CHAPTER 9

A Laboratory of Colonial Agricultural Modernity

Environment, Sugar and Slavery in Cuba

Leida Fernandez-Prieto

1 Introduction

Cuba emerged as the world's leading cane sugar producer in the early nineteenth century.* This was achieved as a result of the void left in the international market by the collapse of the French colony of Saint-Domingue (now Haiti), the transfer and circulation of know-how, expert personnel and technologies in the adoption of the Caribbean sugar plantation model, and Cuba's insertion within transatlantic slave trade and trafficking circuits. Brazil and Cuba were the last two countries to receive enslaved Africans who were forced to work on agricultural plantations. Over more than three centuries, some eight hundred thousand enslaved Africans were brought to the Caribbean island.[1] Sixty per cent of them were the result of illicit trade after the signing of the Anglo-Spanish treaty prohibiting slave trade in 1817. From then on, the *ingenio* (sugar mill), a central part of the slave-based sugar agro-industrial complex, was the flagship of modernity on both sides of the Atlantic until the abolition of slavery in 1886.

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1 Philip D. Curtin, *The Atlantic Slave Trade: A Census* (Madison: University of Wisconsin Press, 1969); Juan Pérez de la Riva, *El monto de la inmigración forzada en el siglo XIX* (Havana: Editorial de Ciencias Sociales, 1979); José Luciano Franco, *Comercio clandestino de esclavos* (Havana: Editorial de Ciencias Sociales, 1980). For a recent overview of the numbers of enslaved Africans introduced to America, see David Eltis and David Richardson, *Atlas of the Transatlantic Slave Trade* (New Haven: Yale University Press, 2015).

This chapter seeks to situate the place of tropical agriculture and slavery within the period of modernity and the industrial sugar revolution, departing from the dialogue between the global history of labour relations, studies of slavery and science, commodity histories and environmental histories. The commodification of the tropical environment and the enslaved population were constitutive elements of the production chain and the consumption of sugar as a commodity destined for the international market. According to the taxonomy established by Karin Hofmeester and Marcel van der Linden, slave labour not only produced commodities for the world market but was also conceived as a commodity in itself within slave plantation design.[2] At the same time, this chapter underscores the elaboration of a grand narrative centred on the environment to conceptualise, justify, classify, and control slave labour relations in tropical sugar agriculture, and researches slave agency through African practices and knowledge about crops and food. The chapter also illuminates new global-local connections among different labour relations and commodity production chains along the axis of Cuba, Uruguay and Europe, and examines how they are woven into the visual representation of slavery in the context of modern industrial agriculture and debates on the science of nutrition.

Conceptual history establishes the transition towards the language of political modernity in Latin America between 1770 and 1870.[3] These years coincide with the rise and fall of slave-based sugar plantations in Cuba. Some authors identify the sugar boom with colonial reinforcement in the era of the Atlantic revolutions.[4] Other scholars highlight the contribution of the *indianos* – Spanish emigrants in the Americas who returned with large fortunes – to the modernisation of cities such as Barcelona and Asturias.[5] At the same time, Havana's transformation into a modern port city is owed to the capital accumulated through slave agriculture. Agrarian, economic and commodity histories highlight the analysis of slave plantation crops that are key to European expansion and the development of capitalism as a world system.

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2 Karin Hofmeester and Marcel van der Linden, "Introduction," in *Handbook Global History of Work*, ed. Karin Hofmeester and Marcel van der Linden (Berlin and Boston: De Gruyter Oldenbourg, 2018), 1–14.

3 Javier Fernández Sebastián, ed., *Diccionario político y social del mundo iberoamericano: Conceptos políticos fundamentales, 1770–1870* (Madrid: Centro de Estudios Políticos y Constitucionales – Universidad del País Vasco, 2014).

4 Ada Ferrer, *Freedom's Mirror: Cuba and Haiti in the Age of Revolution* (New York: Cambridge University Press, 2014).

5 Martín Rodrigo Alharilla and Lizbeth Chaviano, eds., *Negreros y esclavos: Barcelona y la esclavitud atlántica, siglos XI – XIX* (Barcelona: Icaria, 2017).

Studies on Cuba pay little attention to identifying the contributions of various agents (landowners, experts, slaves, etc.) and technologies in tropical agriculture in the context of the "second slavery" and the environmental conquest during the industrialisation of the nineteenth century from the perspective of labour relations in conversation with other methodological approaches. This is most likely due to the influence of the thesis on the immobility of tropical agriculture associated with dependency theory.[6] Sugar's industrial modernity was surely co-constitutive of racial agricultural capitalism based on African slavery and other forms of coerced labour, as was the case with Asian labour. Some texts observe the colonies as authentic laboratories of modernity to emphasise the presence of multiple and heterogeneous modernities in the face of the Western Eurocentric gaze. Mintz, for example, argues that the Caribbean sugar slave plantation represented the beginning of modernity.[7] Other studies argue for the possible colonial origin of the modern factory system based on the existence of different forms of coerced labour in the colonies that were constitutive of the wage worker training process.

Labour history has focused on the working class and its struggles after the 1959 Cuban Revolution, whose narrative responded to Marxist endeavours but also to Eurocentric ones that excluded other labour relations, including slavery.[8] Slavery studies, on the other hand, highlight resistance tactics used by slaves, which ranged from rebellions and maroonage – slaves who fled and took refuge in the countryside – to demonstrate their access to various mechanisms to achieve freedom.[9] More recently, geographers, botanists and

6 For a historiographical analysis of labor relations and slavery in Latin America and the Caribbean, see James P. Brennam, "Latin America Labor History," in *The Oxford Handbook of Latin America History*, ed. José C. Moya (New York: Oxford University Press, 2011), 342–63; Rossana Barragán and David Mayer, "Latin America and the Caribbean," and Patrick Manning, "Slave Labour," in *Handbook Global History of Work*, ed. Karin Hofmeester and Marcel van der Linden (Berlin and Boston: De Gruyter Oldenbourg, 2018), 83–110 and 377–94.

7 Sidney Mintz, *Sweetness and Power: The Place of Sugar in Modern History* (New York: Viking, 1985).

8 Joan Casanovas Codina, *Bread, or Bullets! Urban Labor and Spanish Colonialism in Cuba, 1850–1898* (Pittsburgh, PA: University of Pittsburgh, 1998); Robert J, Alexander, *A History of Organized Labor in Cuba* (Westport, Conn: Praeger, 2002).

9 Rebecca Scott, *Slave Emancipation: The Transition to Free Labor, 1860–1899* (Pittsburgh, PA: University of Pittsburgh Press, 2000); Manuel Barcia, *Seeds of Insurrection: Domination and Resistance on Western Cuban Plantations, 1808–1848* (Baton Rouge: Louisiana State University Press, 2009); and Alejandro de la Fuente and Ariela J. Gross, *Becoming Free, Becoming Black: Race, Freedom, and Law in Cuba, Virginia, and Louisiana* (New York: Cambridge University Press, 2020). A recent study offers new insights into the efforts and mechanisms carried out by the slaves to achieve freedom. See Claudia

historians of science have examined the transmission of medicinal, nutritional and religious knowledge of enslaved Africans in the Americas.[10]

This chapter examines the creation of a narrative centred on the idealisation of the environment to organise the tropical agrarian space in the context of industrial modernity in Cuba. This was in contrast to the introduction of technologies and expert personnel in response to the deterioration of natural production conditions. The second section highlights the control mechanisms of slave labour relations exercised by the landowners, but, above all, it illuminates the gaps in the plantation system itself that allow slaves to be valued as human beings rather than as machines, which is one of the prevailing theses in sugar historiography. A final section analyses Cuba's connection with various global-local production chains and labour relations through the promotion and sale of Liebig's Extract of Meat Company products on the European market, the success of the livestock industry in Uruguay, and the illegal transatlantic slave trade.

2 The Commodification of the Environment: The Invention of Prodigal Tropical Agriculture

The benign climate and extremely fertile land of Cuba – benefitted from what I term "prodigal tropical agriculture" – were heralded by various institutional and private agents as the ideal natural conditions to support the thesis of Cuban exceptionalism, which was centred on the consolidation of the sugar plantation. In 1768, Agustín Crame published a report to promote the development of agriculture with the information collected during a reconnaissance and exploration trip throughout the entire colonial territory.[11] Crame, a Spanish-Flemish

Varela and Manuel Barcia, *Wage-Earning Slaves: Coartacion in Nineteenth-Century Cuba* (Gainesville: University Press of Florida, 2020).

10 Judith A. Carney and Richard Nicholas Rosomoff, *In the Shadow of Slavery: Africa´s Botanical Legacy in the Atlantic World* (Berkeley, Los Angeles, and London: University of California Press, 2009); Robert Voeks and John Rashford, *African Ethnobotany in the Americas* (New York: Springer, 2013); Leida Fernández Prieto, "Plantas, plantas y saberes en la red del tráfico negrero: Cuba-España-África," in *Cádiz y el tráfico de esclavos: De la legalidad a la clandestinidad*, ed. Martin Rodrigo y Alharilla and Maria del Carmen Cózar Navarro (Madrid: Silex, 2018), 295–321.

11 Agustín Crame, *Discurso político sobre la necesidad de fomentar la isla de Cuba acompañado de una breve descripción de sus principales pueblos y planos de toda la Isla*, Archivo General de Indias (AGI), SD, Materias Gubernativas, leg. 1157, fols. 120–177; Leida Fernández Prieto, "Crónica anunciada de una Cuba Azucarera," in *Francisco Arango y la*

military engineer, was part of the group of colonial officials in charge of implementing the Bourbon reforms after the British returned Havana to Spain. He was also a representative of the English trading houses that introduced slaves from the island of Jamaica, one of the routes that blurred imperial frontiers in the sugar business early on. Crame highlighted the supposed superiority of the fertility of Cuban lands compared to those of the British colony to ensure the success of the slave plantation system. He associated that fertility with the abundance of virgin woodlands, although he was aware of the productive limits when he mentioned the use of fertiliser in Jamaica.

Cuba illustrates the place of ecology as a central analytical category in the creation of the environmental concept of "prodigal tropical agriculture" and racialised labour relations as part of industrial modernity that rested on an unprecedented drive for slavery through the illicit trade of human beings. On the one hand, I have chosen this term because tropical agriculture encompasses colonial agriculture. On the other hand, I want to underscore the value of tropical ecosystems in the production of agricultural commodities destined for the world market through the design of the slave plantation system. This concept is built on the foundation of multiple and contradictory qualifications that continue to this day. For instance, talking about the tropics evokes notions of abundance, lavishness, exuberance and fertility and, at the same time, of decadence, backwardness, and the supposed absence of scientific innovations in the collective imagination, in a way that crosses historical analyses. The term reflects various tensions between temperate and tropical agriculture, between modernity and backwardness, domination and tutelage, and the racial division of labour common to colonial agriculture. All of these notions made up the language of slave-based industrial agricultural modernity between 1750 and 1870.

The Creole statesman and landowner Francisco de Arango y Parreño argued for the exceptionality of Cuba's natural conditions from a free trade position applied to export agriculture. Arango defined this system as "branches of extraction," thinking of it as a form of "plantation agriculture" that he associated with "prosperity" and the "happiness" of obtaining free trade from Spain, greater facilities for the introduction of slaves, and greater possibilities to convince landowners to adopt all of the advances of the Industrial Revolution for the development of slave-based sugar production.[12] He was considered

invención de la Cuba azucarera, ed. María Dolores González-Ripoll and Izaskun Álvarez Cuartero (Salamanca: Universidad de Salamanca, 2009), 55–65.

12 Francisco Arango y Parreño, *Obras* (Havana: Ministerio de Educación, 1952); María Dolores González-Ripoll and Izaskun Álvarez Cuartero, eds., *Francisco Arango y la invención de la Cuba azucarera* (Salamanca: Universidad de Salamanca, 2009).

the ideologue responsible for the invention of a "sugar producing" Cuba. For Arango, the island had "vastness, a happy location, fertile soil, a variety of productions and abundant and beautiful ports," which distinguished it from the rest of the Antilles when it came to developing plantation agriculture based on slavery. In his view, blacks were the "necessary evil" because they were best able to withstand the rigours of the climate. Thus, Arango followed in the wake of those who justified the myth of European whites' inability to perform agricultural work in tropical zones. He also defended the supposed kindness of the Spaniards towards the slaves as opposed to the French people's inhumane treatment, a "black legend" repeated in numerous later works.

Arango proposed to transplant the slave plantation model to the European industrial centres and the British and French sugar colonies, and put forward a plan for the creation of a local board for the protection of agriculture. The objective of the expedition was to become familiar with industrial advances because "even in the fertile lands, this fertility ends and here industry enters to replace it." Like Cramer, Arango was aware of the limits of the commodification of tropical nature. Historians have analysed the industrial espionage trip as part of the landowners' local strategies to catapult the island as the primary producer of cane sugar in the world, after the Haitian Revolution.[13] This expedition illustrated the circulation of knowledge through the recruitment of expert personnel among the Caribbean sugar colonies. For example, Julien Lardière, a French sugar technician, was contacted in Jamaica for the subsequent modernisation of the so-called new mills in Cuba at the end of the eighteenth century and the beginning of the nineteenth century.[14] The landowners created the *Real Junta de Fomento de la Habana* (Royal Board of Development of Havana) with the approval of the Spanish Crown. This institution and the *Real Sociedad Económica de Amigos del País* (Royal Economic Society of Friends of the Country) were spaces for the dissemination and creation of agro-industrial knowledge, although it is better to study these institutions in terms of industrial modernity rather than agricultural improvements. The landowners prioritised the introduction of industrial technologies, since they understood that obtaining sugar relied on factory processing. They relied on the benign climate

13 María Dolores González-Ripoll, "Dos viajes, una intención: Francisco Arango y Alejandro Oliván en Europa y las Antillas azucareras (1794 y 1829)," *Revista de Indias* 62, no. 224 (2002): 85–102.

14 Leida Fernández Prieto, "Mapping the Global and Local Scientific Archipelago: Agriculture, Knowledge and Practices, 1790–1870," in *Global Scientific Practice in an Age of Revolutions, 1750–1850*, ed. Patrick Manning and Daniel Rood (Pittsburgh, PA: University of Pittsburgh Press, 2016), 181–98.

and the fertility of the soil for their achievements in agriculture. This idea has been confirmed above all by economic historians, who have insisted that the landowners did not introduce agricultural reforms. References to their role in the introduction and/or acclimatisation of plants, successful or not, and the participation of various agents in local trials and experiments are found in memoirs and reports from the two institutions, which merit further study.

Arango was one of the local informants who hosted the well-known Baron Alexander von Humboldt, who more precisely defined the role of tropical regions for the production of "agricultural types," or "colonial productions," destined for European industrial manufacturing.[15] Humboldt witnessed the major capital investments that went into modernising the mill factories. At the same time, he recognised the fertility of Cuban lands that produced for more than twenty years without the need for replanting. In his essay, however, he warned about deforestation and fuel shortages as problems for the island's sugar industry. Von Humboldt was critical of the slave trade and how landowners considered slaves "beasts of burden," criticisms that earned him initial censorship in Cuba. Writing from a Eurocentric point of view, the German traveller suggested the formation and training of *criollos* (creoles, or locally-born people) in European laboratories to achieve improvements in the manufacturing of beet sugar to cane sugar, rather than depending on more or less successful local experiments. This proposal had previously been defended by important landowners from the *Sociedad Económica de Amigos del País* and the *Real Junta de Fomento de la Habana*.

In 1840, Spanish chemist José Luis Casaseca described the so-called Cuban Industrial Revolution, based on the installation of steam engines in the mills to increase industrial yields. Previously, in 1837, the introduction of the railroad extended the boundaries of sugar plantations. That is how landowners in Cuba consolidated the strategy of industrial technological development and the "art of making sugar," understood as the empirical skills of the sugar master responsible for manufacturing and/or applied chemistry to the industry by specialised workers, almost always from industrial centres. In other words, the term worked interchangeably both to designate amateur knowledge and specialised knowledge.

15 Miguel Ángel Puig-Samper, Consuelo Naranjo Orovio, and Armando García González, eds., *Ensayo Político de la isla de Cuba, Alexander von Humboldt* (Aranjuez: Doce Calles, Junta de Castilla y León, 1998).

In recent decades, new studies maintain that the colony was not a simple recipient of the advances of the industrial sugar revolution.[16] The texts highlight the role of the local elite as agents of enlightenment and modernisation based on the introduction of European and American ideas and machinery, the translation of reference works, research trips, and data collection endorsed by the Spanish empire. These approaches continue to privilege the industrial process. Other debates revolve around profitability and the impossibility of adopting new technological advances with the use of slave labour.[17] On the other hand, some authors observe the correlation between the greater technological impulse and the so-called second slavery, which strengthened American industrial capitalism.[18] The studies exclude technological changes in agriculture and the participation therein of farmers, skilled personnel and slaves.

In 1845, Ramón de la Sagra was the first to define tropical agriculture based on biological, social and racial ideas in the context of the Industrial Revolution and the European division of labour. Sagra was the director of the Botanical Garden in Havana, a colonial institution that developed the plan for scientific reforms based on slavery. He employed the work of so-called emancipated Africans, those Africans whom the British located on slave ships and declared free under abolitionist treaties.[19] In reality, they were again enslaved, forced to work in the construction of urban sites and on plantation agriculture. For the Spanish botanist and agronomist, the overpopulation and food shortage in Europe could be solved by a division between agricultural colonies and manufacturing empires, between the Old World and the New World. Sagra justified the colonial function of producers of raw materials for the European market

16 María M. Portuondo, "Plantation Factories: Science and Technology in Late-Eighteenth-Century Cuba," *Technology and Culture* 44 (April 2003): 231–57; Jonathan Curry-Machado, *Cuban Sugar Industry: Transnational Networks and Engineering Migrantsin Mid-Nineteenth Century Cuba* (New York: Palgrave Macmillan, 2011); Adrian Leonard and David Pretel, eds., *The Caribbean and the Atlantic World Economy: Circuits of Trade, Money and Knowledge, 1650–1914* (Basingstoke: Palgrave Macmillan, 2015).

17 Laird W. Bergad, Fe Iglesias García, and María del Carmen Barcia, *The Cuban Slave Market, 1790–1880* (New York: Cambridge University Press, 1995).

18 Dale W. Tomich, *Through the Prism of Slavery: Labor, Capital, and World Economy* (Lanham, Md.D: Rowman & Littlefield, 2004); Dale W. Tomich, ed., *New Frontiers of Slavery* (New York: SUNY Press, 2016); Dale W. Tomich, ed., *Slavery and Historical Capitalism during the Nineteenth Century* (Lanhan, MD: Lexington Books, 2017).

19 Inés Roldán de Montaud, "The Misfortune of Liberated Africans in Colonial Cuba, 1824–76," in *Liberated Africans and the Abolition of the Slave Trade, 1807–1896*, ed. Richard Anderson and Henry B. Lovejoy (Rochester, NY: University of Rochester Press, 2020), 153–73.

because: "the intertropical regions seem to be nature's laboratory, and the temperate and cold [regions are] the manufacturers of art," or "nations that change the products of their labour industry for the exclusives of a prodigal nature little supported even by human ingenuity," in a clear allusion to slavery.[20] It was probably the first time that the term *ingenio* was tied to intelligence and the first time that scientific practice was applied to agriculture in Cuba.

For the botanist, colonial agriculture was in its "infancy" because it did not include cattle ranching, which was common in intensive farming in Europe in order to maintain the soil's fertility rather than abandoning it in search of virgin lands to clear and cultivate. Thus, Sagra clearly warned readers about the negative effects of deforestation that characterised plantation agriculture:

> Devastating logging and the system of unpredictability that directs it are transformed into barren and scorched plains that were formerly thick and leafy. And successively temperatures will rise and the precipitation will be reduced … where the trees are annihilated a scene of loneliness and death will replace the laughing spectacle of a young and wild nature that offered to reward with usury the efforts of well-managed industry.[21]

Sagra believed that prodigal nature had triumphed over a "vicious organisation" with regard to slavery. He argued that slaves belonged to a "savage race" that made the "progress of cultivation impossible," and wrote about "the basis of their backwardness and the great and insurmountable obstacle that has always been experienced in the Antilles to constitute agriculture as a science, as it is practised in Europe," the "paralysing" element of "the soil's natural forces and the intellectual means of man," and "the building of tropical agriculture on the absurd foundation of force, ignorance, and the unforeseen." In other words, he put forward the thesis of the impossibility of introducing scientific advances with slave labour, which has cut through historical debates to this day. By contrast, European white settlers were portrayed as "active, honest, industrious and able to withstand the milder climate of those regions," debunking the myth of the rigours of the tropical climate for white settlement.

The farmers' search for solutions to lower production costs in the face of competition from beet sugar and Spain's supposed prohibition of the slave trade, facilitated the entry of European white settlers, Yucatecans and Chinese

20 Ramón de la Sagra, *Estudios coloniales con aplicación a la isla de Cuba* (Madrid: Imprenta de D. Dionisio Hidalgo, 1845).

21 Ramón de la Sagra, *Historia económico-política y estadística de la Isla de Cuba* (Havana: Imprenta de la Viuda de Arazoza y Soler, 1831), 84–85. My translation.

coolies in the context of the second slavery. In 1847, for example, the *criollo* landowner Pedro Diago brought in more than five hundred Chinese coolies from Amoy to work in his mill, with the support of the *Real Junta de Fomento*. From then on, the country saw the arrival of thousands of Chinese coolies on English and North American ships. Therefore, we should not be surprised by Sagra's defence of the immigration of Chinese coolies – the "Asian race," which he defined as "a crucial element for the recent improvements in agriculture" – as opposed to slavery.

The French publishers Eduardo Laplante and Luis Marquier and the Creole landowner Justo G. Cantero presented the industrial modernity of the mills as a symbol of prosperity to an international audience.[22] Cantero described the relationship between sugar cane, tropical climate and fertility that fed the discursive myth of earthly paradise and prodigal nature common to tropical agricultural colonies. His descriptions of the sugar mills, however, alluded to frequent episodes of droughts, soil exhaustion and hurricanes that affected the plantations. This translated into greater attention from farmers to agricultural experimentation, the hiring and participation of expert personnel, the introduction and dissemination of equipment, the use of fertilisers, and the coexistence of slavery with other types of labour, such as Asian workers in a degree of semi-slavery, involved in the production of goods for the world market.

Tropical agriculture more clearly reflected the periphery/periphery, Atlantic/Pacific and centre/periphery connections through biological transfers and the introduction and diffusion of mechanical farming and modern practices with the participation of landowners, who were experts in plantations and slaves. Tracing these exchanges documents the global and local debates associated with the application of scientific knowledge to solve the ecological, economic and social problems of industrial slave-based agriculture. Here, I refer to the global diffusion of sugar cane varieties, the introduction and application of fertilisers and technologies – hallmarks of modern agriculture – but also to the fragility of the tropical environment.

The Caribbean islands proved the ideal homeland for the acclimatisation of sugar cane, to the point that many naturalists and travellers were unsure

22 Luis Miguel García Mora and Antonio Santamaria García, eds., *Los ingenios: Colección de vistas de los principales ingenios de azúcar de la isla de Cuba*, ed. Justo G. Cantero and Eduardo Laplante (Madrid: CSIC-Doce Calles, 2005). New studies highlight the place of lithography for analysis of the control of the industrial landscape of plantation and slave labour. See Dale W. Tomich et al., *Reconstructing the Landscapes of Slavery: A Visual History of the Plantation in the Nineteenth-Century Atlantic World* (Chapel Hill: University of North Carolina Press, 2021).

whether the plant was indigenous or exotic. This issue became very important when the Otaheiti variety, key to the development of the Caribbean sugar industry, degenerated on the oldest sugar cane plantations. The Otaheiti variety had first entered Cuba via the transatlantic sugar and slave trade circuits in 1789. During his sugar expedition, Arango had learned of the Otaheiti cane variety's advantage in adapting to the machinery established in Cuba. Thereafter, he ordered a large quantity of seeds from the slave trader Philip ("Felipe" to the Cubans) Allwood. Alexander von Humboldt also confirmed that the sugar cane variety had debunked his fear that it would degenerate in the New World. Even so, landowners chose to sow different varieties in the plantations in Cuba, which turned the plantations into true fields of experimentation in the context of industrialisation, including Cristalina (from Java), and that ultimately prevailed on the exhausted soil. Landowners also organised expeditions to search for new Otaheiti canes in the original domestication sites, an aspect that is hardly considered in historiography. This was the case with the successful expedition of Tomás de Juara y Soler, who ordered cane from Otaheiti (now Tahiti) to be delivered to the Pacific islands. The seed arrived in fifteen boxes through the Tahiti route – California – Panama – Colon – New Orleans – Havana. The whole trip took four months. Others tried to bring seeds from the United States and even devised a (failed) expedition to the island of Tahiti via France.

In 1846, the first sugar plague broke out, affecting the Otaheiti cane on the British island of Mauritius and the French island of Bourbon (now Réunion). The overall strategy was the introduction of new varieties from Java, other regions of Southeast Asia and Oceania, Brazil and Egypt. At the same time, institutional and private agents began to pay more attention to scientific study and global-local experimentation. Cuba was not affected by the plague but it raised the issue of the plant's degeneration on exhausted soils and, with it, the beginning of debates on the cane's supposed infertility when seeds were obtained from the crossing of several varieties. For example, Cantero recalled that Leonard Wray did not understand why agronomists wanted to obtain seed when it was impossible and he recommended the Otaheiti and Salangore varieties in the main sugar treatise of the period.[23] The sugar cane hybrid was likely obtained in Barbados and Java in the late nineteenth century.

23 Leonard Hume Wray, *The Practical Sugar Planter: A Complete Account of the Cultivation and Manufacture of the Sugar cane, According to the Latest and most Improved Processes* (London: Smith, Elder, 1848); Stuart G. McCook, *States of Nature: Science, Agriculture and Environment in the Spanish Caribbean 1760–1940* (Austin: University of Texas Press, 2002);

Cuba became a laboratory and a meeting place between the practices of European and domestic landowners, between the global and the local, with the introduction and application of organic and chemical fertilisers. The landowners tried different types of fertilisers, including guano, due to its high level of organic matter, when they found that the "prodigal" nature of the country was not exempt from the increasing decline in agricultural yields. The application of organic and chemical fertilisers favoured the entry of scientific sugar agriculture into the Spanish colony. This made the overlapping of circuits visible to consolidate both industrial and agricultural modernity. For example, in 1840, Pedro Diago used the same transatlantic sugar and slave networks for the acquisition and commercialisation of Peruvian guano fertiliser through the New York firm A.B. Allen.[24] At the same time, the landowners once again relied on the recruitment of workers and experts from the industrial centres for their farms. At his Las Cañas sugar mill, Juan Poey tested manure compost prepared according to the European model, that is, in pits made on his own farms, under the direction of Edgar Carbonne, a French engineer based in Cárdenas, Cuba. This mill, like others, was financed with capital from the slave trade.

Likewise, the progressive generalisation of certain mechanical equipment (ploughs and rollers, among others), illustrates the connections with industrial centres in the United States and England, but it also highlights how the tropical agrarian space responded to local demands. The English firm Fowler and Company commissioned the in situ construction of special ploughs for the terrain conditions in Cuba, including the steam plough tested at the plantation owned by Miguel Aldama in 1863. By contrast, the diffusion of the mechanical plough reflected the multidirectional connections that existed: periphery/periphery, Atlantic/Pacific and centre/periphery. This was the case with the Messrs Ransome Company, which created the Ransome's Patent Indian Cultivator plough in India. This plough was later used in the West Indies; Jamaica in particular was cited as an example of the exchange of techniques from East to West.

Landowners in Cuba called the cultivation in rows – planting at an adequate distance that would allow the use of agricultural implements – "Louisiana-style" growing. This indicated that the landowners were looking more towards the mechanised agriculture practised in the United States, the country from

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Leida Fernández Prieto, "Islands of Knowledge: Science and Agriculture in the History of Latin American and the Caribbean," *Isis* 104, no. 4 (December 2013): 786–97.

24 Roland T. Ely, *Cuando reinaba Su Majestad el Azúcar: Estudio histórico-sociológico de una tragedia latinoamericana; El monocultivo en Cuba, origen y evolución del proceso* (Havana: Imagen Contemporánea, 2001), 574.

which the equipment was sent, and that the wide dissemination and exchange of knowledge and practices often erased their origins. The *criollo* agronomist Álvaro Reynoso thought this method of sugar cultivation should be called "English" because it had been applied to sugar cane for the first time in English, and later French, colonies. It was introduced in Cuba by Alexandre Dumont, a French officer who emigrated after the Saint-Domingue Revolution, but who then did not become a general in the Spanish colony.

Reynoso is considered the father of Cuban scientific agriculture. He was a disciple of Justus von Liebig during his landowner-funded studies in Europe. He made a series of agricultural scientific trips in Cuba that culminated in numerous publications. Of these, the best known was the "Essay on the Cultivation of Sugar Cane" (1862), which became the leading manual for Java and Brazil but not for Cuba.[25] Reynoso's work placed agriculture as the cornerstone of the modernisation of the sugar industry despite slavery. In this text, Reynoso defined the guidelines of the integral Cultivation System that took into account various ecological, socio-economic and cultural factors, as well as the scientific procedures for producing a greater quantity of sugar. For example, he mentions drainage systems, the use of organic and chemical fertilisers, and the use of agricultural mechanics. In his essay, Reynoso used the terms "local agriculture" and "our agriculture" for the first time, as well as "backward, primitive, transhumant or emigration agriculture," because he sought virgin lands. For him, extensive cultivation was contrary to civilisation. However, Reynoso understood that the priority was to modernise the industrial factory because he had invested a lot of capital, knowledge and workers, relative to the abundance of land and the absence of the knowledge and men necessary to propagate scientific agriculture.

Reynoso participated in the "black legend" of the landowners' treatment of slaves, whom he not only identified as workers, but he also bought them and described them as "happier than European workers because they are better fed, have comfortable and healthy rooms, have infirmaries that are like the best hospitals, not due to petty calculations of interest but to a true advance in humanitarian sentiments," an opinion Cantero also held. However, Reynoso tried to dismantle Sagra's thesis on the impossibility of introducing modern agricultural equipment with slave labour because, at times, the enslaved labourers were sugar masters, carpenters, machinists and blacksmiths, much

25 Álvaro Reynoso, *Ensayo sobre el cultivo de la caña de azúcar* (Havana: Imprenta del Tiempo, 1862); Ulbe Bosma and Jonathan Curry-Machado, "Two Islands, One Commodity: Cuba, Java, and the Global Sugar Trade (1790–1930)," *Nieuwe West-Indische Gids* (*New West Indian Guide*) 86 (2012): 237–62.

more difficult trades. Historians do not know the level of slave agency during the introduction of agricultural technologies. Some of the manual labour on the plantations consisted of practices known to Africans, such as clearing, felling and burning, or the planting of rice and yams, because many of them came from the so-called crop belt on the west coast of Africa. Therein lies the question: Did enslaved populations reproduce or recreate African knowledge and practices on plantations in Cuba?

3 The Slave as Machine?

Traditionally, economic historiography on Cuba considers the slave as a key entity within the productive chain of sugar manufacturing, a human machine that landowners exploited and controlled in a rational way in order to obtain greater outputs and profitability.[26] From this perspective, studies deny the possibility that slaves reproduced and/or transmitted their knowledge and practices originating in Africa. Other scholars, on the other hand, demonstrate the transfer of African knowledge for the development of commercial crops such as rice and indigo in plantations in the southern United States.[27] New approaches underscore the opportunity for medical careers from the practice and study of slave diseases on Caribbean plantations.[28] According to the authors of these studies, the owners were interested in preserving the health and guaranteeing the reproduction of their primary workforce by hiring doctors and professionals who centred their studies on slaves in order to justify slavery and scientific racism. In fact, the plantations became spaces for the circulation and exchange of medical knowledge in the Atlantic, as was the case for French physician and anthropologist Henri Dumont's research on sugar plantations in Cuba.

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26 Manuel Moreno Fraginals is still the main reference among Cuban sugar historians. See Manuel Moreno Fraginals, *El ingenio* (Barcelona: Crítica, 2002).

27 Judith A. Carney, *Black Rice: The African Origins of Rice Cultivation in the Americas* (Cambridge, MA Harvard University Press, 2001); Andrea Fesser, *Red, White, and Black Make Blue: Indigo in the Fabric of Colonial South Carolina Life* (Athens, GA: University of Georgia Press, 2013).

28 Steven Palmer; "From the Plantation to the Academy: Slavery and the Production of Cuban Medicine in the Nineteenth Century," *Health and Medicine in the Circum-Caribbean, 1800–1968*, ed. Juanita De Barros, Steven Palmer, and David Wright (New York: Routledge, 2009), 53–75; Diego Armus and Adrian López Denis, "Disease, Medicine, and Health," in *The Oxford Handbook of Latin America History*, ed. José C. Moya (New York: Oxford University Press, 2011), 424–53.

Keeping the working days for slaves very long was a tactic used by the landowners to control and prevent possible uprisings, escapes or suicides.[29] The long duration of more than twelve hours of work, with hardly any rest and few hours for sleeping, caused multiple work accidents and cases of limb mutilation, and a higher percentage of deaths between May and June at the end of the milling. Likewise, landowners maintained a register and kept strict control over their slave workers. The *mayoral*, the person in charge of watching over them and doling out work and punishments, forced slaves to sing in order to prevent them from carrying out acts of resistance, which some authors identify as strategies for them to act as automatons in carrying out their jobs.

The degree to which slaves were objectified, the predominance of male slaves on plantations, and the young age at which enslaved people were brought onto slave ships constitute some of the historiographic theses put forward by scholars to argue the impossibility for slaves to transmit knowledge and practices originating from Africa. The analyses are based on the fact that women were the main agricultural workforce on the African continent, the low level of sexual reproduction, the overexploitation of slave labour, and possible demographic collapse, which would justify the scarce presence of mitochondrial DNA among the current Cuban population.[30] Following attestations that some African populations enjoyed forms of resistance to pathogens and certain diseases, geneticist Beatriz Marcheco analysed a significant sample of the population in Cuba. The result was that 72 per cent of the Cuban population's genes are of European origin compared to 20 per cent being of African origin, which contrasts with the high number and late introduction of enslaved Africans to the island, at least until 1867. This has led to the questioning of the myth that slavery in Cuba was relatively benign. On the contrary, Marcheco's study suggests the need to undertake a broader analysis to clarify whether there was a possible demographic collapse due to the effects of malnutrition, exploitation, suicides and infections.

The problem with these theses, especially from the perspective of economic rationality, is that they ignore the fact that slaves were people of flesh and blood; or, in other words, they perpetuate the dehumanisation and victimisation of slaves within labour relations. Moreno Fraginals pointed to a change in strategies among planters and traffickers to bring more women onto slave

29 For an analysis of the different strategies in the control of slaves in Cuba, see José Antonio Piqueras, ed., *Orden político y gobierno de esclavos* (Alzira, Valencia: Centro Francisco Tomás y Valiente, UNED, 2016).

30 Cesar Fortes-Lima et al., "Exploring Cuba`s Population Structure and Demographic Story Using Genome-Wide Data," *Scientific Reports*, 11422 (2018).

ships, seeking a balance within the plantations around 1850, in the context of the sugar boom. Following Spivak's idea, slaves perhaps most clearly illustrate the absence of written testimonies from subordinate subjects. Even so, the records of emancipated Africans and other sources have been insufficiently explored to document the life histories of slaves and to trace the possible transmission of knowledge and practices in Cuba, beyond religious knowledge, which is much better-studied.

Daniel Rood highlights the contribution of a transnational group of "plantation experts" in adapting the technologies of the Industrial Revolution to the conditions of the tropics, as well as in forging alliances in the Upper South in the United States, Cuba, and Brazil that broke with British dominance and the circuits of the American Northeast.[31] Focusing on the manufacturing process, Rood illustrates the indispensable involvement of enslaved people in obtaining tropical expert know-how and maintaining profitability. For this, he alludes to the skills and knowledge of slaves who worked on the expansion of railways and other trades linked to their roles in the development of new technologies for the sugar mills. For example, Rood highlights the introduction and adaptation of the steam system devised by the French-American Afro-descendant Norbert Rillieux, the son of a white slave owner and a free woman of colour, whose knowledge paradoxically contributed to reinforcing racial ideologies and the dominance of slave owners.

One of the most atrocious measures implemented by landowners on Cuban plantations was linked to birth control, and was meant to guarantee the replacement of the slave labour market, given the possible end of the illicit trade and the probable labour shortage due to the low birth rates on the plantations. This measure worked against slaves' abortive practices based on their ancestral knowledge of plant properties. Fraginals stated that more than 25 per cent of slave women suffered from so-called "fallen uterus" due to the use of abortifacient plants for birth control. He pointed out that certain ethnic groups from the Congo living in Cuba used potions made with papaya fruit and leaves to induce miscarriage.

At some sugar mills, despicable *criollo* breeding spaces – a term clearly connecting the slaves with cattle – were used, dedicated to the sexual reproduction and birth control of slaves. Among his descriptions of Cuban industrial magnificence, Cantero documented this practice, for instance as it was carried

31 Daniel Rood, *The Reinvention of the Atlantic Slavery: Technology, Labor, Race, and Capitalism in the Greater Caribbean* (New York: Oxford University Press, 2017).

FIGURE 9.1 Sugar mill
SOURCE: LUIS MIGUEL GARCÍA MORA AND ANTONIO SANTAMARIA GARCÍA, ED., *LOS INGENIOS: COLECCIÓN DE VISTAS DE LOS PRINCIPALES INGENIOS DE AZÚCAR DE LA ISLA DE CUBA*, WRITTEN BY JUSTO G. CANTERO AND DRAWN BY EDUARDO LAPLANTE (MADRID: CSIC-DOCE CALLES, 2005)

out at the Trinidad or Vista Hermosa sugar mill, owned by Esteban José Santa Cruz de Oviedo y Hernández and located in a sugar region par

excellence, which had more than a thousand slaves (see figure 1): "Next to this farm, and assisted by his group of Negroes, he has a *criollo* breeding place, well kept by the owner, who is able to have an increase of thirty blacks year after year .... During one half of the year the Negroes are fed viands and during the other half they are fed corn flour, rice and beans, and often fresh beef and pork as well, and three large meals over the course of the day. To this care is owed the cessation on this farm of the dysentery that was previously carried by so many individuals."[32]

The idealisation and "romantic" vision of slavery that the book transmitted was interspersed with references to the inhuman practices of these degrading spaces, such as the rapes suffered by female slaves in sugar cultivation

32 García Mora and Santamaría, *Los ingenios*, 163. My translation.

throughout the nineteenth century. Santa Cruz de Oviedo had no legitimate children from his marriage. In 1851, twenty-six of his children from slaves were recognised. This violence contrasted with the elementary education provided: he financed some of his children to continue their instruction in New York, and six others went to study in Paris. What's more, in a case similar to Rillieux's, his eldest son inherited and perpetuated the father's sugar business, the origins of which stemmed from human trafficking.

Cantero also made detailed references to the barracks where the slaves lived, and to the *conucos*, plots of land given by the landowners to the slaves for gardening and to guarantee the mill's self-sufficiency, the surplus of which they could sell the local market and to nearby farms. This practice was carried out mainly by women, like in Africa. In the *conucos*, or "gardens" of the dispossessed, slaves grew food and raised pigs and chickens. For some authors, these spaces point to the transmission of African knowledge and practices because many of these crops were known and important in African agriculture, like the aforementioned rice and yams.[33]

Other historians suggest that the practice of the landowners of allowing the slaves the *conucos* for their self-subsistence disappeared with the generalisation of barracks in the context of industrialisation.[34] The barracks were closed buildings with separate rooms for men and women, in some cases with rooms for families, and kitchens in the centre. On the one hand, it is very likely that the two practices coexisted, especially since Cuba was not completely overrun by sugar monoculture in the nineteenth century. On the other hand, Esteban Montejo, a former maroon, affirmed in his biography the fact that even the barracks had *conucos*, located behind the buildings, to ensure the slaves' subsistence.[35]

As a control measure, landowners established racial categories through assigning tasks based on the African ethnic groups origins of the enslaved. According to Fraginals, the owners preferred the enslaved Lucumi Africans for working the mills given their supposed strength, although they were feared

33 Judith A. Carney, "African Traditional Plant Knowledge in the Circum-Caribbean Region," *Journal of Ethnobiology* 23, no. 2 (2003): 167–85; Miguel Esquivel and Karl P. Hammer, "The Cuban Homegarden '*Conuco*': A Perspective Environment for Evolution and In Situ Conservation of Plant Genetic Resources," *Genetic Resources and Crop Evolution* 39, no. 1 (January 1992): 9–22.

34 Moreno Fraginals, *El ingenio*, 37; Mercedes García Rodríguez, *Entre haciendas y plantaciones: Los orígenes de la manufactura azucarera de La Habana* (Havana: Editorial de Ciencias Sociales, 2007).

35 Miguel Barnet and Estebán Montejo, *Biografía de un cimarrón* (Manchester: Manchester University Press, 2010).

for their fierceness and inclination to suicide. Similarly, he pointed out that another strategy was to separate the various ethnic groups, although Fraginals indicated that the Lucumis, Mandingas and Congos understood each other.

In 1866, a cynical book circulated in Havana comparing wage labourers in Spain and slave labourers in its colony. Europe was the clear audience for this publication. Under the initials R.J.E., Ramón J. Espinosa agreed with Reynoso that the slaves had better lives than workers, because they did not have to worry about food and medicine, which the slave owners were responsible for.[36] Espinosa included racial categories to describe the slave as being brutalised, submissive and lazy. In his opinion, blacks born in Africa who still spoke their native languages, belonged to the "true" African race, which occupied a lower rank than the Western race. Likewise, he was in favour of a racial division of labour according to ethnic groups, placing the Arará at the fore because they adapted best to European civilisation, saved up to buy their freedom, and were family-oriented and, therefore, more submissive. He defended the policy of the "good" slave owners who gave the African-born slave a pig and a plot of land because it assured their loyalty to the slave owner and a sense of belonging. According to Espinosa, the daily ration consisted of sixteen ounces of meat, sweet potatoes, bananas, yucca, taro and corn flour, almost all of which were planted by the slaves. He also recalled that two slaves were assigned to instruct the others in Christian customs from the time they were baptised, among other supposed benefits of slavery in Cuba.

For the present purposes, however, the text is particularly of interest as it allows us to follow the life stories of three enslaved Africans that confirmed the horrors of illegal human trafficking, even when this was conducted behind the veil of the supposed benignity of slavery. Nicolás, an imposed Christian name, of the Arará ethnic group, was twelve years old when he was illegally brought to Cuba on a slave ship in 1840, as part of the second slavery during the industrial sugar revolution. According to the author, Nicolás was known among other slaves for the special care and large extension of his *conuco* where he raised pigs and chickens, as well as crops that he delivered to his master and then sold, a practice that was common in the first decades of the nineteenth century. During slow times, Nicolás worked on the plantations, while in the harvest season he was a cane cutter. At the age of twenty-five, he had managed to save three thousand pesos, marrying a fifteen-year-old

36 Ramón J. Espinosa, *El proletario en España y el negro en Cuba* (Habana: Imprenta Militar de M. Soler, 1866).

Cuban-born *criolla*. When Espinosa published his book, Nicolás was thirty-nine years old. Between the ages of nine and fifteen, enslaved children worked in the fields with the *criollos*. At the same time, other slaves worked on his *conuco*. For the writer, Nicolás was such a successful example that he said he would not return to Africa "because he who had lived as a person could not live as a beast again," a cynical rhetoric justifying slavery in the eyes of European readers.

The second testimony was of a Carabalí ethnic couple. Filomena and Cayetano had also been forced to embark on the same illicit expedition as minors. Cayetano was a runaway slave; he was punished and he even tried to commit suicide. All this changed, according to the text, when he began working on his *conuco*. He married and became a "kind of African Rothschild," understood as such by the author because he became a moneylender – specifically, a pig broker; besides this, he had learned to read, count and write. At his death at age fifty-nine, he bequeathed his widow thirteen thousand pesos, money that the enslaved woman gave to the slave owner, who, according to the writer, returned it after putting the deceased's accounts in order. The third account is that of Antonio, a *criollo*, who was assigned to domestic service from a young age. He bought his freedom, but lost his savings after a "failed love affair," and returned to slavery.

The book was a cynical panegyric to slavery in the eyes of modern, civilised Europe. However, besides demonstrating the harshness of slavery, the three examples also show how *conucos*, trades and domestic work could offer slaves the opportunity of saving some money, with which they could buy their freedom, even though this was not the general rule. What's more, they point to the probable transmission of knowledge through agriculture practised in the *conucos*. Recent studies highlight that many of the same crops were grown in Africa and Cuba as a result of the Columbian exchange and the slave trade. Robin Law points out that the African population's diet consisted of grains such as sorghum and millet, yams, and game and fish products that were seasoned with chili pepper and ginger.[37] Many of these crops were brought to the Americas. We must remember that at some Cuban mills, food was delivered raw because the slaves preferred to season their meals. All of this warrants more detailed studies that are beyond the scope of this chapter.

37 Robin Law, Suzanne Schawarz, and Silke Strickrodt, *Commercial Agriculture, the Slave Trade and Slavery in Atlantic Africa* (Oxford: James Currey, 2013).

4 Labour Relations, Food, Commodities and Transatlantic Circuits

The feeding of the slaves was a central concern for landowners. The establishment of the *conucos* to guarantee the slaves' self-subsistence at the mills was alternated with the systematic purchase of jerky and cod on the international market. Sugar historians emphasise that the sugar mill broke with the eating habits of enslaved Africans, whose basic diet was imposed by the owners as a function of workforce maintenance and profitability.[38] Therefore, their diet was rich in carbohydrates through the intake of sugar cane itself, as well as banana, sweet potato, rice, corn, and jerky and cod as animal protein. Other studies highlight the link between medicine and food, which was common to the slave plantations of the Americas.[39] These essays relate the appearance of diseases in slaves, such as beriberi, to insufficient nutrition in their diet, although they argue that slaves' diets differed across agricultural plantations and between western and eastern Cuba.

The importation of foods that ensured animal protein in the slaves' diet illustrates the multidirectional horizontal-vertical exchanges and connections at various scales (global, regional and local) within the transatlantic slave and sugar circuits. Global food exchange also connected triangular trade, the Industrial Revolution, and the debates about nutritional science relating to the middle and working classes on both sides of the Atlantic, especially after the famine in Europe due to the potato plague in Ireland in 1845. This aspect has received little attention from scholars working in the fields of global and labour history, the history of science, commodity histories, and the history of slavery in Cuba.

Cuban landowners tended to feed their slaves with cod imports from Norway, and jerky was introduced from Tampico and the Río de la Plata region at the end of the eighteenth century. Andrew Sluyter analysed the jerky route across Brazil, Cuba and Africa.[40] In the mid-nineteenth century, the importation

38 Ismael Sarmiento, "Del 'funche' al 'ajíaco': La dieta que los amos imponen a los esclavos africanos en Cuba y la asimilación que éstos hacen de la cocina criolla," *Anales del Museo de América* 16 (2008): 217–36; Nitza Villapol, "Hábitos alimenticios africanos en América Latina," in *África en América Latina*, ed. Manuel Moreno Fraginals (México: Siglo XXI, 1977), 325–36.

39 Kennet F. Kiple, *Blacks in Colonial Cuba, 1774–1899* (Gainesville, Florida: University Press of Florida, 1976); Reinier Borrego Moreno, "La temible Trinidad: Esclavitud, malnutrición y beriberi en Cuba," in *Orden político y gobierno de esclavos*, ed. José Antonio Piqueras (Alzira, Valencia: Centro Francisco Tomás y Valiente, UNED, 2016), 177–204.

40 Andrew Sluyter, *Black Ranching Frontiers: African Cattle Herders of the Atlantic World, 1500–1900* (New Haven: Yale University Press, 2012).

of jerky connected Uruguay, Havana, Africa and Europe, a less studied route within historiography.

The Uruguayan cattle industry developed around the meat-curing plants (*saladeros*) where jerky was produced for the slave plantations of Brazil and Cuba. This business prospered with the illicit trade of enslaved Africans. Basque landowner Julián de Zulueta and Pedro Blanco, two notorious slave traders, resorted to the transatlantic Havana – Uruguay jerky route to supply their slave ships with jerky for the journey to West Africa.[41] For example, Zulueta commissioned Pedro Blanco to buy beef jerky at the Gallinas factory in Uruguay, where he acted as agent to Cuba's sugar producers in Africa, with the aim of feeding enslaved Africans.

In the 1840s, the German chemist Justus von Liebig argued for the possibility of industrially obtaining meat extract, a highly concentrated broth derived mainly from cattle, but he lacked the raw material supplies to launch a large-scale commercial venture. In 1859, a group of landowners of English origin had established a meat-curing plant in the town of Fray Bentos, located in western Uruguay.[42] A year later, the German engineer George Christian Giebert, who had worked on the railways and roads in Brazil, bought the land and partnered with Liebig to establish a company dedicated to industrial meat processing, following up on the chemist's proposal by introducing European machinery. Initially, the venture was registered under the name of "Societé de Fray Bentos Giebert et Companie." In 1865, it became known as Liebig's Extract of Meat Company, under Liebig's direction.

Some authors have pointed out that the venture marked the start of the Industrial Revolution in the Río de la Plata region.[43] The company took in workers from various countries. In addition, it globally connected other merchandise production chains such as salt that was imported from Cádiz. Packaged meat changed the eating habits of the working- and middle-class populations around the world. Since then, Fray Bentos has been known as the world's kitchen. In 2016, UNESCO declared the factory a World Heritage Site.

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41 Archivo Histórico Nacional (AHN), Sección Estado, Expediente 8048. The character of Pedro Blanco inspired the novel by Lino Novás Calvo, *Pedro Blanco, el negrero* (Madrid: Espasa Calpe, 1973); María Dolores García Cantús, "Pedro Blanco, el lado oscuro de un negrero," *Hispania*, 45, no. 160(1985): 299–352; María del Carmen Barcía Zequeira, *Pedro Blanco, el negrero: Mito, realidad y espacios* (Havana: Ediciones Bolonia, 2018).

42 René Boretto Ovalle, *Historiografía de la ciudad de Fray Bentos* (Fray Bentos: Imprenta Fray Bentos, 2000).

43 Lucía Lewowicz, *LEMCO: Un coloso de la industria cárnica en Fray Bentos, Uruguay* (The Meat Industry`s Colossus in Fray Bentos, Uruguay) (Montevideo: INAC, Zona Editorial, 2017).

Meat extract was successfully marketed on British and European markets just when science was gaining prominence in solving problems related to the health and nutrition of the middle and working classes, who relied on animal protein as the main nutrient in their diets. As it was easy to transport and not prone to spoilage it was used to feed sailors in the imperialist wars in Africa, and the troops during the Civil War in the United States. Jules Verne even included it as food for astronauts in one of his novels. However, its main uses were medicinal, and housewives used it to flavour food. In fact, the company edited its own cookbooks in various languages. In 1867, meat extract entered Spanish pharmacies as a fortifying digestive tonic.

Mark Finlay suggests various ways in which Liebig's persona and company may be studied in the future.[44] For example, for historians of science interested in the relationship between science and business Liebig may be of interest because he was the ideal example of a business scientist. Similarly, he may be used to more closely examine the relationship between science, medicine and nutrition, especially laboratory solutions applied to social problems. Indeed, Liebig was key in the training and formation of a group of avantgarde scientists, who introduced innovations and modernisation policies in their own countries and (former) colonies, as was the case for the aforementioned *criollo* agronomist Álvaro Reynoso in Cuba. According to Finlay, Liebig is also an interesting figure to study for those interested in observing scientists' occasionally unscrupulous behaviour. For instance, Liebig lied about some information related to his academic background and the quality of some of his products. Similarly, studying Liebig's company is worthwhile for business history, visual culture and women's history. Indeed, Liebig was one of the first to use aggressive advertising and publicity methods to advertise his products. His advertising methods connected the domestic market for women with the world of labour relations. So far, however, this relationship has been insufficiently explored.

In 1872, the Liebig Company promoted meat extract to housewives in Europe through recipes that it marketed with a series of lithographs that alluded to the places where the product was consumed. The company had commercial agents in more than fourteen countries, including Brazil and Cuba. Black servants

44 Mark R. Finlay, "Quackery and Cookery: Justus von Liebig`s Extract of Meat and the Theory of Nutrition in the Victorian Age," *Bulletin of the History of Medicine* 66, no. 3 (1992): 404–18, and Mark R. Finlay "Early Marketing of the Theory of Nutrition: The Science and Culture of Liebig's Extract of Meat," in *The Science and Culture of Nutrition*, 1840–1940, ed. Harmke Kamminga and Andrew Cunnigham (Amsterdam: Brill, Editions Rodopi, 1995), 48–74.

were frequently represented in the advertising artwork because they were the ones who best knew the cuisine of plantation societies. As Cooper recalls, at a time when European elites thought of workers as a class, they thought of Africans as a race, which cannot be overlooked in an analysis of labour relations.[45] The company's visual representation was no exception.

The lithographs were published as collectibles in sets of six to twelve. Cuba participated with a group of six postcards titled "African Picture Cards," in which the image of slaves was associated with the consumption of the product (see figures 9.2–9.7).[46] The lithographs were published in 1899, when Cuba had ceased to be a colony of Spain and was under the occupation of the United States of America. We know that enslaved people on Cuba ate beef jerky, but was the meat extract supplied to slaves? Did it become a part of Cuban cuisine? Were recipe books published in Cuba? These questions remain unanswered. What we do know, is that the lithographs showed male and female slaves working on tobacco and sugar plantations. In other lithographs, the free coloured population was represented as, for instance, local market vendors and milk street vendors, as well as domestic servants. The women depicted in market scenes carried their baskets on their heads, like African women.

The image of enslaved Africans and *criollos* put forward on the lithographs was that of happy and smiling faces against a background of idyllic and exotic tropical landscapes, and was clearly manufactured for a European audience. For example, in the lithograph depicting the sugar plantations, the image of a slave carrying an ox-drawn cart full of sugar cane shows an idealised country landscape with traditional peasant huts. That is, the landscape does not reproduce the slave sugar plantation. Instead, it appropriates the rural landscape of Cuba with some of the typical houses of the peasants (see figures 9.2–9.7). The recipe on the back of the card was aimed at middle-class and working-class European housewives. Thus, slavery entered European cuisine, but it also associated Liebig with the Caribbean slave plantation.

The numerous lithographs featuring cooking recipes and home remedies not only linked the domestic female labour market with slave plantations in Brazil and Cuba; they also connected women around the globe, for instance connecting Andalusian women with Asian workers on pepper plantations in

45 Frederick Cooper, *Plantation Slavery on the East African Coast* (New Haven: Yale University Press, 1977), and *Beyond Slavery: Explorations of Race, Labor, and Citizenship in Postemancipation* Societies (Chapel Hill: University of North Carolina Press, 2014).

46 Liebig's Extract of Meat Company, *Advertising Cards* (Belgium: Antwerp, 1899–1942). See William Woys Weaver, "The Dark Side of Culinary Ephemera: The Portrayal of African Americans," *Gastronomica: The Journal of Food and Culture* 76, no. 3 (2006): 76–81.

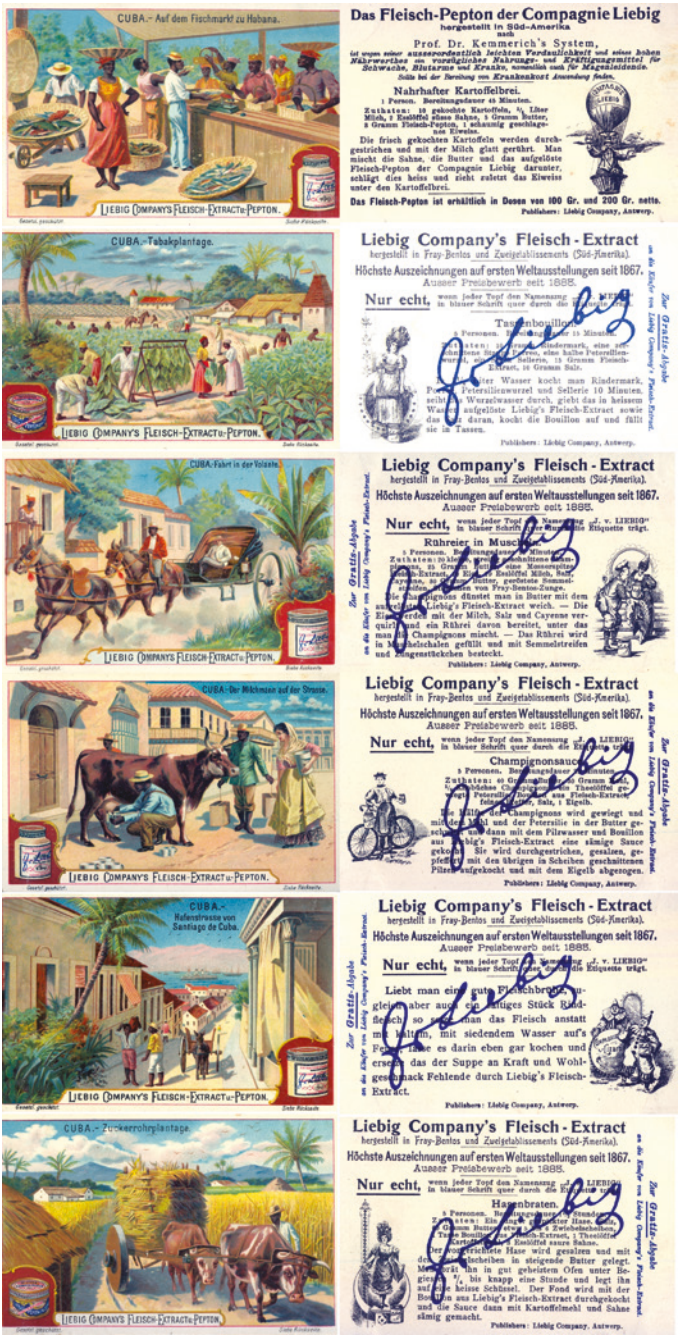

FIGURE 9.2–9.7 Liebig's advertising cards
SOURCE: LIEBIG' S EXTRACT OF MEAT COMPANY, *ADVERTISING CARDS* (BELGIUM: ANTWERP, 1899)

Malaysia or housewives in the United States. Similarly, the picture cards perpetuated racial and folkloric stereotypes within the collective imagination.[47] In Spain, the cards perpetuated the image of gypsy women; in the Americas and Southeast Asia, they featured the landscape and workers of the plantations – slaves and indentured labourers, as well as male and female cooks and labourers and even the general population.

5 Conclusions

Conceptual history has highlighted the need to explore the diverse, ambiguous and contradictory meanings of the concept of "tropical agriculture." The notion was probably born with the conquest of the tropics and imperial expansion in the New World, but its greatest scope and consolidation within the language of industrial modernity occurred between the 1750s and 1870s, an era that coincided with the rise and decline of the slave plantation in Cuba. Today, many of the terms related to tropical agriculture continue to give shape to the collective imagination of the tropics and its agriculture, perpetuating notions of the dependency and underdevelopment of the so-called Global South.

In this chapter, I have outlined the main discursive elements that distinguished the creation of the concept of tropical agriculture in the period of industrial modernisation. Cuba is undoubtedly a good case study because it developed slave plantation agriculture in the middle of the golden age of the Industrial Revolution in Europe. At the same time, it had a group of erudite and active landowners who promoted and/or financed – through the private initiative of colonial institutions – the introduction of the industrial advances that were the driving force of industrial and agricultural modernity on both sides of the Atlantic. Early on, the island was connected with the transatlantic sugar and slave circuits of which the east coast of the United States and the Caribbean sugar and slave colonies (the so-called Sugar Islands) were part. Cuba also had an abundance of land and an ideal climate for cultivating sugar cane; in combination with the labour strategies used by landowners, these factors made it the "sugar queen" par excellence, according to economic historians. However, the sugar was only cultivated on certain parts of the island until the end of the nineteenth century. Therefore, the notion that Cuba's success in sugar cultivation depended on natural conditions concealed the fact that

47 David Ciarlo, *Advertising Empire: Empire, Race and Visual Culture in Imperial Germany* (Cambridge, MA: Harvard University Press, 2001).

colonial agriculture was an active participant in the global history of the sugar industry, because it marked the time limits of the industrial frenzy. That is, the success of the industry was affected if agricultural yields decreased due to overexploitation and collapse of ecological conditions.

My reflections, therefore, are rooted in the absence of studies on the origin and circulation of the concept of "prodigal tropical agriculture," an idea that I have been researching for several years to demonstrate that colonial agriculture was the focus of local knowledge and practices that shaped global tropical agricultural science. I argue that it was impossible to reproduce the tropics in the laboratories of the European and American industrial power centres in order to dissect, inventory and conquer them. That is, their study required what Robert Kholer has called "residential science" and the formation of what I call a tropical community of global and local agents, to collect information in situ but also to produce, correct and apply knowledge to agro-industry, which is only studied by the manufacturing sector.[48] The recruitment and hiring of transnational plantation experts in industrial centres was also key for agricultural modernity. In this process, the practices and knowledge of enslaved Africans should be considered within global history studies of agricultural labour relations. In other words, the introduction, diffusion and production of agricultural technologies in the tropics relied on and/or were negotiated between the practices and knowledge of Western science and the practices and ancestral knowledge of slave workers. The latter is of growing interest for studies on African agency within the history of slavery.

The microcosm of the slave sugar plantation illustrates the confluence of various labour Relationships, such as Asian workers, destined to produce for both global and local markets. The modernity of agriculture elucidates the connections that not only blurred borders – imperial, Atlantic/Pacific, centre/periphery – but that also made agriculture multidirectional. An analysis of these connections demonstrates that colonial agricultural modernity was jointly constructed by the same transatlantic sugar and slave agents, networks and circuits that led to the invention, circulation and adaptation of industrial capital in Europe and the United States. This chapter illuminates the central place of slaves' diet in connecting different labour relations that respond to the global taxonomy developed by Karin Hofmeester and Marcel van der Linden. At the same time, it underscores the interconnectedness between various agricultural commodity chains, the Industrial Revolution and the science of the

48 Robert E. Kohler, *All Creatures: Naturalists, Collectors, and Biodiversity, 1850–1950* (Princeton, New Jersey: Princeton University Press, 2013).

nutrition of workers on both sides of the Atlantic. They are all connected by the invisible thread of globalisation and the world market.

Bibliography

Alexander, Robert J. *A History of Organized Labor in Cuba*. Westport, CT: Praeger, 2002.

Armus, Diego, and Adrian López Denis. "Disease, Medicine, and Health." In *The Oxford Handbook of Latin America History*, edited by José C. Moya, 424–53. New York: Oxford University Press, 2011.

Barcía Zequeira, María del Carmen. *Pedro Blanco, el negrero: Mito, realidad y espacios*. Havana: Ediciones Bolonia, 2018.

Barcia, Manuel. *Seeds of Insurrection: Domination and Resistance on Western Cuban Plantations, 1808–1848*. Baton Rouge: Louisiana State University Press, 2009.

Barnet, Miguel, and Estebán Montejo. *Biografía de un cimarrón*. Manchester: Manchester University Press, 2010.

Barragán, Rossana, and David Mayer. "Latin America and the Caribbean." In Hofmeester and Van der Linden, *Handbook Global History of Work*, 83–110.

Bergad, Laird W., Fe Iglesias García, and María del Carmen Barcia. *The Cuban Slave Market, 1790–1880*. New York: Cambridge University Press, 1995.

Boretto Ovalle, René. *Historiografía de la ciudad de Fray Bentos*. Fray Bentos: Imprenta Fray Bentos, 2000.

Borrego Moreno, Reinier. "La temible trinidad: Esclavitud, malnutrición y beriberi en Cuba." In *Orden político y gobierno de esclavos*, edited by José Antonio Piqueras, 177–204. Alzira, Valencia: Centro Francisco Tomás y Valiente, UNED, 2016.

Bosma, Ulbe, and Jonathan Curry-Machado. "Two Islands, One Commodity: Cuba, Java, and the Global Sugar trade (1790–1930)." *Nieuwe West-Indische Gids* (New West Indian Guide) 86 (2012): 237–62.

Brennam, James P. "Latin America Labor History." In *The Oxford Handbook of Latin American History*, edited by José C. Moya, 342–63. New York: Oxford University Press, 2011.

Carney, Judith A. *Black Rice: The African Origins of Rice Cultivation in the Americas*. Cambridge, MA: Harvard University Press, 2001.

Carney, Judith A. "African Traditional Plant Knowledge in the Circum-Caribbean Region." *Journal of Ethnobiology* 23, no. 2 (2003): 167–85.

Carney, Judith A., and Richard Nicholas Rosomoff. *In the Shadow of Slavery: Africa´s Botanical Legacy in the Atlantic World*. Berkeley, Los Angeles and London: University of California Press, 2009.

Casanovas Codina, Joan. *Bread, or Bullets! Urban Labor and Spanish Colonialism in Cuba, 1850–1898*. Pittsburgh, PA: University of Pittsburgh, 1998.

Ciarlo, David. *Advertising Empire: Empire, Race and Visual Culture in Imperial Germany*. Cambridge, MA: Harvard University Press, 2001.

Cooper, Frederick. *Plantation Slavery on the East African Coast*. New Haven: Yale University Press, 1977.

Cooper, Frederick. *Beyond Slavery: Explorations of Race, Labor, and Citizenship in Postemancipation Societies*. Chapel Hill: University of North Carolina Press, 2014.

Curry-Machado, Jonathan. *Cuban Sugar Industry: Transnational Networks and Engineering Migrants in Mid-Nineteenth Century Cuba*. New York: Palgrave Macmillan, 2011.

Curtin, Philip D. *The Atlantic Slave Trade: A Census*. Madison: University of Wisconsin Press, 1969.

Eltis, David, and David Richardson. *Atlas of the Transatlantic Slave Trade*. New Haven: Yale University Press, 2015.

Ely, Roland T. *Cuando reinaba Su Majestad el Azúcar: Estudio histórico-sociológico de una tragedia latinoamericana; El monocultivo en Cuba, origen y evolución del proceso*. Havana: Imagen Contemporánea, 2001.

Espinosa, Ramón J. *El proletario en España y el negro en Cuba*. Habana: Imprenta Militar de M. Soler, 1866.

Esquivel, Miguel, and Karl P. Hammer. "The Cuban Homegarden '*Conuco*': A Perspective Environment for Evolution and In Situ Conservation of Plant Genetic Resources." *Genetic Resources and Crop Evolution* 39, no. 1 (January 1992): 9–22.

Fernández Prieto, Leida. "Islands of Knowledge: Science and Agriculture in the History of Latin American and the Caribbean." *Isis* 104, no. 4 (December 2013): 786–97.

Fernández Prieto, Leida. "Crónica anunciada de una Cuba Azucarera." In *Francisco Arango y la invención de la Cuba azucarera*, edited by María Dolores González-Ripoll and Izaskun Álvarez Cuartero, 55–65. Salamanca: Universidad de Salamanca, 2009.

Fernández Prieto, Leida. "Mapping the Global and Local Scientific Archipelago: Agriculture, Knowledge and Practices, 1790–1870." In *Global Scientific Practice in an Age of Revolutions, 1750–1850*, edited by Patrick Manning and Daniel Rood, 181–98. Pittsburgh, PA: University of Pittsburgh Press, 2016.

Fernández Prieto, Leida. "Plantas, plantas y saberes en la red del tráfico negrero: Cuba-España-África." In *Cádiz y el tráfico de esclavos: De la legalidad a la clandestinidad*, edited by Martin Rodrigo y Alharilla and Maria del Carmen Cózar Navarro, 295–321. Madrid: Silex, 2018.

Fernández Sebastián, Javier, ed. *Diccionario político y social del mundo iberoamericano: Conceptos políticos fundamentales, 1770–1870*. Madrid: Centro de Estudios Políticos y Constitucionales – Universidad del País Vasco, 2014.

Ferrer, Ada. *Freedom's Mirror: Cuba and Haiti in the Age of Revolution*. New York: Cambridge University Press, 2014.

Fesser, Andrea. *Red, White, and Black Make Blue: Indigo in the Fabric of Colonial South Carolina Life*. Athens, GA: University of Georgia Press, 2013.

Finlay, Mark R. "Early Marketing of the Theory of Nutrition: The Science and Culture of Liebig's Extract of Meat" In *The Science and Culture of Nutrition, 1840–1940*, edited by Harmke Kamminga and Andrew Cunningham, 48–74. Amsterdam: Brill, Editions Rodopi, 1995.

Finlay, Mark R. "Quackery and Cookery: Justus von Liebig's Extract of Meat and the Theory of Nutrition in the Victorian Age." *Bulletin of the History of Medicine* 66, no 3 (1992): 404–18.

Fortes-Lima, Cesar, Jonas Bybjerg-Grauholm, Lilia Caridad Marin-Padrón, Enrique Javier Gomez-Cabezas, Marie Bækvad-Hansen, Christine Søholm Hansen, Phuong Le et al. "Exploring Cuba's Population Structure and Demographic Story Using Genome-Wide Data." *Scientific Reports* 11422 (2018). https://doi.org/10.1038/s41598-018-29851-3.

Franco, José Luciano. *Comercio clandestino de esclavos*. Havana: Editorial de Ciencias Sociales, 1980.

Fuente, Alejandro de la, and Ariela J. Gross. *Becoming Free, Becoming Black: Race, Freedom, and Law in Cuba, Virginia, and Louisiana*. New York: Cambridge University Press, 2020.

García Cantús, María Dolores. "Pedro Blanco, el lado oscuro de un negrero." *Hispania* 45, no. 160 (1985): 99–352.

García Mora, Luis Miguel, and Antonio Santamaria García, eds. *Los ingenios: Colección de vistas de los principales ingenios de azúcar de la isla de Cuba,*written by Justo G. Cantero and drawn by Eduardo Laplante. Madrid: CSIC-Doce Calles, 2005.

García Rodríguez, Mercedes. *Entre haciendas y plantaciones: Los orígenes de la manufactura azucarera de La Habana*. Havana: Editorial de Ciencias Sociales, 2007.

González-Ripoll, María Dolores. "Dos viajes, una intención: Francisco Arango y Alejandro Oliván en Europa y las Antillas azucareras (1794 y 1829)." *Revista de Indias* 62, no. 224 (2002): 85–102.

González-Ripoll, María Dolores, and Izaskun Álvarez Cuartero, eds. *Francisco Arango y la invención de la Cuba azucarera*. Salamanca: Universidad de Salamanca, 2009.

Hofmeester, Karin, and Marcel van der Linden, eds. *Handbook Global History of Work*. Berlin and Boston: De Gruyter Oldenbourg, 2018.

Hofmeester, Karin, and Marcel van der Linden. "Introduction." In *Handbook Global History of Work*, edited by Karen Hofmester and Marcel van der Linden, 1–14. Berlin and Boston: De Gruyter Oldenbourg, 2018.

Kiple, Kenneth F. *Blacks in Colonial Cuba, 1774–1899*. Gainesville, Florida: University Press of Florida, 1976.

Kohler, Robert E. *All Creatures: Naturalists, Collectors, and Biodiversity, 1850–1950*. Princeton, New Jersey: Princeton University Press, 2013.

Law, Robín, Suzanne Schawarz, and Silke Strickrodt. *Commercial Agriculture, the Slave Trade and Slavery in Atlantic Africa*. Oxford: James Currey, 2013.

Leonard, Adrian, and David Pretel, eds. *The Caribbean and the Atlantic World Economy: Circuits of Trade, Money and Knowledge, 1650–1914*. Basingstoke: Palgrave Macmillan, 2015.

Lewowicz, Lucia. *LEMCO: Un coloso de la industria cárnica en Fray Bentos, Uruguay* (The Meat Industry's Colossus in Fray Bentos, Uruguay). Montevideo: INAC, Zona Editorial, 2017.

Manning, Patrick. "Slave Labour." In *Handbook Global History of Work*, edited by Karen Hofmester and Marcel van der Linden, 373–94. Berlin and Boston: De Gruyter Oldenbourg, 2018.

McCook, Stuart G. *States of Nature, Science, Agriculture and Environment in the Spanish Caribbean 1760–1940*. Austin: University of Texas Press, 2002.

Mintz, Sidney. *Sweetness and Power: The Place of Sugar in Modern History*. New York, Viking, 1985.

Moreno Fraginals, Manuel. *El ingenio*. Barcelona: Crítica, 2002.

Novás Calvo, Lino. *Pedro Blanco, el negrero*. Madrid: Espasa Calpe, 1973.

Palmer, Steven. "From the Plantation to the Academy. Slavery and the Production of Cuban Medicine in the Nineteenth Century." In *Health and Medicine in the Circum-Caribbean, 1800–1968*, edited by Juanita De Barros, Steven Palmer, and David Wright, 53–75. New York: Routledge, 2009.

Pérez de la Riva, Juan. *El monto de la inmigración forzada en el siglo XIX*. Havana: Editorial de Ciencias Sociales, 1979.

Piqueras, José Antonio, ed. *Orden político y gobierno de esclavos*. Alzira, Valencia: Centro Francisco Tomás y Valiente, UNED, 2016.

Portuondo, María M., "Plantation Factories: Science and Technology in Late-Eighteenth-Century Cuba." *Technology and Culture* 44 (April 2003): 231–57.

Puig-Samper, Miguel Ángel, Consuelo Naranjo Orovio, and Armando García González, eds. *Ensayo Político de la isla de Cuba, Alexander von Humboldt*. Aranjuez, Doce Calles: Junta de Castilla y León, 1998.

Rodrigo Alharilla, Martín, and Lizbeth Chaviano, eds. *Negreros y esclavos: Barcelona y la esclavitud atlántica, siglos XIX-XIX*. Barcelona: Icaria, 2017.

Roldán de Montaud, Inés. "The Misfortune of Liberated Africans in Colonial Cuba, 1824–76." In *Liberated Africans and the Abolition of the Slave Trade, 1807–1896*, edited by Richard Anderson and Henry B. Lovejoy, 153–73. Rochester, NY: University of Rochester Press, 2020.

Rood, Daniel. *The Reinvention of the Atlantic Slavery: Technology, Labor, Race, and Capitalism in the Greater Caribbean*. New York: Oxford University Press, 2017.

Sarmiento, Ismael. "Del 'funche' al 'ajíaco': La dieta que los amos imponen a los esclavos africanos en Cuba y la asimilación que éstos hacen de la cocina criolla." *Anales del Museo de América* 16 (2008): 217–36.

Scott, Rebecca, *Slave Emancipation: The Transition to Free Labor, 1860–1899*. Pittsburgh, PA: University of Pittsburgh Press, 2000.

Sluyter, Andrew. *Black Ranching Frontiers: African Cattle Herders of the Atlantic World, 1500–1900*. New Haven, Yale University Press, 2012.

Tomich, Dale W., ed. *New Frontiers of Slavery*. New York: SUNY Press, 2016.

Tomich, Dale W., ed. *Slavery and Historical Capitalism during the Nineteenth Century*. Lanhan, MD: Lexington Books, 2017.

Tomich, Dale W. *Through the Prism of Slavery: Labor, Capital, and World Economy*. Lanham, MD: Rowman & Littlefield, 2004.

Tomich, Dale W., Rafael de Bivar Marquese, Reinaldo Funes Monzote, and Carlos Venegas. *Reconstructing the Landscapes of Slavery: A Visual History of the Plantation in the Nineteenth-Century Atlantic World*. Chapel Hill: University of North Carolina Press, 2021.

Varela, Claudia, and Manuel Barcia. *Wage-Earning Slaves:* Coartación *in Nineteenth-Century Cuba*. Gainesville: University Press of Florida, 2020.

Villapol, Nitza. "Hábitos alimenticios africanos en América Latina." In *África en América Latina,* edited by Manuel Moreno Fraginals, 325–36. México: Siglo XXI, 1977.

Voeks, Robert, and John Rashford. *African Ethnobotany in the Americas*. New York: Springer, 2013.

Woys Weaver, William. "The Dark Side of Culinary Ephemera: The Portrayal of African Americans." *Gastronomica: The Journal of Food and Culture* 76, no. 3 (2006): 76–81.