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Small Islands and Huge Comparisons

Caribbean Plantations, Historical Unevenness, and Capitalist Modernity

Introduction

Charles Tilly (1984) has advocated the study of "big structures, large processes and huge comparisons" as the surest path to knowledge in the present conjuncture. This essay follows his lead with a comparative study of the transformation of the sugar industry in Martinique and Cuba during the nineteenth century. Slavery in the Americas is commonly viewed as an archaic form of social and economic organization that is incompatible with

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modern forms of economy and polity emerging in the nineteenth century. Such a perspective presumes the singularity of slavery and represents its abolition throughout the hemisphere as a linear transition to capitalist modernity. However, the examination of the slave sugar plantation in Martinique and Cuba undertaken here reveals contrasting yet interrelated paths of development that suggest more complex historical relations between slavery and capitalism. In Martinique the intensive exploitation of prevailing forms of socioeconomic organization resulted in the reproduction of an "old" spatiotemporal pattern of slavery that constrained social and technical innovation. At the same time, the slave economy of Cuba underwent a process of dramatic expansion: the rhythm of development accelerated as the elements of slave production were radically recomposed in new social and spatial configurations consistent with emerging global patterns of industrial production and market integration. These contrasting outcomes are not simply the result of properties internal to Martinique and Cuba. Rather, they derive from the interrelation and reciprocal influence of the two plantation systems within the expansion of the nineteenth-century world economy. Thus, what appear to be two spatially separate sugar islands with common attributes may be more adequately conceived as distinct yet mutually conditioning socioeconomic configurations whose divergent trajectories have decisive implications for the recomposition of land, labor, and technology in each instance.

These distinct yet interrelated paths of development raise questions about comparative method that are central to the concerns of this article. Conventional procedures for comparison abstract from time and space and emphasize formal similarities and dissimilarities between cases by treating cases as independent of one another and by regarding their properties as commensurate across cases. They thereby obscure two essential features of the instances being compared: first, their unavoidable relational character; and second, the role and importance of different temporalities in the formation of each of these socioeconomic configurations. In contrast, the comparative strategy presented here grounds comparison in substantive processes of world economy in order to recover the different constitution and historical trajectory of each slave-based sugar complex. It thereby seeks to comprehend the sociohistorical construction of relations and spatiotemporal heterogeneity. Comparison thus goes beyond external similarities to reveal

both the historical diversity of slave relations and the spatial and temporal unevenness of the world-economic processes.

The Problem of Historical Comparison

Before beginning the substantive discussion, I must address in greater detail some problems of method raised by the comparison under consideration. The method of formal comparison treats each unit as independent and equivalent and/or uniform in terms of its set of attributes. Comparison attempts to specify variance (contrasts/particularizations) or invariance (generalizations) by observing relations among (or correlating) the attributes of the units. These relations constitute contrasting or generalizable patterns. In turn, these patterns tell us something specific about the units themselves or something general about the relations among their properties. The condition of comprehension within this logical framework is that both the units of comparison and the attributes of those units are defined as independent of and external to one another and that both are treated in terms of their formal equivalence and identity: comparison is intelligible in so far as phenomena differ through occurring in different surroundings (Sartre 1982: 141).

For example, formal comparison would treat the sugar plantations of Martinique and Cuba as comparable constellations of land, labor, and technology that define Martinique and Cuba as separate, comparable units. Any distinctions or similarities between these cases would derive from the correlations among these attributes and the relative presence or absence of other complicating factors or events within each constellation. This method ultimately focuses on configurative distinctions among abstracted conditions of the units, which are themselves abstracted from time and place. From this point it is but a short step to conceiving of units as discrete and independent social entities, each endowed with its own economy, polity, and society. By isolating units of comparison and their conditions, such as land, labor, or technology, as independent and equivalent phenomena, formal comparison eliminates from consideration both the historical processes forming these relations and the changing patterns among them.

The substantive comparison I am proposing suggests the limitations of such an approach. The divergent historical trajectories of plantation agri-

culture in Martinique and Cuba indicate the need to ground comparisons within the historical processes under investigation. In contrast to the assumptions of the formal logic of comparative inquiry, the "cases" here are not independent; neither are their attributes equivalent. Rather, in each instance slavery, land, and technology are constituted differently within relational complexes possessing distinctive spatiotemporal characteristics. Further, the sugar industries in Martinique and Cuba coexist and mutually influence one another. Cheap Cuban sugar was a major force in the development of a protected market for sugar in France and the intensive exploitation of Martinique. The enormous amounts of American and, above all, Cuban sugar entering the European market in the decades following the Napoleonic wars threatened to destroy the French colonial sugar industry (and with it French maritime commerce) and to compromise the recovery and prosperity of the Atlantic port cities. On the other hand, the French system of protection pressured Cuba to increase its productive efficiency and the size of its output while the use of French sugar technology made such a response possible for Cuba. Thus, in a sense, Martinique is Martinique because Cuba is Cuba, and vice versa. Indeed, they may be seen to represent divergent outcomes of the unified processes forming the world economy, and more particularly the world sugar market, during the nineteenth century: it is their historical interdependence and difference that most urgently require understanding.

In response to difficulties of this sort Tilly advocates the use of historically grounded comparisons. Such an approach seeks to attach statements "to specific eras and parts of the world, specifying causes, involving variation from one instance to another within their time-space limits, remaining consistent with the available evidence from the times and places claimed" (Tilly 1984: 60). In particular, he suggests that "encompassing comparisons" represent a fruitful, if risky, strategy for macrohistorical inquiry. Such comparisons "begin with a large structure or process. They *select locations* within the structure or process and explain similarities or differences among those locations as consequences of their *relationships to the whole*" (ibid.: 125 [emphasis added]). Consequently, he envisions macrohistorical analysis as "the study of big structures and large processes within particular world systems." Its task "is to fix accounts of specific structures and processes within particular world systems to historically grounded generalizations concerning those world systems" (ibid.: 74).

In Tilly's view, encompassing comparisons are promising but run the danger of falling into a functionalist explanation in which the whole determines the behavior of the parts. The danger is not simply the possibility of functionalism, however, but the very formulation of the terms of comparison. In Tilly's approach, world economies and macrosociological and microsociological structures and processes not only remain conceptually independent of one another; they are treated as if they refer to discrete empirical entities or levels. Encompassing comparison presumes a governing systemic unit and subordinate case units that are related to one another, not as interrelated and mutually formative if asymmetrical processes, but as externally opposed things. Eric Wolf (1982: 3) warns of the limitations of such a conception: "Only by understanding these names as bundles of relationships, and by placing them back into the field from which they were abstracted, can we hope to avoid misleading inferences and increase our share of understanding." By thus presuming the analytical units, encompassing comparison, as presently formulated by Tilly, removes from theoretical consideration the formation and interrelation of these very units. It thereby limits the scope and possibility of historical explanation and jeopardizes the development of the historically grounded social theory it was intended to promote (McMichael 1990: 388–89).

As Wolf's warning implies, it is insufficient simply to *place* phenomena within empirically given chronological and geographical coordinates. Instead, the sociohistorical construction of temporal and spatial processes and relations must itself become an object of inquiry. To this end, Philip McMichael proposes the use of "incorporated comparison" as an alternative strategy. Here, comparable social phenomena are viewed not as discrete *cases*, but as differentiated *outcomes* or *moments* of historically integrated process (ibid.: 392). This emphasis on the unity of historical process allows the relational character of units to be formulated. Neither whole nor parts are regarded as independent categories or units of analysis; rather, they are treated as units of observation of systemic processes (ibid.: 391). Instead of external contextualization, incorporated comparison seeks to relate apparently separate moments as interconnected components of a broader, world-historical process or conjuncture. Such interrelated instances are "both integral to, and define, the general historical process" (ibid.: 389).

Such an approach avoids treating the world economy as a completed

totality whose parts are related functionally to one another. In this latter conception, exemplified particularly by Wallerstein's earlier formulations of the world system, the whole is greater than its parts, functional descriptive categories dominate, and the system appears as an ever present "external cause." We are presented with a historical structure without a history. Neither does the strategy presented here treat the terms of comparison as reified national-level units counterposed to or embedded within an equally discrete world-level unit as suggested by Tilly's approach. Instead, it takes them to represent "bundles of relations" that are treated as provisionally isolated instances of a larger unitary process. They are thus regarded as formative of one another and, in unequal and asymmetrical ways, as formed by and formative of a larger whole.

Hence, the comparison of the sugar industry in Martinique and Cuba may be grounded in a specific historical complex of relations and processes—here the capitalist world economy at a specific point of its formation.[1] From such a perspective, land, labor, and technology appear not as autonomous and equivalent "factors" but as historically formed social relations that are constituted differently in each instance within the emerging patterns of production, exchange, and consumption of the larger world economy. Here, comparison, instead of abstracting from time and space, seeks to theoretically specify and reconstruct these relations and processes *within* the historical development of the world economy. It thereby attempts to recover the temporal and spatial dimensions of these relations and processes as themselves products of historical development. Such comparison yields insight into the diversity and interdependence, and therefore spatial and temporal unevenness, of unified historical processes. In this way, it gives historical content to theoretical categories while allowing general concepts to be refined so they more adequately comprehend particular historical instances. This approach thus contrasts to modernization theory (e.g., Rostow), which posits historical development as the repetition of multiple linear times ("take off" from traditional to modern), and world-system theory (e.g., Wallerstein), which appears to account for these same processes by spatial movement within a single curvilinear time.

The *Usine Centrale*

The discussion of the sugar industry in Martinique and Cuba can begin with a well-known characteristic of sugarcane: it must be harvested when it is ripe and converted into sugar as soon as it is harvested. This characteristic of sugar imparts an industrial character to plantation organization. When the cane is ripe, cutting, transporting, grinding, clarifying, evaporating, and crystallizing must be integrated within a continuous process in order to obtain sugar. Speed, continuity, and coordination are of vital importance. Consequently, the agricultural operations required for cultivating and harvesting cane and the industrial operations required for processing it into sugar must be located in close proximity to one another. Further, the efficient operation of a sugar plantation requires that an equilibrium be maintained between the amount of land cultivated; the capacity of mill, refinery, and the internal transport system; and the size of the labor force. Innovations that improve output in one sector of production must be matched by proportional increases in the output of the other sectors in order to be effective. An examination of the technical and social conditions under which these various operations are combined reveals a great deal about the history of the sugar plantation in the Americas.

The central refinery revolutionized the production of cane sugar during the nineteenth century. From a technical point of view, it incorporated modern industrial technologies, most notably the steam mill, the vacuum pan, the centrifuge, and the railroad. The all-metal steam-powered horizontal grinding mill made it possible both to process a greater quantity of cane and to extract a higher proportion of juice from the cane stalks than the earlier animal-, wind-, or water-powered mills. The vacuum pan and the centrifuge dramatically improved the quantity and quality of sugar that could be obtained from a given quantity of juice and transformed sugar manufacture from an artisanal process depending upon the particular knowledge and skill of the refiner to a scientific process resting upon standardization, measurement, and systematic application of chemistry and physics. The railroad allowed greater quantities of goods to be moved more rapidly over longer distances. It enabled individual plantations to increase the area under cultivation, provided cheap overland transportation, and permitted the exploitation of new regions. These innovations increased the scale of production

and transformed the character of plantation agriculture. The centralization of manufacturing, more extensive cultivation, and higher capital investment entailed in their adoption could have diverse implications for social organization, ranging from larger plantations on the one hand to the development of central factories processing the product of cane farmers within a variety of possible property and class relations on the other. The technical and social characteristics of the sugar central have led many investigators to identify it with modern capitalism and free labor. However, its origins lie within the history of Caribbean slavery. I compare the origins and early development of the central refinery, or *usine centrale*, in Martinique with the development of the plantation system in Cuba and discuss the implications of these two paths of development for some problems of historical interpretation.

The Transformation of the World Sugar Market, 1760–1860

The origins of the transformation of sugar production and the emergence of the sugar central in both Martinique and Cuba are found in the transformation of the world sugar market between 1760 and 1860. World production and consumption increased steadily beginning in 1760, while the period of wars and revolution between 1789 and 1815 dramatically altered the political organization of markets. The "old colonial system" broke up. Saint Domingue —the world's richest colony and the source of nearly half the world's sugar— was destroyed. Britain emerged as the single dominant economic and political power in the European world economy. Under its hegemony there began a process of integration of the world market and a redefinition of the role and significance of colonialism. The growth of world sugar production and consumption accelerated after 1815. Old producing regions expanded their output, and new regions emerged. The relations between producers and consumers no longer coincided with previous colonial boundaries, nor were they defined by political control over the sources of production. Instead, economic control over the flow of goods assumed increasing importance. For some planters, colonialism and economic protectionism provided a means of self-defense in an increasingly integrated and competitive market, while for others they were obstacles to their ability to take advantage of the new conditions. For all, however, the underlying processes of market integra-

tion, expansion, and competition put the premium, directly or indirectly, on productive efficiency. Thus, new varieties of cane were developed, the technology of sugar grinding and refining underwent almost constant innovation, and, most important, labor was reorganized. In some places slavery was abolished; in others it was expanded and intensified. Contract laborers from Asia, Africa, and elsewhere were brought to the sugar zones. The development of the sugar plantation in Martinique and Cuba during the first half of the nineteenth century represents two different responses to the processes restructuring the world market.

The *Usine Centrale* in Martinique

The expansion of the sugar industry in Martinique after 1815 depended upon the development of a protected market for its product in France. The colony had been devastated by war, revolution, foreign occupation, and limited access to overseas markets between 1789 and 1815, and it was unable to withstand competition from the vast amounts of cheap foreign sugar available after the peace. In addition, following the loss of Saint Domingue and without access to other markets, France had to rely on trade with its remaining colonies, and especially their sugar industries, for the recovery of its Atlantic port cities and its merchant marine and navy. Thus, a system of protective tariffs that virtually excluded foreign sugar from the metropolitan market was the condition for the recovery of the maritime sector of the French economy and the rapid expansion of the sugar industry and slave labor in Martinique, Guadeloupe, and Bourbon (Réunion). By 1830 these three small islands produced as much sugar as Saint Domingue in its peak year (Tomich 1990: 33–61).

The sugar boom initiated by the protective tariffs resulted in the expansion and consolidation of the existing estate system in Martinique between 1815 and 1830. However, there was little opportunity to restructure production after 1815. Martinique was an old sugar colony. Sugar production began there in the 1640s, and by 1720 virtually all of the principal agricultural lands of the island were occupied. The units of property, the scale of production, and the division of labor on the estate had been formed in accordance with the conditions prevailing in the eighteenth century. Thus, between 1815 and 1848, the great majority of properties were too small to utilize effectively the

new milling and refining technologies, while the amount of land available for either the expansion of old estates or the formation of new ones was limited. The total area of Martinique was approximately 89,000 hectares, about 40% of which was arable. However, not all arable land was suitable for sugar cultivation. Sixty large estates, each producing between 150 and 300 tons of sugar annually, dominated the island's economy. The largest of these planted about 128 hectares in sugar and had about 200 to 210 slaves, about half of whom were employed in sugar production. In addition, 100 plantations produced between 75 and 150 metric tons of sugar each, while the remaining sugar estates each produced less than 75 tons (ibid.: 150).

Consequently, the growth of sugar production in Martinique was the result of greater exploitation of resources, especially slave labor, within the historically prevailing framework. Existing estates intensified their production, and new estates—often small and inefficient—formed on marginal lands. Coffee, tobacco, and cotton plantations were cannibalized for land and slaves to sustain the growth of the sugar industry. In 1820 there were 351 sugar plantations, 10 of which had steam-driven mills. They employed 31,231 slaves on 16,457 hectares of land and produced 26,529 metric tons of sugar. By 1847, the last year before emancipation, the number of sugar plantations had increased to 498, and the number of steam mills to 33 (the majority of which were underpowered). They employed 40,429 slaves on 19,735 hectares and produced 32,093 metric tons (ibid.: 100–103). Thus, with the expansion of sugar production, the existing social and technical organization of the plantation system in Martinique was reinforced and became more rigid. Despite greater total output, the relative inefficiency of colonial sugar producers increased their reliance on protective tariffs.

Paradoxically, the colonial sugar industry came to require such high tariff barriers in order to maintain its position in the national market that the way was opened for the revitalization of the French beet sugar industry. The colonies were then confronted with a powerful and dynamic competitor in the only market open to them. The reemergence of the beet sugar industry initiated a period of crisis for colonial sugar producers. Between 1830 and 1848 French sugar consumption increased, the price of sugar fell, and the processes of sugar production were radically transformed by the technical advances of the beet sugar industry. Colonial producers were under great pressure to increase the quantity and quality of the product. But the plantation system in the colonies froze the framework for organizing land, labor,

and technology and blocked innovation. New techniques were either adapted to the existing division of labor or abandoned. The obstacle to change was not technical transformation in one or another sector of production but the integration of the division of labor on the sugar estate as a whole (ibid.: 61–75, 139–204).

By the late 1830s the very impossibility of reforming sugar production led to a radical solution to the problem: the complete separation of the agricultural and industrial aspects of sugar production. The *usine centrale* would centralize milling and refining operations, while the plantations would specialize in cane cultivation. This arrangement would alter the division of labor prevailing on the sugar estates of Martinique and allow production to be organized on a scale sufficient to take advantage of the new milling and refining technologies. At the same time, cane farmers would no longer have to bear the expense of processing equipment, and the area under cultivation would not be limited by the capacity of the mill and refinery.

Despite the promise of the *usine centrale*, however, old forms of social and technical organization persisted in Martinique. Few planters had the resources necessary to establish a *centrale*, and most feared that once they lost control over processing their own sugar, they would become mere cane farmers subordinated to the giant central factories. Indeed, in the view of traditional planters, the *usine centrale* was unsuitable for local conditions, and its adoption would only deliver them into the hands of metropolitan bankers and speculators. In addition, they regarded it as a threat to the social order: its introduction was accompanied by proposals for free labor that contributed to pressure against the slave regime. Finally, so long as planters processed their own sugar, no matter on how small a scale, they could claim the status of *habitant sucrière*. They feared that if they ceased to do so, they would no longer be regarded as members of the planter elite and that the distinction between them and free mulatto cane farmers would diminish. Consequently, labor and land remained tied to the existing organization of production in Martinique, and the development of the *usine centrale* was blocked (ibid.: 204–13).

The Cuban *Ingenio*

Cuba represents a different path of development of the sugar plantation. Over the long term, Cuba was the greatest gainer from the crisis of world sugar production provoked by the Haitian Revolution. Cuban sugar produc-

tion increased rapidly and continuously in the years after the Napoleonic wars. By 1820 sugar was established as the dominant sector of the Cuban economy, and by 1830 Cuba emerged as the world's largest sugar producer. World demand continued to grow at an accelerating rate, and Cuban production more than kept pace with it. Cuba accounted for a little more than 19% of world sugar production in 1840, nearly 25% by 1850, and nearly 30% by 1868 (Moreno Fraginals 1978, 1:46–47, 67–71, 95–102, 167–255, 2:93–97, 106–74, 3:35–36; Scott 1985: 10; Knight 1970: 14–18, 40–44).

Unlike Martinique, Cuba did not enjoy a protected market for its sugar. Spain could not provide adequate markets for Cuban sugar. By 1818 Cuba had gained virtual commercial freedom from Spain in order to export its products to the United States, Britain, Germany, France, Russia, and the Low Countries. By 1830 the United States emerged as Cuba's major trading partner. The United States was the second largest consumer of sugar in the world and had the fastest-growing population. With the Haitian Revolution and the collapse of the old colonial system, it was cut off from its former access to both Saint Domingue and the British West Indies. Cuba provided a dynamic alternative both as a source of supply of sugar and its by-products and as a market for North American goods. The close links between the United States and Cuba were a significant exception to Britain's ability to dominate the markets of peripheral countries through its industrial and commercial superiority. The United States was not only the major consumer of Cuban sugar but increasingly a supplier of lumber, foodstuffs, and, significantly, industrial goods to Cuba (Knight 1970: 43–45).

Nevertheless, throughout the nineteenth century, world sugar production increased enormously, and the price of sugar fell steadily. Without a preferential market of its own, Cuba was forced to compete against protected sugar in the highly competitive "free" sugar markets of the United States and continental Europe. In order to maintain their position in these markets, Cuban planters were under constant pressure to expand output, increase efficiency, and lower costs. They were able to respond successfully to these demands precisely because Cuba was still a "sugar frontier" throughout most of the nineteenth century. Only 515,820 hectares out of a total area of 12,428,272 hectares were under cultivation in 1827 (Friedlaender 1978: 197). The unprecedented expansion of the Cuban sugar industry was due to the ability of Cuban planters to increase the area under cultivation, establish

new plantations, concentrate labor, and incorporate scientific advances into production processes in combinations and on a scale that were not possible in the older Caribbean slave colonies. The availability of fresh land and labor, especially in the context of a rapidly expanding world market, made possible the remarkable technical evolution of the Cuban sugar mill from animal-powered *trapiche* to mechanized mill. Land and labor could be combined with the mill in new proportions as the capacity of the latter developed. Indeed, it is not an exaggeration to suggest that technical innovation was the condition for the expansion of sugar and slavery in Cuba (Marrero 1983–86, 2:179–80; Zanetti Lacuona and García Alvarez 1987: 23–24).

The development of the Cuban sugar industry was centered in the western part of the island. Sugar cultivation spread south and west of Havana, displacing coffee and tobacco producers and spreading onto new lands. New and ever larger plantations were established at a rapid pace, and old ones increased their capacity. The number of *ingenios* increased almost fourfold between 1800 and 1857. During the initial stages of expansion the multiplication of traditional production units accounted for much of the increase in total production, although even here the scale of production was frequently considerably larger than elsewhere in the Caribbean. Steam power made an early appearance, however, and the methods of sugar manufacture in Cuba were transformed by the application of modern industrial techniques. Knight estimates that in 1827 only 2.5% of the 1,000 *ingenios* in Cuba were steam-powered. But, according to Moreno Fraginals, in 1860 there were 359 animal-powered mills, with an average production capacity of 113 tons; 889 semimechanized mills using steam engines, with an average production capacity of 411 tons; and 64 mechanized mills using steam power and more advanced processing technology (including vacuum pans), with an average production capacity of 1,176 tons (about 15% of total production in the island). In conjunction with the adoption of steam power, there was a steady process of land concentration. The average size of a sugar estate in western Cuba in 1762 was between 121 and 162 hectares. By 1860 it had risen to 567 hectares, while the total area planted in sugar reached 279,755 hectares (Knight 1970: 38–39; Moreno Fraginals 1978, 1:170–73; Scott 1985: 20–21).

Distance and the lack of internal transport limited the amount of land that could be exploited for cane cultivation and raised the price of sugar. Overland transport was slow, difficult, and costly. Thus the establishment of

new plantations was initially limited to the regions around maritime or river ports, particularly Havana. These difficulties made planters look for novel if not audacious solutions to the transportation problem. In 1837, 13 years after the first steam-driven railway began to operate in England, the first railroad in Latin America or the Caribbean was completed between Havana and Güines (Guerra y Sánchez 1964: 54; Marrero 1983–86, 2:169–70; Zanetti Lacuona and García Alvarez 1987: 61–62).

The railroad and the sugar industry developed in the closest interdependence. The railroads were built to serve the sugar industry, and sugar provided most of their profits. The rail network opened new lands and permitted the profitable exploitation of the rich soils of the interior of the island. Sugar replaced coffee and tobacco. Slavery was extended, expanded, and intensified. Shipping costs were reduced drastically, and land use was maximized. Massive amounts of sugar were moved rapidly to ports for shipment overseas, and heavy supplies, such as machinery for the *ingenios*, could be carried inland. New, larger, and technically more advanced sugar mills could be established on virgin lands. Following the railroad, the center of gravity of the Cuban sugar industry moved eastward from Havana toward Matanzas and Santa Clara provinces between 1837 and 1851. In these new territories, still larger plantations were founded, incorporating not only the steam engine but also the latest refining technology available from the European beet sugar industry. By 1860 Matanzas had 44 of the island's fully mechanized mills, followed by Santa Clara with 10. With the highest number of steam-powered mills and the largest number of mills with vacuum pans, Matanzas had the largest total output and the largest average output on the island. Increasing production and lowering costs, in part due to the railroad, allowed the Cuban planters to prosper in the growing world sugar market, despite falling prices. Conversely the construction of the railroads was predominantly financed by Cuban planters and merchants from the profits of sugar production and slave labor (Marrero 1983–86, 3:154–59, 191–93, 209, 212–13; Zanetti Lacuona and García Alvarez 1987: 6, 61–62; Guerra y Sánchez 1964: 66; Knight 1970: 32–39; Scott 1985: 21–24).

Cubans enjoyed the technological edge of latecomers. Though they were few in number, the mechanized sugar mills represented a qualitative transformation in the conditions of sugar production. The Cuban sugar mill developed on a giant scale, and the technology of sugar production there at-

tained the most advanced level known under slavery. Steam-powered mills, the vacuum pan, and the centrifuge increased the capacity of the more advanced plantations and produced more and higher quality sugar. On large estates small rail lines were introduced, often using animal-drawn equipment, to transport canes to the mills from the fields and for transportation within the factories and to the wharves. These developments broke the fixed ratio between land, labor, and mill capacity that had limited the development of the old *ingenio*. It was no longer necessary to limit the acreage under cane. The use of rail transport within estates allowed a greater area to be planted and provided the increased supply of cane required by modern refining techniques. The scale of production increased, and the capital requirements for founding an *ingenio* grew enormously. With the introduction of estate railways, there was bitter competition for land and labor. Small producers were squeezed out, and a monocultural economy emerged that was dominated by large planters who could afford the increased costs of the new mechanized mills. The optimal size of a large sugar estate rose to 2,000 or 3,000 tons instead of the previous 300 or 400 tons, and the form of plantation organization itself was transformed with the emergence of giant semimechanized and finally the fully mechanized mills (Marrero 1983–86, 2:153–59; Knight 1970: 18–19, 30–40; Guerra y Sánchez 1964: 54, 66; Moreno Fraginals 1978, 1:167–255, 2:106–74, 3:35–36; Scott 1985: 20–21).

Conclusion

A comparison of the development of the sugar plantation in Martinique and Cuba reveals firmly linked spatial and temporal differences shaping the nexus of market and productive processes in each situation. Despite apparent formal similarities, land, labor, and technology are in each instance constituted differently within distinct spatiotemporal configurations and result in contrasting historical trajectories.

In Martinique, the evolution of the sugar plantation was constrained and shaped by structures formed in a cycle of slavery and sugar that preceded the integration of world markets and the emergence of industrial capital. The revitalization of the plantation system during the first half of the nineteenth century maintained the old productive and commercial pattern within the new development. However, the tariff barriers that gave new life to the old

system led to the emergence of the beet sugar industry in France. The accelerated rhythm of development and greater technical efficiency of beet sugar unified different temporal structures within the French market and pushed the full development of the colonial sector. In Martinique, the process of extensive exploitation requiring new lands found its limit—which appeared to be absolute—in the manner in which it was articulated with technical and social processes. The near impossibility of change created an almost static form of time, virtually imprisoned by the "natural" shortage of land. Persistence and stability, if not a cyclical repetition of the past, characterized temporal experience.

In contrast, the organization of land, labor, and technology in Cuba presupposed integrated world markets and capital circuits increasingly anchored in industrial production. In Cuba technological development had dynamic consequences. The availability of land—essential to the extensive pattern of exploitation of the Cuban sugar industry—was blocked by difficulties of transport. Nevertheless, this limit instead of being simply destructive and leading to a regression as in Martinique, resulted in the previous order being surpassed. The introduction of the railroad, integration into the international circulation of capital, and the expansion and intensification of slave labor imposed new socioeconomic forms and an accelerated rhythm of development. Indeed, one might speak here of a structural change in temporality itself—the "denaturalization of historical time," to borrow Koselleck's (1985: 96) phrase—defined by technology, industry, and economy. Movement, increasing speed, and openness to new socioeconomic arrangements and spatial configurations within and without characterized the temporal dimension of the sugar industry in Cuba.

By conceiving of Martinique and Cuba as parts of a spatiotemporal whole, a singular historical world economy, the comparative strategy presented here brings the processes of transformation in each plantation system into relation with one another. In contrast to methods of formal comparison, the units of comparison are not treated as discrete, independent, yet comparable "cases" abstracted from their location in time and space. Rather, they are taken to represent "instances" of world processes that are formed and reformed by their relation with one another (Hopkins 1982: 30). This approach thus recognizes and accounts for the interrelation and mutual conditioning of units within historical processes of world economy.

Within this framework, the purpose of comparison is not to derive general lawlike statements from the discovery of "causal regularities" among units treated as comparable replicate "cases" of the processes under investigation (Taylor 1987: 16). Rather, comparison seeks to reconstruct in time and space patterns of relations that shape and reshape the world economy and the connections among them. Time and space are not concepts or variables outside world economy but are fundamental properties of the system itself. The outcomes of such processes are contingent upon their temporal and spatial relations (Taylor 1987: 16, 34). From this perspective, the question is not simply to locate processes forming the world economy in time and space. Rather, it is to understand the historical production of time and space and the ways in which time and space produce history in the modern world economy. The task of comparison is thus to reconstruct time and space relationally within world-economic processes.

Because phenomena are grounded within a theoretically unified historical field, comparison here discloses difference not by establishing the presence or absence of particular universal factors across cases, but by specifying sociohistorical relations and processes through their relation to the whole (thereby historically specifying the whole itself) (Sartre 1982: 141).[2] This procedure differentiates particular historical sequences and spatial configurations by locating them within the evolving ensemble of relations forming the world economy. It thereby permits the identification of both different temporal orders within individual sequences and the differing role and importance of individual elements within apparently similar sequences. By thus establishing the spatial and temporal relatedness of particular historical developments, this approach makes it possible to formulate the changing character of social categories over time and to reconstruct theoretically the complex, interdependent, mutually conditioning processes that shape the trajectory and pace of change.[3]

This approach calls into question the homogeneity of time and space as processes of world economy. Slavery, land, and technology in Martinique and Cuba derive their role and meaning from their position within specific historically interrelated and changing configurations. Within the expansion of nineteenth-century world economy we have identified the persistence of an "old" spatiotemporal pattern of slavery in Martinique that is related to and conditioned by the creation of a new pattern of slavery in Cuba. Comparison

thus goes beyond external similarities to reveal the distinctive character of slavery in each instance. Cuba is not simply the repetition of Martinique but represents the radical reconfiguration of slavery and plantation agriculture within the emergent economic and political conditions of the new world-scale cycle of accumulation.

At the same time, the sugar industries in Martinique and Cuba are not only contemporaneous with each other but remain interrelated, mutually conditioning parts of a unified whole. Through their development specific rhythms, sequences, and periods combine within a complex conjuncture of differentiated temporal strata. Such strata can only be understood in relation to one another. Varying in pace and duration, and possessing diverse trajectories, they nonetheless interact in the same historical dimension of modernity. The "old" is created in relation to the "new": "backwardness" appears *not* as the "not yet" but as an integral part of a heterogeneous "now." On a world scale, the processes of capitalist accumulation thus differentiate and stratify "temporal planes" (see Koselleck 1985: esp. 92–104). Not all space is equally susceptible or equally available to rationalization by economy and technology. Here, the more thoroughly and effectively each region exploits the possibilities given within its particular spatial and temporal configuration, the more the gap between the various regions widens. Thus, the historical time of the modern world economy at once unifies temporalities specific to each of its circuits and is differentiated by them. It imposes its conditions on particular temporal strata; shapes the articulation of temporal sequences, trajectories, and rhythms; and hierarchizes the relation between them, thereby producing the temporality of the world economy as a whole, which coincides only accidentally with any particular temporal stratum.

Thus, the world economy, understood as a spatiotemporal whole, is neither reducible to the properties of the individual processes comprising it or their sum, nor is it a discrete unit external to its constituent relations and processes. Rather, its character as world phenomenon derives from the interrelatedness of the processes comprising it. On a world scale, the processes of capitalist development simultaneously unify and differentiate temporal and spatial relations. By establishing spatial and temporal unevenness, the comparative strategy pursued here reconstructs the world economy as a specific historically evolving constellation of processes and relations ("bundle of relations") linked through definite modes of economic and political integration. This approach reveals both the specificity and the variety of particular re-

lations and the total structure and dynamic of a larger, unified network of political power, social domination, and economic activity. It thereby suggests the conditions, possibilities, and limits for development imposed by these structures.

Notes

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1 While, for reasons of exposition, emphasis here is on Martinique and Cuba, this approach nonetheless theoretically implies and historically presumes the larger and more diverse universe of relations and processes forming the world economy.

2 For Sartre, the general concepts of nature and material scarcity provide the totalizing moment that permits comparison of difference. In contrast, the strategy adopted here grounds comparison in the concept of world economy in order to comprehend difference as time and space relations within a specific historical system rather than in human history generally. It thereby attempts to at once disclose the social and historical premises of spatial and temporal relations forming the capitalist world economy and thus the characteristics and conditions of capitalist modernity itself.

3 The potential of theoretically constructed narrative accounts of such sequences for providing both causal explanation and interpretation of meaning in sociological analysis are discussed in Griffin 1992, Abbott 1992, Quadagno and Knapp 1992, and Aminzade 1992.

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