
HoST - Journal of History of Science and Technology

Vol. 15, no. 1, June 2021, pp. 1-10

10.2478/host-2021-0001

SPECIAL ISSUE

GLOBAL FLORA: MASTERING EXOTIC PLANTS (EIGHTEENTH—NINETEENTH CENTURIES)

Introduction: Global Flora: Mastering Exotic Plants (Eighteenth—Nineteenth Centuries)

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My idea in urging us to postpone the end of the world is

simply so that we can always tell one more story.

If we can do that, we'll be postponing the end.

Ailton Krenak, *Ideias para Adiar o Fim do Mundo*
(São Paulo: Companhia das Letras, 2019)

In this dossier, we reflect on plants that travel and the knowledge associated with them. Like human beings, plants move around and can adapt to new situations. In fact, it is no longer possible to effectively distinguish native and exotic plants. Environmental preservation and

restoration works often deal with plants foreign to the biome they now inhabit, some of which become invasive species that stunt the growth of native plants. At the same time, to take but one example, our current pattern of food consumption is based on such nearly ubiquitous plant species as potatoes, wheat, and rice. Other plants are now so acclimatized in their new habitats that people think of them as having been there forever, like mangoes in Brazil, cassava in Africa, chili peppers in India, and rubber trees in Malaysia.¹

While plants may have always traveled, the European colonization of the Americas accelerated the process and quickly altered habits and customs worldwide, as Alfred Crosby demonstrated in his pioneering work.² With the onset of the colonial enterprise and the trade of enslaved people from Africa to the Americas, the Atlantic became one of the great modern routes for the circulation of plants, as a number of studies have shown.³ Oceania, the final frontier in the unification of our planet's biota, was conquered in the latter half of the eighteenth century.⁴ In step with later colonial and agricultural expansions, the charting of plants focused on exploration of the interior of vast, scientifically unknown territories.⁵ We use the term “scientific” in a broad sense here, encompassing types of knowledge that deemed themselves universal, cumulative, and grounded in expert authority; that amassed information and experience within academic disciplines and institutions; and that standardized the practices followed by specific groups within each society. Our use of the term thus comprehends heterogeneous kinds of knowledge, with their own traditions and historical development. As historiography has convincingly shown, we should not consider the sciences as a European

¹ There is extensive bibliography on this topic. See, for example, Lucile Brockway, *Science and Colonial Expansion: The Role of the British Royal Botanic Gardens* (New York/London: Academic Press, 1979); André-Georges Haudricourt and Louis Hédin, *L'homme et les plantes cultivées* (Paris: A.-M. Métailié, 1987); Judith Carney, *Black Rice, The African Origins of Rice Cultivation in the Americas* (Cambridge, Mass.: Harvard University Press, 2001); José Mendes Ferrão, *A aventura das plantas e os descobrimentos portugueses* (Lisboa: Instituto de Investigação Científica Tropical, 2005); Lorelai Kury, ed., *Usos e circulação de plantas no Brasil, séculos XVI-XIX* (Rio de Janeiro: A. Jakobsson, 2013).

² Alfred Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport: Greenwood Pub, 1972).

³ Luiz Felipe de Alencastro, *The Trade in the Living: The Formation of Brazil in the South Atlantic, Sixteenth to Seventeenth Centuries* (Albany: State University of New York, 2018); Londa Schiebinger, *Plants and Empire. Colonial bioprospecting in the Atlantic World* (Cambridge, Mass.: Harvard University Press, 2004); Judith Carney and Richard Rosomoff, *In the Shadow of Slavery: Africa's Botanical Legacy in the Atlantic World* (Berkeley/Los Angeles/London: University of California Press, 2009).

⁴ Richard Grove, *Green Imperialism* (Cambridge: Cambridge University Press, 1995); Harry Liebersohn, *The Travelers' World: Europe to the Pacific* (Cambridge, Mass.: Harvard University Press, 2006).

⁵ Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London/New York: Routledge, 1992); Richard Holmes, *The Age of Wonder. How the Romantic Generation discovered the Beauty and Terror of Science* (New York: Pantheon, 2009); Lorelai Kury, ed., *Sertões Adentro: viagens nas caatingas, séculos XVI a XIX* (Rio de Janeiro: A. Jakobsson, 2012); David Lambert, *Mastering the Niger: James MacQueen's African Geography and the Struggle over Atlantic Slavery* (Chicago: University of Chicago Press, 2013).

creation that would later spread around the rest of the globe.⁶ Contemplating the sciences from a historical perspective means considering the complex, ongoing process of exchanging, appropriating, and discarding constituent knowledge and practices, while likewise considering the participation of a broad gamut of agents.

The articles in this thematic dossier contribute to an analysis of plant circulation from the viewpoint of the science and techniques that sought to use or examine exotic species, particularly within the European circuit. Our focus on Europe is not due to any form of nostalgia for its former hegemony in different parts of the world, including Latin America and the “European periphery,” the birthplace of the editors of this thematic issue. In the geographical areas where we do our research, the so-called sciences were understood to be fundamentally European in the eighteenth and nineteenth centuries (and later of U.S. origin). As historians, we analyze the works and lives of many naturalists and physicians from the past who believed they were acting within a kind of Basallian paradigm.⁷ Before the early twentieth century, for example, Brazilian apothecaries essentially relied on Portuguese pharmacopoeias and the French *Codex medicamentarius gallicus*. The first Brazilian pharmacopoeia was only approved by the government in 1926, about one hundred years after the country’s independence.⁸ The local population of course relied on hundreds of native medicinal plants, but scientific and technical references came from abroad. Analyzing the past thus requires both to understand the mechanisms by which European scientific practices and narratives ensured domination and hegemony as well as to analyze historiography itself as an integral part of this analysis.⁹

The circulation of plants on a global scale allowed many populations to utilize exotic plants in their daily lives. Naturalists, planters, druggists, doctors, healers, and others appropriated plant products for use in the areas of medicine, the arts, food, and entertainment. Working with these plants at times challenged traditional or modern knowledge as well as long-established or more novel practices.¹⁰ Species had to be named and classified within a general system, their medicinal properties and possible industrial applications had to be ascertained, and their

⁶ Kapil Raj, “Beyond Postcolonialism ... and Postpositivism. Circulation and the Global History of Science,” *Isis* 104, no. 2 (2013): 337-47; Pedro Raposo, Ana Simões, Manolis Patiniotis and José Ramón Bertomeu-Sánchez, “Moving Localities and Creative Circulation: Travels as Knowledge Production in 18th-Century Europe,” *Centaurus* 56 (2014): 167–88.

⁷ George Basalla, “The spread of western science,” *Science* 156 (1967): 611-22.

⁸ “Decreto 17.509,” November 4, 1926, Brazil, <https://www2.camara.leg.br/legin/fed/decret/1920-1929/decreto-17509-4-novembro-1926-500661-publicacaooriginal-1-pe.html>

⁹ Richard Drayton, “Imperial History and the Human Future,” *History Workshop Journal* 74 (2012): 156-72; Jorge Cañizares-Esguerra, “On Ignored Global ‘Scientific Revolutions’,” *Journal of Early Modern History* 21 (2017): 420-32; Juan Pimentel and José Pardo-Tomás, “And yet, we were modern. The paradoxes of Iberian science after the Grand Narratives,” *History of Science* 55, no. 2 (2017): 133–47.

¹⁰ On Europe’s “local” naturalist tradition, see Alix Cooper, *Inventing the Indigenous. Local Knowledge and Natural History in Early Modern Europe* (Cambridge: Cambridge University Press, 2007).

potential for acclimatization had to be determined. Management of nature was a key concern for medicine and natural history during the Enlightenment, just as it was for specialized science in the nineteenth century. While certain types of knowledge incorporated well-established skills, others created new ways to address unknown subjects. Produced by colonized and non-colonized people alike, these extra-European knowledge traditions were essential to scientific activities in Europe, yet were often stifled or discredited. In order to, in some way, replace local knowledge and provide sure, useful information on how to treat these plants, natural history and medicine searched for useful indications, reoccurrences, or patterns by surveying the collections and information that had been gathered by institutions and individuals.

The article “Paraguay Natural Ilustrado by José Sánchez Labrador SJ: Between the American Experience and Exile,” by Eliane C. D. Fleck (to be published as part of this thematic dossier in the next *HoST* issue), explores an intriguing topic: a scientific work that was written in different places and at different moments, where the New World is at times situated “here,” at other times “there.” Sánchez Labrador, a Spanish Jesuit, reported on knowledge that was only accessible to him because of his close contact with Indigenous peoples in the Jesuit Province of Paraguay. During his thirty-four years of experience in South America, twenty of which as a missionary, he gained deep familiarity with the lives of the inhabitants of the River Plate and with its plants. On the other hand, his exile in Ravenna, Italy, gave him easy access to printed and handwritten texts, contact with other clerics, and the opportunity to visit apothecaries and botanical gardens.

In her article, Fleck highlights Sánchez Labrador’s interesting perception of the novel plant life in the River Plate. In his text, Sánchez Labrador mentions the fact that the European missionaries, who ventured into the jungles to contact non-Christianized populations, should identify edible fruit by following the example of birds and insects; in his case, having spent decades among the Guarani, Mbayá, and Guaná, the Jesuit missionary was guided by these peoples’ centuries-old experience. He often identified plants with their names in Guarani and explained their use based on local habits. According to him, South American plants were serving medicinal purposes in Ravenna and Bologna, although people were unaware of their origins. Fleck thus shows how a variety of forms of knowledge, practices, and circumstances played into the writing of Sánchez Labrador’s book on natural history and medical matters.

In “Knowledge and Circulation of Plants: Unveiling the Participation of Amazonian Indigenous Peoples in the Construction of Eighteenth and Nineteenth Century Botany,” Nelson Sanjad, Ermelinda Pataca, and Rafael dos Santos portray the search for natural products in the Amazon basin in the eighteenth and nineteenth centuries. The authors argue that Indigenous peoples were central to this process both as knowledge holders and as skilled labor used to process plants, that is, to cut, collect, separate parts out, and so on. While European naturalists and physicians largely ignored the role of Indigenous people in the globalization of certain plant

species, the article explores how their participation actually played out, mainly through the example of ayapana, a plant employed by the original peoples of the Amazon for medicinal purposes and then described in the works of European naturalists and doctors.

Ayapana traveled many paths before reaching the pages of early nineteenth-century European scientific and medical works: it journeyed on scientific voyages, was raised in colonial botanical gardens, and took part in scenes of adventure. It served as medication in places as diverse as Calcutta, the Caribbean, and the French colony of Isle de France. But as the chain of events unfolded, original Indigenous knowledge faded or became secondary. The authors suggest that historiography could, and should, take a fresh look at the circulation of plants to shed further light on how Indigenous peoples contributed to the cataloguing of Brazilian nature, the establishment of trade flows, and the transformation of habits worldwide.

These two articles emphasize the collective nature of scientific production and the various ways in which plants became known beyond their regions of origin. These plants were sometimes considered “exotic” where they traveled, inhabiting hothouses, books, or herbaria; other times, they became so wholly assimilated that their origin mattered little to the customer purchasing them at an apothecary.

The word “exotic” can signify something from another country, as the term is employed in today’s biological sciences, or it can have a broader meaning, designating unusual or exciting people, objects, plants, animals, and events.¹¹ During the colonialism of the last two centuries, the notion of “exoticism” has often been associated with the sexual oppression of non-white women,¹² as well as with the luxury goods market. As far as plants went, sometimes the terms “exotic” and “tropical” were, and still are, interchangeable. Exotic plants fed the world of luxury goods, the arts, and literature. Moreover, when Europe’s natural historians incorporated exotic species, they buried the local knowledge associated with these plants, seeking to produce a kind of knowledge external to a plant’s natural context.

The article “Global Affinities: The Natural Method and Anomalous Plants in the Nineteenth Century,” written by us, looks at how professional botany addressed two particularly unique plants, *Rafflesia arnoldii* and *Welwitschia mirabilis*. These visually bizarre species were hard to

¹¹ Sara Albuquerque, “Glimpses of British Guiana at the Colonial and Indian Exhibition, 1886,” *Culture & History Digital Journal* 5, no. 1 (2016): 1-16.

¹² Historiography has studied the iconography and narratives that availed themselves of a sexualized exoticism, from Tahiti’s “Graces” to colonial postcards. See Serge Tcherkezoff, “La Polynésie des Vahinés et la Nature des Femmes: une Utopie Occidentale Masculine,” *Clio. Femmes, Genre, Histoire* 22 (2005): 63–82; Sadiya Qureshi, “Displaying Sara Baartman, the ‘Hottentot Venus,’” *History of Science* 42, no. 2 (2004): 233-57; Malek Alloula, *The Colonial Harem* (Minneapolis: University of Minnesota Press, 1986); Pascal Blanchard, Nicolas Bancel, Eric Deroo and Sandrine Lemaire, ed., *Human Zoos: Science and Spectacle in the Age of Colonial Empires* (Liverpool: Liverpool University Press, 2008).

describe and classify. Nineteenth-century botany had to learn how to deal with plants from regions that Europe had recently brought into its zone of action and influence, like Oceania, the birthplace of *Rafflesia*, and the African interior, homeland to *Welwitschia*. This required ample access to herbaria, seeds, libraries, and institutions, along with participation in networks of colonial correspondents.

Through the work of Robert Brown and the artist brothers Franz and Ferdinand Bauer, the huge, fetid *Rafflesia* entered the circuit of scientific texts. Replacing Linnaean procedures, the so-called natural method enabled Brown to detect the flower's "hidden affinities" with other plants and formulate hypotheses about its kinships and classification. In his hermetic narrative, detached from any travel experiences or adventures, Brown did not exoticize the plant; relying on microscopic analyses and the theory of metamorphosis, he stripped *Rafflesia arnoldii* of its oddity, turning it into a "normal" flower. By the time the botanist Friedrich Welwitsch came across this extremely peculiar plant in the Namibian desert, a firm separation had already been established between the circulation of strictly scientific accounts and the circulation of "exotic" ones, although these two fields were always to maintain some degree of dialogue. While Welwitsch targeted a specialized public, the artist, writer, and explorer Thomas Baines, who painted a self-portrait showing a *Welwitschia* in the interior of Africa, wrote for a generalist public, that is, for an audience that appreciated novelty and exoticism.

Acquiring knowledge of plants and experiencing their sensory and aesthetic pleasures are not mutually exclusive but complementary acts. For example, many naturalists financed their travels by sending species back to European collectors and growers. This was the case with the Scottish botanist George Gardner, who journeyed to Brazil and there kept a close eye out for cactuses and orchids that he could ship back to the United Kingdom.¹³ The allure of exotic plants gave rise to dynamic markets for seeds and seedlings in several European cities. Belgium horticulture companies and the Botanical Garden of Brussels dispatched plant hunters around the globe in quest of attractive species to raise in hothouses.¹⁴ During the 1889 Exposition Universelle (Universal Exhibition) in Paris, French horticulturalists were given the task of ensuring that the orchids in the Brazilian pavilion were always in bloom: "The exhibited samples have a commercial value of around 400,000 francs, and the committee has reached an agreement with the Société internationale d'horticulture (International Horticultural Society), in Brussels, to look after the hothouse, where the rarest orchids will always be in bloom and will be replaced as often as necessary during the course of the Exposition."¹⁵

¹³ For example: "Letter from George Gardner to Sir William Jackson Hooker," Rio de Janeiro, Brazil, 25 August 1837, Archives, Directors' Correspondence, Royal Botanic Gardens (Kew).

¹⁴ Denis Diagre-Vanderpelen, *The Botanic Garden of Brussels (1826–1912): Reflection of a Changing Nation* (Meise: National Botanic Garden of Belgium, 2011).

¹⁵ *Guide Bleu du Figaro et du Petit Journal* (Paris: Imp. de Chaix, 1889), 172-73.

In the mid-nineteenth century, the robust development of Belgium horticulture helped encourage experiments to acclimatize trees of the genus *Morus*. In “The National Sericultural Utopia and Debates on the Acclimatization of Plants in New-born Belgium (1830-1865),” Denis Diagre-Vanderpelen examines several questions related to this utopia. Mulberry trees were not raised for their fruit or wood but because larvae of the *Bombyx mori* moth fed on them, and silk—a major product on the luxury market—is produced from the moth’s cocoon. The northern European climate plus a silkworm disease put an end to this endeavor in the 1860s. Efforts to produce strong, healthy mulberry trees continued for years, because it was believed plants could adapt to climates different from their climates of origin. Diagre-Vanderpelen deliberates on the polysemy of the term “acclimatization” and how it is confused with the notion of “naturalization.”

The discussion about acclimatization dates to Linnaeus, but for some eighteenth-century horticulturalists, such as Abbé Rozier and André Thouin, the topic was of great interest. In consonance with the theories of Jean-Baptiste Lamarck, Rozier and Thouin proposed methods that progressively changed the habits of plants. To explain why these ideas persisted in mid-nineteenth-century Belgium, Diagre-Vanderpelen points to the successful naturalization of exotic plants, mainly the potato, and the fact that people had only vague notions about “foreign” plants and where they came from. The author demonstrates that the topic of acclimatization continued to spark controversy throughout the nineteenth century, especially as applied to humans in the context of colonialism, scientific racism, and migration.

The four articles in this thematic dossier thus investigate different aspects of the same topic, that is, how the sciences addressed exotic plants in the eighteenth and nineteenth century, mainly in the European circuit. The conclusion we can draw is that different traditions came into play, along with new experiences and new information. The construction of knowledge about the planet’s flora involved acts, both large and small,¹⁶ on the part of woodsmen, boatmen, gardeners, priests, merchants, doctors, naturalists, and artists. But above all we must bear in mind the plasticity of the plant world and its expansion and limits. The naturalization of one species can trigger uncontrollable transformations and deeply alter certain regions of the world or international trade routes. This was the case with sugar, a story told so well by Sidney Mintz;¹⁷ once a rarity dosed out in pinches, sugar became one of the main sources of quick but hardly nutritional energy for working classes the world over.

¹⁶ Sarah Easterby-Smith, “Recalcitrant seeds: material culture and the global history of science,” *Past and Present* 242, supplement no. 14 (2019): 215-42.

¹⁷ Sidney Mintz, *Sweetness and Power: The Place of Sugar in Modern History* (New York: Viking, 1985).

Plants are always pushing boundaries, as exemplified by genetically modified organisms¹⁸ and plants raised in space stations.¹⁹ But because of these boundaries, sometimes a dry branch, a drawing, or a balm²⁰ must travel where the entire living plant could never go. As historiography has shown, a remarkably simple innovation brought a turning point in the non-spontaneous movement of plants around the globe in the 1830s: the Wardian case.²¹ Thanks to this small greenhouse, it was possible to keep plants and seedlings in a closed system without any contact with the outer atmosphere, making plant transportation much more efficient. The Belgian horticulturalist and exotic plant collector Louis van Houtte traveled through Brazil from 1834 to 1836 in search of orchids for rich collectors in his country. An analysis of an image from this trip (Figure 1) is perhaps a good way to conclude this introduction.



Figure 1. Rio de Janeiro, Off. lith. & pict in Horto van Houtteano, in Louis Van Houtte, “Courte Excursion dans les montagnes des Orgues et dans les forêts vierges au Brésil,” *Flore des Serres et des Jardins de l’Europe*, 4 (1848): 333. Image from the Biodiversity Heritage Library, contributed by Missouri Botanical Garden, Peter H. Raven Library, www.biodiversitylibrary.org

¹⁸ Sheila Jasanoff, “Biotechnology and Empire: The Global Power of Seeds and Science,” *Osiris* 21, no. 1 (2006): 273–92.

¹⁹ See <https://www.nasa.gov/content/growing-plants-in-space>

²⁰ Marcelo Fabián Figueroa, “Packing techniques and political obedience as scientific issues: 18th-century medicinal balsams, gums and resins from the Indies to Madrid,” *HoST - Journal of History of Science and Technology* 5 (2012): 49–67.

²¹ Luke Keogh, *The Wardian Case: How a Simple Box Moved the Plant Kingdom* (Chicago: University of Chicago Press, 2020); Marianne Klemun, “Live plants on the way: ship, island, botanical garden, paradise and container as systemic flexible connected spaces in between,” *HoST - Journal of History of Science and Technology* 5 (2012): 30–48.

In Guanabara Bay, in Rio de Janeiro, three Black men dressed in scant clothing, most likely enslaved, their torsos bare, row van Houtte's boat, while the European has his head stuck in a book. One of the boatmen adjusts the canopy that is protecting van Houtte from the sun. Next to the naturalist sit five portable greenhouses, apparently Wardian cases holding plants he has just collected on one of his excursions around the city. The contrasts are fascinating: while the plants need the sun shining through the glass, the European hides from it, sheltered by a canopy, his clothes, and a hat. The boatmen, on the other hand, are not a bit concerned with the solar rays, despite their relative nudity. Their color serves as a kind of natural shadow in the image. This representation carries greater weight once the reader has perused the traveler's narrative, published together with the image in an illustrated periodical. Van Houtte's account offers a brief description of the lascivious dance of the Blacks, called the "*batuque*," in which half-naked men and women dance to the sound of exotic instruments. On his boat ride, the naturalist is depicted as indifferent to the landscape and to the boatmen's conversation—he has accomplished his mission and his cargo could not be more precious: plants. If most transplanted species did not cause any significant transformations, some of them altered customs, others intrigued botanists, and still others made certain individuals rich. Whatever the case, overall, exotic plants moved into hothouses, greenhouses, and orangeries and came to illustrate magazines and adorn dishware, fans, furniture, and fabric. And yet some naturalists approached these treasures as if the only agent in the image were the man who is reading, and as if the cargo only became valuable once removed from its place of origin.

Acknowledgements

We would like to thank the anonymous reviewers, who made this dossier more solid and precise. We would also like to thank our many colleagues who took part in discussions at the seminar "Plants and History: Knowledge, Uses, and Circulation," held at Fiocruz's Casa de Oswaldo Cruz in Rio de Janeiro in August 2019. The idea of this thematic issue was an outgrowth of interactions and exchanges that took place at this seminar. Furthermore, none of this would have been possible without the support of the Casa de Oswaldo Cruz's Research Department and its Graduate Program in the History of the Sciences and Health. Lastly, we would like to thank Heloisa Gesteira, Carlos Fidélis da Ponte, and Miriam Junghans for their critical reading of the first draft of this introduction.

Competing interests

The authors declared that no competing interests exist.

Funding

Lorelai Kury's research was funded by the Conselho Nacional de Pesquisa (CNPq). Sara Albuquerque wishes to thank FCT (Fundação para a Ciência e a Tecnologia, Portugal, ref. SFRH/BPD/108236/2015 and UIDB/04209/2020).