

Quest for Permanence in the Tropics: Portuguese Bioprospecting in Asia (16th-18th Centuries)

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Abstract

The history of agricultural, botanical, pharmacological, and medical exchanges is one of the most fascinating chapters in early modern natural history. Until recently, however, historiography has been dominated by the British experience from the nineteenth and the early twentieth centuries, with Kew Gardens at the center of the “green imperialism.” In this article we address the hard-won knowledge acquired by those who participated in early modern Portuguese imperial bioprospecting in Asia. The Portuguese were the first to transplant important economic plants from one continent to another, on their imposing colonial chessboard. In spite of this, the history of Portuguese bioprospecting is still fragmentary, especially with respect to India and the Indian Ocean. We argue not only that the Portuguese—imperial officials, missionaries, and the people connected with them, ~~some coming from different parts of Europe but~~ living and working under the banner of the Portuguese empire—were interested in gathering knowledge but also that the results of their endeavors were relevant for the development of natural history in the early modern period and that they were important actors within the larger community of naturalists.

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Keywords

Natural History – Portuguese Empire – India

Introduction

This article is about the edifice of bioknowledge erected by those who participated in early modern Portuguese imperial bioprospecting in Asia.¹ The Portuguese were the first to transplant important economic plants from one continent to another, on their imposing colonial chessboard. From stories of successful transfer of sweet oranges to gardens in Portugal to descriptions of civility and order that reigned in the gardens of Portuguese *casados* (settlers) and missionaries in places such as Goa, Melaka, Kyushu, and Macao, natural history seems to have been written spontaneously as a synecdoche of a larger imperial discourse.² The history of Portuguese bioprospecting is, however, still fragmentary, especially with respect to India and the Indian Ocean.³

Two basic questions need to be asked: Which were the places of production, the producers, and the knowledges about South Asia that these early modern actors considered the most important for imperial governance and for their own physical survival? How was this knowledge disseminated, and in what ways did it survive?

To answer these questions, limited as we are by the fragmentary nature of the available sources and the insufficient scholarly attention bestowed on early modern Catholic colonial knowledge-practices in Asia, our analysis is

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- 1 We find Londa Schiebinger's concept of "bioprospecting" useful, although our brief is not to discuss systematically all "bioknowledge". Neither is our goal to address all other "sciences" and scientific practices, such as geography, mathematics, and astronomy. Our major focus is on botany and pharmacology, because these were part of the "vital" concern of the empire, which was its survival. Londa Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World* (Cambridge: Harvard University Press, 2004).
 - 2 Pedro Lage Reis Correia, "Father Diogo de Mesquita (1551-1614) and the Cultivation of Western Plants." *Bulletin of Portuguese-Japanese Studies* 7 (2003): 73-91. The Portuguese who brought sweet oranges to the Mediterranean basin left a trace in the Arabic and Persian words for orange, *burtuqāl* and *portaqāl*, respectively.
 - 3 Especially in comparison with the recent sophisticated and diversified publications about Hispanic empire. Daniela Bleichmar, *Visible Empire: Botanical Expeditions and Visual Culture in the Hispanic Enlightenment* (Chicago: University of Chicago Press, 2012).

focused on case studies.⁴ We have combined less-known printed and manuscript sources with those traditionally used by students of Portuguese imperial history. This eclectic corpus helps us think beyond familiar historiographical divisions, such as colonial-versus-national, thus opening up the debate and linking various historiographies related to Iberian early modern empire, the history of South Asia, and the history of science. In this way, our aim is to contribute, if modestly, to a more global history of science.⁵

The history of agricultural, botanical, pharmacological, and medical exchange is one of the most fascinating chapters in early modern natural history, although the actors involved were rarely aware of the enormity of its impact on environment and culture. Until recently, however, historiography has been dominated by the British experience from the nineteenth and the early twentieth centuries, with Kew Gardens at the center of the “green imperialism.”⁶ In the past ten years, historians of early modern Iberian and Atlantic connections and encounters have successfully challenged a Whiggish scenario that portrays Portuguese and Spanish colonial institutions as uninterested in advancing knowledge and sciences, compared to the steady march towards scientific and technological modernity of the northern European colonial powers. But if colonial botanical and natural history, under the mantle of the Spanish monarchy, has indeed been put back on the map and assimilated into the narrative of scientific “modernity” (a still disputable placeholder), the same has not been accomplished for the Portuguese Asian empire.⁷ Numerous archives, with documents in various southern European languages, interspersed with non-European vocabulary and concepts from the colonized and non-colonized areas, have often discouraged historical research.

We shall argue not only that the Portuguese—imperial officials, missionaries, and people connected with them, ~~some coming from different parts of Europe~~ but living and working under the banner of the Portuguese empire—were

4 In our forthcoming book, *Catholic Orientalism*, we develop further some of the ideas presented in this article. The Catholic dimension of this knowledge became a convenient scarecrow in the later development of scientific method.

5 Sujit Sivasundaram, “Sciences of the Global: On Methods, Questions and Theory.” *Isis* 101 (2010): 146-158.

6 Richard H. Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860* (Cambridge: Cambridge University Press, 1995).

7 See, for example, *Science in the Spanish and Portuguese Empires, 1500-1800*, ed. Daniela Bleichmar, Paula De Vos, Kristine Huffine, and Kevin Sheehan (Palo Alto: Stanford University Press, 2009) and *Science and Empire in the Atlantic World*, ed. James Delbourgo and Nicholas Dew (New York: Routledge: 2008).

interested in gathering knowledge but also that the results of their endeavors can be glimpsed in the archives.⁸

By shedding light on documents related to natural history—both those that were intended as such and the occasional and fragmentary treatments of flora and fauna, medicine, remedies, and similar topics that one finds in travel literature—we propose an itinerary that takes us from the beginning of the Portuguese presence in Asia to the end of the eighteenth century. We identify chronological variations and sociological changes among the producers, as well as distinctions due to the differences between manuscript and print cultures, that are responsible, in many ways, for the degree of visibility of knowledge produced in the early modern period. Simultaneously, we discuss the role played by institutions in selecting some knowledge and excluding other knowledge, thus contributing to the disappearance or oblivion of certain archives. This approach—privileging practices, networks, and institutions—provides a critical perspective regarding the mapping of knowledge production and the frameworks of different historiographies on these subjects.⁹

The first section of the article examines the project and the problems Portuguese faced, already in the early sixteenth century, in controlling land in Asia. The second section is concerned with the production of bioknowledge by two important sixteenth-century Portuguese naturalists (Garcia de Orta and Cristóvão da Costa) and with its European dissemination. The third section deals with the role of the missionaries, especially the Jesuits, in collecting and disseminating plants and bioknowledge during the seventeenth and eighteenth centuries. In the final section, we chronicle the self-conscious reflection on the loss of “India” through the voice of a Portuguese diplomat and mercantilist, Duarte Ribeiro de Macedo, and the transplantation to Brazil, from the eighteenth century onwards, of the most relevant Portuguese imperial bioprospecting projects.

1 Controlling the Land

As the Portuguese opened new oceanic routes and thus the way to early-modern globalization, they had in the back of their minds a Roman model of

8 See also Timothy Walker, “Acquisition and Circulation of Medical Knowledge within the Portuguese Colonial Empire during the Early Modern Period.” In *Science in the Spanish and Portuguese Empires*: 247-270.

9 Our approach is inspired, at a distance, by Pierre Bourdieu's practice theory and Bruno Latour's network theory.

land settlement and colonization. This goes against historiography that relies on the “network of settlements” theory.¹⁰ These intentions can be detected in the accounts of the conquest of Goa by Afonso de Albuquerque and all the way to the identity narratives of the Christianized Goan elites at the end of the seventeenth and in the early eighteenth century.¹¹

In fact, the Portuguese, who travelled to serve the crown, trade, and settle in Asia in the early modern period, shared with those who moved through other imperial spaces and in Portugal itself the attachment to territorial possession. The possessive pronoun “our,” as in “*nossa terra* (our land)” or “our Portuguese” was a common means of identity demarcation, but it should also be taken as signifying just what it implies, ownership.

We argue, therefore, that the repeated topos that Portuguese discoverers were in search of “spices and Christians” should be rephrased to take account of the evidence that they were also in search of places to grow wheat and cereals on account of insufficient domestic supply.¹² This was one of the reasons that Ceuta was conquered and was responsible for the pattern of colonization of Madeira and the Azores. Although the expansion towards the East initially had different purposes, agricultural and settler values soon reappeared. Even on a symbolic level, although Portuguese “settlements” were mere dots on the vast map of South Asia, they were not simply land but footholds for the *Respublica Christiana* that the Portuguese considered providential and bound to grow.

Portuguese colonization of Brazil evinced similar providential narratives. According to Pero Vaz de Caminha’s letter to King Dom Manuel, there was plenty of good water and an abundance of palm trees, while the inhabitants lived, naked, in Adamic simplicity.¹³ By the end of the sixteenth century, however, the Portuguese turned this bucolic idyll into a plantation economy of sugar based on Indian and African slave labor. From Salvador to Rio de Janeiro

10 This theory has been developed in Luís Filipe Thomaz, “A estrutura politico-administrativa do Estado da Índia.” In his *De Ceuta a Timor* (Lisbon: Difel, 1994): 207-243. In another essay, Thomaz makes it clear that Dom Manuel’s title (Lord of Conquest, Navigation, and Commerce) included potential and “rightful” territorial dominion, although “the essence of the empire was the sea.” Luís Filipe Thomaz, “Goa: Uma sociedade Luso-indiana.” In *De Ceuta a Timor*, 259.

11 Ângela Barreto Xavier, “David contra Golias na Goa seiscentista e setecentista. Escrita identitária e colonização interna.” *Ler História* 49 (2005): 107-143.

12 José E. Mendes Ferrão, *A aventura das plantas e os descobrimentos portugueses* (Lisbon: IICT, CNCDP, Fundação Berardo, 1992): 16-19.

13 Luísa Borralho and Mário Fortes, “Do Jardim de Éden às Terras de Vera Cruz.” *Episteme* 15 (2002): 75.

there were more than 150 *engenhos* and double that by the middle of the seventeenth century.¹⁴

In South Asia, the agricultural territory in Portuguese possession, acquired by conquest or ceded by the local kings, as in the case of Salcete, Bardez (parts of the territory now known as Goa), and the *Província do Norte* (various coastal territories from Daman to Chaul, including Bombay and Bassein), remained scarce and so even more precious.¹⁵ The way to extract revenues from the agricultural land remained, as elsewhere and later during the British Empire, a complex process of renegotiation among various interests, from crown officials to land tenants.

The difficulty of controlling the land and its production and commerce and labor in Asia was due to the dense socio-economic arrangements and political organization already in place. In Sri Lanka, the Portuguese conquered the coastal area, including the kingdoms of Kotte and Sitawaka, and attempted to control both cinnamon cultivation and its trade, but they never succeeded in conquering the kingdom of Kandy (where most of the cinnamon was grown) in the inaccessible mountainous area in the center of the island. When the Portuguese lost its hold on Sri Lanka to the Dutch in the middle of the seventeenth century, regret at losing this territory turned into a series of narratives demanding its reconquest and extolling the beauties and riches of the island.¹⁶

By the end of the seventeenth century, instead of reclaiming the territory, the Portuguese pursued a less chivalrous goal of “stealing” (according to the Dutch) and transplanting cinnamon trees from Sri Lanka and India in Brazil. This was a long way from Dom Manuel’s initial policy of preventing the cultivation of Indian spices in Brazil, which continued to the end of the

14 *Engenho* is the term for a sugar-cane mill in colonial Brazil. Stuart B. Schwartz, “‘Commonwealth within Itself.’ Early Brazilian Sugar Industry, 1500-1670.” *Revista de Indias* 65/233 (2005): 82-83.

15 The *prazo* system of the *Província do Norte*—that is, the grants of land given by the king for loyal service—turned into a combination of the pre-existent Indo-Muslim *iqṭāʿ* and European *enfiteuse* (emphyteusis, the right to hold property under a long-term or perpetual lease). Livia Baptista de Souza Ferrão, “Land Tenure and People in Daman: Past and Present.” In *Goa and Portugal: History and Development*, ed. Charles Borges, Óscar G. Pereira, and Hannes Stubbe (New Delhi: Concept, 2000): 159-168.

16 Jorge Manuel Flores, *Um curto historia de Ceylan: Quinhentos anos de relações entre Portugal e o Sri Lanka* (Lisbon: Fundação Oriente, 2000): 99; João Ribeiro, *Fatalidade histórica da Ilha de Ceilão*, ed. Luís de Albuquerque (Lisbon: Alfa, 1989); Fernão de Queiroz, *Conquista temporal e espiritual de Ceilão* (Colombo: H.C. Cottle, Government Printer, 1916). See also an English translation by S.G. Perera, *The Temporal and Spiritual Conquest of Ceylon*, 3 vols. (Colombo, 1930, reprint New Delhi: Asian Educational Services, 1992).

sixteenth century.¹⁷ It was also a belated effort, because the idea was an old one. Ambrosio Fernandes Brandão proposed the transfer of pepper to Brazil in the text titled *Diálogos das Grandezas do Brasil* (written c. 1617), attributed to him by Capistrano de Abreu. By describing the natural world of Brazil as infinitely useful and fertile, even more than the Asian, the author tried to prove his point that Brazil was the Promised Land for the Portuguese, as predicted by Dom Manuel's astrologer.¹⁸

An incomplete series of letters in the Goan archives written between 1677 and 1690 shows the extent to which the Brazilian transfer was important to the Portuguese crown. Not only were saplings and seeds sent to Brazil but also cultivators from India. The king himself repeatedly demanded of the viceroys that they send "men experienced in cultivating cinnamon and pepper trees" to Bahia.¹⁹ There is evidence that plants were sent with Instructions (*Regimento*) on how to care for them during and after the transoceanic voyage.²⁰ While the Portuguese continued their efforts, from the second half of the seventeenth century through the eighteenth, to make Brazil and, to a lesser extent, Portuguese Africa, with their vast territories, into centers of production of "Indian" cash crops, the competition for these same resources with the British, Dutch, and French was intense.

Although land could not be controlled in the same way in Brazil, Africa, and Asia, natural objects such as plants were of crucial interest to the Portuguese. They were "green gold," as important as minerals and metals, especially when rare, and they provided medicines to keep the bodies of the colonial actors (from *fidalgos* to lowly plantation slaves) safe and sound, especially in the face of global travel and migration.²¹

17 In the second part of the seventeenth century, the crown policy came to be centered on Brazil. Live specimens of plants and seeds of cinnamon, nutmeg, clove, ginger, and pepper were ordered to be sent to Bahia and Lisbon. See A.J.R. Russell-Wood, *The Portuguese Empire, 1415-1808: A World on the Move* (Baltimore: John Hopkins University Press, 1998): 153.

18 Capistrano de Abreu, *Diálogos das grandezas do Brasil de Ambrósio Fernandes Brandão* (Salvador: Progresso, 1956; Biblioteca Virtual do Estudante de Língua Portuguesa, <http://www.bibvirt.futuro.usp.br>): 14-15.

19 Directorate of Archives and Archaeology in Panjim (henceforth, DAAG), *Monções do reino*, vol. 55B, fol. 348 (10 March 1690). Five years earlier the king wrote to Viceroy Francisco de Távora, Conde de Alvor to send eight families of *Canarins casados* (Goans or Konkans) to Bahia in order to transfer expertise in cultivating Indian crops. See also DAAG, *Monções do reino*, vol. 51a, fol. 25 (19 March 1685).

20 DAAG, *Monções do reino*, vol. 44-5, fols. 68, 72, 120.

21 "Green gold" is a term used by Londa Schiebinger in "Prospecting for Drugs: European Naturalists in the West Indies." In *Colonial Botany: Science, Commerce, and Politics*

In the Portuguese empire, bioknowledge became a field of expertise, based on empirical observation and the ability to describe facts, both in words and in drawings, but they were also subject to political, economic, scholarly, social, and personal concatenations and interventions, like the ones that can be identified between Garcia de Orta, Cristóvão da Costa, and Carolus Clusius. Thus, the result of what was called “natural history” appeared in different guises, embedded in various texts and contexts.²²

2 Natural History: Empiricists, Merchants and the Republic of Letters

When Garcia de Orta printed his *Colloquies on the Simples and Drugs of India* (*Colóquios dos simples e drogas he cousas medicinais da India*) in Goa in 1563, he marked his place as an unsurpassed Portuguese natural history expert in Asia.²³ What he could not know was that the list of firsthand published natural-history works would remain very short, since it was closed with the second and last work by another physician who visited India from 1568 to 1572, Cristóvão da Costa. Published in Burgos in 1578, the *Treatise of Drugs and Remedies of the East Indies, with their Plants Drawn from Life* (*Tractado de las drogas y medicinas de las Indias orientales*) is in many ways affiliated with Orta’s book, and Costa did not hide his inspiration but rather acknowledged his debt.²⁴

in the Early Modern World, ed. Londa Schiebinger and Claudia Swan (Philadelphia: University of Pennsylvania Press, 2007), 119. See also Paula de Vos, “The Science of Spices: Empiricism and Economic Botany in the Early Spanish Empire.” *Journal of World History* 17/4 (2006): 401. On the treatise by Louis Feuillée, who writes explicitly that plants were more important than the riches of Peruvian mines, see Neil Safier, “. . . To Collect and Abridge . . . Without Changing Anything Essential.” *Book History* 7 (2004): 90.

22 This is the case with Pedro Teixeira’s *Relaciones de Pedro Teixeira del origen, descendencia y svccession de los Reyes de Persia y de Harmuz, y de vn viage hecho por el mismo avtor dende la India oriental hasta Italia por tierra*, Antwerp: Hironymo Verdussen, 1610 (facsim. ed., Elibron Calssics, 2007). Embedded in the text under this “orientalist” title are many observations of plants and remedies. See Rui Manuel Loureiro, “Drogas asiáticas e práticas médicas nas Relaciones de Pedro Teixeira (Antuérpia, 1610).” Workshop *Plantas Medicinaias e Fitoterapêuticas nos Trópicos*, IICT/CCCM, 29-31 Oct. 2008 (unpublished).

23 Garcia de Orta, *Colóquios dos Simples e Drogas he Cousas Medicinais da India*, Goa, 1563 (Lisbon: Imprensa Nacional-Casa da Moeda, 1987). This is a facsimile edition of an annotated edition by Conde de Ficalho published in 1891. For convenience, we use the title in its still famous Victorian English translation, *Colloquies on the Simples and Drugs of India*, by Sir Clements Markham, published in London in 1913. See also Conde de Ficalho, *Garcia da Orta e o seu tempo* (Lisbon: Imprensa nacional-Casa de Moeda, 1886, repr. 1983).

24 Costa was a physician working under the protection of the tenth viceroy of India, Dom Luís de Ataíde (1568-71). He may also have been of New Christian origin, born in

In the Catholic world, these two works stand out, not only because they were printed while most other texts remained in manuscript but also because they were accomplished natural histories, comparable to other early modern works produced in Europe. Both Orta and Costa were perfectly aware that there was a community of naturalists in Europe with whom they shared the field of inquiry and an “intense effort” at the precise empirical description of the objects and phenomena.²⁵ Both the *Colloquies* and the *Treatise* are polemical: they confirm, dispute, and appraise opinions, claims, and experiments of the naturalists who were their contemporaries and of the whole tradition of natural philosophy, beginning with the classical Greek and Latin authors, such as Dioscorides and Pliny the Elder.

Orta never returned to the Europe he left in 1534, fleeing the ever-growing hostility to New Christians in Portugal.²⁶ He arrived in Goa under the protection of the powerful *fidalgo* Martim Afonso de Sousa but was also conscious of the empowering nature (and prestige) of the naturalists’ community. In Goa, however, Orta could enjoy the sociability of only a small humanist circle and a few learned physicians, such as Dimas Bosque.²⁷ This is, perhaps, one of the reasons that Orta chose to tell his natural history in a dialogue with an imaginary physician, Ruano, a common literary form among humanists, but less so among naturalists.

In discovering Portuguese natural history archives, such as those preserved in the *Colloquies*, we must also take into account the structure of the edifice that encloses them. In many respects, the detailed knowledge of plants and remedies that Orta displayed in fifty-nine chapters was not unfamiliar to the experienced Portuguese merchants, apothecaries, and physicians. Tomé Pires’s letter (1516) to King Dom Manuel, with its detailed list of “drugs,” shows that Orta did not start from scratch but rather built his knowledge on a half-century of intense Portuguese trade in Asian spices, plants, and medicines. How and to what extent manuscripts by royal officials, such as Tomé Pires (1465?-1524

Portuguese African territories. Christoval Acosta [Cristóvão da Costa, in Portuguese], *Tractado delas drogas, y medicinas de las Indias Orientales, con sus plantas debuxadas al bivo por Christoval Acosta medico y cirujano que las vio ocularamente* (Burgos: por Martin de Victoria impressor de su Magestad, 1578); see his preface, “Al muy illustre senado de la Real Ciudade de Burgos,” not paginated.

25 Brian W. Ogilvie, *The Science of Describing: Natural History in Renaissance Europe* (Chicago: University of Chicago Press, 2006): 5-8.

26 New Christian is a term used to refer to Iberian Jews and Muslims who were forcefully converted to Catholicism from the 15th century onwards.

27 Augusto da Silva Carvalho, *Garcia d’Orta* (Coimbra: Imprensa da Universidade, 1934), 107-112. According to this author, most of the physicians in Goa were surgeons who were not necessarily accomplished humanists, as Orta was.

or 1540) and Duarte Barbosa (c. 1480-1521), circulated in Goa is impossible to reconstruct, but they certainly contained strategic information shared by Portuguese crown officials. In spite of their strategic value, the Italian geographer and compiler Giovanni Battista Ramusio managed to procure and publish the text of Duarte's *Book* in 1550 and parts of Pires' *The Summa of the East*, without mentioning the name of the author.²⁸ And every merchant in Goa, Orta included, must have known the text written in 1554 by Antonio Nunes, *Book of the Weights of India, as well as Measures and Coins* (*Lyvro dos pezos da Yndia, e assy medidas e mohedas*), which listed all the spices and medicinal substances (*drogas*) and how they were measured and priced in various coastal markets.²⁹

Orta never mentioned these sources and authors by name, with the exception of the apothecary Simão Álvares. Without disclosing his name or quoting from his *Information about All the Drugs that Go to the Kingdom* (*Enformação de todas as drogas que vão para o Reino*), written around 1547, Orta paraded Álvares's opinion, with which he disagreed, that white and black pepper belong to the same plant.³⁰ That Orta and Álvares were not the best of friends, and possibly even rivals, is clear from the way the story is told in the *Colloquies*, but it indicates how local social hierarchies were important for the construction of knowledge. It is also interesting that, almost fifteen years later, Cristóvão da Costa takes Orta's side in this dispute.³¹ He even adds a drawing of the "black pepper (*pimenta negra*)" in his *Treatise*, claiming that the plants of the white

28 *The Suma Oriental of Tome Pires and the Book of Francisco Rodrigues*, ed. Armando Cortesão (New Delhi: Asian Educational Service, 1990), 1: xviii.

29 "Droga" in the early modern Portuguese vocabulary was a larger category than it is today. It could include commercial spices and medicinal substances of various provenances. Conde de Ficalho, *Garcia da Orta*: 349.

30 Jaime Walter, "Simão Alvares e seu rol das drogas." *Studia* 10 (1962): 117-49; Donald Lach, *Asia in the Making of Europe: The Century of Discovery* (Chicago: University of Chicago Press, 1994), 2/2: 429. Álvares's text is published in António Alberto de Andrade Banha, "Drogas do Oriente (no v Centenário do Nascimento de Vasco da Gama)." *Arquivos do Centro Cultural Português* 3 (1971): 112-88.

31 Costa claims in the *Tractado* that he met Orta, but, according to Augusto da Silva Carvalho and Jayme Walter, when da Costa arrived at Goa by the end of September, Orta was already dead. Carvalho, *Garcia d'Orta*, 68; Jayme Walter, "Os 'Coloquios' de Garcia de Orta no 'Tractado de la Drogas' de Cristóvão da Costa." *Garcia de Orta* 11/4 (1963): 12. Others, such as Raúl Rodríguez Nozal and Antonio Gonzáles Bueno, speculate that he did encounter Orta shortly before he died. Raúl Rodríguez Nozal and Antonio Gonzáles Bueno, *El Tratado de las Drogas de Cristóbal de Acosta* (Burgos, 1578). *Utilidad comercial y materia medica de las Indias orientales en la Europa renascentista* (Madrid: Ediciones de Cultura Hispánica, 2000): 15.

and black pepper were so similar that the drawing is a good representation of both.³²

And yet, Álvares was right, which proves Orta's larger claim that merchants and experienced *casados* (settlers) in Asia knew better than the naturalists in Europe, from the Greeks to the moderns, but his mistake remains a puzzle. The only possible answer is that he did not possess a pepper plant in his garden in the Rua dos Namorados in Goa and thus had no experience of its complete cycle of growth and the drying process. As it is known that, due to Portuguese demand, the cultivation of Malabar pepper expanded north into the foothills of Kanara during the sixteenth century, it may be inferred from the *Colloquies* that it had not yet arrived in the environs of Goa in Orta's time.³³

If Orta was so wrong on pepper, can he be trusted regarding other spices, simples, and plants, some of which he confessed having never seen personally, such as durian? Perhaps not, but the dialogical form may have helped him press his point with authority.³⁴ It is only because of Ruano's insistent request to be told something about this Southeast Asian fruit that Orta responded first "informally," as the two interlocutors were on their way to lunch (or dinner), with a few evocatively titillating remarks, such as "the Malays say that it is good for the feast of Venus."³⁵ When Ruano was not satisfied, Orta offered a formal description containing the size, shape, and color of the fruit, as well as of its flowers and leaves. What is remarkable about Orta's description is that, for someone who had not seen the fruit, it was quite accurate. This is confirmed by Cristóvão da Costa who travelled to Melaka and made a drawing of the tree.³⁶ Moreover, to describe the smell of the fruit, he borrowed Orta's phrase, "rotten onions."

The same question, however, can be asked about Costa: how trustworthy is his knowledge? Why did he wrongly believe that white peppercorns grew on white pepper vines? Both the *Colloquies* and the *Treatise*, the first more tenaciously than the second, criticized their predecessors and contemporary naturalists for peddling the wrong information by copying and recopying older

32 Costa, *Tractado delas drogas*: 19-20.

33 On the pepper trade, see Anthony R. Disney, *Twilight of the Pepper Empire: Portuguese Trade in Southwest India in the Early Seventeenth Century* (Cambridge MA: Harvard University Press, 1978). Om Prakash, "Spices and Spice Trade." In *Oxford Encyclopedia of Economic History*, ed. Joel Mokyr (Oxford: Oxford University Press, 2003), 5: 3.

34 Palmira Fontes da Costa, "Geographical Expansion and the Reconfiguration of Medical Authority: Garcia de Orta's Colloquies on the Simples and Drugs of India (1563)." *Studies in History and Philosophy of Science* 43 (2012): 74-81.

35 Orta, *Colóquios dos Simples*, 1: 298.

36 Costa, *Tractado delas drogas*: 227.

texts, and yet they failed to observe accurately. How did direct observation, of which both Orta and Costa were so proud, betray them?

To begin, their autoptic proofs were in fact based on multiple observations, by multiple observers. The humanists' approach, which consisted in trying to reconcile ancient descriptions with modern observations, is their guiding method, but the results tend to disqualify the knowledge of the ancients and of those points of view that are immobile, fixed in or originating from a unique place. For Orta, it was the unprecedented mobility of the Portuguese that fuelled the machine of knowledge of the natural world.³⁷ Unable to travel where he wanted, as he complained in the *Colloquies*, Orta portrays his house and his book as a hub in which reports of all sorts of ocular observations converged and were sorted out and evaluated.³⁸ His home was therefore the laboratory and the kitchen in which the natural objects were stored, tested, applied, and consumed. He is witness to the effects (e.g., visual, textual, curative, olfactory, palatal) of these substances, not a "modest witness" at that, because, besides speaking for his objects, he speaks also for himself—he pleads for himself.

The knowledge collected in the *Colloquies* is impressive, though hardly original, especially for other physicians in Goa who came to Asia, just as Orta did, to practice medicine but also to trade and to get rich. What is spectacular about Orta's book is his ability to shore up his authorial position. He succeeds in his own lifetime, and then, after a hiatus of three centuries following his judgment by the Inquisition, he is rehabilitated and enshrined in the gallery of great Portuguese men.

The printing of the *Colloquies* is something of a miracle in itself. It was the first secular book printed in Goa in the sixteenth century and also the last. The printing press in Goa was in ecclesiastical hands throughout the seventeenth century, and all of the forty some books that were published were directly connected to local political and missionary interests.³⁹ We can only speculate who

37 Ines G. Županov, "The Wheel of Torments': Mobility and Redemption in Portuguese Colonial India (Sixteenth Century)." In *Cultural Mobility: A Manifesto*, ed. Stephen Greenblatt et al. (Cambridge: Cambridge University Press, 2009): 24-74.

38 Orta did travel from the Kathiawar Peninsula to Sri Lanka during the first years, when he accompanied his patron Martim Afonso de Sousa on several military campaigns before settling in Goa. He also mentioned his visits to Burhan Nizam Shah, the king of Ahmadnagar and to his leased-out quinta (country estate) on the island of Bombaim (today in the center of Mumbai). Charles R. Boxer, "Pioneers of Tropical Medicine: Garcia d'Orta and Nicolás Monardes." In *Charles R. Boxer: Opera Minora II*, ed. Diogo Ramada Curto (Lisbon: Fundação Oriente, 2002): 182.

39 José António Ismael Gracias, *A imprensa em Goa nos séculos XVI, XVII e XVIII. Apontamentos Histórico-Bibliográficos* (Nova-Goa: 1880); Hélder Garmes, *Oriente, engenho e arte: imprensa e literatura de língua portuguesa em Goa, Macau e Timor Leste* (São

had selected this secular work to be printed and why Aleixo Dias de Falcão, the first inquisitor in Goa, and Dom Gaspar de Leão Pereira, the archbishop of Goa, gave their permission. In fact, from his *Compendio Spiritual* of 1561 until the *Desengano de Perdidos* (*Disillusioning the Lost*), printed ten years later, Dom Gaspar de Leão Pereira accused sensualists of living under the rule of Satan, and the sensual natural remedies proposed by Orta were not good enough for achieving the ultimate goal, which is salvation.⁴⁰

One explanation for Orta's success is that he managed to mobilize different audiences on different issues. In Goa, in his own time, he proposed an answer to a burning question: How does one survive in the Torrid Zone? He waved before the eyes of his fellow colonial expatriates the promise of remedies, cures, and diets fit for the climate. Survival by acclimatization is one of the strong messages in the *Colloquies*.⁴¹ Not just bare life (including his own) was at stake, but also masculinity and, in the long run, the procreation that engendered the multicultural *casado* households and allowed the conservation of Portuguese imperial rule in Estado da Índia, which suffered a chronic deficit of human resources.⁴²

Another audience for Orta's book consisted of other naturalists and curiosi. There was no lack of enthusiasm and admiration for Asian natural history among the Portuguese elites, from learned *fidalgos* to *casados*, ecclesiastics and missionaries, and there was no lack of experiments on "drogas" and remedies. Works of natural history and medical herbaria surely circulated among the physicians and apothecaries and were given as gifts to patrons and *fidalgos*, as in the case of Manuel Godinho de Erédia's the *Summa of Trees and Plants of India intra Ganges* (1612).⁴³

Paulo: Alameda, 2004). Diogo Ramada Curto, *Cultura escrita: séculos XV a XVIII* (Lisbon: Imprensa de Ciências Sociais): 324-330.

40 D. Gaspar de Leão Pereira, *Compendio spiritual tirado de muitos autores pello primeiro Arcebispo de Goa* (Goa, 1561). *Desengano de Perdidos* (Goa, 1573), ed. Eugenio Asensio (Coimbra, 1958). *Tratado que fez mestre Hieronimo, medico do papa Benedicto 13 contra os judeus: Em que prova o Mesias da ley ser vindo*, prefaced by Dom Gaspar's *Carta do primeiro Arcebispo de Goa a povo de Israel, seguidor ainda da ley de Moises, & do talmud, por engano & malicia dos seus Rabis* (Goa, 1565).

41 Ines G. Županov, "Drugs, Health, Bodies and Souls in the Tropics: Medical Experiments in Sixteenth-Century Portuguese India." *Indian Economic and Social History Review* 39/1 (2002): 1-45. Ines G. Županov, *Missionary Tropics: The Catholic Frontier in India: 16th-17th Centuries* (Ann Arbor: University of Michigan Press, 2005).

42 Carvalho, *Garcia d'Orta*: 75.

43 Manuel Godinho de Erédia, *Summa de Árvores e Plantas da Índia intra Ganges* (1612), ed. J.G. Everaert, J.E. Mendes Ferrão, and M. Cândida Liberato (Lisbon: CNCDP, 2001).

A mestizo and a former student in the Jesuit college and seminary of St. Paul in Goa, Erédia was a talented artist.⁴⁴ As shown by his signed treatises and maps, he considered himself, in his post-Jesuit life, a cosmographer and mathematician, but what he really desired was to be a discoverer. Although he was mostly looked down upon by the viceroys and governors in Goa, whom he petitioned incessantly for funding and honors, his cartographic and artistic talents were recognized. More than 210 maps and plans are known to be from his hand, some of which were the result of his expeditions to the hinterland (*sertão*) of Melaka, the environs of Goa, and the golf of Gujarat. Others traced his imaginary, wishful-thinking geographical spaces.

And yet, Erédia's *Summa of Trees and Plants of India intra Ganges* has nothing imaginary about it. The seventy-two pages of watercolors are minimalist but naturalistic in the depiction of plants. The text that accompanies each picture is strictly medico-pharmacological, although some plants are simply edibles, and there are no references to medical authorities. The album itself was a gift to Viceroy Ruy Lourenço de Távora (1609-12), to whom Erédia had already dedicated an atlas of Portuguese forts in India. Strictly speaking, this collection is not a natural history but a combination apothecary's manual and pictorial herbarium. The choice of plants shows that he was copying from nature the plants that grew in the gardens in and around Goa without asking himself where they stood in the Book of Nature. Unlike Orta and Costa, who always began with names which they drew from or tried to connect to the classical erudition, Erédia trusted his eyes first and then his hands to imitate and reproduce nature. Useful objects were unmistakably more important to him than names. In addition, his explanation on the back of the picture often contained just a single name, usually in Konkani.

With his pictorial herbarium, Erédia was not saving his life, as Orta probably did with the *Colloquies*, but was trying to buy the protection, favor, and patronage of the viceroy.⁴⁵ His *Summa*, at one point deposited in the Jesuit professed house in Goa, reappeared in the Norbertine Monastery in Tongerlo, in Belgium, in the early eighteenth century.⁴⁶ The album was brought to Europe as a gift by a returning Jesuit priest or had been acquired through networks of exchange

44 *Documenta Indica*, ed. Joseph Wicki (Rome: Institutum Historicum Societatis Iesu, 1975), 13: 746.

45 On *Colloquies* as Orta's defense from the Inquisition, see Županov, "The Wheel of Torments."

46 Manuel Godinho de Erédia, *Summa de Árvores*: 163-164.

and gifting that operated among the religious orders, especially after the suppression of the Society of Jesus (1773).⁴⁷

It was in the European Republic of Letters that the *Colloquies* acquired a second life, beyond the control of its author, the Inquisition, and the Estado da Índia. Besides Cristóvão da Costa's *Treatise*, which contributed to the dissemination of Orta's medico-botanical knowledge, the main actor responsible for that second life was Carolus Clusius (Charles de l'Ecluse). A year before Orta's death, Clusius translated the *Colloquies* into Latin and published it in an illustrated volume, entitled *Aromatum et simplicium aliquot medicamentorum apud Indos nascentium historia* (Antwerp, 1567) that went through several editions.⁴⁸

Writing from Burgos while employed as the town physician, Cristóvão da Costa responded to a different kind of audience, one that demanded descriptions of the plants, regions, and people that were both exotic and desirable. Instead of revealing natural history in order to hide his own, as Orta did successfully with the *Colloquies*, Costa wanted to reveal as much as possible of the Asian chapter in the Book of Nature.⁴⁹ His enthusiasm for laying bare the true representation of plants and for shoring up his authority, especially vis-à-vis borrowings from Orta, compelled Costa to add forty-seven drawings "from life" (*plantas debuxadas al vivo*).

The stylized form in which a single plant is pictured, with its roots, leaves, flowers, and fruits, often at the cost of a radical foreshortening of the trunk and branches, found no admirers in the northern printing houses where Plantin and Clusius published their famous natural history books.⁵⁰ In his translation

47 After the suppression of the Society of Jesus, the Jesuits' archives were scattered or sold or ended up in the archives of other religious institutions. For example, in Pondicherry, the French Société des Missions Etrangères simply incorporated the remaining Jesuits and their archives.

48 Translations into Italian, French, and Spanish followed in the sixteenth century. Juan Bautista Monardes read the work carefully, and Juan Fragoso translated it into Spanish, *Discursos de las cosas aromaticas, arboles y frutales, y de otras muchas medicinas simples que se traen de la India Oriental, y sirven al uso de medicina* (Madrid, 1572); Teresa Nobre de Carvalho, "O olhar abrangente de Juan Fragoso sobre o mundo natural exótico." *Revista Oriente* 19 (2008): 24-44.

49 Teresa Nobre de Carvalho, "Imagens do mundo natural asiático na obra botânica de Cristóvão da Costa." *Revista de Cultura* (Macao) 20 (2006): 37. Da Costa published two more treatises on moral and spiritual topics, *Tratado en contra, y pro de la vida solitaria* (Venice, 1592) and *Tratado en loor de las mugeres* (Venice, 1592).

50 Sachiko Kasukawa, "Uses of Pictures in Printed Books: The Case of Clusius' *Exoticorum libri decem*." In *Carolus Clusius: Towards a Cultural History of a Renaissance Naturalist*, ed.

of the *Treatise* published in 1582 in Antwerp as *Aromatum et medicamentorum in Orientalis India nascentium liber*, Clusius suppressed all but a single picture from the original,⁵¹ which was reproduced as an example of a spurious representation and juxtaposed with the “legitimate (*legitima*)” picture. In his 1605 edition of *Exoticorum libri decem*, Clusius reprinted the pair of *spuria icones* of the clove tree and the *legitima icon* of the clove branch in order to lecture his natural-history audience on falsity and truth. By dismissing Costa’s drawings, by summarizing, translating, and merging the *Colloquies* and the *Treatise* into his own printed works, and by presenting himself as the authority in that matter, Clusius caused the two Portuguese authors slowly and smoothly to slip into irrelevance.⁵²

Scholars have recently demonstrated the importance of Clusius’s European network and the exchanges of seeds, plants, texts, and drawings that made his prolific printed oeuvre possible.⁵³ Among his friends and correspondents were several Spanish physicians and naturalists, including Benito Arias Montano and those from the Sevillian circle (Simón de Tovar, Juan de Castañeda, Rodrigo Zamorano), but not Nicolás Monardes, whose work on American plants and remedies he also translated into Latin.⁵⁴ Neither is there any letter to or any effort at contacting Cristóvão da Costa before he retired to his hermitage in La Peña de Tharsis around 1587.⁵⁵ Moreover, by the end of the sixteenth century, the British and the Dutch had opened their own commercial routes to the Orient, and Clusius turned to their networks for information on exotic plants.

Florike Egmond, Paul Hoftijzer, and Robert Visser (Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, 2007): 221-246. On the larger question of the role of visual culture in early modern European context of art and science, see Pamela H. Smith, “Art, Science, and Visual Culture in Early Modern Europe.” *Isis* 97 (2006): 83-100.

51 Kasukawa, “Uses of Pictures in Printed Books”: 224.

52 Clusius acquired da Costa’s *Tractado* during his stay in England. He also used information obtained from the Pacific expedition of Francis Drake to complement Orta’s work in *Aliquot notae in Garciae aromatum historiam* (Antwerp: Christ. Plantin, 1582). See also Joseph L. Barona, “Clusius’ Exchange of Botanical Information with Spanish Scholars.” In *Carolus Clusius: Towards a Cultural History of a Renaissance Naturalist*, ed. Florike Egmond, Paul Hoftijzer, and Robert Visser (Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, 2007): 99.

53 The Clusius project (2005-2009) at the Scaliger Institute of Leiden began with the digitization of 1300 letters addressed to Clusius and some three hundred that he wrote to various correspondents. See *Carolus Clusius*, 3.

54 Barona, “Clusius’ Exchange of Botanical Information”: 105.

55 Nozal and Bueno, *El Tratado de las Drogas*: 20.

Although historians of science have emphasized the importance of friendly support networks through which correspondence, ideas, and materials circulated and helped Renaissance naturalists to build their collections and publicize and print their books, the rivalries between individuals, circles, and institutions redirected certain efforts and blocked others. It is remarkable to what extent Orta, Costa, and Clusius shared the same culture of classical medico-botanical references, only to reject them when they contradicted their own empirical observation and knowledge. Nonetheless, writing natural history from Goa, Burgos, or Antwerp in the sixteenth century meant that the actual publishing and production of the book was contingent on the author's ability to attract local and global patronage. As we have seen, having a work printed was not a guarantee against oblivion. The afterlife of a book depended also on its author, the language of publication, the editors, and the market. Whether the author was from northern or southern Europe, a layman or religious—especially from the seventeenth century onwards—was also important for the success of the book.

3 Natural History in the Mission

Surprisingly, one of the most important networks through which information and knowledge about Asian and New World plants and remedies circulated around the globe from the second half of the sixteenth century to the eighteenth century was not secular but religious, and it was in the hands of the Jesuits.⁵⁶ They were the most important naturalists and most industrious agents of plant transplantation, bioprospecting, and pharmacological experiments in the *Respublica Christiana*, parallel to the Republic of Letters being built by other Europeans. The Society of Jesus had members placed strategically in all Portuguese, Spanish, and (from the end of the seventeenth century), French colonies. The Jesuits were not only well trained but also specialized in whatever trade or profession was considered useful for the mission of conversion and for the maintenance of the Catholic world. The Jesuit College

⁵⁶ On Jesuit science and natural history in the overseas missions, see the excellent article by Steven J. Harris, "Jesuit Scientific Activity in the Overseas Missions, 1540-1773." *Isis* 96 (2005): 71-79, and his "Confession-Building, Long-Distance Networks, and the Organization of Jesuit Science." *Early Science and Medicine* 1/3 (Oct. 1996): 287-318. On the recent state of the historiography of early modern Jesuit science, see Sheila J. Rabin, "Early Modern Jesuit Science. Historiographical Essay." *Journal of Jesuit Studies* 1 (2014): 88-104.

of St. Paul in Goa, created in 1541, would become a “university” for training in grammar, music, theology, and science famous throughout Portuguese Asia, as well as a place where Jesuits of different nationalities and with different intellectual competencies taught and exchanged knowledge. Manuel Godinho de Erédia was himself an alumnus of this institution and even taught mathematics there.

Although medicine was not part of the Jesuit educational curriculum, some medical training may have been provided in the Jesuit colleges in Goa and Macao. In fact, medical and pharmacological information rapidly became a crucial asset in the missionary field.⁵⁷ Hospitals and pharmacies were attached to the mission residences, colleges, and professed houses and were often praised for their wonderful effect on the patients and “pagans.” It is in this milieu that knowledge of natural history was generated, tested, and exchanged. Recipes and plants, both medicinal and culinary, circulated among Jesuit colleges and missions with instructions, lists, and manuals.⁵⁸ Acclimatization gardens were attached to the Jesuit residences and churches, although they are yet to be studied in South Asia. We know more about Brazilian experiments, such as the Quinta do Tanque that belonged to the Jesuit College in Bahía, where they cultivated cinnamon and pepper brought from Goa in the 1680s, as soon as the Portuguese crown reversed a more than 150-year ban on the transplantation of East Indian spices to the West Indies.⁵⁹ Also, while some of the inventories of hospital pharmacies (*pautas das mesinhas*) are available, the archives of the Jesuits and other religious orders in Goa contain much precious data on the materia medica. Unfortunately, these documents are still unexplored and are not properly catalogued.⁶⁰ For example, the description of the region, the climate, diseases, and the basic flora and fauna was expected from each Jesuit newcomer to and traveller through the Torrid Zone, and the official Jesuit annual letters and personal correspondence are dotted with comments on natural history, illnesses, epidemics, local medical cures, and ethnobotany, although the information can sometimes be elliptical.

57 Županov, “Drugs, Health, Bodies and Souls in the Tropics”: 1-45.

58 Sabine Agnostiou, “The International Transfer of Medicinal Drugs by the Society of Jesus (Sixteenth to Eighteenth Centuries) and Connections with the Work of Carolus Clusius.” In *Carolus Clusius*: 293-312.

59 Russell-Wood, *The Portuguese Empire*: 153.

60 “Pauta das Mezinhas.” In J.H. da Cunha Rivara, *Arquivo Portuguez-Oriental* (New Delhi: Asian Educational Services, 1992), 5/2: 877-883. For the Hospital del Rey in Goa in 1572, see also Walter, “Simao Alvares e o seu rol das drogas”: 117-149.

An empirical and utilitarian approach to nature was hardly new, especially in the Estado da Índia, but the extent to which the Jesuits and other religious became involved in bioprospecting, trade in medicinal drugs, and intercontinental transplantation of plants is surprising.

The main reason that Jesuits and other missionary orders became worldwide pharmacological specialists and import-export entrepreneurs can be found in their social location and cultural intentions. Present at all levels of society, from the poorest of the poor to the thrones of the kings, Jesuits had access to a wide variety of local knowledges in Europe and, especially, in the overseas colonies. While they identified therapeutic rituals and ceremonies and tried to suppress them or expurgate their “idolatrous” content, they were also quick to notice and record indigenous natural remedies. Of fourteen locally grown medicinal plants identified by Fernão Cardim in Brazil, one particularly potent and attractive plant was simply called “holy plant” (*erva santa*). When exactly this “holy plant,” which became a commercial hit in the long run, came to India is not clear, but it is attested that Akbar accepted a gift of tobacco from his emissary Asad Beg upon his return from Bijapur in 1605. By the time Jahangir ascended the throne of the Mughal empire, the addictive qualities of the substance had already been amply observed, and Jahangir was the first to impose a smoking ban.⁶¹

Jesuits who worked in the difficult missions in tropical southern India experimented with all kinds of remedies, some known locally for suppressing sexual desire. Henrique Henriques, a scrupulous missionary on the Fishery Coast (on the Gulf of Mannar) wrote to Diogo Laínez, the general of the Society of Jesus, inquiring whether or not he should use the remedy recommended by the yogis. According to Henriques, the excessive heat made the missionaries susceptible to sexual disorders.⁶² The negative answer arrived much later, from Stefano Borja, the third general of the Society of Jesus, who maintained that sexual desire should be fought by will, not by medicine.⁶³ The identity of this remedy was never mentioned. Perhaps the recipe was kept secret for strategic

61 Russell-Wood, *The Portuguese Empire*, 173. Edward MacLagan claims that Akbar asked the Jesuits for their opinion on tobacco; see *The Jesuits and the Great Mogul* (New York: Octagon Books, 1972): 62.

62 H. Henriques to D. Lainez, Mannar, 19 Dec. 1561, *Documenta Indica* (Rome: Institutum Historicum Societatis Iesu, 1958), 5: 382.

63 F. de Borja to A. de Quadros, Rome, 29 Nov. 1565, *Documenta Indica* (Rome: Institutum Historicum Societatis Iesu, 1960), 6: 526. On Borja’s confusion between “*bonjes*,” a distorted term for *bonzes* (or *bhikkhu* in Pali) first used for Buddhist priests in Japan and “*jogues*” (Eng. *yogis*),” see Županov, “Drugs, Health, Bodies and Souls in the Tropics.”

reasons, as was the case with the *pedra cordial* or (*lapis de Goa*), invented by the Florentine Jesuit Gaspar Antonio.⁶⁴

It is thus not surprising that, when John Fryer visited Goa in the late seventeenth century, he was impressed by Jesuit pharmacy and by the revenues earned through the sale of *pedra cordial*. “The Paulistines [Jesuits] enjoy the biggest of all the Monasteries at St. Roch; in it is a Library, an Hospital and an Apothecary’s Shop well furnished with Medicine where Gaspar Antonio, a Florentine, a Lay Brother of the Order the Author of the Goa Stone brings them in 50000 Xeraphins by that invention Annually.”⁶⁵ What Fryer is referring to is the fact that the Jesuits had a global monopoly on the production and export of certain coveted remedies. For example, they were exporters of the “fever bark” or “Jesuit bark” (*Cinchona*) from Peru, the first effective remedy for malaria. The Jesuits not only put great hopes in this substance for the cure of the disease but were also banking on it for successful conversion of non-Christians to Christianity. The healing scene, before or after conversion, is one of the topoi in Jesuit letters and reports. This is certainly what they hoped when they cured the Chinese emperor, Kangxi, in 1693.⁶⁶ The emperor was grateful but did not embrace Christianity.

Similar substances, such as cocoa in Brazil and other *drogas do sertão* (“drugs of the hinterland,” including indigenous gum benzoin and cloves), were also

64 A cordial stone was a manufactured remedy created in the Jesuit pharmacy in Goa. Russell-Wood, *The Portuguese Empire*, 179. Russell-Wood also claims that Gaspar Antonio authored a treatise on medicine. Ana Maria Amaro, “A famosa pedra cordial de Goa ou de Gaspar Antonio.” *Revista da Cultura* 19/22 (1988-1989): 87-108. Ana Maria Amaro, *Introdução da medicina ocidental em Macau e as receitas de segredo da botica do Colegio de São Paulo* (Macao: Instituto Cultural de Macau, 1992). “Regimento, e virtudes das pedras cordeaes compostas, & primeiro inventadas na India pelo Irmão Gaspar Antonio da Companhia de Jesus.” In J.T. de Sousa Martins, *A tuberculose pulmonar e o clima de altitude da Serra da Estrela* (a “booklet,” Lisbon: Imprensa Nacional, 1890). Jesuits were also involved in the trade in bezoar stones. The history of the global circulation of this early modern “medical” substance has recently attracted several studies that we cannot address here for lack of space. Older works include Dauril Alden, *The Making of an Enterprise: The Society of Jesus in Portugal, Its Empire, and Beyond, 1540-1750* (Palo Alto: Stanford University Press, 1996), 282, 543, and Donald F. Lach, *Asia in the Making of Europe*, vol. 2, *A Century of Wonder, Book 1: The Visual Arts* (Chicago: University of Chicago Press, 2010): 11-20, 23-30.

65 *Travels in India in the Seventeenth Century by Sir Thomas Roe and Dr. John Fryer* (New Delhi: Asian Educational Services, 1993): 373.

66 M.E. Hanson, “Jesuits and Medicine in the Kangxi Court (1662-1722).” *Pacific Rim Report* 43 (July 2007): 4.

important sources of Jesuit revenues.⁶⁷ In India it was coconuts, tobacco, and rice that became crucial cash crops, as is apparent from acrimonious disputes, between the Jesuit provinces of Malabar and Goa, over the three villages in Salcete (Ambelim, Velim, and Assolna),⁶⁸

One of the most interesting Jesuit agronomical treatises, the *Arte palmarica*, reflects their economic approach to cultivation of coconut trees. Although the text survived in transcriptions from a later period, and given the ongoing Jesuit custom of “improving” and “updating” (or expurgating) their texts, it is a remarkable document of that particular moment in the late seventeenth century, when the Jesuits espoused “scientific” methods in farming. This scientific experiment was closely connected with commercial exploitation. The work of an anonymous Jesuit, it is a manual on selecting, planting, and tending coconut palm trees in order to obtain the most fruit possible from each tree. Divine intervention is absent from the text, except for a fleeting analogy between the coconut tree and the tree that St. John saw in the Apocalypse, an analogy drawn, the author claimed, because those trees yielded twelve harvests a year, each time with “a bunch of fruit.” “And there are palm trees that produce fifteen or sixteen bunches (*cachos*) a year, as I saw, and in a single harvest gave 196 coconuts, all good and well grown.”⁶⁹

The utility of this plant is then described in detail, followed by advice on how to cultivate it and on what soil, how to protect it from vermin, how to choose the best seeds and the best species of coconuts, and so on. “If they [the cultivators] observe the rules,” he wrote, “that I suggested here, there is no doubt that their farms will be very fruitful and remunerative and that they would give fruit in a short time and be preserved and known as good, as experience has shown me.”⁷⁰

And this is precisely the content of the book—the rules for producing the best and most ample crop of coconuts. In nine chapters, every aspect of cultivation is considered, with all necessary technical detail, but for this Jesuit coconut farm manager, local knowledge was neither sufficient nor appropriate.

67 Russell-Wood, *The Portuguese Empire*: 155. Timothy Walker, “Establishing Cacao Plantation Culture in the Atlantic World: Portuguese Colonial Cacao Cultivation in Brazil and West Africa, c. 1580-1912.” In *Chocolate: History, Culture and Heritage*, ed. Louis E. Grivetti and Howard-Yana Shapiro (Hoboken NJ: Wiley, 2009): 543-557.

68 *Informação que se deu ao N.R.P. Geral sobre a fazenda de Assolna de Goa*, Arquivos Nacionais/Torre do Tombo (Lisbon), Armário jesuítico, maço [Jesuit Cabinet, bundle] 90: doc. 115.

69 *Arte palmarica escrita por um padre da Companhia de Jesus, nova edição* (Nova Goa: Imprensa Nacional, 1918): 1.

70 *Arte palmarica*: 3.

"I was not guided in this matter," he wrote in the closing lines, "by the customs of the natives but by the dictate of reason, based on observation and experience. God, who is the author of all good, has provided that everything succeeds with prosperity for the major glory and the universal good of us all."⁷¹ There is no reason to distrust the author's assessment. As he stated at one point, he had been a manager of a few Jesuit farms in Goa and had a larger sample for observations than an individual cultivator would have. Of interest is the Jesuits' modern approach to technological progress in agriculture, which went against traditional methods. At the same time, the Jesuits apparently consolidated the plots and employed a type of bonded laborers. The *mundukars*, as these were called, were tied to the land because of the small loans that they could not repay.⁷² The *Arte palmarica* describes very labor-intensive work that required strict organization and control of agricultural actors and materials.

This text gives us a taste of the Jesuit style of economic management, in this case the management of farming—intensive labor, under strict organization and control. A similar sort of order and control reigned in the Jesuit pharmacy and in the Jesuit-administered hospitals referred to above. For the Royal Hospital in Goa, the most famous in Asia, the Jesuits, who first accepted its administration and then were compelled to be in charge of by the viceroys and governors at the end of the end of the sixteenth century—wrote a *Regimento* (rule book).⁷³ It was order, more than medicine, that ruled in the hospital, where the art of curing was, in fact, the art of managing and controlling the patients.⁷⁴

The expertise acquired by the missionaries before they entered the religious order was often useful for mobilizing and appropriating local knowledge. The Discalced Carmelites sent by the Sacred Congregation for the Propagation of the Faith (Propaganda Fide) to the mission in Kerala among St. Thomas Christians were both rivals and successors of the Jesuits in the region.⁷⁵

71 Ibid.: 36. In a similar claim, he states that "I did not take into account the customs of the natives in this thing. I was governed and govern myself only by my own discourse, observations, and experiences based on good reason" (Ibid.: 4).

72 Charles Borges, *The Economics of Goa Jesuits, 1542-1759: An Explanation of their Rise and Fall* (New Delhi: Concept Publishing Company, 1994): 82.

73 Cunha Rivara, *Arquivo Portuguez-Oriental*, 5/3: 1006-1066.

74 According to the *Regimento*, two basic principles emphasized the social conditions of healing—the smooth repetitiveness of medical or paramedical gestures (every morning, every day, every week, ~~every year~~) and the strict division of tasks and offices among the hospital personnel. Županov, "Drugs, Health, Bodies and Souls in the Tropics": 40-41.

75 St. Thomas Christians, also known as Syrian Christians or Nasrani are an ancient Christian community in Kerala. The *padroado* (royal patronage) of the missions was an arrangement

Their interest in natural history is attested in still largely unstudied documents scattered in various European archives and in printed books produced in the late seventeenth and eighteenth centuries.⁷⁶ Paulinus a Sancto Bartholomaeo mentioned a *hortus siccus*, an herbarium of dried specimens (*erbario malabarico*) with descriptions of simples by Vincenzo di Santa Caterina da Siena deposited in the “Library of the Missionary College of S. Pancrazio.”⁷⁷ Because this collection seems to have disappeared, perhaps during the sack of the College by the French army (or Garibaldi’s army?), another work, by Matteo di San Giuseppe (alias Pietro Foglia), *Viridarium Orientale*, is the witness of the Discalced Carmelite’s bioprospecting efforts. It is well known that Matteo di San Giuseppe inspired Hendrik Adrian van Rheedee tot Drakenstein’s *Hortus Indicus Malabaricus* and contributed his knowledge of Malabar plants and his talent as a draftsman, but historians were satisfied with deprecatory remarks by the contemporary Dutch observers, who had not studied San Giuseppe’s work and who dismissed it as nothing more than an aide-memoire, compared with the Dutch masterpiece. Ironically, the manuscript of the *Viridarium orientale* in the Biblioteca Nazionale Centrale in Rome was described in the catalogue, until just a few years ago, as a “spiritual” treatise.⁷⁸

between the king of Portugal and the Holy See, by which the latter delegated to the former the administration of the local churches. With the establishment of the Propaganda Fide congregation of the Roman Curia in 1622, Rome attempted to renegotiate the rules.

- 76 The seventeenth-century printed *viaggi* (travel books) by the Discalced Carmelites are the easiest way to understand the riches of their archives. Giuseppe di Santa Maria Sebastiani (1623-89), *Prima spedizione alle Indie orientali* (Rome: Filippo Maria Mancini, 1666), *Segunda spedizione alle Indie orientali* (Rome: Filippo Maria Mancini, 1672), and Vincenzo Maria di Santa Caterina da Siena (alias Vincenzo Maria Murchio), *Il viaggio all’Indie orientali del padre F. Vincenzo Maria di S. Caterina da Siena Procurator Gener. de’ Carm. Scalzi, con le osseruationi, e successi nel medesimo, i costumi, e riti di varie nationi, et reconditissimi arcani de’ gentili, cauati con somma diligenza da’ loro scritti, con la descrizione degli animali quadrupedi, serpenti, uccelli, piante di quel Mondo nuovo, con le loro virtu singolari, diuiso in cinque libri. Opera non meno utile, che curiosa* (Venice: Giacomo Zattoni, 1678).
- 77 Paolino da S. Bartolomeo (Paulinus a Sancto Bartholomaeo), Carmelito Scalzo, *Viaggio alle Indie orientali, umiliato alla santità di N.S. Papa Pio Sesto Pontefice Massimo* (Rome: Impresso Antonio Fulgoni, 1796): 362.
- 78 Ray Desmond, *Great Natural History Books and Their Creators* (London: British Library and Oak Knoll Press, 2003): 40. See the excellent pioneering work by Giuseppe Olmi, “Lavorare per i libri degli altri. Padre Matteo di S. Giuseppe, medico, botanico e disegnatore di piante, ‘qui nomine suo nihil edidit.’” In *Belle le contrade della memoria: Studi su documenti e libri in onore di Maria Gioia Tavoni*, ed. Federica Rossi and Paolo Tinti (Bologna: Pàtron editore, 2009): 53-79. One copy of his *Viridarium orientale* is preserved in the Muséum de

From Paulinus a Sancto Bartholomaeo's *Viaggio* and the boxes of his papers in the archives in Rome, we can glimpse the vigorous research in natural history in Kerala throughout the seventeenth and eighteenth centuries. He mentions manuscripts by "Father Giovanni Alvarez, Father Antonio Gomes, Mr. Queiros, Mr. Ambrosio Lopes, and Vapu; all these are native Malabar botanists and doctors."⁷⁹ Moreover, the aforementioned Giovanni Alvarez, an Indian priest, was a translator of a Sanskrit text on Brahmanic medicine (*Medicina brahmanica*). Paulinus also boasted of owning a few palm-leaf manuscripts (*olai*) and drawings of plants made by a Malabar physician and annotated by a certain countess of Salms.⁸⁰ Richard Grove has made a valiant effort to put back into the context of natural history the three Gauda Saraswat Brahmins and an Ezhava physician and herbalist, Itti Achuden, who co-produced, with some acknowledgement from Van Rheedee, the *Hortus Indicus Malabaricus*. Grove remained unaware of the subalternization of the "Catholic" missionary knowledge. One of the reasons for this omission is Indian colonial and post-colonial historiography, mainly constructed in a Protestant intellectual framework, which continues to perceive Catholic missionaries as indifferent, if not opposed, to "scientific" projects and knowledge.⁸¹

4 Transplantation: Between the Indian and Atlantic Oceans

Access to colonial bioresources emerged in the sixteenth century, and even more self-consciously in the seventeenth century, as a strategic field of intense struggle between Iberian monarchies and other ambitious European colonial and merchant enterprises. As has been recently argued, knowledge gathering

l'Histoire Naturelle in Paris, MS. 1764. We have consulted Biblioteca Nazionale Centrale di Roma, Vittorio Emanuele II, MSS. Rari, Fondi Minori, Santa Maria della Scala, Varia, MS. 178, but the most interesting volumes, in which botanical and spiritual obsessions of the author are displayed in hundreds of drawings, are preserved in the Biblioteca Medicea Laurenziana in Florence, MS. Redi 186 and MS. Mediceo Palatino 29 (1-8 vols.).

79 Paolino da S. Bartolomeo *Viaggio*, 367. Ines G. Županov, "Amateur Naturalist and Professional Orientalist: A Discalced Carmelite Missionary in Kerala and Rome (16th-18th centuries)." In *Os viajantes europeus e o mundo natural asiático (séculos 16 a 18)*, ed. Rui Manuel Loureiro, *Revista de Cultura* (Macao) 20 (2006a): 86.

80 *Ibid.*: 99.

81 Richard H. Grove, "Indigenous Knowledge and the Significance of South-West India for Portuguese and Dutch Constructions of Tropical Nature." In *Nature and the Orient*, ed. Richard H. Grove, Vinita Damodaran, and Satpal Sangwan (Delhi and New York: Oxford University Press, 1998): 187-236.

was indeed linked to chivalric virtues and heroic narratives of conquest in the sixteenth century, before being transformed by later national and nationalist historiography into enlightened narratives of the utility of acclimatization and transplantation of plants and other bioresources. But what was considered by some as bioprospecting was considered by others as theft and piracy. Those colonial actors who protected their possessions and controlled information were likewise often seen by their rivals as secretive protectionists and xenophobes.

The transformation of the colonized regions through acclimatization and transplantation occurred throughout the seventeenth and eighteenth centuries, and the direct control of land, with the prospect of founding plantations based on slave labor, was the central goal of most of the imperial powers, including Portugal. People, as well as plants and animals, were transplanted from the Indian Ocean and Africa to the Caribbean and Brazil.

It was, however, an apparent lack of coherent Portuguese discourse and secular accounts of the acquisition, dissemination, and meaning of natural-history knowledge—particularly of the kind constructed by the British and the French—that contributed to the black legend of Portuguese backwardness, bigotry, and ignorance. Cañizares-Esguerra has argued for including the Iberian empires on the map of European modernity by simply showing the extent to which historiographical neglect, a combination of ignorance and indifference, has the power to make an historical field a *tabula rasa*. However, the Portuguese empire in Asia, as well as the Portuguese colonial natural history of Asia, are often treated as subaltern and less successful than Spanish. The fact that effective Portuguese control of territory was confined to small enclaves, compared with the vast and heavily populated, and mostly well administered, neighboring non-Christian states, presents a set of methodological challenges different from those applicable to the Atlantic Iberian empires. In addition, from the seventeenth century onwards, the *Estado da Índia* was incapable of asserting political sovereignty over Asia, in the face of Dutch, British, and French imperial designs. In fact, even the Papacy and some Italian states sent emissaries and spies, under various pretenses, to prospect for colonial territories and special “deals.”⁸²

82 Paolo Aranha, “‘Glocal’ Conflicts: Missionary Controversies on the Coromandel Coast between the XVII and the XVIII Centuries.” In *Evangelizzazione e globalizzazione: le missioni gesuitiche nell’età moderna tra storia e storiografia*, ed. Michela Catto, Guido Mongini, and Silvia Mostaccio (Città di Castello: Società Editrice Dante Alighieri, 2010): 79-104.

Although it has been claimed that the continued use of manuscripts—which limited access to knowledge much more than did printed works—was due to a scheme of the Portuguese to preserve sensitive knowledge of biore-sources, it is now accepted that manuscripts circulated at least as rapidly as printed works through certain channels, such as those of the missionaries. In addition, even if the Portuguese officials were trying to prevent the dissemination of information, manuscripts were very difficult to control, because they could travel embedded in other manuscripts and documents, often anonymously. This helps explain why they were easily appropriated by those who, among many others, would later boast of their superior “scientific” methods and their advancement of learning.

In fact, while some bioprospected for plants in Asia, others were content to travel to Lisbon and “bioprospect” for texts on natural history. This is what happened with the treatise on palm trees, *Discurso das palmeiras*,⁸³ dictated in the Jesuit Residence of São Roque in Lisbon by the old Jesuit missionary Jerónimo Lobo to the British diplomat and collector Sir Robert Southwell, sometime between 1666 and 1668. This manuscript was given to the secretary of the Royal Society in 1668, together with two crates of plants from Brazil, India, and Angola, and was translated and published in English a year later. The name of its author is mentioned only casually, in truncated form, as “Father Jeronimo.” On the manuscript preserved in the archives of the Royal Society, somebody has added “A Discourse about the Palme-trees by F. Jeronimo Lobo of St. Roch, to send him spectacles and prospective glasses.”⁸⁴ Was this what the exchange between a British collector and a Jesuit missionary was about? A pair of glasses?⁸⁵ Although Lobo’s text was presented at the Council of the Royal Society in November 1668 and translated within a year or two into French, German, and Italian, it was probably not considered important enough to be included in the *Philosophical Transactions of the Royal Society* (1809).⁸⁶

83 Jerónimo Lobo, “Discurso das palmeiras diversidade que dellas ha, de seus frutos e o para que servem, do terrenhos que as cria.” In *Itinerário e outros escritos inéditos*, ed. P.M. Gonçalves da Costa (Barcelos: Companhia Editora do Minho, 1971): 701-724.

84 Lobo, “Discurso das palmeiras”: 664.

85 Ibid. The old missionary may not have required anything else, but another Jesuit, a professor of mathematics in Coimbra, Gaspar de Mere de Souza, who also met Southwell, wrote to Henry Oldenburg, the secretary of the Society, asking to be admitted as a member of the Royal Society. Mere was elected in 1669.

86 *The History of the Royal Society in London* (London, printed for A. Millar in the Strand, 1756), 2: 401. Charles Hutton, Richard Pearson, and George Shaw, *The Philosophical Transactions of the Royal Society of London, from their Commencement in 1665, to the Year 1800*, vol. 1 (London: printed by and for C. and R. Baldwin, 1809).

The Tree of St. John, as Lobo called the generic palm tree of which he distinguished various species (e.g., coconut and areca), either was not so important to the British scientists after all, or perhaps the Jesuit description failed to meet the standards of the Royal Society. Lobo's text was first published in Portuguese in 1971, but similar texts apparently circulated in manuscript. Moreover, palm trees were ubiquitous in the colonies and cherished for their utility and productivity, and they were transplanted and "reintroduced," in the course of three centuries, to Brazil and Angola.

If the transplantation of *drogas da India* to Brazil appeared as a rational solution to the loss of territory on one side of the globe and the gain in another, the justification was sometimes couched in the European discourse of scientific efficacy. In 1675, as an envoy in Paris, Duarte Ribeiro de Macedo, who espoused Colbert's mercantilist ideas, wrote a letter to the Portuguese king defending the "transplantation" from India to Brazil, because it would mean ruin to the Dutch, "powerful because of their commerce in India."⁸⁷ In this rambling letter, structured around proofs ("from reason") and crammed with various types of information acquired in conversation with the British ambassador and the Dutch, he also quotes the *Journal des sçavans* and Thomas Sprat's *History of the Royal Society of London*.

In his rendering of the activities of the Royal Society of London, Duarte Ribeiro de Macedo defines its goal as "discovering the secrets of the natural Philosophy." He reproduces almost verbatim the list of recent achievements of transplantation, such as the oranges that were brought by the Portuguese from China and that were capable of producing "riches" in Europe.⁸⁸ According to Sprat, "the Orange of China . . . has drawn a great Revenue every Year from London alone."⁸⁹ It is obvious that Duarte Ribeiro de Macedo was pointing to the fact that, in Portugal, these possibilities of profit from transplantations were not all yet fully realized. He added, "as I finished this letter I found in the *Journal des sçavans* (3 June 1675) an extract from the *Journal* in England in which they report every month what is discovered and discussed in the Royal Society."⁹⁰ The "discovery" that he found interesting was the fact that the British brought cinnamon trees in pots from Sri Lanka and preserved them all

87 Duarte Ribeiro de Macedo, *Obras ineditas de Duarte Ribeiro de Macedo, Desembargador dos Aggravos da Casa da Supplicação, Cavalleiro Professo da Ordem de Christo, e Concelheiro da Fazenda de Senhor Rei D. Affonso Sexto* (Lisbon: Impressão Regia, 1817): 130.

88 Duarte Ribeiro de Macedo, *Obras ineditas*: 121.

89 Thomas Sprat, *The History of the Royal Society of London, for the Improving of Natural Knowledge*, 4th ed. (London: J. Knapton et al., 1734): 387.

90 Duarte Ribeiro de Macedo, *Obras ineditas*: 122.

through the winter with pigeon droppings. “This is the proof,” he wrote, “that the cinnamon tree can come from India to England without being altered in a different climate.”

Acclimatizing Sri Lankan cinnamon, which was controlled by the Dutch, was a near obsession that the Portuguese shared with the French.⁹¹ In the early eighteenth century, the Oratorians, all from Goan Catholic Brahman families, who served as clandestine missionaries in Sri Lanka, were constantly contacted with demands, including from the authorities of the Estado da Índia, to smuggle out cinnamon trees and seeds. In a 1726 letter, Gabriel de Sá apologized to the Secretary of the State, Tomé Gomes Moreira, for being unable to procure cinnamon buds and clove seeds from Sri Lanka. He had notified the fathers there, he insisted, but they were unable to respond, due to Dutch control of the borders.⁹²

If documents about bioprospecting in Portuguese Asia are fragmentary compared to archives of other imperial “green gold” diggers, the efforts and intentions were far from unsystematic. Communication networks being dangerous and slow between the Indian Ocean, Africa, Brazil, and Portugal, the plants, texts, and people continued to travel in a sustained endeavor by crown officials and individual merchants and missionaries to settle the land, extract riches from it, and populate it. Each new land, seen from afar, held the promise

91 Pierre Poivre and Pierre Sonnerat were both engaged in bioprospecting for cinnamon, cloves, and nutmeg in the Indian Ocean and Southeast Asia. On another official French scientific expedition to Peru, by Charles Marie de la Condamine, one of the objectives of which was to smuggle out Peruvian bark and rubber trees; see “Introduction.” In *Colonial Botany: Science, Commerce, and Politics in the Early Modern World*, ed. Londa Schiebinger and Claudia Swan (Philadelphia: University of Pennsylvania Press, 2007): 1-16.

92 M. da Costa Nunes, *Documentação para a historia da Congregação do Oratório de Santa Cruz dos Milagres do Clero Natural de Goa* (Lisbon: Centro de Estudos Históricos Ultramarinos, 1966): 649. The situation became embarrassing when these promises were not kept, and the king was becoming impatient. The missionaries tried to wriggle out of the situation by denouncing the Dutch control of the maritime trade between the Indian subcontinent and Sri Lanka. Moreover, every shipment of goods sent from Goa for missionary use, such as tobacco, and other objects needed for church service had a difficult route, and by the time it reached the missionaries, if it ever reached them, its contents had diminished by half or more. Ines G. Županov, “Goan Brahmans in the Land of Promise: Missionaries, Spies and Gentiles in 17th-18th Century Sri Lanka.” In *Portugal-Sri Lanka: 500 Years*, ed. Jorge Flores (Wiesbaden: Harrassowitz and the Calouste Gulbenkian Foundation, 2006b): 171-210.

of a Garden of Eden. None lived up to the expectations, but some, especially Brazil in the seventeenth century, came close to the mark.⁹³

The Portuguese never forgot that they were the first to “discover and conquer” India through the heroic deeds and sacrifices of their men-at-arms, letters, and crosses. As Duarte Ribeiro de Macedo lamented, “we discovered the passage to India, by which the Dutch came in and became powerful and rich at our loss.”⁹⁴ He also proposed an explanation why this “right” to India turned into the “rightful” loss of India. Reminiscent of Francis Xavier’s warning in the early sixteenth century, that “the profit of gaining the whole world” may entail the loss of one’s soul,⁹⁵ Duarte Ribeiro de Macedo and a legion of Portuguese literati, such as António Vieira, with whom he exchanged letters, conjured up a moral and divine reason for the loss of their permanent command of the Asian tropics.⁹⁶

Ribeiro de Macedo’s references to the *Journal des sçavans* and to the publications of the Royal Society confirm the impact that the knowledge produced by these institutions had on the Portuguese royal court and on Portuguese intellectuals. This admiration for French and British scientific practices only grew in the eighteenth century among the Portuguese, who became increasingly convinced of their own mediocrity and inferiority. The foundation of the Academia Real da História in 1720 was an effort to “catch up” with the northern institutions of knowledge-making. Its primary goal was to prevent the oblivion of the Portuguese contribution to European and world “progress.” From the beginning, the Academy focused, self-consciously, on the collection of information, on archives, and on history writing. Its élan was devastated by the earthquake of 1755, which destroyed the Academy’s archives and research collections.

Contrasting with the feelings of loss, frequently associated with the decline of Estado da Índia, the territories in Brazil were becoming increasingly significant for the Portuguese monarchy and its survival. The discovery of gold mines

93 Borralho and Fortes, “Do Jardim de Éden às Terras de Vera Cruz,” 71-93; Capistrano de Abreu, *Diálogos das grandezas do Brasil*, 30. “E é tanto isto assim, que não faltam autores que querem afirmar estar nesta parte situado o paraíso terreal, e fortificam sua razão com dizerem que a Equinocial partia o dia pelo meio.”

94 Duarte Ribeiro de Macedo, *Obras inéditas*: 142.

95 Francis Xavier quotes the New Testament, Matt. 16:26, in one of his letters on how to “advise” João III: “Quid prodest homini si universum mundum lucretur animae vero suae detrimentum patiatur?” Joseph Wicki, “La Sagrada Escritura en las cartas e instrucciones de Francisco Xavier.” *Manresa* 24 (1952): 259-264. *Epistolae S. Francisci Xaverii aliaque eius scripta*, ed. G. Schurhammer and J. Wicki (Rome: 1996), 1: 421.

96 Duarte Ribeiro de Macedo, *Obras inéditas*: 142.

and the steady flow of precious metals from Brazil to Portugal beginning in the first decades of the eighteenth century are well known, and, according to recent research by historians of science, this was also a period of intensified efforts at bioprospecting in Brazil.⁹⁷

In Lisbon and the Portuguese Atlantic tropics, from the beginning of the eighteenth century, new botanical gardens, naturalist collections, and academies appeared, boasting of their contacts with similar European scientific institutions and with the finest Enlightenment thinkers.⁹⁸ These processes accelerated in both worlds, with the reform of the University of Coimbra in 1772 and the founding of the Academy of Sciences of Lisbon in 1779.⁹⁹ In addition, when the royal court moved to Rio de Janeiro in 1808, it stimulated the transfer of scientific practices, objects (e.g., libraries, instruments, and charts), and people. While the scientific institutions in Brazil profited from this move,¹⁰⁰

97 This is a dynamic field of knowledge. For a snapshot and general view, see *Ensaio de história das ciências no Brasil: das Luzes à nação independente*, ed. Lorelai Kury and Heloísa Gesteira (Rio de Janeiro: EdUERJ, 2012); Ângela Domingues, *Monarcas, ministros e cientistas. Mecanismos de poder, governação e informação no Brasil colonial* (Lisbon: CHAM, 2012), and Cláudia Beatriz Hucitec, *As culturas do Brasil* (São Paulo: Hucitec, 2010).

98 See, among others, Oswaldo Munteal Filho, "Todo um mundo a reformar: intelectuais, cultura ilustrada e estabelecimentos científicos ilustrados em Portugal e no Brasil, 1779-1808." *Anais do Museu Histórico Nacional* 29 (1997): 87-108; Ronald Raminelli, "Ciência e colonização: viagem filosófica de Alexandre Rodrigues Ferreira." *Tempo* 3/6 (1998): 157-82; Ângela Domingues, "Para um melhor conhecimento dos domínios coloniais: a constituição de redes de informação no império português em finais do setecentos." *História, ciências, saúde. Manguinhos* 8 (suppl.) (2001): 823-38; Lorelai Kury, "Homens de ciência no Brasil: impérios coloniais e circulação de informações (1780-1810)." *História, ciências, saúde. Manguinhos* 11 (suppl. 1) (2004): 109-129.

99 The best known works are by Domingos Vandelli, *Diccionario dos termos technicos de historia natural, extrahidos das obras de Linneo, e a memoria sobre a utilidade dos jardins botanicos* (Coimbra: Real Officina da Universidade, 1788) and *Florae lusitanicae et brasiliensis specimen . . . et epistolae ab eruditís viris. Carolo a Linné, Antonio de Haen ad Dominicum Vandelli* (Coimbra: Typ. Academico-Regia, 1788). Several other academicians were interested in the natural products of Brazil, including Bernardino António Gomes, "Observationes botanico-medicae de nonnullis brasiliae plantis," *Memorias da Antonio Real Academia das Sciencias de Lisboa* (1812): 3:1-104, *Observações sobre a canella do Rio de Janeiro* (Rio de Janeiro, Impressão Antonio Regia, 1809), and "Observações botanico-medicas sobre algumas plantas do Brasil," *Memorias da Real Academia das Sciencias de Lisboa* 3 (1812): 1-104.

100 Maria de Fátima Nunes, "Portugal-Brasil 1808: Trânsito de saberes." In *Ensaio de história das ciências no Brasil: das Luzes à nação independente*, ed. Lorelai Kury and Heloísa Gesteira (Rio de Janeiro: EdUERJ, 2012): 267-279; *Espaços da ciência no Brasil (1800-1930)*, Maria Amélia Dantes (Rio de Janeiro, Editora Fiocruz, 2001); *O Atlântico revolucionário:*

the members of the Academy of Sciences in Lisbon continued to pursue their research on natural history as vigorously as ever.¹⁰¹

Soon after its foundation, the Academy of Sciences published the “Short Instructions to Correspondents of the Academy of Sciences in Lisbon regarding the Consignment of Products and Accounts of Natural History in Order to Create the National Museum.”¹⁰²

Aside from detailed rules on how to compose the texts to accompany each item, most of the instructions were about how to flay, dry, embalm, stuff, and mount animal carcasses, and how to dry and preserve plants and minerals. In the museum cabinet, the members of the Academy of Sciences hoped that, with this kind of information gathered from the Portuguese colonies, they could start the hard scientific work of standardizing and classifying nature. They did not dream that some decades later Napoleon and his troops would invade the country, and the royal court would leave the kingdom for Brazil. These events would be as disturbing as an earlier earthquake for the nascent Portuguese scientific worlds.

Meanwhile, the interest in the Estado da Índia continued to decline, until, in the nineteenth century, the political power again became interested in domesticating nature, in both the metropolitan world and the imperial territories. At that point, both Portuguese and Goan orientalist turned their attention to the documents produced in the earlier periods, looking for sources similar to those that had already been collected for the European centers of knowledge such as Paris and London.

In fact, Portuguese intellectuals recognized the backwardness of Portuguese science and tried to imitate the institutions and practices existing abroad. It was in this context that the members of Academy of Sciences searched for the historical traces of Portuguese “scientific” efforts. However, even if the Portuguese were the first to produce European “modern” knowledge of Asian natural substances and products, to transplant plants from one continent to another, and to reflect systematically on European well-being and physical survival in the tropics, these practices were overshadowed by larger and more

circulação de ideias e de elites no final do Antigo Regime, ed. José Damião Rodrigues (Ponta Delgada: CHAM, 2012).

- 101 On economic research by the members of the Academy see *Memórias económicas da Academia real das sciencias de Lisboa*, a series founded in 1789. *Memórias económicas da Real Academia das Ciências de Lisboa, para o adiantamento da agricultura, das artes e da industria em Portugal, e as suas conquistas*, ed. José Luís Cardoso 2 vols. (Lisbon: Banco de Portugal, 1990-1991).
- 102 *Breves instruções aos correspondentes da Academia das sciencias de Lisboa sobre as remessas dos productos, e noticias pertencentes à historia da natureza, para formar hum Museu Nacional* (Lisbon: Regia Officina, Typografica, 1781).

visible imperial projects. Moreover, in the transitional period between the eighteenth and nineteenth centuries it was the Atlantic world (Brazil, Angola), not the Indian, that became essential for the geography and the political economy of the Portuguese empire. Portuguese naturalists were more interested in the natural secrets of those regions that, compared to the territories in Asia, promised to be more useful for Portuguese economic development. The fragmented histories of bioprospecting that we address in this article may give us a glimpse of the mechanics of this particular early modern process of producing, disseminating, selecting, and excluding natural knowledge about Asia in the Portuguese imperial framework. By making this more visible, we hope to contribute to a more global history of science.

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