For example, Beck, *Tilforladelig Kort over Eylandet St. Croix udi America*, annotated 1767, at the Library of Congress.
47. See Higman, "The Spatial Economy of Jamaican Sugar Plantations: Cartographic Evidence from the Eighteenth and Ninetenth Centuries," 19, 22-28.
48. Daniel P. Hopkins, "Peter Thonning, the Guinea Commission, and Denmark's Postabolition African Colonial Policy, 1803-50," *William and Mary Quarterly*, 3rd Series, 66:4 (2009): 781-808, esp. 787, and Hopkins, "The Danish Ban on the Atlantic Slave Trade," 157-158.
49. Hopkins, "Peter Thonning, the Guinea Commission, and Denmark's Postabolition African Colonial Policy," 783-784.
50. Axel Garboe, *Geologiens Historie i Danmark* (Copenhagen: C. A. Reitzels Forlag, 1959-61), Vol. 2, 161-169, particularly 161; Aage Rasch, *Dansk Ostindien 1777-1845*, Vol. 7 of *Vore Gamle Tropekolonier*, 2nd. ed, 245, 254-257. See the maps of the Nicobar Islands among Christian VIII's papers, Kongehusets Arkiv, Christian VIII, No. 247, 1803-1834, Sager vedr. kolonierne, at the Danish National Archives.
51. Hopkins, "Peter Thonning, the Guinea Commission, and Denmark's Postabolition African Colonial Policy," 800, 803-804.