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ARTICLE

Cannabis et al.: The Portmanteau Biota Concept Applied to an Enslaved Central African Migration

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Abstract

Historian Alfred Crosby developed the concept of "portmanteau biota"—the organisms that accompany a human migration—to analyse European expansion in the Atlantic World. This concept has not been used to understand enslaved African migrations. I identify elements of the portmanteau biota of people whom slavers called "Congoes." At least five other organisms accompanied these people from Central Africa: *Cannabis*, manioc, cattle, the tsetse fly, and the trypanosome that causes African sleeping sickness. Based on how these organisms affected social-ecological resilience for the "Congo" migration, I describe four ways to characterize elements of portmanteau biotas. Some organisms negatively impact social-ecological systems in which they were previously unknown; I call these "novel antagonists." In contrast, "familiar antagonists" negatively impact social-ecological systems in which they were previously known. Other organisms, which I call "mutualists," enhance social-ecological resilience, differing by whether they were familiar or novel in those systems. The role of any organism is context-dependant, and not categorical. *Cannabis*, for example, had mutualistic characteristics as it enhanced resilience for African social-ecological systems, and antagonistic characteristics as it enhanced the capacity of overseers to extract labour within plantation capitalism. Applied in this way, the portmanteau biota concept underscores the ecological complexity of human migrations.

Keywords: biogeography; Cannabis; Columbian Exchange; trypanosomiasis; transatlantic slave trade

Introduction

Cannabis, like all drug plants, has a biogeographic history that reflects its ecological adaptations in conjunction with human activities. It is a highly adaptable plant and humans have valued its psychoactive potential for millennia.[1] Consequently, *Cannabis* has travelled worldwide, from its evolutionary centre of origin in Central Asia to nearly all inhabited landmasses between sixty degrees north and south latitude. An important event in the historical biogeography of *Cannabis* was when it crossed the Atlantic to colonize the Americas.

The transatlantic transfer of plants and animals has transformed environments worldwide since 1492. Scholars study the so-called Columbian Exchange to understand relationships between social systems and ecosystems.[2] The development and expansion of

[1] Robert C. Clarke and Mark D. Merlin, Cannabis: Evolution and Ethnobotany (Berkeley: University of California Press, 2013); Chris S. Duvall, Cannabis (London: Reaktion Books, 2014).

[2] Nicole Boivin, Dorian Q. Fuller, and Alison Crowther, "Old World Globalization and the Columbian exchange: comparison and contrast," *World Archaeology* 44 (2012): 452-469; Judith Carney, *Black Rice: The African Origins of Rice*

capitalism has been a important theme in environmental histories of the post-1492 Atlantic World, because this is where key elements of modern societies arose.[3] The transatlantic dispersal of *Cannabis*—whether considered from a European perspective as primarily a fibre crop, or an African perspective as primarily a drug crop—is linked to the expansion of plantation capitalism, a system built upon coerced labour, industrial monocropping, and extractive technologies.[4] I focus herein on the African history of *Cannabis*, which connects to the history of slavery. Plantation capitalism encircled the Atlantic by the eighteenth century, when slave-grown commodities like sugar, cotton, and tobacco were integral to European and North American industrialization.[5] Critics of the current global economy have called our moment the *plantationocene* because plantation capitalism endures.[6] This political-economic system arose not solely through social and technological processes, but also through interactions of human and non-human organisms.

Most organisms that have crossed the Atlantic came on European-controlled ships. Consequently, scholars have focused on the environmental consequences of European economies of colonial and capitalist expansion, neglecting the subsistence economies and migrations of non-European peoples.[7] Africans in particular have been overlooked, under the belief that slavery prevented the enslaved from having agency in shaping the environments in which they lived. Africans did, however, carry plant seeds, other organisms, and environmental knowledge across the Atlantic, and helped to produce new environments in the Americas.[8]

The organisms that accompanied transatlantic human migrations included grains and other foodstuffs, domesticated animals, animal feed and fodder (including weed seeds), pests, and infectious diseases. Most people who crossed the Atlantic only passively accompanied non-human species, and did not purposefully carry any fellow organisms. Intentionally transported crops and livestock helped enable European societies to establish outposts in new lands with climates similar to Europe; the crops that Africans carried helped support cultural and physical survival. Passively transported weeds, pests,

Cultivation in the Americas (Cambridge, MA: Harvard University Press, 2001); Judith Carney and Richard N. Rosomoff, *In the Shadow of Slavery* (Berkeley: University of California Press, 2009); Alfred W. Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport, CT: Greenwood Publishing Co., 1972); Erle Ellis et al. "People have shaped most of terrestrial nature for at least 12,000 years," *Proceedings of the National Academy of Sciences* 118 (2021): e2023483118; Daniel W. Gade, "Particularizing the Columbian exchange: Old World biota to Peru," *Journal of Historical Geography* 48 (2015): 26-35; Thomas Grennes, "The Columbian exchange and the reversal of fortune," *Cato Journal* 27 (2007): 91-107; Nathan Nunn and Nancy Qian, "The Columbian exchange: A history of disease, food, and ideas," *Journal of Economic Perspectives* 24 (2010): 163-188.

[3] Joseph E. Inikori, "Atlantic slavery and the rise of the capitalist global economy," *Current Anthropology* 61 (2020): S159-S171; Trevor Burnard and Giorgio Riello, "Slavery and the new history of capitalism," *Journal of Global History* 15 (2020): 225-244.

[4] Duvall, *Cannabis*; Chris S. Duvall, *The African Roots of Marijuana* (Durham, NC: Duke University Press, 2019).

[5] Sidney Mintz, *Sweetness and Power: The Place of Sugar in Modern History* (New York: Viking, 1985); Sidney Mintz, "Was the plantation slave a proletarian?," *Review (Fernand Braudel Center)* (1978): 81-98; Dale Tomich, "Rethinking the plantation: Concepts and histories," *Review (Fernand Braudel Center)* (2011): 15-39; Jason W. Moore, "The Modern World-System as environmental history? Ecology and the rise of capitalism," *Theory and Society* 32 (2003): 307-377; Trevor Burnard and John Garrigus, *The Plantation Machine: Atlantic Capitalism in French Saint-Domingue and British Jamaica*. (Philadelphia: University of Pennsylvania Press, 2016).

[6] Wendy Wolford, "The Plantationocene: A lusotropical contribution to the theory," *Annals of the American Association of Geographers* 111 (2021): 1622-1639.

[7] Carney, *Black Rice*.

[8] Carney, *Black Rice*; Carney and Rosomoff, *In the Shadow of Slavery*; Duvall, *The African Roots of Marijuana*; Andrew Sluyter, *Black Ranching Frontiers* (New Haven, CT: Yale University Press, 2012); Robert Voeks, *Sacred Leaves of Candomblé: African Magic, Medicine, and Religion in Brazil* (Austin, TX: University of Texas Press, 1997); Case Watkins, *Palm Oil Diaspora: Afro-Brazilian Landscapes and Economies on Bahia's Dendê Coast* (Cambridge: Cambridge University Press, 2021).

and pathogens—such as Eurasian smallpox and measles—decimated Indigenous American populations independently of the human-to-human violence of colonial expansion.

Environmental historian Alfred Crosby described the suite of organisms associated with the transatlantic European migration as its "portmanteau biota". This concept supported his explanation of settler colonialism as "a team effort by organisms that had evolved in conflict and cooperation over a long time."[9] Conceptualizing human migrations as multispecies events is powerful because environmental change exists in complex, more-than-human networks.[10] Crosby's research has been influential because he analysed the processes of European colonial expansion more holistically than earlier studies. His core idea—colonialism was a multi-species team effort—has not been challenged as an explanation in environmental history, even though scholars have objected to Eurocentrism in studies of the Columbian Exchange.

My focus is how the concept of portmanteau biota can be applied to understand the forced migrations of enslaved Africans that underpinned plantation capitalism. Portmanteau biota began as a Eurocentric idea because Crosby was explicitly focused on European imperial expansion. However, its analytical power extends more broadly. For example, prehistorians of the Indian Ocean and Pacific Ocean Worlds discuss ancient human migrations based on the portmanteau biotas associated with different population movements.[11] This generic sense is absent in works focused on the Atlantic, even though transatlantic migrations were more diverse than European expansion. Indeed, Africans were the most numerous demographic group to cross the ocean until the early 1800s.[12] The portmanteau biota concept has not served in human-environment analyses of enslaved African migrations, or other non-European population movements, such as indentured South Asian labourers in the 1800s or Indigenous American migrations after 1492. Constructing portmanteau biota as a solely European feature oversimplifies post-Columbian social-ecological changes.

Portmanteau biotas unconnected to European biogeography altered social-ecological conditions around the Atlantic in ways that both aided and hindered the expansion of colonialism and capitalism. Crosby's presentation of the portmanteau biota concept centred on Eurasian organisms and benefited from his vivid metaphor of "shock troops"—unintentionally transported, rapidly dispersing plants, pests, and pathogens—that damaged indigenous social-ecological systems prior to the arrival of settlers. I want to raise two points with regard specifically to Crosby's "shock troops" metaphor.

First, the anthropomorphic, militaristic language of his metaphor implies that colonial expansion can be reduced analytically to biotic warfare and that post-1492 social-ecological change was a unidirectional, sweeping invasion outward from Europe. Biotic, Darwinian competition contributed to post-1492 environmental changes, but all political-economic regimes exist as historically and geographically contingent social-technical-ecological systems. Colonial expansion and the rise of plantation capitalism were equally dependent upon uneven social power relations and extractive technologies as upon biotic interactions. Second, the "shock troops" metaphor works for some organisms—particularly pathogens of Eurasian origin in the Americas—but it is poor for others. Based on analysis of one African portmanteau biota, I identify additional categories of organisms according to how these affected resilience in social-ecological systems (Table 1). Many organisms had roles that encompassed more than one of these categories, which are intended only as

[9] Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe* (Cambridge, UK: Cambridge University Press, 1986), 293.

[10] Jamie Lorimer and Timothy Hodgetts, *More-than-Human* (London: Taylor & Francis, 2024).

[11] Nicole Boivin et al., "Indian Ocean Food Globalisation and Africa," *African Archaeological Review* 31 (2014), 547–81; S. Hertler, et al., "Alfred W. Crosby: Adapting Within a Matrix of Flora and Fauna," *Life History Evolution: A Biological Meta-Theory for the Social Sciences*, ed. Steven C. Hertler et al. (New York: Springer, 2018), 43–56.

[12] Carney and Rosomoff, *In The Shadow of Slavery*, 102.

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Table 1. Functional categories organisms within portmanteau biotas. These descriptions are intended to be heuristic, and not exclusionary, taxonomic groupings

Metaphorical labels	General descriptions	Specific examples
novel antagonists	Crosby's "shock troops": Organisms that reduce the resilience of social-ecological systems in which they were previously unknown.	Smallpox among Indigenous Americans
familiar antagonists	Organisms that reduce the resilience of social-ecological systems in which they were previously known.	Trypanosomiasis among Central Africans
familiar mutualists	Organisms that increase the resilience of social-ecological systems in which they were previously known.	*Cannabis* among Central Africans
novel mutualists	Organisms that increase the resilience of social-ecological systems in which they were previously unknown.	Manioc among Central Africans

heuristic guides. My thinking about resilience rests upon theory in sustainability science that resilient social-ecological systems are those that maintain identity despite disruptions.[13] Individual organisms can affect social-ecological resilience in many ways within more-than-human networks of relationship.

My argument contributes to efforts to particularize the processes that produced the Columbian Exchange.[14] I examine the historical biogeographies of five organisms, highlighting *Cannabis*, that participated in transatlantic chattel slavery but have been mostly neglected in the Columbian Exchange literature. Geographically, my focus is western Central Africa, where transatlantic slaving began in the 1500s and sharply peaked in the early 1800s.[15] I concentrate on a species assemblage that included the group of forced migrants that slavers called "Congoes," because they were embarked from ports located in the so-called Congo coastal region of modern Angola to Gabon. Slavers devised many labels in order to categorize enslaved Africans.[16] The "Congo" label did not correspond to any pre-existing group, but related only to where people entered the Middle Passage. The geographic basis of labels like "Congoes" aligns with approaches in historical biogeography that seek to identify dispersal pathways along which organisms achieved their current distributions. Multiple species of plants and animals accompanied the enslaved human migration from western Central Africa. The portmanteau biota of "Congoes" included food crops, livestock, pests, pathogens, and at least one drug crop, *Cannabis*. By "drug crop" I mean a cultivated plant valued principally as a source of therapeutic substances.[17]

Below, I first summarize the sources from which scholars can deduce the transatlantic ecological expansion of Africa during the modern period. Next, I describe the portmanteau biota I have identified in association with "Congoes", emphasizing the organisms that have been neglected within the Columbian Exchange literature. Finally, I close by assessing the

[13] Graeme Cumming and Garry Peterson, "Unifying research on social–ecological resilience and collapse," *Trends in Ecology & Evolution* 32 (2017): 695-713.

[14] Gade, "Particularizing the Columbian exchange."

[15] Joseph Miller, *Way of Death: Merchant Capitalism and the Angolan Slave Trade* (Madison, WI: University of Wisconsin Press, 1988); Daniel Domingues da Silva, *The Atlantic Slave Trade from West Central Africa* (Cambridge, UK: Cambridge University Press, 2017).

[16] Marcos Abreu Leitão De Almeida, "African Voices from the Congo Coast: Languages and the Politics of Identification in the Slave Ship Jovem Maria (1850)," *Journal of African History* 60 (2019): 167-189.

[17] Definition based on "pharmaceutical crop" as defined by: Shiyou Li et al., "Pharmaceutical crops: An overview", *Pharmaceutical Crops* 1 (2010): 1-17.

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impacts of the "Congo" portmanteau biota on past socio-ecological systems, and how this case aids understanding of the Columbian Exchange more broadly.

African ecological expansion

Historic observers and recent scholars have identified organisms that crossed the Atlantic to and from Africa after 1492. Evidence for African ecological expansion comes from primary documentary sources, cultural and linguistic geography, and biogeography, including phylogeography. An overview of these general types of sources helps contextualize evidence for the "Congo" portmanteau biota.

Historical writers recorded either direct observations of biotic transport, or contemporaneous oral histories of transport. Primary sources were written almost exclusively by Europeans. The earliest primary sources are from the fifteenth century, and the record is still expanding: transatlantic transfers continue in the present.

Although historical interest in newly encountered landscapes and colonial economic development generated many relevant observations, the primary record is very patchy in historical, geographic, and biological terms. There are observations made in Africa that provide evidence for the distribution of African organisms, and the occurrence of organisms originally from Europe, the Americas, and Asia. For instance, in 1602 in what is now Ghana, a Dutch trader recorded local production of oranges, limes, and bananas, proof that these crops had crossed Africa centuries after arriving from southern Asia to eastern Africa. He also observed maize, the first indication that this New World crop had arrived in Africa, while his descriptions of finger millet and West African rice indicate connections between the coast and the distant inland areas where the indigenous grains had been domesticated.[18] Many relevant accounts relate to the provisioning of slave ships, which took on African foodstuffs prior to departing toward the Americas.[19] Other primary sources include observations made in the Americas, where some observers had direct knowledge of past plant and animal introductions or the ability to interpret their observations as historical biogeographic evidence. For instance, in Brazil in the 1640s, a Dutch naturalist identified in the gardens of enslaved people the African plants okra, sesame, and African aubergine, and concluded, "Just as the Europeans once transported plants and seedlings to America that they found valuable, so [did] the Africans."[20] Overall, primary sources do not include information about most organisms, and observations were recorded for relatively few locations and relatively few moments in time. European observers generally overlooked plants and animals that did not directly provide economic benefits, or were inconspicuous, or were not valued in European societies.

Consequently, scholars have used additional sources of information to deduce the historical dispersals of organisms. Language geography can provide circumstantial evidence of past dispersals. Colonial languages often suggested general origins, through names such as "Angola grass" and "Guinea grass", two forage species that accompanied African livestock across the Atlantic.[21] Of course, such names can be inaccurate or misleading, and must be examined alongside additional information. Some plant names are traceable to specific African languages or language areas. For example, *Cajanus cajun*, now commonly called "pigeon pea", was historically called "Congo pea," "Angola pea," or "guandú" (or similar

[18] Pieter de Marees, *Description and Historical Account of the Gold Kingdom of Guinea* (Oxford: Oxford University Press, 1987 [1602]).

[19] Carney and Rosomoff, *In the Shadow of Slavery*.

[20] Guilherme Piso, *História Natural e Médica da Índia Ocidental* (Rio de Janeiro: Instituto Nacional do Livro, 1957 [1658]), 441.

[21] Judith Carney, "Seeds of Memory: Botanical Legacies of the African Diaspora," *African Ethnobotany in the Americas*, ed. Robert Voeks and John Rashford (New York: Springer, 2013), 13–33, see 22.

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words), based on the plant's name in Kikongo and related Central African languages.[22] The appearance of African plant or animal names in the Americas shows that knowledge crossed the Atlantic, but not necessarily the organisms themselves.[23] Overall, the number and variety of African plant names recorded in the Americas is strong circumstantial evidence of both plants and plant knowledge crossing the Atlantic.[24]

Biogeography can suggest the likely general area where a species originated by identifying where closely related organisms exist. For instance, peanuts are an important crop across Africa but were clearly introduced from South America, where there are 79 other species in the same genus.[25] In recent decades, genetic studies have produced unprecedented detail for understanding historical dispersals of a relatively small number organisms, and only one of those I consider, manioc (*Manihot esculenta*). Phylogeographic analyses that map the distribution of genetic groups have allowed biologists to identify centres of biogeographic origin more narrowly than previously possible. As an example, botanists have traced the origins of African rice cultivars in Guyana to locations in modern Senegal, Gambia, and Mali, a finding that corroborates biogeographies inferred from historical, cultural, and linguistic evidence.[26] Additionally, genetic analyses have enabled studies of inconspicuous organisms, such as insects and pathogens. For instance, based on phylogeography biologists have identified African origins of the mosquito *Aedes aegypti*, which transmits yellow fever and dengue fever to humans.[27] Historians have known from primary sources that *Aedes* was associated with transatlantic slave shipping,[28] but the genetic evidence strengthens understanding of historical ecology and epidemiology.

Cultural geography can indicate human knowledge transfers associated with specific plants and animals. Cultural geographic analyses have helped change the historiography of the Atlantic World. During the twentieth century, a theme was that Africans had no role in the Columbian Exchange. This interpretation reflected general neglect of Africans in academic history, and more narrowly the view that the constraints of slavery erased African knowledge and prevented the enslaved from having agency within social-ecological systems. Recent scholars have shown that enslaved people did exercise agency in shaping the landscapes they encountered, and, indeed, in many cases slaveholders sought African expertise to improve the production systems they oversaw.[29] The historiographic action of removing agency from Africans often accompanied unjustifiable attribution of knowledge and agency to Europeans. For example, the geographer Judith Carney has shown that plantation owners in South Carolina sought enslaved labourers from Senegambia who had technical knowledge of rice cultivation. Yet, earlier historians attributed the establishment of the rice economy to Europeans who were entirely ignorant of this agriculture.[30]

More broadly, it is unjustifiable to attribute human agency in cases where humans had no knowledge or awareness of accompanying organisms.[31] Thus, humans might have created a habitat for *Aedes* mosquitoes in shipboard water barrels, but the insect located the mobile

[22] Carney, "Seeds of Memory," 15; Duvall, *The African Roots of Marijuana*, 153.

[23] Voeks, *Sacred Leaves*.

[24] Tinde Van Andel et al., "Local Plant Names Reveal that Enslaved Africans Recognized Substantial Parts of the New World flora," *Proceedings of the National Academy of Sciences* 111 (2014), e5346–e5353.

[25] David J. Bertioli et al., "An overview of peanut and its wild relatives," Plant Genetic Resources 9 (2011), 134-149.

[26] Tinde Van Andel et al., "Hidden Rice Diversity in the Guianas," *Frontiers in Plant Science* 10 (2019), 1161.

[27] Michelle Moore et al., "Dual African Origins of Global *Aedes aegypti* Populations Revealed by Mitochondrial DNA," *PLoS Neglected Tropical Diseases* 7 (2013), e2175.

[28] J.R. McNeill, *Mosquito Empires: Ecology and War in the Greater Caribbean, 1620–1914* (Cambridge, UK: Cambridge University Press, 2010).

[29] Carney and Rosomoff, *In the Shadow of Slavery*; Sluyter, *Black Ranching Frontiers*.

[30] Carney, *Black Rice*.

[31] Gade, "Particularizing the Columbian exchange".

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habitat patches and had the biological and behavioural adaptiveness to survive in these patches. Non-human agency is a core element of Crosby's "team effort" interpretation of portmanteau biota, even if it is challenging to de-centre historical analyses from humans.

One Portmanteau Biota from Africa

An assemblage of organisms travelled from western Central Africa to points around the Atlantic. The central element of this assemblage were the enslaved humans whom slavers called "Congoes". The portmanteau biota of these people consisted of at least five other species: psychoactive *Cannabis*, manioc, cattle, tsetse fly (*Glossina morsitans*), and the microorganism *Trypanosoma brucei*, which causes human African trypanosomiasis (commonly called sleeping sickness). Biogeographically, these species include two indigenous to Africa (*Glossina* and *Trypanosoma*), two originally from Eurasia but established in Africa centuries before 1492 (cattle and *Cannabis*), and one (manioc) from South America that was introduced to Africa and later recrossed the Atlantic on slave ships. I focus on *Cannabis*, tsetse fly, and the trypanosome because these have received little attention in the Columbian Exchange literature.

Documentation of this portmanteau biota dates primarily from the nineteenth century, which is when the greatest number of enslaved people, cumulatively several million, were taken from western Central African ports.[32] The human element of the "Congo" migration is well documented through primary sources, such as slave-ship records held in the Transatlantic Slave Trade Database that enumerate the number and some demographic characteristics of enslaved people embarked and/or disembarked at different ports.[33] For the other species, the primary record is strongest regarding manioc and cattle; there are also good sources for *Cannabis* dispersal from Africa that I analyse in more detail elsewhere.[34]

Transatlantic slaving from Central Africa started in the 1500s. In the following centuries, slave-trading routes extended gradually inland from Atlantic ports toward different areas.[35] By the middle 1700s, for instance, enslaved people originally from the lower Zambezi River valley in south-eastern Africa began entering Atlantic commercial networks. The volume of the transatlantic slave trade from Central Africa peaked in the period 1800-1840, even as abolition efforts advanced. The number of people who were taken from western Central African ports rose steadily from the mid-1700s, reached its annual maximum about 1830, and finally ceased in the 1860s. During the 1800s, most of the enslaved people were shipped toward Brazil, with Cuba also receiving hundreds of thousands. Smaller numbers were landed in locations ranging from São Tome to the United States.

Beginning in 1808, the British Navy captured slave ships and resettled the so-called Liberated Africans in British-held territories around the Atlantic, most commonly St. Helena (which was a transfer point), Sierra Leone, and the Caribbean.[36] To a far lesser extent the U.S. Navy also captured slave ships, settling the freed people primarily in Liberia. Although Liberated Africans were a small subset—perhaps 10%—of the total captive population, they were well-documented by European physicians, administrators, and others involved in naval suppression of the slave trade. Many of the best documentary sources for the "Congo" portmanteau biota refer to Liberated Africans, especially in Sierra Leone,

[32] Miller, *Way of Death*; Domingues, *The Atlantic Slave Trade*.

[33] The Slave Voyages Consortium, *Trans-Atlantic Slave Trade Database*, v2.2.13 (2023). URL: https://www.slavevoyages.org/.

[34] Duvall, *The African Roots of Marijuana*.

[35] Miller, *Way of Death*; Domingues, *The Atlantic Slave Trade*.

[36] Daniel Domingues da Silva et al., "The diaspora of Africans liberated from slave ships in the nineteenth century," *The Journal of African History* 55 (2014): 347-369.

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Liberia, and the Caribbean. I must underscore that voyages which began in Central Africa and ended at an African port provide evidence about transatlantic processes, despite their relatively short distances. Disembarkations in São Tome, Liberia, or Sierra Leone represent a sample of the much larger population of ships and people that fully crossed the Atlantic.

The dispersal of psychoactive *Cannabis* from western Central Africa is relatively well documented, although the historical biogeographic literature on *Cannabis* is highly Eurocentric.[37] The genus *Cannabis* comprises two groups—sometimes called species, subspecies, or varieties—that differ genetically in their psychoactive potential. However, these groups do not consistently differ in physical appearance, meaning that psychoactive and non-psychoactive plants cannot be reliably distinguished based on visible characters. Prior to about the 1840s, essentially all European plants belonged to the non-psychoactive group, often labelled *Cannabis sativa*, while African plants belonged to the psychoactive group, labelled *Cannabis indica*. The dominant narrative about *Cannabis* is that the plant came to the Americas almost exclusively from Europe, where *sativa* hemp was valued before and after 1492 as a fibre source. According to this narrative, psychoactivity appeared in the Americas only because non-European populations found dissipative uses of the European industrial crop. This explanation builds upon racial stereotypes of drug use but is biologically faulty because the European plant population did not have psychoactive potential.[38] People from Africa are given almost no role in the plant's transatlantic history, despite that *Cannabis indica* was present in Africa long before 1492, and many more Africans crossed the Atlantic than any other migration from Old World locations where *indica* grew.

Primary sources and language geography provide evidence for the dispersal of psychoactive *Cannabis* from Africa.[39] Accounts of *Cannabis* in Central Africa show that the plant travelled with slaves toward ports of embarkation. In Angola, slavers supplied *Cannabis* to their captives, while also making the enslaved carry commercial shipments of the plant drug.[40] In Gabon, in about the 1840s, a French-American traveller observed an enslaved man keeping *Cannabis* seeds in order to plant these wherever he would be disembarked.[41] At the other ends of the Middle Passage, oral histories recorded in Brazil, Liberia, and Sierra Leone indicated that *Cannabis* arrived with "Congoes" who carried seeds through their journeys.[42] Language geography suggests that *Cannabis* crossed the ocean from Central Africa, where it arrived from southeastern Africa. [43] European observers widely called the plant "Congo tobacco" and "Angolan tobacco". Other words for psychoactive *Cannabis* around the Atlantic trace to Bantu languages spoken in the region from the Congo coast to the lower Zambezi Valley. The most widespread examples relate to words such as Kimbundu *diamba, liamba*, and *mariamba*, the root of *marihuana*.[44] Historical accounts indicate that labourers appreciated *Cannabis* as a multi-purpose therapeutic substance, a stimulant used before and during work, and a relaxant used other times.

The dispersal of tsetse fly and the trypanosome broadly paralleled that of African *Cannabis*, though the plant was much more successful. The plant is not connected ecologically to the other organisms; these merely co-existed within a portmanteau biota. Moreover, the insect and the pathogen are connected ecologically in sleeping sickness, an

[37] Duvall, *The African Roots of Marijuana*, chapter 2; Duvall, *Cannabis*.

[38] Duvall, *The African Roots of Marijuana*, chapter 2.

[39] Duvall, *The African Roots of Marijuana*.

[40] William Daniell, "On the D'amba, or dakka, of southern Africa," *Pharmaceutical Journal and Transactions* 9 (1850), 363–5.

[41] Paul Du Chaillu, *Explorations and Adventures in Equatorial Africa*, 1st ed. (New York: Harper Brothers, 1861), 420.

[42] Duvall, *The African Roots of Marijuana*, 144-146.

[43] Duvall, *The African Roots of Marijuana*, chapter 7.

[44] Duvall, *The African Roots of Marijuana*, 140.

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illness endemic to sub-Saharan Africa that exists through the interaction of three organisms: *Trypanosoma brucei*, its vector the tsetse fly, and a mammal reservoir that hosts the trypanosome during part of its lifecycle.[45] Historically, trypanosomiasis had a 100% mortality rate, and still there are few effective treatments. Humans are a reservoir species, as are domestic cattle and their wild relatives, including most African antelopes. Cattle travelled with enslaved people within Central Africa and from regional ports.[46] In cattle, the infection causes African animal trypanosomiasis, the illness commonly called nagana.[47] Historical European awareness of sleeping sickness came from slave trading, because disease outbreaks corresponded to dynamics in forced labour markets.[48] Notable outbreaks accompanied increased slaving activities in West Africa in the late 1700s and Central Africa in the 1830s, and movements of forced labourers in the 1890s. Scientists did not discover the microbial origin of sleeping sickness until 1901.[49]

The trypanosome marks its presence in bodies because infected people develop a distinctive swelling of lymph glands in the neck. By the late 1700s, Europeans recognized that this swelling signified incurable disease.[50] Historical observations of "Winterbottom's sign"—the symptom was named after a British doctor who worked in Sierra Leone in the 1790s—are biogeographic evidence of trypanosome dispersal. Slave traders considered the swollen glands "a symptom indicating a disposition to lethargy, and they either never buy such slaves, or get quit of them as soon as they observe any such appearances."[51] Slavers attempted to 'cure' infected people through whipping. [52] A later physician reported, "When any of the slaves showed symptoms of the disease on transport ships, they were mercilessly thrown overboard."[53] The trypanosome directly and indirectly reduced the capacity of enslaved Africans to survive the conditions of captivity.

In the 1700s and 1800s, physicians proposed many possible causes of sleeping sickness. One set of explanations attributed the illness to some sort of poisoning—perhaps palm wine, bad water, manioc, or *Cannabis*.[54] Again, there is no ecological connection between the plants and the disease; the historical discourse arose from recognition of their coexistence within environments occupied by "Congoes". The first detailed effort towards medical treatment of sleeping sickness was published in 1840 by a British physician working among liberated slaves in Sierra Leone.[55] He also published the earliest record of *Cannabis* in West Africa, in Sierra Leone in 1851, where the plant had arrived decades earlier with people freed from slave ships.[56] Some of these people carried *Cannabis* seeds,

[45] There are two subspecies of *T. brucei, gambiensis* in western Africa and *rhodesiense* in East Africa. August Stich, Paulo M. Abel, and Sanjeev Krishna. "Human African trypanosomiasis," *British Medical Journal* 325 (2002): 203-206.

[46] Miller, *Way of Death*; Nicolas Delsol, *Cattle in the Postcolumbian Americas: A Zooarchaeological Historical Study* (Gainesville, FL: University Press of Florida, 2024).

[47] R.J. Connor and P. van den Bossche, "African Animal Trypanosomoses," *Infectious Diseases of Livestock, Volume One* (2004), 251–96.

[48] Maryinez Lyons, *The Colonial Disease: A Social History of Sleeping Sickness in Northern Zaire, 1900–1940* (Cambridge: Cambridge University Press, 1992).

[49] Dietmar Steverding, "The History of African Trypanosomiasis," *Parasites & Vectors* 1 (2008), 3–33.

[50] Ian Maudlin, "African trypanosomiasis," *Annals of Tropical Medicine & Parasitology* 100 (2006): 679-701.

[51] Thomas M. Winterbottom, *An Account of the Native Africans in the Neighbourhood of Sierra Leone*, vol. 2 (London: C. Whittingham, 1803), 30.

[52] Winterbottom, *An Account*, 30.

[53] Louis Sambon, "The Elucidation of Sleeping Sickness," *Transactions. Epidemiological Society of London* 23 (1904), 61–3.

[54] Otto Gleim, "Berichte über die Schlafkrankheit der Neger im Kongogebiete," *Archiv für Schiffs- und Tropen-Hygiene* 4 (1900), 359–63, see 361–2.

[55] Robert O. Clarke, "Observations on the disease lethargus: With cases and pathology," *London Medical Gazette* 26 (1839–1840), 970–6.

[56] Clarke, "Observations on the disease lethargus," 973.

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some carried trypanosomes. The physician speciously connected *Cannabis* and trypanosomiasis in 1860 when he wrote, "I have known several instances of [sleeping sickness] being induced in youth of both sexes from smoking 'diamba'."[57] In the following decades the cannabis-causes-trypanosomiasis idea became common knowledge in western Central Africa.[58]

Nonetheless, few physicians accepted the poisoning theory of trypanosomiasis aetiology, based primarily on comparing the distributions of the plant and the illness. São Tome provided an important test case. Portuguese epidemiologists working in the archipelago in 1900 rejected the cannabis-causes-trypanosomiasis idea because the disease occurred on Principe island, where the plant was absent, and because its increased incidence during the 1800s correlated to increased arrivals of indentured plantation labourers from mainland Central Africa.[59] The disease spread to the islands because tsetse flies arrived there probably in the 1820s, with cattle shipped from Gabon.[60] The pathogen and plant also arrived during the same period, though the plant did not survive on Principe. Manioc poisoning was similarly rejected as a cause of sleeping sickness because the plant was consumed much more widely across Africa than the disease occurred.[61] Manioc had come to São Tome centuries before, on Portuguese ships in the 1600s.[62]

Manioc—the subject of a robust historical literature—contrasts with the other elements of the "Congo" portmanteau biota. *Manihot esculenta* was domesticated prehistorically in the Amazon Basin, and by 1492 was a widespread staple in the tropical Americas.[63] Importantly, manioc can be toxic if not processed properly. Knowledge of its detoxification did not necessarily accompany the plant, and inadvertent poisonings enabled the manioc-causes-trypanosomiasis theory. Manioc became fundamentally important to colonial and capitalist economies because it proved a reliable and inexpensive crop; it enabled subsistence farming as well as industrial food production throughout the global tropics.[64] Portuguese traders introduced it to western Africa during the sixteenth century. In Central Africa, the crop spread inland along slave-trading routes and became a subsistence staple incorporated into local, non-commercial food cultures.[65] Simultaneously, *Manihot* became an integral foodstuff in plantation capitalist endeavours worldwide, including American sugar plantations

[57] Robert O. Clarke, "Gold Coast, Enclosure No. 1, Medical Report for the year 1858," *The Reports Made for the Year 1858 to the Secretary of State having the Department of the Colonies [...]. Part II* (London: Eyre and Spottiswoode, 1860), 21–33, see 29.

[58] August Hirsch, *Handbuch der historisch-geographischen Pathologie*, 1st ed., vol. 2 (Erlangen, Germany: Ferdinand Enke, 1862–1864), 661.

[59] Ministerio da Marinha e Ultramar, *Doença do Somno: Relatorios Enviados ao Ministerio da Marinha Pela Missão Scientifica Nomeada por Portaria de 21 de Fevereiro de 1901* (Lisbon: Libanio da Silva, 1901), 5–6.

[60] Catherine Higgs, *Chocolate Islands: Cocoa, Slavery, and Colonial Africa* (Athens, OH: Ohio University Press, 2012), 58–64.

[61] Annibal Bettencourt, Ayres Kopke, José Gomes de Rezende Junior, *Doença do Somno: Trabalhos executados até 6 de agosto 1902 pela missão enviada a Angola [...]* (Lisbon: Typographia do "Dia", 1902), 48-49.

[62] Doyle McKey and Marc Delêtre, "The emergence of cassava as a global crop," *Achieving Sustainable Cultivation of Cassava*, ed. Clair Hershey (Sawston, UK: Burleigh Dodds Science Publishing, 2017), chapter 1.

[63] McKey and Delêtre, "The emergence of cassava."

[64] Kaori O'Connor, "Beyond 'Exotic Groceries': Tapioca/Cassava/Manioc, a Hidden Commodity of Empires and Globalisation," *Global Histories, Imperial Commodities, Local Interactions*, ed. Jonathan Curry-Machado (London, Palgrave Macmillan, 2013), 224-247; Nielson Rosa Bezerra, "Slavery and Cassava in the Atlantic World: Commercial and Cultural Relationship between Rio de Janeiro and Angola in the Nineteenth Century," *Many Rivers to Cross: Black Migrations in Brazil and the Caribbean*, ed. Elaine Rocha (Wilmington, DE: Vernon Press, 2024): 49.

[65] Takako Ankei, "Diffusion of Cassava Detoxification in Africa: A Reconsideration of its Biocultural History," *African Study Monographs* S61 (2023): 93-138; Jan Vansina, "Histoire du manioc en Afrique centrale avant 1850," *Paideuma* 43 (1997): 255-279.

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and African slave markets, because manioc flour could be readily produced, stored, and shipped in large quantities.[66]

Manihot revolutionized Central African agriculture.[67] Africans developed new methods of detoxification alongside new cultivars.[68] *Manihot* proved especially important because it could thrive in conditions unsuitable for other crops and survive periods of social unrest as a root living inconspicuously underground. It could be left underground as long as needed, in contrast to other crops that had specific harvest seasons. The agriculture that developed in western Central Africa after 1492 centred on the dietary and economic staples manioc, maize, calabash, and tobacco,[69] but it was manioc's productivity, drought tolerance, and resilience that strengthened farming systems. *Cannabis* was similarly resilient, a hardy crop that yielded valued products even without horticultural care. Farmers grew it in small quantities along with various vegetables as complements to manioc and other staples.[70] Manioc and *Cannabis* both suited travellers, some of whom carried little but the durable root and packets of dried *Cannabis*. [71] Manioc re-crossed the Atlantic from east to west as processed flour and possibly also as stem cuttings or unprocessed roots.[72] In the Americas, enslaved and free African communities grew the crop because it was a staple in their food cultures and adapted to socially and ecologically risky conditions.[73]

These plants succeeded in environments that also generated sleeping sickness. Historians have interpreted sleeping sickness in nineteenth-century Central Africa as the culmination of decades of social-ecological exploitation and destruction.[74] Across that region, *Cannabis*, manioc, cattle, and trypanosomiasis accompanied exploitative labour relationships. Tsetse fly occupies much of tropical Africa, but its biogeographic range expanded because ecological disruption produced their optimal habitat of patchy woodland vegetation inhabited by cattle and antelope.[75] Ecological disruption occurred through multiple pathways, including vegetation changes associated with changes in human demographics and farming and hunting practices.

[66] Miller, *Way of Death*, 415; McKey and Delêtre, "The emergence of cassava"; O'Connor, "Beyond 'Exotic Groceries'"; Vanessa S. Oliveira, "Gender, Foodstuff Production and Trade in Late-Eighteenth Century Luanda," *African Economic History* (2015): 57-81.

[67] Miller, *Way of Death*, 19; Vansina, "Histoire du manioc"; Oliveira, "Gender, Foodstuff Production and Trade".

[68] Ankei, "Diffusion of Cassava'; McKey and Delêtre, "The emergence of cassava."

[69] J.J. Monteiro, *Angola and the River Congo*, vol. 2 (London: Macmillan, 1875), 28; F. Welwitsch, *Synopse explicativa das amostras de madeiras e drogas medicinaes e de otros objectivos normente ethnographicos colligidos na provincia de Angola* (Lisbon: Imprensa Nacional, 1862), 45; H. Baum, *Kunene—Sambesi-Expedition* (Berlin: Kolonial-Wirtschaftlichen Komitees, 1903), 7; H.A. Dias de Carvalho, *Expedição portugueza ao Muatiânvua: Descripção da viagem á Mussumba do Muatiânvua, Vol. 2: Do Cuango ao Chicapa* (Lisbon: Imprensa Nacional, 1892), 56; H. Capello and R. Ivens, *De Benguela as Terras de Iácca*, vol. 2 (Lisbon: Imprensa Nacional, 1881), 259.

[70] A. Sisenando Marques, *Expedição portugueza ao Muata-Ianvo: Os climas e as producções das Terras de Malange á Lunda* (Lisbon: Imprensa Nacional, 1889), 103.

[71] J.H. de Faria Leal, "Memorias d'Africa, Capitulo 4: Como se foi ocupando a antiga circunscrição de S. Salvador do Congo [Continuação]," *Boletim da Sociedade de Geographia de Lisboa* 33 (1915): 18.

[72] Other foodstuffs were processed on slave ships, including grains and oil palm nuts: Carney, *Black Rice*; Watkins, *Palm Oil Diaspora*. Manioc roots sprout when planted but they are difficult to store without spoilage, so the likelihood of transoceanic survival is low. Manioc transports readily as stem cuttings, which are inedible but resprout when planted. I have not found evidence for the form in which the plant traveled from the Americas on European ships, or whether it recrossed the Atlantic from Africa.

[73] Watkins, *Palm Oil Diaspora*; Tinde Van Andel, Amber van der Velden, and Minke Reijers, "The 'Botanical Gardens of the Dispossessed' Revisited: Richness and Significance of Old World Crops Grown by Suriname Maroons," *Genetic Resources and Crop Evolution* 63 (2016): 695-710.

[74] Lyons, *The Colonial Disease*; John Ford, *The Role of the Trypanosomiases in African Ecology: A Study of the Tsetse Fly Problem* (Oxford: Clarendon Press, 1971).

[75] Ford, *The Role of the Trypanosomiases*.

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Slave caravans included infected people and thus spread trypanosomes within Africa, allowing the pathogen to colonize landscapes where tsetse flies were present.[76] Sleeping sickness entered transatlantic slave trading, as did cattle, manioc, and *Cannabis*. In 1869 a French physician traced occurrences of sleeping sickness in Martinique to "Congoes," who carried the illness to London too.[77] The disease was not contagious outside Africa because tsetse flies did not survive shipping farther than São Tome.[78] The disease likewise did not spread in locations where infected cattle arrived but the fly did not. Of course, the illness is not simply an ecological relationship. The social-economic processes that enabled slavery and the expansion of capitalism enabled trypanosomiasis epidemics. People unable to travel freely cannot avoid locations they consider dangerous. On São Tome, for example, plantation bosses rejected labourers' beliefs that tsetse flies caused sleeping sickness and forced them to work in habitats where the flies thrived.[79] People with inadequate clothing or shelter have reduced protection against insect bites. Slave coffles must have been tormented by tsetse flies as bound slaves were unable to swat them. People—both the enslaved and their captors—used *Cannabis* as a general-purpose therapeutic in these environments, but I cannot link its use with any specific disease.

I have dwelt upon trypanosomiasis because the illness has not received attention comparable to the domesticates that were coincidentally associated with it. Plants, animals, and microorganisms were all elements of the "Congo" portmanteau biota. These organisms all somehow thrived in environments associated with "Congoes," a made-up ethnicity whose presence marked aspects of plantation capitalism extending from slave markets in Africa to industrial farms in the Americas.

Portmanteau Biotas and Social-Ecological Resilience

My research has broadly focused on *Cannabis*, and this journal issue is about histories of drugs. Nonetheless, this paper devotes many words to manioc, cattle, and trypanosomiasis because *Cannabis* and its drug use is a more-than-human entity, not simply an interaction between plant and people.[80] The historical biogeography of *Cannabis* in the Atlantic World is embedded in the expansion of colonialism and plantation capitalism.[81] The plant's past dispersal includes its past sociopharmacology, the context of health-related factors such as disease, nutrition, and housing, all of which are produced within social-ecological systems.[82] Understanding the past sociopharmacology of *Cannabis* is a step toward more precise understanding of the Columbian Exchange, necessary because Crosby's seminal works were highly generalized.[83] Drug plants except tobacco have been neglected in histories of the Columbian Exchange.

The case of the "Congo" portmanteau biota suggest ways in which non-human fellow travellers might affect resilience within social-ecological systems, including colonialism and capitalism. First, the example of trypanosomiasis suggests that Crosby's "shock troops" should be re-labelled to recognize other ways that pathogens can relate to human

[76] Frank L. Lambrecht, "Aspects of Evolution and Ecology of Tsetse Flies and Trypanosomiasis in Prehistoric African environment," *The Journal of African History* 5 (1964), 1-24.

[77] Steverding, "The History of African Sleeping Sickness"; Sambon, "The Elucidation".

[78] Rudolph Matas, "Morbid Somnolence," *The New Orleans Medical and Surgical Journal* 11 (1883–1884), 510–25, see 523.

[79] Higgs, *Chocolate Islands*, 58.

[80] See: Lorimer and Hodgetts, *More-than-Human*.

[81] Duvall, *The African Roots of Marijuana*.

[82] Samuel R. Friedman, "Sociopharmacology of drug use: initial thoughts," *International Journal of Drug Policy* 13 (2002): 341-347.

[83] Gade, "Particularizing the Columbian exchange."

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societies (Table 1). Crosby focused on what I term novel antagonists, exemplified in the Columbian Exchange by Eurasian pathogens that decimated Indigenous American populations. I have not identified novel antagonists in the "Congo" portmanteau biota, but African organisms did have this role in American environments.[84] The best known examples are malaria, yellow fever, and their mosquito vector *Aedes aegyptii*.[85] Africans carried acquired immune resistance to these illnesses to the Americas; few Europeans had resistance and Indigenous Americans had none. By producing increased mortality rates for Europeans in the tropical Americas, these African pathogens theoretically improved African prospects—though only theoretically because the social-technological conditions of enslavement likely cancelled any biotic benefit.

Not all antagonists within a portmanteau biota are novel, as illustrated by *Trypanosoma brucei*, which reduced the resilience of the social-ecological systems in which it was indigenous. There is no evidence that human populations exposed to the trypanosome develop immunological resistance.[86] Historical Africans from endemic areas were biologically as susceptible to infection as either Europeans or Africans from non-endemic areas. However, European physicians initially believed sleeping sickness was "strictly confined to the negro race."[87] Africans were more susceptible only because of the social-technical conditions of the exploitative, racial labour systems that existed historically. All people fell victim to trypanosomiasis, but those deprived of basic needs were more susceptible to initial infection. Incidence rates from São Tome in 1900 show 6% of Europeans and 18% of Africans became infected.[88] The different incidence rates represent effects of socioeconomic class on disease exposure and susceptibility within the archipelago's plantation capitalism. Trypanosomiasis was effectively an occupational hazard for coerced labourers, even though biologically it was equally malignant to all people. Both the trypanosome and its insect vector were familiar antagonists within the "Congo" portmanteau biota (Table 1).

The trypanosome did not function as a novel antagonist for American populations because its reproductive cycle depends upon tsetse flies, whose different biological needs meant that it rarely survived shipping. Tsetse fly has relatively narrow climate tolerances and must feed at specific moments of the lifecycle for successful reproduction.[89] It endured only the relatively short passage to São Tome, the sole location I have identified where the five elements of the "Congo" portmanteau biota survived. "Congoes" survived and ultimately thrived in many locations around the Atlantic, despite severe social-cultural oppression and the continued pestilence of familiar antagonists like malaria, yellow fever, and trypanosomiasis.

Finally, some elements of portmanteau biotas are mutualists because they increase the resilience of social-ecological systems (Table 1). *Cannabis* and manioc are both examples. As a novel mutualist, manioc helped improve diets and enable population growth in Central Africa despite the impacts of slaving and warfare.[90] Across the Atlantic, manioc was important for the same reasons for enslaved and free people of African descent.[91] Beginning in the 1600s, people in Central Africa adopted *Manihot* and began traveling with it. It certainly accompanied them through the Middle Passage in the form of flour, and possibly in the living forms of stem cuttings or unprocessed roots. Manioc grew on either end of the Middle

[84] See: Reinhard Hoeppli, *Parasitic Diseases in Africa and the Western Hemisphere: Early Documentation and Transmission by the Slave Trade* (Basel: Verlag für Recht und Gesellschaft, 1969).

[85] McNeill, *Mosquito Empires*.

[86] Maudlin, "African Trypanosomiasis'; Steverding, "The History of African Trypanosomiasis."

[87] Sambon, "The Elucidation," 61.

[88] Ministerio da Marinha e Ultramar, *Doença do Somno*, 8–9.

[89] C.H.N. Jackson, "The Biology of Tsetse Flies," *Biological Reviews* 24 (1949): 174-199.

[90] Miller, *Way of Death*, 19; Vansina, "Histoire du manioc"; Oliveira, "Gender, Foodstuff Production and Trade."

[91] Carney and Rosomoff, *In the Shadow of Slavery*; Watkins, *Palm Oil Diaspora*.

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Passage, where it enhanced the resilience of Central African and "Congo" social-ecological systems.

Cannabis enhanced resilience as a fellow traveller, from the time of its earliest documentation in Africa in the lower Zambezi valley in the 1580s.[92] In broad terms, it supported people who faced hardship, such as when it was used as an appetite suppressant or general-purpose therapeutic, and stimulated social engagement within varied cultural contexts. However, neither *Cannabis* nor manioc should be categorized as simply mutualist, because both had complicated roles within the "Congo" portmanteau biota. Manioc served subsistence farmers and small-scale markets, as well as large-scale food production necessary to sustain coerced labour regimes. The biological dispersal of *Cannabis* and the cultural diffusion of its drug use were linked to highly stratified social systems, whose underclasses were made to complete onerous but simple tasks in risky environments, and rarely with any prospect of release from those conditions. *Cannabis* was a low-input environmental resource that labourers valued because it enhanced their capacities to endure marginalization and exploitation. People chose to grow it because of its pharmacology, which helped workers manage appetite, stimulate willingness to work, and treat generalized mental and physical malaise. To some degree, *Cannabis* increased the resilience of the "Congo" migration by helping people endure appalling conditions.

Nonetheless, both manioc and *Cannabis* had antagonistic characteristics in their subsistence roles. Other elements of portmanteau biotas have had multifaceted, if not contradictory, roles in social-ecological change. By helping labourers endure, *Cannabis* enhanced the capacities of elites to profit from exploitation. A quote from a British colonial administrator in nineteenth-century Trinidad encapsulates how *Cannabis* supported the goals of overseers; although this quote reflects one observer's perspective in a specific place and time, it summarizes labour-drug relationships documented elsewhere and with other substances.[93] The administrator observed, "if a man can undergo harder exertions under the influence of ganja than his might would allow [...] it is rather a kind of inhumanity on the part of his employers to extort more work from him than his natural health and strength can permit."[94] The extraction of "more work" illustrates the concept of surplus value in political-economic thought. Surplus value is one source of wealth that can be captured in capitalist societies, when overseers take labour from workers without paying for it. Manioc also generated surplus value in its role as a subsistence crop: it required less labour than earlier Central African staples, and thereby increased the availability of labourers to work colonial cash crops.[95] This relationship existed too in the gardens of enslaved and manumitted people in the Americas, whose self-provisioning enabled their overseers to spend less on rations or wages. By assisting the extraction of surplus value, both manioc and *Cannabis* functioned as antagonists in some contexts.

Yet simultaneously, *Cannabis*, like other drugs, has hindered capitalist endeavours by aiding workers in resisting the demands of their overseers. *Cannabis* enhanced work slowdowns, purposeful inefficiencies, absenteeism, subversive thought, and other activities that opposed the desires of elites. Around the Atlantic, by the early 1900s political-economic authorities came to agree that *Cannabis* ultimately benefited workers more than elites.

[92] Duvall, *The African Roots of Marijuana*, 166-167.

[93] Mintz, *Sweetness and Power*; William Jankowiak and Daniel Bradburd, eds., *Drugs, Labor and Colonial Expansion* (Tucson, AZ: University of Arizona Press).

[94] The quote is from the "Trinidad Commission", apparently one of several subcommittees within the Indian Hemp Drugs Commission that were assigned to investigate *Cannabis* and other drugs in British colonies outside India: Indian Hemp Drugs Commission, *Report of the Indian Hemp Drugs Commission, 1893–1894, Report* (Simla, India: Government Central Printing Office), 406.

[95] McKey and Delêtre, "The emergence of cassava," 16.

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Colonial authorities bemoaned the plant drug's effects on labour supply and quality and pushed for cannabis prohibition on these bases.[96]

Conclusion

By proposing heuristic categories for non-human organisms within portmanteau biotas, I wish to draw attention to the ecological complexities of human migrations, including the interconnectedness of drug plants and other organisms. The concept of portmanteau biota helps to analyse how social-technical-ecological systems might move spatially over time, in contexts beyond its explicitly Eurocentric original application. The categories I have described—novel and familiar antagonists and mutualists—suggest different ways in which non-human organisms might affect humans, but the effect of non-human agency is context-dependent. Any species might do and mean different things in different times and places. Social-ecological change happened around the Atlantic after 1492 not through an epic battle won by a Eurasian biota but instead through biotic entanglements within social-technical systems that produced stark power differentials between people. Drug plants other than tobacco have been essentially overlooked in histories of the Columbian Exchange. The complex interconnections *Cannabis* has had with other organisms helped produce aspects of plantation capitalism that were associated with the enslaved "Congo" migration.

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[96] Duvall, *The African Roots of Marijuana*.

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