

Imperial Palms over Colonial Gardens

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Scientific investigations into the properties of Chinese herbal preparations, spices, and Mediterranean plants that were collected for botanical gardens in the walled confines of medieval European monasteries aimed at developing tinctures, infusions, and poultices for ministration to the sick. As overland and maritime trade routes to Asia, Africa, and the Mediterranean expanded collectors' access to unexplored plant specimens, commercial counterparts to scientific and medical objectives emerged with gardens and with gardening. Gardening encyclopedias with techniques of planting and garden layouts became available in twelfth century Europe and a century later books, seeds, and plants of diverse origins were available in Paris, London, and Oxford.¹

The first modern botanical garden, known as a physic garden (*hortus medicus*), was created for scientific investigation under the private sponsorship of Grand Duke Cosmo de Medici I at Pisa in 1543. Together with its sequel in Florence, established in 1550, it formed the scientific corpus for the center of medical instruction at Padua in 1545. Several decades later, in 1590, a physic garden founded at the University of Leiden provided a nucleus for scientific exploration into the collection of plants held there.

Early physic gardens resembled simplified Renaissance gardens and were designed to verify the subordination of nature to man's plans and designs. The shapes of the gardens were circular or elliptical and were divided into four quarters that represented the four corners and continents of the known world: Europe, Africa, Asia, and America. Axial symmetry was emphasized with paths or avenues that extended north, east, west, and south in straight lines from a centrally located statue or fountain. Parterres and topiary completed the man-made scenario.²

European encounters with the Americas introduced an unprecedented series of botanical exchanges that not only enhanced European scientific interest in the curing properties of plant species but generated widespread interest in the commercial potential of plants, metals, and minerals. Little is known of pre-

¹Patrick Goode and Michael Lancaster, *The Oxford Companion to Gardens* (Oxford, 1986), 364.

²Wolfgang Born, "Early Vegetable Gardens," in *CIBA Symposia*, July-August 1949, 1103.

Columbian gardens although the offerings of herbs, flowers, fruits, and copal for incense in Chichimec temples attest to the existence of Chichimec gardens prior to the arrival of the Aztecs.³ Cedar and cyprus groves, flowering trees, aromatic herbs, and flowers traced to early gardens of Toltec and Tarascan monarchs, and to the Ixtapalapa palace garden of Cuitlahuatzin, brother of Aztec ruler Moctezuma, reveal extensive indigenous knowledge of gardening, irrigation, and herb remedies. Francisco Cervantes de Salazar in his *Crónica de Nueva España* (1560-1567) made reference to four of Moctezuma's gardens in the center of the capital city of Tenochtitlán, on the slopes of Chapultepec, at El Peñón in the midst of the lake of Mexico, and at a hunting preserve in Atlixco. Garden layouts were said to contain borders of ornamental flowers and flowering shrubs in addition to scientifically arranged systematically cultivated medicinal plants.⁴ King Philip II's physician and botanist, Francisco Hernandez, sent to the New World in 1570, used the botanic gardens at Chalco for his work on the vegetable world in the Americas.⁵ Careful scientific attention was drawn to native plant specimens in the Spanish holdings in the Americas, but commercial interest in the production of spices, plants, and drugs for cures and trade was gradually overshadowed as the commercial potential of precious metals was verified and developed.

Owing to the diversity of previously unknown medicinal, dietary, and ornamental properties of plants that found their way to Europe through the Columbian exchanges from Mesoamerica and other areas of Spanish and Portuguese exploration, the New World replaced the Mediterranean as Europe's botanic garden.⁶ Dutch, Portuguese, English, and French colonizers, traders, clergy, and administrators following on the Spanish and Portuguese encounters recorded and transmitted to their European bases indigenous uses for plants and subsequently registered the practices of enslaved Africans who were brought to the Americas beginning in the sixteenth century.⁷

In addition to scientific aspects associated with the cultivation of New World treasures, scents, colors, shapes, and properties of countless varieties of greenery provided an aesthetic dimension to the exchanges. The elaboration of scientific sketches, etchings, illustrations, and still-life scenes of seeds, roots, buds, leaves, and flower arrangements graced hand-crafted porcelain china, table ornaments, fabrics, and cutlery that graced the galleries, salons, and dining halls of European monarchs, merchants and aristocratic elites. New World artistic

³Ida K. Langman, "Botanical Gardens in Ancient Mexico," *Missouri Botanical Garden Bulletin* XLIV (February 1956), n. 2: 17.

⁴*Ibid.*, 20.

⁵Born, *op. cit.*, 1100.

⁶Therese O'Malley, "Art and Science: The Design of Botanic Gardens, 1730-1830," in John Dixon Hunt, ed., *Garden History. Issues, Approaches, Methods* (Washington, DC: Dunbarton Oaks Research and Collection), 283.

⁷Alfred Crosby, *The Columbian Exchange* (1972).

motifs not only contrasted with the complex ornate designs associated with Asian and Islamic plants and gardens, but were unique in providing European governments with a garden laboratory that provided for colonial scientific and commercial needs.⁸ For a nineteenth century observer in 1862:

The distribution of valuable products of the vegetable kingdom amongst the nations of the earth—their introduction from countries where they are indigenous into distant lands with suitable soils and climates—is one of the greatest benefits that civilization has conferred upon mankind.⁹

New World Plantations and Imperial Laboratories

Portugal's Garden Empire

The Portuguese were the forerunners in the Americas of a colonization project that not only satisfied scientific and commercial ends but introduced plantation agriculture in the early 1500s. Like the Spanish rulers, Portuguese expeditions sought to enrich the material bases of Portugal's dynamic commercial and maritime colonial empire by developing the commercial potential of natural resources.¹⁰ Precious metals such as gold and silver eluded the Portuguese until the seventeenth century but forest products—spices, medicinal plants, and red Brazil dyewood—were profitable items that were earmarked for the Atlantic trade. Of the species of flora that numbered in the tens of thousands, pineapples, brazilnuts, cashews, and jaboticaba were among the fewer than ten cultivated plants that originated in Brazil and together with forest products such as dyewoods, herbs, and spices, were selected by Portuguese colonizers for commercial purposes.¹¹

Colonizers to Portugal's New World holding encountered a vast supply of fruits and spices and an indigenous population which was knowledgeable in

⁸Philip Curtin defines a plantation complex as "the economic and political orders centering on slave plantations in the New World tropics," in *The Rise and Fall of the Plantation Complex. Essays in Atlantic History* (Cambridge, 1990), ix.

⁹Clements Markham (1862), in Lucile H. Brockway, *The Role of the British Royal Botanic Gardens* (New York, NY: Academic Press, 1979), 60.

¹⁰C.R. Boxer termed the Portuguese colonial empire in Asia, in Africa, and later in Brazil as commercial and maritime, "cast in a military and ecclesiastical mould." C.R. Boxer, *Four Centuries of Portuguese Expansion, 1415-1825: A Succinct Survey* (Johannesburg: Witwatersrand University press, 1963), 14, 18, 63. A.J.R. Russell-Wood, "Ports of Colonial Brazil," in Franklin W. Knight and Peggy K. Liss, *Atlantic Port Cities* (Knoxville, TN: The University of Tennessee Press, 1991), 209.

¹¹A.J.R. Russell-Wood, *A World on the Move. The Portuguese in Africa, Asia and America 1415-1808* (New York, NY: St. Martin's Press, 1992), 164.

their use. Early Portuguese settlers and officials maintained a diet of imported mainstays and bore to Brazil many of the same plants and culinary practices that Spaniards transported into North and South America and the Caribbean. This, according to Warren Dean, was “because Portuguese colonists longed to consume familiar foods and because their compatriots at home could not be expected, at least in the short run, to introduce crops from the Old World already appreciated in Portugal.”¹² In addition to wine, codfish, olive oil, and wheat flour, edible products that traversed the Atlantic Ocean included cultivated bitter oranges, lemons, sesame, and rice that had been acclimatized in Portugal centuries before.¹³ Figs, pears, and quinces that were common to European gardens and wheat, barley, broad beans, chick peas, onions, radishes, cauliflower, cabbage, lettuce turnips, cucumbers, and lentils that were cultivated on the cool habitat provided by the São Paulo plateau, lent variety to the fruits, root crops, and fish and game of Brazil’s rivers and forests. Dillweed, roses, mint, coriander, and parsley were grown for culinary and medicinal properties with varying degrees of success, as were bay leaf and rosemary.¹⁴ Trade in Portuguese foodstuffs and products was aimed at Europeans who sought to preserve dietary custom and medicine for their own benefit.

The Portuguese also became the dispersal agents in Brazil for tropical flora that were alien to them but were plentiful in Asia and Africa.¹⁵ Warren Dean has pointed out that the capacity of the Portuguese to determine the transfer of plants and domesticated animals between Portugal and overseas holdings was one of the most powerful arms of Lusitanian imperialism.¹⁶ Seedlings and plants including coconuts, ginger, plantains, camellia, mangoes, watermelons, and jackfruit from India, the Malay archipelago, Indonesia, and China were added to Brazil’s tropical flora via the Atlantic Islands.¹⁷ Maize, peanuts, and the sweet potato were taken to West Africa and cassava and manioc, that settlers learned how to grow and process from the Brazilian Amerindians, became a poor man’s food there and in Africa.¹⁸ With varying degrees of success and mindful of crown restrictions, Portuguese colonizers in Africa transferred peppers, yams, gourds, okra, squashes and date palms on the ships that departed from Western and Central West Africa. Those ships also bore increasing

¹²Warren Dean, *With Broadax and Firebrand* (Berkeley, CA: University of California Press, 1995), 55.

¹³Helder Carita and Homem Cardoso, *Portuguese Gardens* (Antique Collectors’ Club, Ltd., 1990), 26.

¹⁴Roses were used for medicinal rosewater. Dean, *op. cit.*, 55.

¹⁵*Ibid.*

¹⁶Warren Dean, “A Botânica e a Política Imperial: a introdução e a domesticação de plantas no Brasil,” *Estudios Históricos* 4(8) (1991): 216.

¹⁷Russell-Wood, *World*, 155-7.

¹⁸Brockway, *op. cit.*, 41.

numbers of enslaved Africans too supply the labour force to the Brazilian plantation complex that was evolving inland from the coastal expanse.¹⁹

The onset of systematic large-scale cultivation of sugarcane through the plantation system in the 1530s underlay the shift from the Indian Ocean to the Atlantic Ocean as the center of Portugal's commercial activities. Unrefined sugar made an early debut in the 1530s into Brazilian *culinaria* from the plantations that were established on the islands of Madeira and São Tomé with African labor imported from the mainland. Initially a coveted luxury item, sugarcane rivalled honey as a sweetener for liqueurs and fruit marmalades and in its distilled form, *aguardente* or sugarcane brandy, was a powerful alcoholic stimulant popularly known as *parati* or *cana*.²⁰ The production of cones of sugar, molasses, and rum in the donatary captaincies of Pernambuco and São Vicente established a model for plantation agriculture as a colonizing principle and catapulted Brazil to unrivalled status in the production of and trade in unrefined sugar.²¹ Under the donatary captaincy arrangement, plantations, exploitative and settlement, were developed by private owners under the aegis of the state and utilized a core of resident labor subject to stringent discipline to produce an agricultural staple for sale and profit in a distant market.²² Although Brazil's competitive sugar-producing status ebbed as Caribbean production increased in the early 1700s, the production of sugar, tobacco, and cotton justified the maintenance of plantation agriculture for the accumulation of revenues by the Portuguese Crown.²³ Sporadic rather than sustained crown interest and sponsorship in improving yields or disseminating plants suggest that initiatives in these areas fell to private rather than public sponsors.²⁴

¹⁹Russell-Wood, *World*, 161-2. See footnote 8 for Curtin's definition of a plantation complex.

²⁰T. Bentley Duncan, *The Atlantic Islands*. J.H. Galloway, *The Sugar Cane Industry*, 182.

²¹Sugarcane had been cultivated in Granada in the 12th century and was introduced into the Americas at Hispaniola by Columbus on his second voyage. Russell-Wood, *A World on the Move*, 160-1.

²²Edgar T. Thompson, *The Plantation. An International Bibliography* (Boston, MA: G.K. Hall and Co., 1990), Introduction, xiv-xv. James G. Leyburn has made the distinctions between exploitative and settlement plantations.

²³Russell-Wood, "Ports," 209. On the early history of the Caribbean, see David Watts, *The West Indies. Patterns of Development, Culture and Environmental Change since 1492* (Cambridge: Cambridge University Press, 1987), chs. 4-7. Galloway, *Sugar Cane*, 77-83. Curtin, *op. cit.*, chs. 4 & 6. Sidney Mintz, *Sweetness and Power. The Place of Sugar in Modern History* (New York, NY: Viking, 1985). On the shift of the center of Portugal's commerce, see Russell-Wood, *World*, 128; Caio Prado, Jr., *História Econômica do Brasil* (São Paulo: Brasiliense, 1956), 20.

²⁴Russell-Wood, *World*, 176. See also Heloisa Maria Bertol Domingues, *Ciência: Um Caso de Política. As Relações entre as Ciências Naturais e a Agricultura no Brasil-Imperial* (São Paulo: Universidade de São Paulo, Departamento de História, 1995), 32.

Colonies of settlement were rare in the tropics but in the Portuguese case the plantation became a model for settlement that also satisfied commercial ends.²⁵ Under the aegis of other European colonial governments, private, public, and church sponsored colonies of settlement expanded in the Caribbean, in the southern British colonies on the North American mainland, and in Central and South America. On the plantations that emerged in many of these areas, intensive cultivation of tobacco and sugar was followed by production of cotton, rice, cacao, and coffee as production of those staples responded to demands from distant markets of the Atlantic economy. The nature of these settlements in the hot and moist areas of the Americas, “consisted of a small white managerial class, a number of free blacks and mulattos, and an enormous mass of African slaves.”²⁶

Botanic Gardens in the Americas

Botanic gardens in Europe originated as medicinal gardens but the New World counterparts were distinguished by their commercial nature.²⁷ New World plantations that preceded them were ideal laboratories for experimentation with local strains and imported plant specimens, dietary and curing properties of native plants, and provision of food in times of need for resident inhabitants—in short, as nuclei of production and circulation, they were precursors to the botanic gardens that united scientific with commercial aims under government auspices in the eighteenth century.

The establishment of botanical gardens reflected the concern of European colonial governments to experiment with plants for commercial purposes and to solve problems of food scarcity in overseas possessions. According to Wolfgang Born:

The economic development of overseas possessions put before the European nations the problem of introducing useful plants to areas which were short of important agricultural and horticultural products but whose soil lent itself well to the cultivation of the needed plants. This problem could be solved

²⁵According to Alfred Crosby, European colonies of settlement in the Americas were usually concentrated in places where wheat and cattle would thrive (Crosby, *Ecological Imperialism. The Biological Expansion of Europe, 900-1900* [Cambridge, 1986], 140-1.) On the Portuguese introduction of the plantation as a colonizing aim, see Sidney M. Greenfield, “Plantations, Sugar Cane and Slavery,” 86-8.

²⁶Crosby, *ibid.*

²⁷Jean Constance Robertson Sim, “Conservation of Historic Botanic Gardens,” unpublished master’s thesis, Institute for Advanced Architectural Studies, University of York, 1990, 41.

only by the formation of botanical gardens in which experiments in acclimatization could be undertaken in the tropics.²⁸

The similarities in climate and growing conditions between the European spice and fruit colonies of the East and the Atlantic colonies of the Americas provided propitious conditions for plant research and exchange that favored Dutch, British, and to a lesser degree, Spanish and French commercial interests. The Dutch are credited with the establishment of the first official European botanic garden under government auspices in the Americas. During the short-lived Dutch occupation of northeastern Brazil from 1637-1654, the governor general of Netherlands Brazil, Prince Johan Maurits of Nassau, established zoological and botanical gardens in the heart of the modern day city of Recife, Pernambuco. Artists, scientists, and naturalists from the Netherlands were appointed to examine Brazilian fauna, flora, and the geography of Brazil with an end to identifying and cultivating commercially viable products that would make Brazil self-supporting in foodstuffs. The prince planted 2,000 coconut trees in the Alameda of Aranjues on the country seat and regularly dispatched samples of Brazil's fruits and plants to the Netherlands where sketches of Brazilian flora and fauna are displayed in his private residence that is now a museum in The Hague.²⁹ The Dutch also established botanical gardens in 1694 in Capetown and as other European expeditions followed routes to Asia over the ensuing centuries, gardens for experimental scientific and commercial purposes were established by the French on Mauritius in 1735 and by the British in Calcutta and Penang.³⁰

Prior to the eighteenth century, colonial resource development prioritized intensive cultivation of sugar, tobacco, wheat, indigo, and coffee for trade in the Atlantic economy. Following on the peace treaty of Paris in 1763, a transition began that centered in the botanical garden the experimentation of plant species for export purposes and for domestic dietary needs. In the British Caribbean, the island colony of Saint Vincent provides an illustrative example of the transition from the private sector of the commercial plantation estate to the publicly sponsored botanic garden. In 1765, the governor of the southern Caribbean, General Robert Melville, visited Saint Vincent and made plans for the establishment of a botanical garden to be a repository for all useful plants that could be introduced to obtain medicines and to improve the life and economy of the colony. In contrast to European botanical gardens of the time, the six and

²⁸Born, "Modern Botanical Gardens in Europe and the Tropics," *CIBA Symposia*, July-August 1949, 1113.

²⁹C.R. Boxer, *The Dutch in Brazil, 1624-1654* (Oxford: Clarendon Press, 1957), 112-6. In the aftermath of the defeat and withdrawal of the Dutch from Brazil in 1654, the botanical gardens were not maintained and Portuguese officials did not continue scientific research of its holdings.

³⁰Brockway, *The Role*, 58; Born, "Modern Botanical Gardens," 1114.

eventually twenty acres that were allotted, were for a nursery to increase the numbers of plants to be distributed on the island and to other islands.³¹ Uses of plants for medicinal purposes were fundamental to producing local cures and the British surgeon at the military hospital, Dr. George Young, the first director of the garden, was assigned by Melville to cull information about indigenous medicines from all quarters, including old Caribs and slaves.³² At the same time, Melville foresaw the procurement of plants and seeds from nearby sources in Honduras, cinammon from Guadeloupe, and books, medicines, and instruments from the British government. The gardens had a commercial purpose as well since Dr. Young was permitted to sell plants and garden produce.

By 1773, Young had collected and planted a diverse and commercially productive garden that included cinnamon, logwood, safflower, turmeric, East India mango, rhubarb, Tobago nutmeg, and Chinese root among other specimens.³³ Native plants that were deemed to have commercial potential were transported to England for cultivation in Kew Gardens from where specimens were dispatched to other overseas British gardens for acclimatization and intensive cultivation.³⁴

Experimentation with imported alternatives to dietary mainstays aimed at averting shortages of basic foodstuffs to hospitals, private estates, and the resident population after supplies from the Spanish Caribbean and from British North America dwindled during the American Independence movement. French occupation of the island in 1778 for five years, a hurricane in 1780, Dr. Young's refusal to continue in the directorship, and the gradual cultivation of cotton and tobacco on stretches of the garden by local farmers during French occupation, resulted in the discontinuation of the garden under its original plan. Only in 1785, with the onset of the administration of the second director, Alexander Anderson, did restoration of the gardens begin. Contributions of seeds and specimens to the West Indies, such as Captain Bligh's introduction of breadfruit from Polynesia, and Anderson's local travels to the Guianas, the Lesser Antilles, the Spanish Main, as well as Trinidad and Tobago, enriched Saint Vincent with a variety of 348 plants by 1785; 31 of these held commercial interest.³⁵ Saint Vincent came full circle from an area of small-scale foodstuffs production to the production of export staples for the Atlantic markets, then to a botanical garden center that experimented with non-native plant species, and, finally to a producer of foodstuffs to meet local dietary needs.

³¹Richard A. Howard, "The Role of the Saint Vincent Botanical Garden," unpublished paper (1991), 36.

³²*Ibid.*, 37.

³³*Ibid.*, 38-9.

³⁴Sim, *op. cit.*, 41.

³⁵Howard, *op. cit.*, 42.

Enlightenment Ideals and Botanical Experimentation

At approximately the time when Bernard de Jussieu's classification system was being adopted at the Jardin des Plantes in Paris in 1774, the Marquis of Pombal, the powerful Portuguese Minister to King José I (1750-1777), was institutionalizing natural sciences in Portugal and in the overseas colonies.³⁶ Of no less interest to Pombal was the revitalization of resource development through diversification of plantation agriculture, seen as a means of reversing Portugal's precarious financial status.

Colonial governors based in the Captaincy of Rio de Janeiro, the Count da Cunha (1763-1767), the Marquis of Lavradio (1769-1779), and Luiz de Vasconcellos e Sousa (1779-1789), undertook scientific surveys and expeditions aimed at identifying native plant species that would be suitable for intensive cultivation. In 1772, a plan was developed for a botanic garden for scientists to observe plant growth and stimulate scientific exchange among students of natural history, chemistry, physics, agriculture, and botany. Two decades later, action was taken on a Royal Charter of 1796 that provided for the establishment of a public garden in São José in Belém, Pará in northern Brazil, resulting in the first botanic garden.³⁷ The garden was designed to cultivate exotic plant species of commercial interest—Asian peppers, cinnamon, coffee, breadfruit, nutmeg, cloves, and flax—that were transported from the East Indies to the French colony of Cayenne and from there to the Amazon region.³⁸

By the late 1700s, the growing conditions, production costs, and competition from Asian suppliers had dissuaded crown and private sponsors in the central southern captaincies of Brazil from continuing intensive cultivation

³⁶The diversity and uniqueness of plants from the Americas prompted scientists to separate botany from medicinal science and cures in the late sixteenth century. Owing to the prevalent beliefs in the doctrine of signatures—the belief that the similarities of a plant's shape to a human organ suggested its appropriate usage—systematic scientific classification of plants was only heralded in the early eighteenth century. Until Carl Linnaeus (1707-1778) at the University of Leiden developed a sexual system of classification that was based on the equality and number of stamens and other floral plant parts (*Systeme Naturae*—1735), there was no uniform method for the study of similar plant species. Linnaeus's method was modified by the French scientist, Bernard de Jussieu whose classification system was based on the natural affinities of plants that were placed in relation to one another and named with a nomenclature that obeyed natural families (*Genera Plantarum*—1789). Jussieu's classification system yielded to the doctrine of evolution and, through the efforts of his nephew Antoine-Laurent de Jussieu (1748-1836), was adopted by the Jardin des Plantes in Paris in 1774 where it replaced the original 1635 design of the gardens.

³⁷Bertol Domingues, *op. cit.*, 31-2.

³⁸*Ibid.*, 32.

of cochineal, hemp, cinnamon, and peppers for the export market.³⁹ Experimentation with tea, ginger, wheat, indigo, and coffee proved moderately successful for domestic consumption and exports, especially the latter two that were benefitted by war and revolution in the Caribbean. Blue indigo dye exports, for example, reached 85 tons by 1796.⁴⁰ The production of ginger root, prohibited in 1578 despite widespread dietary usage in Bahia and in Maranhão, was cultivated by consignment in those captaincies by the time a royal decree authorized its commercial production early in the seventeenth century.⁴¹

The Jardim Botânico of Rio de Janeiro

Rio de Janeiro replaced the northeastern port city of Salvador, Bahia as the colonial capital in 1763, a shift that reflected the replacement of the sugar-producing Northeast by the mining and agricultural centers of the Central South. Improvements to the port city of Rio de Janeiro date from this time although restrictions on colonial trade hindered the development of the colonial outpost as a major Atlantic port. The transfer of the royal court of the prince regent and his court of approximately 15,000 from the invading forces of Napoleon I to the colonial outpost of Rio de Janeiro in 1808, finalized an era of major transformations to the colonial court. In addition to opening Brazilian ports to international trade, the prince regent and his advisors undertook major reforms of Rio de Janeiro that included the establishment of a national library, the reorganization of urban space, the creation of a national press, improvements to roads and port facilities, the creation of an agricultural school, and the inauguration of the Jardim Botânico do Rio de Janeiro.⁴²

The selection of the site for the botanical garden offers telling insight into the imperial designs of the Portuguese as they took up residence in the New

³⁹Dauril Alden, *Royal Government*, 311, 382. Russell-Wood, "Ports," 154. Dean, *op. cit.*, 132-3.

⁴⁰The naturalists, Spix and Martius, commented on the cultivation of tea, brought to Brazil in 1810 from Guiana during Portuguese control. Tea leaves were cultivated and harvested in the Botanical Garden of Rio de Janeiro by hundreds of Chinese immigrants who the ex-Minister, Conde de Linhares, had brought to Brazil. Johann Baptiste Spix and Karl Friedrich Philip von Martius, *Reise in Brasilien auf Befehl Sr. Majestat Maximilian Joseph I* (Munich, 1823)(Rio de Janeiro: Imprensa Nacional, 1938, Vol. 1, 87. On indigo, still being produced in 1818, see Dean, *op. cit.*, 133.

⁴¹*Arte e Dicionario do Commercio, e Economia Portugueza para que todos negoceem, e governem os seus bens por calculo, e nao por conjectura; or para que todos lucrem mais com menos risco* (Lisboa, 1784), in Bertol Domingues, *op. cit.*

⁴²Maria Beatriz Nizza da Silva, *Cultura e Sociedade no Rio de Janeiro (1808-1821)*. SP: Ed. Nacional, 1978, Col. Barsiliana, v. 363, 146. The School of Agriculture was created by Royal Decree on June 25, 1812, and the Museu Real, later the Museu Nacional, was established for the development of natural sciences. See Bertol, *op. cit.*, 37.

World. Initially a Royal Kitchen Garden (*Horto Real*), the flat expanse of land lying between the lagoon and the backdrop of Hunchback mountain, had housed a deactivated sugar plantation that was converted to a gunpowder factory when the Portuguese Court arrived in 1808.⁴³ The invasion of French Cayenne by Portuguese forces ensued the following year and enabled the Portuguese to link colonial power with commodity production. Native Cayenne cane was acclimatized for sugar production in Brazil and Asian breadfruit, *carambola*, and mango trees were imported to Cayenne and transshipped from there to the Horto Real.⁴⁴

Agricultural diversification of native and imported plants for intensive commercial purposes became a major priority for the Portuguese as the metropolis grasped the remains of colonial empire in Brazil to recover the heart of empire in Portugal. Mulberry bushes were planted for silk production in the Rio de Janeiro Botanic Garden early in the nineteenth century but the most noteworthy example of high but misguided hopes at commercial resource development was the importation of one hundred Chinese peasants who were set to work in the botanical garden and on the imperial estate, the Fazenda de Santa Cruz. The experiment confirmed the feasibility of cultivating Asian tea in America given the similar latitude and climate. Short-term results were, however, disappointing and the intention of promoting large-scale tea cultivation was abandoned after visiting scientists unfavorably assessed the competitive potential of Brazil in the international tea markets. The naturalists, Spix and Martius, opined during their visit in the eighteen teens that the 6,000 locally cultivated small tea plants produced leaves that “fell far short of the aromatic leaves that were produced in China.”⁴⁵

In addition to crown-sponsored experimentation with tea, indigo, and other imported plants, the crown encouraged importation and cultivation of exotic plant species for commercial agriculture. Incentives included tax exemptions from customs, guarantees for remuneration of costs related to the purchase and shipment of foreign species, and rewards in the form of medals and prizes. Over time, few imported plants proved as promising as the coffee bean that had been cultivated in Brazil since the seventeenth century. Intensifying European interest in Brazilian coffee exports in the early nineteenth century provided a means to revitalize Portugal's flagging economy and may have regenerated Portuguese designs for a renewed empire using the American stronghold as a base. Events proved otherwise as Portugal's foothold slipped in the Americas. Brazil's rupture of the colonial pact in 1822 took a distinct path from that of Saint Domingue where independence was achieved by a violent and bloody

⁴³Bertol, *op. cit.*, 36-37.

⁴⁴Spix and von Martius, *op. cit.*, 35, 140-1. A royal decree from 13 June 1808 created the Royal Horto in Rio de Janeiro.

⁴⁵*Ibid.*, 35.

revolution. Distinct also were the repercussions from the Napoleonic invasion that in Spain generated pre-independence struggles in the Americas in the 1820s. Whereas Spain continued to promote agricultural resources such as foodstuffs, tobacco, hides, sugar, and coffee that in Cuba and Puerto Rico provided mainstays for colonial development until the Spanish American War in 1898, the symbolic interiorization of the Portuguese metropolis in the colony after 1808 placed Brazil in a unique position in the Americas.

Political independence from Portugal was accomplished in 1822, but the permanence of the Braganza royal family head of state on the throne of both the European and American monarchies offered a measure of continuity that was unparalleled in the Americas. Commercial plantation agriculture and exploration of natural resources that had secured colonial Brazil an outstanding role in Portugal's commercial agenda in the Atlantic world continued during the post-independence period as coffee production catapulted Brazil to the position of a major international supplier.

Imperial Collectors

The Botanic Garden of Rio de Janeiro took on symbolic importance as the public showcase of the splendid natural treasures that were the fittings of empire. Visitors were treated to a display of native plants and trees that complemented imported and acclimatized species of flora. Foreign collectors and scientists were drawn to the botanical gardens to familiarize themselves with the diversity of plant specimens that awaited collection, identification, and classification in the vast recesses of the country's hinterlands.

The re-organization of the botanical garden also reflected a progressive stance by the independent monarchy. Like its counterparts in nineteenth century botanic gardens in England and France, the imposing inward-looking walls of feudal times were abandoned. Random planting and asymmetry of walkways blended the gardens into the surrounding outdoors against the natural backdrop of the rainforest and looming hills in the mountainous background. But looks could be deceiving. In 1868, Elizabeth Agassiz visited the Rio de Janeiro Botanic Garden with her husband Louis Agassiz who was on a scientific expedition to collect botanical and zoological specimens for Harvard University. Elizabeth Agassiz was critical of Brazilians who she claimed "seemed to remain in blissful ignorance of systematic nomenclature; to most of them all flowers are *flores*, all animals, from a fly up to a mule or an elephant, are *bixos*."⁴⁶ She described the Botanic Garden as if it were merely a display case of the exotic—an exhibition of diverse vegetation that proliferated on its own accord in the warm climate and required, like the majestic imperial palm or *Palma mater*, little care or arrangement.

⁴⁶Louis Agassiz, *A Journey in Brazil* (Boston, 1868), 76-7.

The Botanical Garden is about eight miles from the centre of the town. It is beautiful, because the situation is admirably well chosen, and because anything that calls itself a garden can hardly fail to be beautiful in a climate where growth is so luxuriant. But it is not kept with great care. Indeed, the very readiness with which plants respond to the least culture bestowed upon them here makes it very difficult to keep grounds in that trim order which we think so essential. This garden boasts, however, one feature as unique as it is beautiful, in its long avenue of palms, some eighty feet in height. I wish it were possible to give in words the faintest idea of the architectural beauty of this colonnade of palms, with their green crowns meeting to form the roof. Straight, firm, and smooth as stone columns, a dim vision of colonades in some ancient Egyptian temple rises to the imagination as one looks down the long vista.⁴⁷

Mrs. Agassiz dismissed the rest of the Botanic Garden as scruffy and uncared-for, making no mention of its value for scientific research and crop experimentation, other than to observe that a panama hat factory was operating on the premises near the palm species *Carludovica palmata*. The on-site transformation of the natural fibers of the palm into an item of consumption might have suggested to Agassiz a parallel with the demise of pristine hinterland forests and their natural flora as Brazil hastened to maintain its competitive status in world coffee markets. But Elizabeth Agassiz and her husband, collectors of specimens for a prominent scientific institution in a wealthy capitalist country, ignored the display of penny capitalism. Or perhaps, the crude manufactory only provided them with a justification for removing Brazil's national treasures before they were devastated or transformed into useable items of consumption. It is most likely that their immediate concerns were purely scientific since private benefactors and patrons were handling the packing, crating, and removal of Brazil's national botanical treasures for museum display, experimentation, and reproduction in botanic and horticultural gardens abroad.

⁴⁷*Ibid.*, 60-1.