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Tropical Transplantations:
Drugs, Nature, and Globalization in the Portuguese and British Empires, 1640-1755

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Tropical Transplantations: Drugs, Nature, and Globalization in the Portuguese and British Empires, 1640-1755

by

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Tropical Transplantations: Drugs, Nature, and Globalization in the Portuguese and British Empires, 1640-1755

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Prior to the nineteenth century, the boundary between pharmaceuticals used in medicine and recreational intoxicants was blurry. The term "drug" (*droga* in the Iberian languages) had, in the sixteenth century, signaled anything from tobacco and opium to cinnamon, mercury, and musk. Yet by the middle decades of the seventeenth century, the term began to acquire more modern connotations: psychoactive, exotic, potentially illicit, valuable. "Tropical Transplantations" is a study of the early modern drug trade that focuses on the tropical outposts of the Portuguese empire (particularly Amazonia and Angola) in the seventeenth and eighteenth centuries. It argues that the long-distance trade and transplantation of drug crops influenced not only commerce and empire, but also the construction of scientific knowledge about tropical nature and the emergence of a globalized culture of healing that incorporated Europeans, Africans, and indigenous Americans. Chapter one examines the roles of the apothecaries and drug merchants who transformed tropical materia medica into compound medicines. Chapter two reassesses bioprospecting in the New World interior by reconstructing the hunt for new drugs in seventeenth-century Amazonia, arguing that the search for tropical remedies was an act not of discovery, but of invention. Chapter three moves from Amazonia to Africa, probing the origins of the *feiticeiro* or "fetisheer" (African healer/sorcerer) as Atlantic world medical practitioners. Chapter four reconstructs little-known schemes to transplant valuable drugs between the East and West Indies and the British and Iberian colonies. Finally, chapter five establishes the broader import of these findings, showing that the global networks of the tropical drug trade profoundly shaped Enlightenment science and European imperialism.

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Glossary of terms

Portuguese

alfandega: customs house, from the Arabic *al-fundaq*
arroba: approximately 32 pounds
botica: the shop and workspace of an apothecary
boticario: an apothecary, one who converts materia medica into *simples*
cachaça: a high-proof alcoholic spirit distilled from the byproduct of sugar refining
caixa: a box in which archival documents are stored, abbreviated here as "Cx."
Capitão-mor: military officer, often commander of a fortress or city
careirra: long-distance sailing route, as in the *Careirra da Índia*
Concelho Ultramarino: The governing body of the Portuguese empire after the 1640 restoration; translated here as "Overseas Council."
cruzado: gold or silver coin worth 400 *réis*
degredado: a convicted criminal sentenced to labor in the Portuguese colonies
feitiço: a magical charm, amulet, or spell created by a *feitiçeiro*
gerebita: sugarcane based moonshine, the less expensive cousin of *cachaça*
legoa: unit of distance known as a league in English, variable but roughly 3 miles
mestiço: of mixed race, analogous to the Spanish *mestizo*
mulatto: of mixed European and African ancestry
negro: African, usually referring to a slave
oitava: one eighth of an ounce
réis: basic unit of currency in the early modern Portuguese empire
sertão: backlands or wilderness, often used to describe Amazonia and Africa

English

dram: an apothecary's unit of measurement, equal to three scruples, 60 grains, and approximately four grams. Abbreviated as ʒ. From the Greek *drachm*.
factory: a trading post, often associated with the East and West India companies
simple: An unprocessed herbal, minerals or animal medicine, often mixed by apothecaries into compound medicines.
specific: A medicinal drug that treats a specific disease or ailment.

A note on definitions, dates, & spelling

The index of William Dampier's 1699 *Voyages* contained a substantial index entry for 'drugs' that mentioned opium, *bang* (cannabis), and tea— but also ambergris, musk, and scorpions. It enjoined curious readers to "see [also] Dyes, Fruits, Herbs, Roots, Spice."[1] Defining the word drug (*droga* in Portuguese) remains a surprisingly difficult task. Even recent scientific research (like Christian P. Müller and Gunter Schumann, "Drugs as Instruments: A New Framework for Non-Addictive Psychoactive Drug Use," in *Behavioral and Brain Sciences*, 34 [2011], 294) offers only vague and subjective definitions of the term. Here, I employ the word in its capacious early modern sense, which included intoxicants like tobacco; analgesics like opium; herbal, mineral, and animal-based medicines, as well as related natural products like perfumes and dyestuffs. The shifting meaning of the terms "drug," "drogue," and "droga" is explored in greater detail in Chapter One and in the Conclusion of the present dissertation.

Unless otherwise indicated, period spelling and capitalization has been retained. This has been done not only to retain the original flavor of the texts but also to aid in OCR (optical character recognition) searches in digital repositories like EEBO and Google Books. However, punctuation has occasionally been silently modernized, and certain well-known names have been standardized to reflect scholarly practice (i.e., Garcia da Orta rather than Garcia d'Orta, and Willem Piso rather than Willem Pies or Guillelmus Piso). All pre-Gregorian calendar dates have been modernized.

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[1] William Dampier, *Voyages and Descriptions* (London: James Knapton, 1699) 2: 134.

INTRODUCTION

The Drug Trade in World History

O reckless people... you have breached what is forbidden!
—ADAMASTOR TO VASCO DE GAMA, *OS LUSÍADAS*, 1572

FIGURE 0.1. The neighborhood of Alcântara as seen from Miradouro de Adamastor in Lisbon, May, 2014.

The dying sailor dreamt of Alcântara. Or rather, he *hallucinated* Alcântara, and this was what worried Jeronimo Lobo the most. The Jesuit missionary had been anxious for days, ever since the coasts of Guinea became visible off port side, and the ship's crew sickened as a palpable wave of tropical heat radiated from the distant shore. Now the strange fever had produced what Lobo called "a wild delirium" in the mind of one unfortunate seaman. Lobo had confronted the man as he was about to walk off the deck of the ship into open ocean: "he answered that he was bound for Alcântara… and looking at the sea through

the open gangway, that he was heading through that field." Alcântara, the neighborhood of Lisbon's sailors and fishermen, was three thousand miles away.[2]

As I researched this dissertation in Lisbon, I adhered to a fairly regular morning routine. Turning south from my front door on the Rua do Poço dos Negros (the Street of the Burial Pits of the Blacks), I would navigate a steep cobbled walkway known as the Travessa do Judeu (Alley of the Jews). Up past the abandoned palace inhabited by a clan of feral Siamese cats, past the greengrocer, the junk shop and the youth hostel, and finally to the Miradouro de Adamastor, with its commanding views of the Rio Tejo that has sustained Lisbon since Phoenician times. And views, as well, of Alcântara, the docklands to the west. I had occasion to meditate on the final thoughts of Lobo's sailor many times as I stared across the small patch of grass that overlooks Alcântara. But I had even more opportunities to reflect on the larger theme of this work. After all, this particular *miradouro* (a kind of scenic overlook distinct to the urban geography of Lisbon) happened to be a place where drugs—and their histories—were continually being bought and sold.

My own drug of choice was a *bica* (double shot of espresso) purchased at the patio café, which afforded a view not only of Alcântara and the sea beyond, but also of two curiously linked yet opposing edifices. Directly across from the café was the hulking statue of Adamastor, the mythological being who lends the *miradouro* its name. In the imperial epic of the Portuguese conquests, the *Lusíadas* of Luís de Camões (1572), Adamastor appears as the African opponent of the Odysseus-like Vasco de Gama. When

[2] Jeronimo Lobo, M. Gonçalves da Costa, ed. *Itinerario e Outros Escritos Inéditos* (Lisbon: Livraria Civilização, 1971), 148-9.

de Gama and his men round a stormy Cape of Good Hope, a "deformed and enormous" figure emerges in the night air "like a second Colossus of Rhodes, most strange to see… its hair grizzled and filled with earth… its mouth black."[3] It is Adamastor, the Spirit of the Cape, an autochthonous deity of the South African wilds who seeks—and fails—to repel the Portuguese from

… *buscando vas mercadoria*	Seeking after merchandise
que produz o aurifero Levante,	that's born of golden Orient,
Canela, Cravo, ardente especiaria,	Cinnamon, clove, ardent spice
Ou droga salutifera, & prestante	Or drugs, healthful and potent.[4]

Pacified by a nineteenth-century sculptor, Lisbon's Adamastor glares out at the Tagus with a look of eternal perplexity, a bronze figure of de Gama perched on the end of the his granite beard. Below, drug dealers ply their wares to local teenagers and college students in the lackadaisical manner typical of Portugal, which in 2001 became the first nation on earth to formally decriminalize all illicit drugs.[5]

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[3] Luís de Camões, *Os Lusiadas*, canto 5, stanza 39.

[4] Camões, *The Lusiados,* canto 2, stanza 4. Translations are my own, but for an English version see Landeg White, trans. and ed. *The Lusiads* (Oxford: Oxford University Press, 2001).

[5] See Michael Specter, "Getting a Fix," *The New Yorker*, October 17, 2011 and Mirjam van het Loo, Ineke van Beusekom and James P. Kahan, "Decriminalization of Drug Use in Portugal: The Development of a Policy," *Annals of the American Academy of Political and Social Science* 582, Cross-National Drug Policy (Jul., 2002), 49-63.

FIGURE 0.2 The Adamastor statue at sunset, with the Museu da Farmácia in the background. May, 2014.

Twenty meters away, at the well-maintained garden and mansion that fronts the north side of the park, the ambience could scarcely be further from the hashish-scented scene at Adamastor's base. The Museum of Pharmacy (Museu da Farmácia) boasts an up-to-date curatorial schedule along with a trendy restaurant, *Pharmacia*. On a typical Friday, as crowds from the nearby nightlife district of Bairro Alto spill onto its cobbles to enjoy a sunset view, the Miradouro is one of the busiest drug markets in Lisbon. But it would seem that the emergence of this marketplace directly across from Portugal's national museum of pharmaceuticals was a sheer accident. The drug dealers who keep their posts outside the Museum—usually recent immigrants from Brazil, Angola, and

Mozambique—are routinely rounded up and dispersed by police, and the Museum's tall wrought-iron fence seems to announce its symbolic and physical distance.

FIGURE 0.3. The Museu da Farmácia at left; at right, an alley frequented by dealers in cocaine, MDMA, and hashish. Photo via Google Street View.

It would be difficult to conjure a more apt spatial metaphor for the story told in the pages that follow. The native African Adamastor and his enemy Vasco de Gama silently gazing out at the same tranquil vista hallucinated by Lobo's dying sailor. The Angolan, Cape Verdean, and Mozambican drug dealers outside of the Museu de Farmacia, whose personal trajectories map out the postcolonial legacy of Portugal's tenacious African empire (the longest-lived colonial empire in history, stretching from the settlement of Cape Verde in 1462 to the independence movements of 1975). And, above all, iron bars dividing the illicit drugs of the *miradouro* and the medicinal ones of the museum. "Tropical Transplantations" examines the early modern origins of the global drug trade,

exploring a time when there was no boundary between the pharmacist and the drug dealer—or, for that matter, between the museum and the marketplace. By extending the historiography of the drug trade backwards in time, from the twentieth to the seventeenth and eighteenth centuries, this project radically revises current understandings of the emergence of drugs as both a conceptual category and as a grouping of global commodities. Whereas the term "drug" had been vague in the fifteenth and sixteenth centuries, signaling anything from opium and musk to mercury and rosewater, by the end of the seventeenth century it had begun to assume connotations that are familiar to us today: psychoactive, exotic, potentially illicit, valuable. The trajectory of the term mapped onto a material transformation in the global medical marketplace, a shift away from local cures and toward a practice of medicines as globalized commodities that continues to shape our existence today.

Yet this is no specialist medical history, concerned solely with mapping the professional lives of drug merchants and apothecaries, or with tracing the intellectual genealogy of drugs. My aim throughout has been to use the history of drugs as a tool for examining unexplored aspects of the history of empire, science, cultural encounters, and environmental change. By tracing the paths followed by substances that had once existed in local cultural and ecological zones as they crisscrossed the globe, "Tropical Transplantations" asks how early modern globalization played out on the ground, within specific local contexts and epistemologies, and even within the body itself. My intention is to move beyond the top-down gaze of much existing work on the Columbian

Exchange. Drugs, like food, are ingested and processed by the human body, rendering them temporary, ephemeral and quotidian. Yet they can also exert powerful effects on individual sensory experience, cognition and health—effects which have made them enduring features of religious ritual, sociability, and above all, practices of medicine and healing. By emphasizing transplantations of both materia medica, natural knowledge, and peoples, this work attempts to place the drug trade in a larger context of ecological and epistemological transformation. Put another way, "Tropical Transplantations" is a study not only of how the global circulation of tropical drugs changed global patterns of trade and consumption, but also of how these changes impacted highly individualized practices of healing and of conceptualizing the human relationship with nature.

The subjective bodily experiences of caffeine and alcohol are familiar to many—perhaps most—adults in the world today. Yet it has gone largely unnoted that many of the other prized trade goods of the early modern era, from nutmeg to Peruvian bark, are also biologically active on the human mind and body. The anti-malarial alkaloid that comprises the active principle of *Cinchona officionalis* (Peruvian bark) and its nineteenth-century derivation quinine, for instance, is infamous for its ability to provoke surreal dreams.[6] Potent early modern strains of tobacco—particularly those of the species *Nicotiana rustica*, which contains up to nine times more nicotine than the *Nicotiana tabacum* used by modern tobacco companies—rendered a powerfully dissociative buzz

[6] Hallucinations and other side effects produced by quinine have mostly recently been discussed in Combiz Khozoie et al, "The Antimalarial Drug Quinine Disrupts Tat2p-mediated Tryptophan Transport and Causes Tryptophan Starvation" *The Journal of Biological Chemistry*, (July, 2009) 284, 17,968-17,974.

that would stagger any contemporary Camel smoker. (Early modern consumers not only smoked this noxious plant but chewed it, ground it into powder and snorted it, rubbed it in wounds, drank it in tonics, and delivered it via enemas.)[7] In this regard, the history of drugs offers a uniquely intimate perspective on the larger patterns of early modern globalization because it bears directly upon the subjective mental and physical experiences of individuals. When these individuals are slaves and other subaltern groups, the study of the meaning and function of drugs can give a rare glimpse into the inner worlds of the most marginalized individuals in early modern colonial society.

It could be argued that the concept of drugs is both a modern and a Western construction, and therefore inappropriate as a frame of reference for a study that seeks to examine both European and non-European societies in a premodern era. I freely acknowledge that previous historians of drugs have focused almost exclusively on the nineteenth and twentieth centuries. Yet I believe this is more a symptom of a longstanding lacuna in scholarship then an indication that a truly global early modern history of drugs cannot or should not be written. Indeed, one of the foremost historians of the twentieth century global drug trade, Paul Gootenberg, closed his recent book *Andean Cocaine* with a plea for historians of colonial Latin America to produce work in this long-neglected field.[8] A core objective of this dissertation is to build on the

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[7] Michael Ziser, "Sovereign Remedies: Natural Authority and the 'Counterblaste to Tobacco'" *The William and Mary Quarterly,* 62:4 (Oct., 2005), 719-74; Kristen J. Gremillion, "Comparative Paleoethnobotany of Three Native Southeastern Communities of the Historic Period," *Southeastern Archaeology*, 14:1 (Summer 1995), 1-16.

[8] A special issue of *Social History of Medicine* has recently made a prominent case for drugs as a subject matter fit for early modern historians: see Harold Cook and Timothy Walker, "Circulation of Medicine in

sophisticated existing studies of the colonial sugar trade, circulations of medicines in the Atlantic world, and environmental history to demonstrate the possibilities of an explicitly early modern history of drugs.

Historiography and methodology

Drugs in the Atlantic world have, to date, been studied primarily through the lens of the history of science. Susan Scott Parish, Londa Schiebinger, and Paula de Vos, among others, have recently turned scholarly attention toward the role of plants and medicines in the early modern Atlantic world and in the history of early modern botany and collecting practices.[9] Yet although scholarship has long acknowledged the centrality of the Portuguese tropical world as a site for go-betweens who transferred natural knowledge, plants, animals and diseases, only recently have historians begun to clarify the specific nature of these transfers.[10] It is notable that the most eminent scholars in the field, from Crosby and Grove to Schiebinger, Drayton, and Cook, have all remarked upon the importance of the Portuguese tropical world in the story they want to tell, yet direct research into Portuguese primary sources has long been overshadowed by research

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the Early Modern Atlantic World," *Social History of Medicine* 26: 3 (2013).

[9] Paula de Vos, "The Science of Spices: Empiricism and Economic Botany in the Early Spanish Empire" in *Journal of World History*, 17: 4 (Dec., 2006), 399-427; Londa Schiebinger and Claudia Swan, eds. *Colonial Botany: Science, Commerce, and Politics*. Philadelphia: University of Pennsylvania Press, 2005; Susan Scott Parish, *American Curiosity: Cultures of Natural History in the Colonial British Atlantic World* (Chapel Hill: University of North Carolina Press, 2006).

[10] The leading historian of Portuguese medicine in the English-language historiography is Timothy D. Walker; see his *Doctors, Folk Medicine and the Inquisition* and "The Medicines Trade in the Portuguese Atlantic World: Dissemination of Plant Remedies and Healing Knowledge from Brazil, c. 1580-1830," in *Mobilising Medicine: Trade & Healing in the Early Modern Atlantic World*, a special issue of *The Social History of Medicine* 26: 3 (2013).

in the imperial archives of the French, British, or even the Dutch.[11] As the historians of science Heinrique Leitão and Palmira Fontes da Costa have noted, science and medicine in the seventh-century Portuguese empire has been "almost completely avoided by historians," and there have been virtually no "comparative studies" which bring Portuguese imperial science and medicine into dialogue with other empires.[12]

This is not to say that important research on the interplay between empire, medicine and environment has not been pursued by scholars in the Lusophone world. In particular, a group of Brazilian historians including Vera Regina Beltrão Marques, Rafael Chambouleyron and Júnia Ferreira Furtado has produced intriguing work on colonial science and medicine in Brazil and early Portuguese understandings of tropical nature.[13] Yet in many older works of Lusophone history of science and medicine, the role of enslaved Africans is minimized, since research on the South Atlantic slave trade has long

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[11] Alfred Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Greenwood Press, 1972); Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600–1860* (Cambridge: Cambridge University Press, 1995); Londa Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World* (Cambridge, MA: Harvard University Press, 2004); Richard Drayton, *Nature's Government Science, British Imperialism and the Improvement of the World* (New Haven: Yale University Press, 2000); Harold Cook, *Matters of Exchange: Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven: Yale University Press, 2007).

[12] Heinrique Leitão and Palmira Fontes da Costa, "Portuguese Imperial Science, 1450-1800: An Historiographic Review," in Bleichmar et al, eds., *Science in the Spanish and Portuguese Empires* (Stanford: Stanford University Press, 2009), 52-3.

[13] Marcia Moisés Ribeiro, *A ciência dos trópicos: a arte médica no Brasil do século XVIII* (São Paulo, Hucitec: 1997); Sidney Chalhoub et al., *Artes e ofícios de curar no Brasil* (Campinas: UNICAMP, 2003); Vera Regina Beltrão Marques, *Natureza em boiões: medicinas e boticários no Brasil setecentista* (FAPESP, Editora da Unicamp/Centro de Memória,Unicamp, 1999); Rafael Chambouleyron, "Portuguese Colonization of the Amazon Region, 1640-1706," (Phd Dissertation, Faculty of History, University of Cambridge, UK, 2005); Júnia Ferreira Furtado "Barbeiros, cirurgiões e médicos na Minas colonial," *Revista do Arquivo Publico Mineiro* (2005), 88-105; "Tropical Empiricism: Making Medicinal Knowledge in Colonial Brazil," in Delbourgo et al, *Science and empire in the Atlantic world* (London: Routledge, 2008), and "The eighteenth-century Luso-Brazilian journey to Dahomey: West Africa through a scientific lens," *Atlantic Studies* 11:2 (2014): 256-276.

tended to follow a separate historiographic path from that of the history of science and medicine.[14] Second, this scholarship has largely avoided considering the Portuguese empire within a global framework—and, consequently, to recognize the degree to which the "Portuguese" colonies in the tropics were regions that existed outside of formal imperial boundaries or state control. As Timothy Coates' exhaustive research has shown, the Portuguese state in the seventeenth century was severely understaffed, and a large proportion of Portuguese in the seventeenth-century colonies were *degredados* (exiled convicts) who demonstrated little allegiance to the Portuguese state that had prosecuted and exiled them, and whose paltry numbers were dwarfed by local indigenous populations.[15] The Portuguese tropics were zones of contested imperial control and intensive cross-cultural contact. Yet most scholarship on the Portuguese world in the seventeenth and eighteenth centuries remains restricted by disciplinary and national boundaries that make it difficult to discern these larger connections.

The history of drugs offers a needed corrective to this state of affairs by highlighting the permeability of imperial boundaries in the tropical belt. Indeed, while the subtitle of "Tropical Transplantations" bears the names of two empires, it could have featured even more: one of the goals of this work is to explore the possibilities of a trans-imperial

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[14] One recent exception is found in recent work on enslaved barber-surgeons (*barbeiros*) in late colonial Brazil. See Furtado, "Barbeiros, cirurgiões e medicos" and Mariza de Carvalho Soares, "African Barber-Surgeons in Brazilian Slave Ports: A Case Study from Rio de Janeiro," in Jorge Cañizares-Esguerra, Matt Childs and Jim Sidbury, eds., *The Black Urban Atlantic in the Era of the Slave Trade* (Philadelphia: University of Pennsylvania Press, 2013). On medicine and slaves in Brazil see also Rafael de Bivar Marquese, *Feitores do corpo, missionários da mente: senhores, letrados e o controle dos escravos nas Américas, 1660-1860* (São Paulo: Companhia das Letras, 2004).

[15] Timothy Coates, *Convicts and Orphans: Forced and state-sponsored colonizers in the Portuguese Empire, 1550-1755* (Stanford: Stanford University Press, 2003).

approach to early modern history. The Dutch, for instance, played a key role in what I will (for lack of a better term) call the "Portuguese" tropics because they very nearly conquered it entirely. The vivid tropical portraits of Brazil's Vermeer, Albert Eckhout, join the writings of Piso, Margrave and Linschoten as some of the many examples of Dutch travelers turning an exacting and calculating eye on the products of Portuguese tropical nature. Likewise, the Spanish Empire was ever lurking the background in the letters, memoranda and books of the Portuguese empire under the Bragança, both as a potential threat and as a model to emulate. Yet it was the British who were the most important "outside" power in the post-1640 Portuguese world. The Anglo-Portuguese alliance is the longest in history, stretching back to the formation of Portugal as an independent state in the twelfth century. The cast of characters who appear in the five chapters which follow—individuals like the Franco-Portuguese apothecary Jean Vigier, the diplomat Duarte Ribeiro de Macedo in his Parisian study, the frontier surgeons and *sertanejos* of Amazonia and Angola, the circumnavigator William Dampier chatting with "bandits" in Cape Verde, or the Benguela war leader who stole Luanda's communion wine—all highlight the porosity of the Portuguese colonies in the tropics, and underscore these transimperial connections.

Because historians of early modern science and medicine focus so closely on book history and the history of collecting (tracing the editions of Vesalius, say, or the contents of Hans Sloane's curiosity cabinet) they tended to emphasize the centers of cultural and textual production in early modern Europe. This emphasis is compounded by the fact

that many of these centers—Lisbon, London, Rome—became the magnets around which national historical archives accrued in the nineteenth and twentieth centuries. In short, the *survivability* of printed artifacts relating to early modern nature naturally draws our attention to them: whereas a sample of Jesuit's bark, for instance, might decay and vanish from the historical record within a matter of years or decades, a thousand identical engravings of the plant will endure.[16] Our understanding of early modern natural knowledge, consequently, tends to hew closely to the scribe's quill. We know quite a lot about the bureaucratic infighting of medical guilds, or learned debates in print about whether digestion is fermentation, or the networks of alchemical knowledge.[17] But topics like the post-Columbian transfer of medicinal plants from Africa to the New World, or the visual culture of colonial Latin American natural history, or seventeenth-century Chinese *bencao* pharmaceutical manuals, are only beginning to receive attention.[18]

One goal of this dissertation is to deploy the sophisticated and well-developed historiography of early modern medicine and natural history in Europe (particularly

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[16] Brian Ogilvy, *the Science of Describing: Natural History in Renaissance Europe* (Chicago: University of Chicago Press, 2006).

[17] This is not to say that these do not continue to be dynamic fields, of course. The 2014 special issueof *Osiris*, "Chemical Knowledge in the Early Modern World" offers an excellent sampling of the recent work of leading scholars of early modern alchemy, such as Jennifer Rampling, "Transmuting Sericon: Alchemy as 'Practical Exegesis' in Early Modern England," Bruce Moran, "Eloquence in the Marketplace: Erudition and Pragmatic Humanism in the Restoration of Chymia," and William R. Newman, "Robert Boyle, Transmutation, and the History of Chemistry before Lavoisier: A Response to Kuhn." The forthcoming Paula Findlen, ed. *Empires of Knowledge: Scientific Networks in the Early Modern World* (in preparation) offers an overview of current scholarship on early modern networks of collectors, naturalists and physicians.

[18] He Bian, "Assembling the Cure: *Materia Medica* and the Culture of Healing in Late Imperial China," (PhD Dissertation, Harvard University, 2014); Daniela Bleichmar, *Visible Empire. Colonial Botany and Visual Culture in the Hispanic Enlightenment* (Chicago: University of Chicago Press, 2012); Emily Berquist, *The Bishop's Utopia: Envisioning Improvement in Colonial Peru* (Philadelphia: University of Pennsylvania Press, 2014).

England) in a global frame. "Tropical Transplantations" offers a holistic view of the drug trade, moving from pharmaceutical manuals printed in Europe to visual sources from the tropics, and from *The Philosophical Transactions of the Royal Society* to Inquisition trials of African healers. Whenever possible, I draw as well upon archaeological evidence and insights from geography and ethnobotany to tell a story that moves between continents and species with abandon. This brings with it substantial challenges, to be sure. How can we ever really integrate the history of textual debates about Jesuit's bark, for example, with the labor of illiterate Amazonian harvesters of *quina*? Such an analysis can suffer from the attempt to compare incommensurables: the labor history of quina, or the epistemologies of shamans who prescribed it in Peru, demands an entirely different set of historical tools and questions than the print history of Robert Talbor's *Pyretologia* (1672), a manual about his famous quina tincture.

Yet it is important to make the attempt to connect them, or at least to study and speak about them in the same work. In this, I have found inspiration in two seminal works on the history of sugar, Sidney Mintz's foundational *Sweetness and Power* and Stuart Schwartz's *Sugar Plantations in the Formation of Brazilian Society*, as well as Marcy Norton's more recent but (to my mind, equally important) monograph *Sacred Gifts, Profane Pleasures*.[19] Taken together, these works point toward the potential of an

[19] Stuart Schwartz, *Sugar Plantations in the Formation of Brazilian Society: Bahia, 1550–1835* (Cambridge: Cambridge University Press, 1985); Marcy Norton, *Sacred Gifts, Profane Pleasures: a History of Tobacco and Chocolate in the Atlantic World* (Ithaca: Cornell University Press, 2008); Sidney Mintz, *Sweetness and Power: The Place of Sugar in Modern History* (New York: Penguin, 1985). Another inspiration, which impressively combines research on three continents and the histories of mining, indigenous America, and South Asian religion, is Kris Lane, *Colour of Paradise: the Emerald in the Age of Gunpowder Empires* (New Haven: Yale

approach that blends close attention to textual sources with the careful investigation of the visual record, anthropological research, and ethnohistory. More recently, books by the historians of Chinese pharmacy He Bian and Carla Nappi offer another methodological guide.[20] (I am particularly intrigued by what He Bian, drawing on Arjun Appadurai, calls "the social life of drugs.") Finally, I have been lucky to draw upon a new body of sscholarship on the history of non-European natural knowledge in the early modern world, including (in the context of the Portuguese empire) excellent recent work by Hugh Glenn Cagle, Raphael Chambouleyron, Timothy Walker, and Júnia Ferreira Furtado.[21] In the context of Spanish America, Matthew Crawford's sensitive studies of the historical trajectory of cinchona, Pablo Gomez's work on the cultures of healing in the colonial Spanish Caribbean, and Antonio Barrera's influential study of empiricism among sixteenth-century Spanish mariners and pilots have also served as important influences on the present work.[22]

University Press, 2010).

[20] Carla Nappi, *The Monkey and the Inkpot: Natural History and its Transformation in Early Modern China* (Cambridge: Harvard University Press, 2009), He Bian, "Assembling the Cure."

[21] Rafael Chambouleyron, *Povoamento, Ocupação e Agricultura na Amazônia Colonial (1640-1706)* (Pará: Editora Açai, 2011); Hugh Glenn Cagle, "The Botany of Colonial Medicine: Gender, Authority, and Natural History in the Empires of Spain and Portugal," in Sarah E. Owens and Jane E. Mangan, eds., *Women of the Iberian Atlantic* (Baton Rouge: Louisiana State University Press, 2012); Walker, "The Medicines Trade in the Portuguese Atlantic World"; Furtado, "Tropical Empiricism."

[22] Matthew J. Crawford, *A Cure for Empire: Botany, Imperial Reform, and an Andean Wonder Drug* (University of Pittsburgh Press, forthcoming); Pablo Gomez, *Wondrous Bodies: The Early Modern Caribbean and the Imagination of the World* (forthcoming); Antonio Barrera, *Experiencing Nature: The Spanish American Empire and the Early Scientific Revolution* (University of Texas Press, 2006).

Chapter outline

This dissertation seeks both to contribute new findings regarding the cultivation, trade and consumption of medicinal drugs in the Portuguese imperial world, and to engage broader scholarship by showing how *materia medica* from the Portuguese empire influenced material culture, commerce, experimental science and slavery in the British empire and beyond. The structure flows from this aim, with an opening chapter outlining the role of apothecaries as global actors, a second section of two archivally-sourced chapters presenting empirical data on bioprospecting in Amazonia and healing and poisoning in Portuguese Africa, and a final two chapter section drawing connections between Portuguese *drogas* and the history of science, medicine, imperial expansion and slavery in the Atlantic world.

This dissertation surveys the history of the global drug trade in the late seventeenth and early eighteenth centuries via a thematic-chronological structure. Chapter 1 offers a general survey of the globalization of the drug trade in the 1600-1750 period and argues that this process was (in part) a response to the devastating pandemics of the seventeenth century, an era of "global crisis" that weakened the authority of traditional approaches to healing in both European and non-European societies.[23] Unlike druggists—wholesalers of the raw materials of drugs—apothecaries altered the substances they purchased by distilling, refining, purifying, grinding, packaging and mixing them

[23] These pandemics were, themselves, a symptom of the global interconnections being forged by European imperial expansion and the growth of long-distance maritime in this period. Geoffrey Parker, "Crisis and Catastrophe: the Global Crisis of the Seventeenth Century Reconsidered," *The American Historical Review* 113: 4 (October 2008), 1053-1079.

according to proprietary formulae. This role of the apothecary as an *artificer* of drugs permitted enormous price markups as well as cases of counterfeiting and mislabeling. Thus, while apothecaries generally defended the rise of Indies drugs, they also contributed to the abiding skepticism about exotic medicines by selling them under false pretenses. To compound matters, pharmacy became associated with both women and Jews, making the apothecary shop a space of boundary-crossing and quasi-illicit commerce in the eyes of early modern Christians. Some apothecaries, like João Vigier in Lisbon, successfully shed these associations by aggressively pursuing patronage at court and differentiating themselves from their peers via printed works. Others, like Maria Coelho, a crypto-Jewish "apothecaress" (*boticaria*) in 1660s Coimbra who was tortured by the Inquisition and shipped to Brazil as a criminal, were not so lucky.

In the Portuguese world, as elsewhere, "bioprospectors" in regions such as the *sertão* (backlands) of Amazonia sought out novel botanicals and medicines, combining indigenous knowledge and European natural philosophy with the demands of an emerging global marketplace. This is explored in Chapter 2. In Portuguese Africa, particularly potent species of tobacco *(Nicotiana rustica)* and high-proof rum from the sugar *engenhos* of Brazil emerged as key trade goods used to purchase slaves. In the seventeenth century, Portuguese Amazonia was administratively and economically distinct from the Estado do Brazil. Colonists attempting to "make discoveries of drugs"—bioprospectors, in modern parlance—traversed the region in search of new substances that might rival sugar and brazilwood as international commodities. This chapter

challenges existing models of bioprospecting by showing how even seemingly solid categories like "plant" became destabilized within cross-cultural transfers of knowledge. The result was a hybridized pharmacy that blended European and non-European materia medica even as it effaced indigenous social and spiritual contexts, replacing them with new ones.

Chapter 3 investigates the complex cultural, socio-economic and epistemic changes produced by the circulation of these and other *drogas* in the Portuguese Atlantic world, with a special focus on their dual role as trade goods and ritual items used in West and West Central African divination and *feitiçaria*. By the close of the seventeenth century, a counter-flow of botanicals from Africa (particularly poisons and antidotes associated with healers and *feitiçeiros*) and the indigenous societies of the Amazon began to challenge understandings of health and illness in European medical discourse. Paradoxically, it was precisely the weakness and porosity of the tropical Portuguese state that made it so important as an arena for the circulation of cross-cultural knowledge and material. Because the Portuguese in Africa (and to a lesser extent in Amazonia) were so dependent on non-European knowledge, skills, and resources for their survival, these regions sheltered hybrid societies where the boundaries between European, African, and indigenous American healing cultures began to blur.

Chapter 4 uses drug and spice transplantation schemes in the late seventeenth century as a lens to bring into focus the itineraries of knowledge, diseases, and drugs as they moved between Portuguese and British empires (and between the discourses of

natural philosophers and the labor of slaves). Meanwhile, transplantations moved along a tropical axis that was defined by environmental rather than imperial factors. The figures who shaped the emergence of a global drug trade in tropical drugs, from Semedo in his Lisbon study to bioprospectors in the backlands of the Amazon, did so for their own reasons: personal enrichment, social capital, professional advancement, or the attainment of spiritual power. Not to mention that most basic of all human needs, the pursuit of health and the desire to escape imminent death from poison or disease. The importance of these pharmaceutical networks is belied by their improvisational and disaggregated nature—and, consequently, by the difficulty of tracing them through time and space.

Chapter 5 concludes by tracing the reception of drugs from the Portuguese colonies in America, Africa, and Asia among the natural philosophers of Restoration London, a key time and place in the history of science. With the aggressive expansion of British traders into the Lusosphere following the 1662 alliance between the two empires, British consumers, natural philosophers and physicians were rapidly exposed to this hybrid world. Medical and scientific pathways emerged that linked tropical Brazil and Portuguese Africa to key members of the Royal Society such as Robert Boyle, Nathaniel Grew, Henry Oldenburg, Robert Southwell, and William Dampier, as well as to lesser-known merchants like the drug trader John Jacob Berlu.[24] I argue that

[24] On "itineraries" of early modern scientific knowledge, see Neil Safier, "Global Knowledge on the Move: Itineraries, Amerindian Narratives, and Deep Histories of Science," *Isis,* 101, (March, 2010); Pamela H. Smith, "Science on the Move: Recent Trends in the History of Early Modern Science," *Renaissance Quarterly* 62: 2 (Summer, 2009), pp. 345-375; Ronald Raminelli *Viagens Ultramarinas: Monarcas, Vassalos E Governo A Distancia* (São Paulo: Alameda, 2008). Notable recent attempts to move beyond the imperial boundaries of early modern studies have included Francesca Trivellato, *The Familiarity of Strangers: The*

scholars have failed to fully recognize the role of tropical nature in these debates, and try to account for some of the complexities of how tropical medicines were received and repackaged by European physicians. The chapter focuses on the overlooked role of Brazilian and Luso-African natural knowledge and *materia medica* in the culture of experimental inquiry that flourished in the London of Hobbes, Locke, Boyle, Newton and Hooke.

A conclusion shows how the themes of this dissertation connect to the history of drugs in the nineteenth and twentieth centuries, arguing for the early modern origins of contemporary divisions between illegal drugs and legal pharmaceuticals.

Sephardic Diaspora, Livorno, and Cross-Cultural Trade in the Early Modern Period (New Haven: Yale University Press, 2009); *A Nation upon the Ocean Sea: Portugal's Atlantic Diaspora and the Crisis of the Spanish Empire, 1492-1640* (Oxford University Press, 2006); Jorge Cañizares-Esguerra, *Puritan Conquistadors* (Stanford: Stanford University Press, 2007), Kris Lane, *Color of Paradise: the Emerald in the Age of Gunpowder Empires* (Yale University Press, 2010).

CHAPTER 1

'The Treasury of Drugs Unlocked': Apothecaries and Early Modern Globalization

> I do remember an apothecary,
> And hereabouts he dwells, which late I noted
> In tatter'd weeds, with overwhelming brows,
> Culling of simples; meagre were his looks,
> Sharp misery had worn him to the bones:
> And in his needy shop a tortoise hung,
> An alligator stuff'd, and other skins
> Of ill-shaped fishes…
>
> —WILLIAM SHAKESPEARE, 1597

> The study of simple drugs is a study so agreeable, and so exalted in its own nature, that it has been the pursuit of the first geniuses of all ages.
>
> —PIERRE POMET, 1694

1.1 Introduction: apothecaries and their shops

When William Shakespeare penned *Romeo and Juliet* in the final years of the sixteenth century, apothecaries occupied a social position not much higher than actors. For Shakespeare's generation, sellers and preparers of "simples" (the raw materials of compounded medicines) were tradesmen who dealt in potentially suspect substances. Apothecary shops challenged the senses with stinking unguents, decaying animal parts, aromatic perfumes, and heady vapors of distillation. They were distinctively cluttered spaces, piled with the detritus of empire and the dried, powdered, and bottled vestiges of living things. Alongside dangling tortoises and alligators—totems of the apothecary's links to the non-European world—the apothecary shop imagined by Shakespeare featured shelves of "green earthen pots, bladders and musty seeds" accompanied by "remnants of packthread and old cakes of roses… thinly scatter'd, to make up a show." The shop of the apothecary was a site of exotic display that offered the promise of both

pleasure and poison. Indeed, as the economic historian Patrick Wallis has argued, the early modern apothecary shop was one of the most important progenitors of the modern shop space as we know it.[25] The modern terms *boutique* and *bodega* both derive from the late medieval term for apothecary shop in the Romance languages (*botica*).[26]

FIGURE 1.1 A reconstruction of a seventeenth-century German apothecary shop, showing the typical dried alligator and ceramic drug jars arranged on tall shelves. Heidelberg Castle, Deutsches Apothekenmuseum (image via Wikimedia Commons).

[25] Patrick Wallis, "Consumption, retailing and medicine in early modern London," *The Economic History Review* 61:1 (2008): 26-53.Throughout this chapter I use the term "apothecary shop" rather than "pharmacy," reflecting a distinction somewhat analogous to Lawrence Principe's differentiation between "chymistry" and "chemistry." In other words, although apothecary shops evolved directly into pharmacies, it is a mistake to collapse the two terms.

[26] The roots of the term stretch back to the Greco-Roman period: in Latin an *apotheca* was a general storehouse or shop, originally derived from the Greek word for barn or warehouse, *ἀποθήκη*, literally "place where things are put away." The *apothecarius* was originally any type of shopkeeper, and apothecary/*apothicaire/boticario* apparently did not develop distinct associations with *materia medica* until around the fourteenth century.

The apothecary in *Romeo and Juliet* is, to be sure, rendered in a particularly negative light: he is a "beggarly" wretch who secretly sells "mortal drugs" to thirteen-year-olds.[27] But his more successful fellow tradesmen were still held in low regard. When the characters in a 1611 play by Shakespeare's contemporary, Thomas Middleton, visit an apothecary shop, they fixate on the trade's lowly social status: "She's a gentlewoman born, I can tell you," one gossips about the apothecary's assistant, "though it be her hard fortune now to shred Indian pot-herbs."[28] The tinctures, unguents, distilled waters, treacles, and powders of the apothecary involved tedious physical tasks like grinding, mixing, pounding, and distilling—and, as in the workshops of tanners and dyers, the process that transformed raw drugs into prepared medicines was far from aesthetically appealing. But the special opprobrium heaped on apothecaries in the sixteenth and seventeenth centuries hinged on what the successful French apothecary Pierre Pomet called the "criminal cupidity" of his colleagues.[29] The apothecary's trade lent itself to fraud. Precise knowledge of the growing regions (and even the identities) of the most valuable medicinal drugs was a jealously guarded trade secret. By obscuring the nature and origin of these "simples" and blending them into "compound medicines" with exotic—and vague—names like mithridatum, Venetian treacle, or aqua celestia, apothecaries could pull a bait and switch on their customers, promising an exotic and expensive drug but offering up a more

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[27] Dominick Grace, "Romeo and the Apothecary," *Early Theatre* 1 (1998), 27-38.

[28] Thomas Middleton, "The Roaring Girl," in *the Works of Thomas Middleton* (London: Edward Lumley, 1840) 453. See Tanya Pollard, "Drugs, Poisons, Remedies, and the Theatre," in *Middleton in Context,* ed. Suzanne Gossett (Cambridge: Cambridge University Press, 2011), 287-94. On "drug cultures" in early modern theater more generally see William Kerwin, *Beyond the Body: the Boundaries of Medicine and English Renaissance Drama* (Amherst: University of Massachusetts Press, 2005), ch. 1.

[29] Pierre Pomet, *Histoire Generale des Drogues* (Paris: Jean-Baptiste Loyson, 1694), i (prologue).

common one. Nor was this manipulation of what economists call "asymmetric information" (knowing more about what is sold than the consumer) the only criminal activity that apothecaries became known for in the sixteenth century.[30] Abortifacients could be purchased from some herbalists and drug-sellers, for the right price.[31] And, as Romeo knew well, the more unscrupulous apothecaries could be persuaded to dispense deadly drugs if convinced by coin.

By the late seventeenth century, however, the position of the apothecary—and of the wares that apothecaries vended—had radically changed. In the preface to his *Histoire Generale des Drogues*, the apothecary Pierre Pomet lauded his profession as both "exalted" and "agreeable," a genteel occupation that combined the rigors of natural philosophy with the riches of the Indies trade.[32] Pomet himself, in addition to being an author and apothecary who sold his own wares out of his shop on the Rue des Lombards at "the sign of the Golden Beard," was the superintendent of the materia medica in the gardens of Louis XIV and a correspondent with both the Royal Society of London and the Académie des Sciences in Paris.[33] He died surrounded by the trappings of gentility, convinced that he had pursued his vocation "with all the good faith and duty that ought

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[30] Kenneth J. Arrow, "Uncertainty and the Welfare Economics of Medical Care," *American Economic Review* (1963) 53:5, 941–973; Wallis, "Consumption," 26-27.

[31] Schiebinger, *Plants and Empire*, ch. 3; John Christopoulos, "Abortion and the Confessional in Counter-Reformation Italy," *Renaissance Quarterly* 65:2 (Summer, 2012), 443-484.

[32] Pomet, *Histoire Generale*, i.

[33] Pomet's shop "á la Barbe d'or" appears to have lasted for a very long time, or at least his sign did. In 1899, a Parisian antiquarian recalled that in years past, "one found on the Rue des Lombards a certain number of antique pharmaceutical signs, such as the Silver Pestle, the Beard of Gold, etc." Andre Collet, "Vielles Enseignes de Paris," *Magasin Pittoresque*, Series II, Tome 16 (1899), 22. Likewise, in a Napoleonic War-era soldier's newspaper, "essence of sarsaparilla" was advertised as being sold by one Fourquet out of "29, rue des Lombards, maison de la Barbe d'Or" (*Le Moniteur de l'Armée*, November 11, 1802, 4).

to attend a man of honor." He also died rich. As Pomet put it, "the knowledge of Drugs that are used in Medicine" had grown into "a commerce that is not only the greatest in the Kingdom, but also the most useful and important to the life of men."[34]

Pomet was not alone. As one critic of the rising status of apothecaries put it in 1669, though their profession was "but of a few years standing," novice apothecaries could invest only a small amount and within a few years expect to "live so high, spend so freely, gain so great Estates."[35] Adriaen van Ostade's 1646 portrait of a grinning, rosy-cheeked, and pipe-smoking apothecary—his buttons loosened to accommodate a well-fed belly, a gin bottle at his elbow— seems to offer a wry commentary on the economic opportunities that became available to participants in the seventeenth-century medicines trade (Figure 1.2).

As novel wares like tobacco, guaiacum, cinchona, various newly-invented alcoholic spirits like gin, and proprietary opium-based elixirs and tinctures came into their own as consumer goods, apothecaries emerged as among the most prosperous shopkeepers in European metropolitan centers. The more successful apothecaries, like Pomet, were soon branching out into auxiliary ventures like publishing popular medical manuals, investing in long-distance shipping ventures, and seeking court appointments and sinecures. Some apothecaries (like Jacob de Castro Sarmento in Portugal and William Salmon in

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[34] Pomet, *Histoire Generale*, i.

[35] Christopher Merret, *A Short View of the Frauds, and Abuses Committed by Apothecaries* (London: printed for J. Allestry, 1669), 6.

FIGURE 1.2 An apothecary enjoying the fruits of success—a pipe of tobacco and a small bottle of gin (a recent Dutch invention). Adriaen van Ostade (1610-1685), *An Apothecary smoking a pipe,* oil on panel, 1646.

England) became successful participants in the realm of print culture, producing vernacular books with eye-catching titles like *A New Mystery in Physick Discovered* (1681) that ran into multiple editions and translations.[36] These apothecary-authors began to portray their trade as a more fundamental art than medicine itself. By the final decades of the seventeenth century, in consequence, the apothecary had become a stock figure of the *noveau riche*: an unscrupulous canny dealer who profited from the growth of European empires and the expansion of an "Indies trade" that attracted both fascination and opprobrium.

What, then, changed between the time of Shakespeare and that of Pomet? I argue here that the shifting fortunes of European apothecaries mapped onto a larger transformation—a refashioning of global demand for medicinal drugs and the increasing interconnectedness of long-distance trade over the course of the seventeenth century. Concurrently, the abilities of the apothecary to transform tropical raw materials into valuable medicines (whether by novel chemical methods or the more traditional practices of compounding, decocting, distilling, grinding, and infusing) became both higher-status

[36] The book history of these seventeenth century drug manuals can be incredibly complex, as will appear from an incomplete bibliography of the example mentioned here. François Monginot's treatise on quina bark and fevers, originally published in English as *A New Mystery in Physick Discovered,* was a translation of a work by the French physician Nicolas de Blegny which appeared under a confusing array of titles and author names. The original source was apparently Blegny's *Zodiacus Medic-Gallicus sive Miscellaneorum Medico Physicorum Gallicorum* (Geneva: printed for Leonardi Choët, 1679), II: 161, which then appeared in French as *La Découverte de l'admirable remède anglois pour la guérison des fièvres* (Paris: C. Blageart and L. d'Hourry, 1680) and again in two different versions in 1682 (*La Remède Anglois pour la guérison des fièvres* [Brussels: E. H. Fricx, 1682] and *La connaissance certaine de la prompte et facile guérison des fièvres, acec des particularitez curieuse et utiles sur le remède anglois* [Paris: V. A. Padeloup, 1682]). Meanwhile, an English translation had appeared in 1681 (printed by Will Crook and entitled *A New Mystery in Physick Discovered*), and in an altered form in 1682 under the title of *The English Remedy; or, Talbor's wonderful secret*. For more on Talbor and his "English remedy," see Chapter 5.

and subjected to increasing scrutiny. Seventeenth-century apothecaries operated at the nexus of imperial resource extraction, domestic medical consumption, and natural philosophical experimentation.

The changing fortune of apothecaries in the seventeenth century has received substantive yet selective attention from historians of medicine. We know the most about the activities of licensed apothecaries in seventeenth-century London, thanks to the work of a dedicated group of medical historians who have laboriously combed through the guild registers, account books and meeting minutes of the Royal College of Surgeons, the Worshipful Order of Apothecaries, and the Royal College of Physicians in London.[37] The excellence of the existing research into London apothecaries is no small part due to Harold Cook's *The Decline of the Old Medical Regime in Stuart London* (1986) and to Margaret Pelling's *Medical Conflicts in Early Modern London* (2003).[38] Cook mapped the rise of London apothecaries as legitimate alternative care-givers, attributing their ascendency vis-à-vis traditional licensed physicians to a general decline of the legal powers of "monarchically dependent corporations" as well as a cultural swing away from the classically-grounded, humanistic learning of the physicians and towards a new emphasis on "wit," exotica, and experimental methods. Cook argued that a new "medical

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[37] Notable investigations of the social history of healing in seventeenth-century Britain include Harold Cook, *The Decline of the Old Medical Regime in Stuart London* (Ithaca: Cornell University Press, 1986); Roy Porter, *Health for Sale: Quackery in England, 1660-1850* (Manchester: Manchester University Press, 1989); Margaret Pelling, *The Common Lot: Sickness, Medical Occupations and the Urban Poor in Early Modern England* (London, 1998) and 'Public and Private Dilemmas: the College of Physicians in Early Modern London,' in *Medicine, Health and the Public Sphere in Britain, 1600-2000* (London, 2002) , 27-42.

[38] See Cook, *Decline*, and Margaret Pelling, *Medical Conflicts in Early Modern London: Patronage, Physicians, and Irregular Practitioners, 1550–1640* (Oxford: Clarendon Press, 2003),

marketplace" emerged in the mid- to late seventeenth century which gave ordinary consumers access to a greatly-expanded field of treatment options. This, in turn, opened up the possibility of apothecaries working as independent healers in their own right rather than as adjuncts to licensed physicians.[39] Margaret Pelling critiqued and refined Cook's concept of the medical marketplace, pointing to the multiplicity of medical practitioners in early modern societies, which extended well beyond the guild-like organizations of apothecaries and physicians to include iatrochemists, cunningwomen, sages, herbalists, midwives and other low-caste and female healthcare experts. [40] In the last five years, quantitative studies by Patrick Wallis have confirmed the rapid expansion in both the socio-economic range of medical caregivers and in the quantity and diversity of medicinal drugs available to consumers in the second half of the seventeenth century.[41]

Yet while my argument here builds on the works of Cook, Porter, Pelling, and Wallis, it also calls for a widening in perspective that encompasses urban tradesmen

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[39] Margaret Pelling's *Medical Conflicts in Early Modern London: Patronage, Physicians, and Irregular Practitioners 1550-1640* (Oxford: Oxford University Press, 2003) goes beyond even Cook in its skepticism toward early modern physicians' centrality, in effect relegating 'official' guild physicians to the sidelines and claiming that apothecaries, surgeons, empirics, quacks, midwives and female healers were the more important purveyors of medical care in early modern times owing to their greater accessibility and affordability.

[40] See Pelling, *Medical Conflicts*, which points out the potential for anachronism and smoothing-out of complexity via overuse of "medical marketplace" as a catch-all term.

[41] See Patrick Wallis, "Exotic drugs and English medicine: England's drug trade, c.1550-c.1800," *Social History of Medicine*, 25:1 (2012), 20-46, which uses probate inventories of apothecaries and a careful examination of London tariff records to offer the first ereliable quantitative data about English drug imports in the seventeenth century. Wallis' findings confirm that medicinal drugs became increasingly popular among a broad segment of society in this period. Imports of new medicines from the New World and the East Indies such as opium, ipecacuanha, sarsaparilla, lignum vitae (i.e. guiacum bark), various aloes, bezoar stones, cinchona and the now-familiar coffee, cocoa and tea (among several dozen others) enjoyed particularly marked increases, confirming the Restoration-era shift toward non-traditional remedies hinted at via the more qualitative and subjective early research of Cook.

beyond London, nations beyond Britain, locales beyond Europe. Understanding the transition from Shakespeare's apothecary to Pomet requires an acute yet global perspective, one that moves readily between diffuse maritime merchant networks, the professional spaces of apothecaries, and the domestic and personal lives of their patients. It also demands a more specific and careful focus on the historical construction of "drugs" as a discrete (albeit diverse and contested) category of goods. Drugs, I argue, came out from the shadow of spices to be become a hugely influential class of global commodity in the seventeenth century. Apothecaries became key participants in an emerging globalization. But what exactly did they sell?

1.2 Defining drugs

In contemporary English, French, Spanish and Portuguese, drug/*drogue*/*droga* has a well-known double meaning. It can signify either "a natural or synthetic substance used in the prevention or treatment of disease," or "a substance with intoxicating, stimulant, or narcotic effects used for cultural, recreational or other non-medical purposes."[42] Yet the genealogy of the word is more tangled than this neat bipartite definition would imply. When it emerged in the fourteenth century from either the Old French *drogue* or Middle Dutch *droge*, the word referred simply to the gamut of dry goods, from medicinal herbs and spices to dyes, incenses, pigments, animal parts, and minerals. The lexical scope of the word changed subtly in the sixteenth century, gaining associations with exotic spices,

[42] "Drug," *OED Online*, December 2012, Oxford University Press. http://www.oed.com.ezproxy.lib.utexas.edu/view/Entry/57982 (accessed February 15, 2013).

medicines, and poisons, and serving to christen a new profession—the druggists, or *droguistas* in the Iberian languages. And while it was not until the late nineteenth and early twentieth centuries that *drug* gained a formalized secondary association with recreational usage in both Germanic and Romance languages, clear connections between drugs and intoxication begin to emerge in the early decades of the seventeenth century.[43] Satirists like John Taylor eulogized the psychoactive effects of common apothecary wares like wormwood and "scurvy ale," while commenters on the commodities of the Indies began to describe substances like opium and cannabis as "stupifying Drugs."[44]

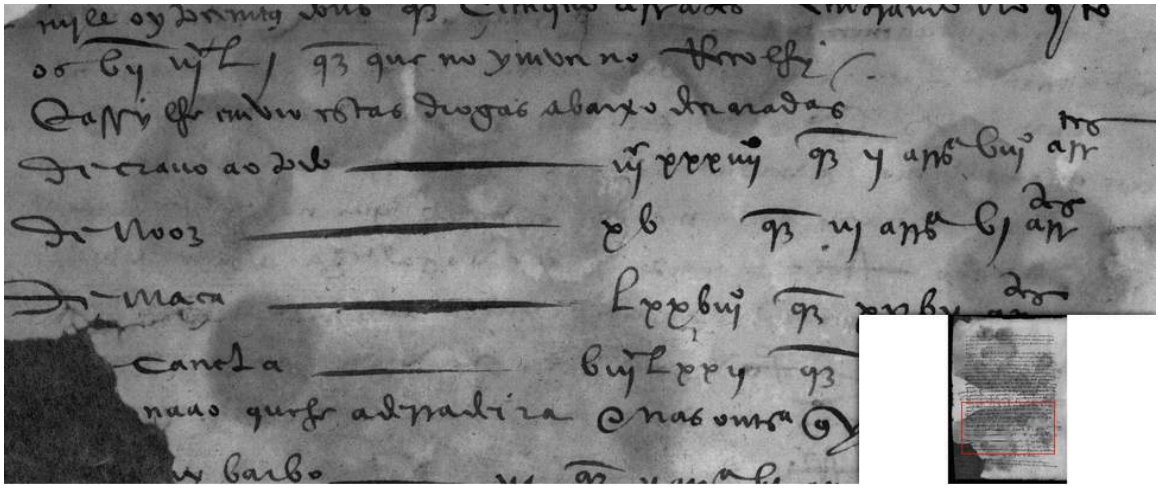

FIGURE 1.3 Detail of a list of "drogas" (cloves, nutmeg, mace, and cinnamon are listed in the visible portion) available in Cochin, 1525. AN/TT Cartas 876/16 "Carte de Manuel Botelho a D. João III sobre a colheita da pimenta e outras drogas," Cochin, January 21 1525, fol. 2r.

[43] A Spanish encyclopedia, for instance, uses 'drogas' to refer to recreational opiate abuse in 1920, but earlier editions lack the term. "Opiomania," *Enciclopedia Universal Illustrada Europeo-Americana* (Madrid, 1920), Vol. 39, 1426.

[44] Paul Rycaut, *The Present State of the Ottoman Empire* (London: Charles Broom, 1665), 275. "They have many times license from their Superiour, to be drunk or intoxicate themselves with Aqua vitae, Opium, or any stupifying Drugs, to be better able to perform with more spirit and vehemency their mad Dance."

The metamorphosis of the word "drug" in the sixteenth and seventeenth centuries mapped directly onto the global expansion of European empires and trading companies. When early Iberian navigators sailed in search of the Indies, for instance, they sought not only gold, silver and slaves, but also *especiarias* (spices) and *drogas* (drugs). In his first letter to Ferdinand and Isabella (1493), Columbus promised the monarchs what Columbus' nineteenth-century translator, R. H. Major, rendered as "rhubarb and other sorts of drugs."[45] In the original Latin, Columbus had written of "reubarbarum et aliorum aromatum genera"—using *aromatum* (aromatics), which early modern translators rendered as both spice or drug according to context.[46] By the early decades of the sixteenth century, the word *droga* was being commonly applied to exotic medicinal imports from the New World and Asia, but in a manner that continued to blur the boundaries between drug and spice. In a 1525 letter, for instance, a Portuguese factor in Cochin named Manuel Botelho sent the crown a list of available *drogas* that included cinnamon, mace, nutmeg, and cloves.[47] This early trade in *drogas* was multidirectional, involving the long-distance shipping of spices across the Indian Ocean as well as between the Indies and Europe. Manuel's possible kinsman, the *veador da fazenda* (financial officer) of the Estado da India, Simão Botelho, wrote in 1552 that "the trading contract in

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[45] R.H. Major, trans. and ed., *Select Letters of Christopher Columbus* (London, 1870, reprinted by Cambridge University Press, 2010), 15. On Columbus' expectations of Indies goods see Nicolas Wey Gomez, *Tropics of Empire: Why Columbus Sailed South to the Indies* (Cambridge, MA: MIT Press, 2008).

[46] Carolus Clusius rendered Garcia da Orta's original title *Coloquios dos simples e drogas da India* as "Aromatum et simplicium [simples]," for instance.

[47] AN/TT Cartas 876/16, "Carte de Manuel Botelho a D. João III sobre a colheita da pimenta e outras drogas," Cochin, January 21 1525, fol. 2r. This letter is discussed in greater detail (and partially translated) by Sanjay Subrahmanyam in his *Career and Legend of Vasco de Gama* (Cambridge: Cambridge University Press, 1997), 327-28.

drugs [*contrato das drogas*] which we maintain with Ormuz, is the most important remedy for [supplying] the necessities of this land [of Goa]," referring primarily to Spice Islands nutmeg, cloves, mace, and cinnamon routed through Goa from Malacca.[48]

By 1539, in the first medical book printed in English, Thomas Elliot was grouping together spices and drugs yet also differentiating them, noting his era's growing "traffyke of spyce and sondry drouges."[49] Twenty-four years later, Garcia da Orta's *Coloquios* (1563) announced its subject matter as "medicinal simples, and drugs, and other medical things of the Oriental Indies." [50] Written in the form of a dialogue between European and Hindu medical practitioners, the *Coloquios* was the third European book published in Asia, and one of the first European works to devote substantial attention to non-Christian sources of pharmacological knowledge. Da Orta's interlocutor in the *Coloquios* begins the work by announcing his "great desire to learn of the *drogas medicinais* [medicinal drugs]" from the Indies. The commenter, one Ruano, clarifies this phrase as

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[48] Simão Botelho to King John III of Portugal, January 30, 1552, transcribed in Rodrigo José de Lima Felner, ed. *Subsidios para a historia da India portugueza* (Lisbon, 1868), 27. It is worth noting, however, that despite the importance of cinnamon, nutmeg and cloves, the Portuguese traded a much wider range of goods. Antonio Nunes's "Lyvro dos pesos da Yndia," a 1554 handbook of weights and measures used by the various ports of the Éstado da India, lists the following as the as the principle drugs, spices, and materials sold by the Portuguese at Ormuz: cloves, mace, nutmeg, cinnamon, tin [*calaym*, from the Malay *klang*], bezoin gum, cardamom, cubebs (a species of pepper), *bastão do cravo* (sticks of cloves), pitch from Melinde (in present-day Kenya), red sandalwood, tamarinds, mirabolans, long pepper, dragonsblood, aloe from the Island of Socotra, *majuu* from Borneo [?], *aguilla* wood, ivory, sandalwood, camphor from China, wax, sulfur, myrrh, ginger, sugar, cotton, *almecegua* [pistachios?], seahorse teeth, aloe from Diu, *putchok* root [*pucho*], coral, rhubarb, vermillion, *solimão* [?], aloe, musk, amber, opium, *laurado* coral, pearls, unspun silk, copper wire, thread, camphor from Borneo, *algualea* [?], raw silk, gold, silver, pepper, lacquer, incense, camphor, indigo, iron, saffron from India, brazilwood, cinnamon from Batecala, lead, copper, dry mirabolans, *ruyua* [?], alum, steel, brass, oak gall [*bugalhos*], saltpetre, rosewater, soap from Diu, licorice, flax, cannabis [*bangue*], areca nut, *cate* [?], *seuo* [?], sumac, *laqueca* [?], rice, wheat, barley, butter, oil, sesame, *mumguo* [?], tar from Baçobaa, biscuits, *cifa* [?], *quil* [?] (transcribed in Felner, ed. *Subsidios*, 6-26).

[49] Thomas Elyot, *The Castel of Helthe... wherby euery manne may knowe the state of his owne body* (Lodnon: Thomas Berheleti, 1539), 22.

[50] Garcia da Orta, *Coloquios dos simples, e drogas he cousas medicinais da India* (Goa, 1563).

"those that in Portugal are called *de botica*," of the apothecary shop.[51] This emphasis on *drogas de botica* reflected da Orta's own participation in Indies commerce: as Rui Manuel Loureiro has noted, the doctor also doubled as a merchant, investing in voyages to Ceylon and Bengal and dabbling in the gemstone trade.[52]

Da Orta's practical approach to natural knowledge turned the *Coloquios* (largely via the Latin translation and revision of Carolus Clusius) into the leading sixteenth century guide to non-European medicines, helping to shape an emerging conception of drugs as separate from spices in the process.[53] For instance, the poet Luis de Camoes (who became acquainted with da Orta as a young soldier in Goa and wrote a poem in praise of his learning) wrote in his *Lusíadas* of

canella, cravo, ardente especiaria	cinnamon, clove, ardent spice
ou *droga salutifera e prestante…*	*or* drug healthful and potent…[54]

Antonio Castel's 1592 *Theorica y Practica de Boticarios* contained a note of advice for readers interested in electuaries (medicines taken at will for chronic ailments) made from "drogas aromaticas":

> those who wish to learn more about these substances should read Garcia de la Huerto who has practiced medicine in the oriental Indies for thirty years, in his book where he has written about aromatic drugs where he speaks about where they originate.[55]

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[51] Orta, *Coloquios*, 19 [1891 edition.]

[52] Rui Manuel Loureiro, "Enter the Milanese lapidary: Precious stones in Garcia de Orta's Coloquios dos simples, e drogas he cousas mediçinais da India," *Journal of History of Science and Technology*, Vol. 8 (Fall, 2013).

[53] On the interconnections between Clusius and da Orta see Hugh Glenn Cagle, "Dead reckonings: disease and the study of nature in Portuguese Asia and the Atlantic, 1450-1650," (PhD Dissertation, Rutgers University, 2011), 106-113.

[54] Camões, *Lusiads*, (op. cit.), canto 2, stanza 4 (emphasis added).

[55] Antonio Castell, *Theorica y pratica de boticarios en que se trata de la arte y forma como se han de componer las*

But if some physicians celebrated the new level of specificity and medical attention that da Orta lavished on exotic drugs, others cursed his name—quite literally. When members of the Inquisition in Goa learnt that he was a Crypto-Jew after his death, they exhumed da Orta's body and ceremonially burnt his corpse at the stake. Although this was a punishment for his religion and not his trade, the physicians, apothecaries and drug merchants who recorded information about Indies drugs fell under increasing scrutiny in the aftermath of this event and of other revelations of crypto-Jewish identities among the medical trades.[56] Likewise, in Stuart Britain, many drug merchants and empiric physicians suffered damaged reputations owing to their association with suspect Crypto-Jewish, Catholic or "Jesuitical" practices of hybrid knowledge, and with indigenous spirituality.[57]

To be an expert in drugs in the sixteenth and seventeenth centuries, in short, was to announce one's engagement with the exotic, the foreign, and the unfamiliar. Although the term had autochthonous origins in medieval Europe, by the late seventeenth century the lexical boundaries of drug/*drogue*/*droga* were beginning to be defined in terms of

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Confectiones ansi interiorers como exteriores (Barcelona: printed by Sebastian de Cormellas, 1592), 109. Elsewhere, (page 84) Castell again approvingly cites "Garcia de la Huerta" as a "learned authority as a learned and very curious man" who had written as an "eyewitness" [*testigo*] regarding "drogas aromaticas que creçen en las indias orientales." Again on page 85 we find Garcia da Orta mentioned as an authority on cinammon and other "drogas aromaticas." Clearly, the semantic category of "aromatic drugs" was, in Castell's mind, closely associated with da Orta.

[56] Timothy Walker, *Doctors, Folk Medicine and the Inquisition: The Repression of Magical Healing in Portugal during the Enlightenment* (Leiden: Brill Academic Publishers, 2005).

[57] See for instance the trial of Doctor Rodrigo Lopez, a Sephardic Jewish physician accused of attempting to poison Queen Elizabeth, whose trial and execution in 1594 may have inspired elements of *The Merchant of Venice* (1596-8). Robert Cecyll and Arthur Dimock, "The Conspiracy of Dr. Lopez," *The English Historical Review*, 9: 35 (July, 1894), pp. 440-472

geographical distance and exotic origins. In *Paradise Lost*, Milton compared Satan (evidently enjoying an acrobatic "solitary flight" above the Gates of Hell) to a fleet of Indies vessels "close sailing from Bengala, or the isles/of Ternate and Tidor, whence merchants bring/ their spicy drugs."[58] With the increasing dissemination of practical empirical knowledge related to distillation, dying, assaying and other artisanal techniques in the late seventeenth century, drugs also became associated with the type of "chymical" artisans studied by Lawrence Principe, William Newman, and Pamela Smith.[59] In his *Dictionaire universelle* (originally published in 1690) for instance, Antoine Furetière defined *drogue* as "merchandise of various types sold by spicers, above all from faraway lands, which are used in Medicine, by dyers and by Artisans… The apothecaries must stock in their *boutique* all sorts of drugs."[60] Widespread skepticism directed at those who dealt in drugs palpably emanates from early dictionaries like Furetières. Indeed, the *Dictionaire universel* offered a secondary definition of drogue with a decidedly moralistic slant: "It is said also of things that have little value... one says proverbially that a fellow 'knows well how to value his drugs,' which is to say, that he is a charlatan."[61] Fifty years later, Samuel Johnson was offering up a second meaning of "to drug" as "to tincture with

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[58] Milton, *Paradise Lost,* Book II, (W. Sharp, 1816), 50.

[59] William R. Newman, *Atoms and Alchemy: Chymistry and the Experimental Origins of the Scientific Revolution* (Chicago: The University of Chicago Press, 2006); William R. Newman and Lawrence M. Principe, *Alchemy Tried in the Fire: Starkey, Boyle, and the Fate of Helmontian Chymistry* (Chicago: University of Chicago Press, 2002); Pamela H. Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago: The University of Chicago Press, 2004).

[60] Antoine Furetière, *Dictionaire Universel* (Paris, 1690) "Drogue," (unpaginated).

[61] Furetière, *Dictionaire.*

something offensive."[62] Elsewhere in the *Dictionnaire universel,* the phrase "Qui pro quo" (meaning a mistaken identity, rather than the more common "quid pro quo") is glossed as "a Latin term which refers to an error by an Apothecary, who gives to one person a medicine prepared for another… from which we have the proverb, God Guard us from the *qui pro quo* of the Apothecary."[63]

As can be seen from Table 1 below, the lexical and conceptual terrain of drugs in the seventeenth and early eighteenth centuries remained expansive: they could be dyestuffs, spices used in cooking, recreational intoxicants, or artisanally-prepared chemical medicines. Likewise, it would be a mistake to equate drugs with plant-based botanicals: a significant proportion were minerals and animal products, while others were "chymically" prepared substances. What bound them together was their novelty. Whether it was an indigenous botanical from a "faraway land" or an iatrochemical formula created by an artisan, the seventeenth-century drug was beginning to be defined by its mysterious origins and controversial social and medical role. To sell drugs was to stake not only a commercial and epistemological, but an ethical claim to that role: to announce one's access to knowledges and material pathways that were not always considered savory, but held an unmistakable allure for consumers. Drugs were becoming desirable—and debatable.

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[62] Samuel Johnson, *A Dictionary of the English Language* (London, 1755)

[63] Furetière, Dictionaire, "Qui pro quo." "Hence the proverb: God guard us from the *qui pro quo* of the Apothecary and the *et cetera* of the Notary."

TABLE 1. Items identified as "drugs" in early dictionaries

P *= plant* • ***M*** *= mineral* • ***A*** *= animal* • ***O*** *= other*

Furetière's *Dictionairre,* 1690 (French)	**Bluteau's *Vocabulario*,** 1712 (Portuguese)	**Johnson's *Dictionary*,** 1755 (English)
Spikenard: "a drug liquid and potable" **[P]** Myrrh: "Myrrh is an odorant drug." **[P]** "Oeuil lucide": "A drug called *lyceum* Crystal: "A drug which one takes in medicines." Orchanette: "A strange drug which is not so good." **[P]** Jonc: "There is an odiferous *jonc*, which the apothecaries call *pature de chameau*." **[P]** Mummy: "A medicinal drug, viscous and bituminous, from the mountains and forests of Arabia and other hot places in the Orient." **[A]** Mace: "The Dutch have a great traffic in it, which is a drug highly esteemed." **[P]**	Almegega gum: "suspends the vomit." **[P]** Camphor : "The ancients knew this drug." **[M]** Segapenum: An Arabian resin. Amianto: "A French Author in his *Apararatus Medico-Pharmaco-Chimico* says this is a drug." **[M]** Gorviam: "A drug used in medicines for horses." Mataleste: "A drug which resembles jalap."**[P]** Mummy: "A dead body which is embalsamed and aromatized... the most perfect mummies are the corspes of Princes and great Lords of Egypt and Syria... their balsam can be drunk with wine." **[A]**	Acacia: "a drug brought from Egypt." **[P]** Agaric: "a drug of use in physick, and the dying trade." [**O]** Myrrh: "Our myrrh is the very drug known by the ancients under the same name." **[P]** Ambergris: "a fragrant drug... many of the orientals imagine it springs out of the sea." **[A]** Nepenthe: "A drug that drives away all pains." **[P]** Ammoniac: "the name of a drug" **[M]** Chocolate: "cacao-nuts, achiot, and other drugs, which their West Indies furnish." **[P]** Elemi: "brought from Aethiopia... it is very rare in Europe." **[P]** Lac: "Authors leave us uncertain whether this drug belongs to the animal or the vegetable kingdom." **[P]** Mummy: "What our druggists are supplied with is the flesh of executed criminals, or any other bodies the Jews can get." **[A]**

1.3 The drama of "Indian drugges"

In 1616, the Anglican bishop Godfrey Goodman proclaimed a personal war on the "farre fetched Indian drugges" that London merchants had begun to import from the tropical world. Along with pearls, rubies, diamonds, incense and rich textiles, traders with the recently-launched English East and West India Companies and the Dutch VOC had begun to import trial amounts of exotic new consumables ranging from guaiacum bark and occidental bezoars to *bhang* (cannabis) and *cha* (tea).[64] In his book *The Fall of Man*, the preacher lambasted apothecaries not only for their greed, but for polluting English bodies with substances derived from foreign climates and cultures:

> When I see [apothecary] shops so well stored and furnisht with their painted boxes and pots, in stead of commending the owner, or taking delight and pleasure in the shop, I begin to pitie poore miserable and wretched man that should be subject to so many diseases, and should want so many helps for his cure[.] I could wish that his pots were only for ornament, or naked and emptie… for he is the happiest man that can live without them.[65]

Goodman protested that the exotic and colorfully-packaged drugs of the apothecaries "doe not agree with our constitution; yet such is our wantonnesse, that sometimes with taking their physicke [medicine], wee overthrow the state of our bodies; and in stead of naturall, we make our selves artificiall stomackes, when our English bodies must prove the store-houses of Indian drugges."[66] Echoing the warnings of King James I in his famous

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[64] Godfrey Goodman, *The Fall of Man, or the Corruption of Nature proved by the light of his Natural Reason* (London: printed by Felix Kyngston, 1616), 83. On Dutch efforts to popularize tea among seventeenth-century European consumers, see Harold Cook, *Matters of Exchange*, 293-300.

[65] Goodman, *Fall of Man*, 96.

[66] Goodman, *Fall of Man*, 98-99.

Counterblaste to Tobacco, Goodman believed that the foreign and non-Christian origins of these drugs threatened to degenerate both individuals and larger social groupings, leading ultimately to the "overthrow" of both "the state of our bodies" and the state of England itself.[67]

Goodman's condemnation of non-European drugs, like that of England's reigning monarch, seems to have derived in part from anxieties about the unprecedentedly long distances that these substances traveled to reach English consumers, and the unfamiliar ecological and climactic regions in which they were grown. "There is a great distance in the Climat," between England and the Indies, Goodman noted,

> and therefore we should not rashly undertake such a journey, to joyne together things so farre separated in nature… In fetching this physicke (these Indian drugs) thousands doe yeerely endanger their lives, through the diversitie of the Climate, going to a new found world, they goe indeed to another world. [68]

Implicit, too, in such a warning was a well-documented theory linking the locality of diseases to that of their cures. In an elaboration of the climactic theories of Aristotle, sixteenth-century medical theory generally upheld the view that human "constitutions" had been ordered by God so as to find local plants beneficial. Conversely, plants which came from a different climactic zone were, as Goodman put it, "separated in nature" and therefore liable to provoke humoral imbalance.[69] As Europeans became increasingly aware

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[67] King James I of England, *A Counterblaste to Tobacco* (London, 1604). For further analysis of this document see Peter Mancall's thoughtful essay "Tales Tobacco Told in Sixteenth Century Europe," *Environmental History*, Vol. 9, No. 4 (Oct., 2004), 661-4.

[68] Goodman, *Fall of Man*, 99.

[69] On bodily and humoral corruption from the Indies climate, see Jorge Cañizares-Esguerra, "New World, New Stars: patriotic astrology and the invention of Indian and Creole bodies in Colonial Spanish America,

of the non-Christian societies inhabiting the tropical New World, Africa and the Indian Ocean region, this theory became tinged with an undercurrent of fear that the ingestion of non-European drugs might also cause Christians to take on "barbarous" or "heathenish" characteristics. This was precisely the fear that King James had articulated. In adherence to the theory of local cures, the monarch acknowledged that American Indians might properly use American tobacco to "adjust the constitution of their bodies" and as an "Antidot against the Pocks, a filthy disease, whereunto these barbarous people are (as all men know) very much subject." However, James feared, if the English chose "to imitate the barbarous and beastly manners of the wilde, godlesse, and slavish Indians" they would potentially come to "denie God…and adore the Devill, as they doe."[70]

Godfrey Goodman's attacks on Indies drugs were similarly rooted in a conflation between the body politic, individual human bodies, and the spiritual health of Christendom. For Goodman, the "pampering of our selves" with Indies drugs augured "the ould age of the world," because the robust physicality and rustic virtues of Ademic times had become replaced by unfamiliar tropical spices and intoxicating liquors that caused weakness and infirmity. "In this last period of times," Goodman wrote, "we are now growne to that faintness hot waters, and strong drinkes, were never so much used, hot spices were never brought over in such plentie, as may well appear in the custom-

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1600-1650," in *American Historical Review*, 104 (Feb., 1999), 33-68

[70] James I, "Counterblaste," 3.

house." To compound matters, Goodman lamented, the resulting "weaknesse of our stomackes" had itself been remedied by "an Indian drug (the use of Tobacco)."[71]

Sixteenth- and seventeenth-century understandings of Indies drugs were, as these quotes suggest, profoundly shaped by their origins in supposedly enervating tropical climates populated by "heathens." Items that early modern Europeans labeled as either spice or drug (or both) tended to hail from ecologically distinctive spaces like the Banda Islands of Indonesia or the jungle valleys of the Peruvian Amazon, which were then lumped together under the umbrella term of "the Indies" or "Indian."[72] Increasingly, the term 'drug' itself began to function as a proxy for the exotic, the non-Christian, and the distant—and so, too, did the apothecary (Figure 1.4).[73] As early as 1577, the Elizabethan clergyman William Harrison had registered his fears about the rising popularity of unfamiliar new drugs from the Indies. "Our continuall desire of strange drugs," Harrison complained, was one "whereby the physician and apothecarie onlie hath the benefit." Harrison believed this trend was not localized only to London or indeed to England, but was a pan-European phenomenon: "a Spaniard or English man stand in need… of forren drugs."[74] He described these drugs as "strange hearbs, plants and annual fruits" which

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[71] Goodman, *Fall of Man*, 352.

[72] On the ecological distinctiveness of the sites of many early modern plantations and colonies see Richard Grove, *Green Imperialism*.

[73] As Alix Cooper's *Inventing the Indigenous* reminds us, early modern Europeans began to form notions of their *own* indigenous culture and landscape partly as a response to the influx of foreign drugs and commodities. Alix Cooper, *Inventing the Indigenous: Local Knowledge and Natural History in Early Modern Europe* (Cambridge: Cambridge University Press, 2007).

[74] William Harrison, "An Historicall Description of the Iland of Britaine," (1577, second edition 1585), reprinted in Georges Edelen, ed. *The Description of England* (Dover Publications: New York, 1994), 267-8. For an overview of early debates about foreign drugs see Andrew Wear, *Knowledge and Practice in English*

were "daily brought unto us from the Indies, Americas, Taprobane [Sri Lanka], Canarie Iles, and all parts of the world."[75] For the clergyman, this fad for exotica had led to the shameful neglect of homegrown medicines. Yet within a few decades, these "strange drugs" had become familiar.

FIGURE 1.4 Five apothecaries—three brandishing plants, two holding books—engaged in a debate. The figure at far left features an Ottoman turban, and the goateed man to his right may be wearing a form of *judenhat*. Colored woodcut from an edition of the *Gart der Gesundheit*, a German translation of the popular medical Latin text known as the *Hortus Sanitatis* or *Ortus Sanitatis* (Augsburg, 1497).

Medicine, 1550-1680 (Cambridge: Cambridge University Press, 2000), 70-81.

[75] Harrison, "Description," 267.

Implicit in these condemnations of Indies drugs was the fear that European bodies and minds might dependent on this foreign "physick." The modern conception of addiction, of course, was not available to these anti-drug writers of the seventeenth century. Yet some Indies drugs did began to accrue associations with recreational use and with causing harmful "passions" and "hungers." Da Orta observed that opium and *bhang* (cannabis) were employed by South Asian potentates to provoke "sweet dreams," and the opium and alcohol addictions of the Mughal emperor Jahangir were reported by European travelers.[76] For da Orta, the unpleasant psychological effects of *bhang* seems to have contributed to his decision not to include the drug among the substances he advocated for in *Coloquios*. Instead, da Orta restricted his discussion to describing

> a Portuguese jester, who was for a long time with me in Balaguate, ate a slice or two of the [bhang], and at night he was pleasantly intoxicated, his utterance not intelligible. Then he became sad, began to shed tears, and was plunged in grief. In his case the effect was sadness and nausea.[77]

Following the lead of da Orta, European medical authors began to contrast Indies drugs with the more benign materia medica from Classical and Neo-Galenic authors.[78] As early as 1604, the French physician Joseph Duquesne (aka Joseph Quercetanus) was theorizing a generalized chemical basis for opium's addictive properties, which he attributed to salts that "stupefy" or "astonish the brain" in the same manner as hemlock,

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[76] Da Orta, *Coloquios dos simples*, 26r: "The great sultan Bahadur said… that when at night, he wanted to go to Portugal, Brazil, Turkey, Arabia, or Persia, he only had to take a little *Bangue* [cannabis]."

[77] Da Orta, *Coloquios dos simples*, 26r.

[78] On the bibliographic history of this work see Charles R. Boxer, *Two Pioneers of Tropical Medicine: Garcia D'Orta and Nicolás Monardes*. (London: Wellcome Historical Medical Library, 1963) and Hugh Glenn Cagle, "Dead reckonings," op. cit.

the poison that killed Socrates:

> The narcotical and stupefactive odor of Poppy, and Hemlock, and suchlike which do stink, and astonish the brain, by reason (as Physicians affirm) of their cold quality… for that which is Stupefactive in the Poppies, and in Opium, is no other thing but a certain oily and sulphurous part….Hereof come sinister and deadly passions and pains, by reason whereof men are constrained to use the imperfect Laudanum of Empirics, against the deadly hunger of such medicines.[79]

Although the latex of *Papaver somniferum* had been widely used by Greek and Roman physicians, the opening up of new trade routes with Persia and South and Southeast Asia vastly expanded the scope of the opium trade and of opium use in the sixteenth and seventeenth centuries. Opium, along with tobacco, became an archetypal Indies drug in European metropoles: an intoxicating, heady, and profoundly evocative substance that combined exotic associations with domestic availability. A body of exotic lore grew up around opium, like the Neapolitan aristocrat turned apothecary Giuseppe Donzelli's observation that it was prized by "Turkish soldiers, who eat it especially when they are in times of danger at war, becoming almost drunken with it and thereby not noticing their danger."[80] Citing Duchesne, Donzelli elaborated that it has a "soporific and stupefying quality," an essence hidden in the "vaporizised spirits" of the substance that can "put in a man in a profound sleep."[81] Donzelli speculated that both opium's dangers and its medicinal benefits derived from what he called its *solfo narcotico, e stupefattivo,* the

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[79] Joseph Duchesne (translated by Thomas Tymme), *The Practice of Chymicall and Hermeticall Physicke* (London: T. Creede, 1605), ch. 4 (n. pag.), a partial translation of Duchesne, *Ad veritatem hermeticae medicinae ex Hippocratis veterumque decretis ac therapeusi* (Paris: Abraham Sagrain, 1604).

[80] Giuseppe Donzelli, *Teatro Farmaceutico, Dogmatico, Espagirico* (Venice: Gasparo Storti, 1696), 341.

[81] Donzelli, *Teatro Farmaceutico,* 341.

"narcotic and stupefying sulfur" that comprised its psychoactive essence.[82]

Capturing this essence was where the art of the apothecary came into play—the most skilled practitioners developed proprietary recipes via a close, quasi-alchemical attention to which processes would best isolate and amplify the hidden "virtues" of a simple.[83] A representative recipe from Donzelli called for a "fermentation of opium" mixed with aloe, cinnamon and "spirits of Wine" (brandy).[84] The variety of these recipes was in part due to the trial and error nature of the trade: each apothecary experimented with countless preparations of the same core group of simples, and even the same practitioner might offer up a half dozen or more different twists on the same recipe. Tiny adjustments to ingredients or preparation styles—fermentation instead of distillation, a scruple instead of a drachm, musk instead of aloe—might draw out a hidden "virtue" or "essence" which would otherwise have lied inert and undiscovered.

The rise of such "compound" medicines containing opium in the early seventeenth century prompted considerable controversy.[85] Although early modern Europeans lacked a well-defined conception of physical addiction or psychological dependence, when medical writers of the seventeenth century called a medicine a "narcotic" or warned of "the deadly

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[82] Donzelli, *Teatro Farmaceutico,* 382.

[83] Evan Ragland, "Chymistry and Taste in the Seventeenth Century: Franciscus Dele Boë Sylvius as a Chymical Physician Between Galenism and Cartesianism," *Ambix*, 59: 1 (March, 2012) 1-21.

[84] Donzelli, *Teatro Farmaceutico*, 384.

[85] Surprisingly little has been written specifically dealing with the rise of proprietary opium-containing remedies in seventeenth-century medicine, such as Thomas Sydenham's famous recipe for laudanum, later marketed in printed advertisements in the eighteenth century as "Sydenham's drops." As my survey of medical recipes in Appendix C suggests, tinctures of opium or poppy numbered among the most common household remedies of the period. For one example see Eunice Bonow Bardell, "Primitive Physick: John Wesley's Receipts," *Pharmacy in History*, 21: 3 (1979), pp. 111-121

hunger of such medicines" (as Donzelli did for opium), they did so with eyes open as to the dangers of what we would today term addictive substances.[86] Tinctures and compound medicines of opium generated controversy—and public demand—not only because they powerfully altered affective states and neurotransmitters, but because these personal and subjective factors had a public-facing impact. Opium-based remedies became prestige goods. The complex preparations espoused by a Donzelli or a Pomet marked out those who sold and consumed them as individuals with both cosmopolitan ties to the non-European world and elite natural philosophical knowledge. The remedies they prepared were consumable fragments of other worlds—the exotica of the Indies and the secrets of the alchemist bound together. And as such, they attracted criticism even as they radiated the allure of the unknown and the psychoactive.

It is important to remember, however, that these conceptions of 'Indies drugs' as pernicious to European bodies and minds were not limited to substances, like tobacco and opium, that twenty-first century medical science has determined to contain psychoactive alkaloids. The placebo effect was in play four hundred years ago just as it is today, and a surprisingly wide array of substances became entangled in debates about foreign drugs that altered individual subjectivity. Although tobacco and opium often functioned as stand-ins for a larger class of Indies drugs, theorists readily extended their detrimental effects to many other imports. Duquesne compared the "sinister" effects of opium to those of pepper and the herb euphorbium, for instance, and when the coffee bean was

[86] Duchesne, *The Practice of Chymicall and Hermeticall Physicke* (London, 1605).

introduced to European cities in the 1650s and 1660s, many physicians attacked it as a dangerous new mind-altering drug.[87] Citing the "Africano" Portuguese doctor Cristovão d'Acosta, Donzelli wrote that "in India, Persia, Arabia and China, it is customary to use bezoar stones against all sorts of poisonings." Yet for both Acosta and Donzelli, the anti-venom properties of the stone also conferred what we would think of as psychological benefits: by removing "gross matter" from the kidneys and purifying the humors, the coveted stones also "root out all sorts of melancholy."[88] Spices, too, often appear in apothecary and medical manuals as substances with psychoactive properties, which dispel melancholy or "enliven the spirit." As late as the 1740s, consumption of the perfume ambergris was claimed to make a man "as merry as if he had drank a great quantity of wine."[89]

As Joseph Duequesne's reference to the "stupefactive odor" of opium hints, the physical action of these substances on the body frequently came to be equated with their aroma and their effects on the senses and mental states. Not for nothing do drugs appear continually in seventeenth-century drama: they were internal and private, yet provocative and popular; productive of sensory associations via smell or sight, while also enacting secret changes on the level of what seventeenth-century physicians called "the reasoning

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[87] Brian Cowan, *The Social Life of Coffee: The Emergence of the British Coffeehouse* (Yale, 2011), 40. Cowan notes that many British medical authorities differentiated coffee from narcotics like opium, attacking its effects on sociability rather than on the body itself. However, anxieties about the effects of coffee on European bodies were also potent. As late as 1733, a Portuguese physician debated whether *caffé* was a "stupefacient," citing no less an authority than Francis Bacon. José Rodrigues Abreu, *Historiologica Medica* (Lisbon, 1733), 422.

[88] Donzelli, *Teatro Farmaceutico,* 390.

[89] Henry Barham, *Hortus Americanus* (Kingston, Jamaica, 1794), 2. Published after his death, Barham's book was based on notes taken in Jamaica during the 1740s.

faculties."[90] The ambiguous allure of these new substances inhered to everyday life even as it was dramatized on theatrical stages. Viewed in this light, it becomes less surprising that a powerfully-scented and exceptionally rare perfume like ambergris—an *aromatum*, in Latin medical terminology—might also take on qualities of narcotic intoxication in sixteenth and seventeenth-century belief. The psychoactive "virtues" of these substances were, in early modern medical theory, intimately bound up with both their evocative sensory characteristics, exotic origins, and prestige—what we might call the "drama" of drugs.[91]

1.4 Apothecaries as artificers of drugs

The early modern apothecary was a list-bound creature.[92] And lists, as the work of Ann Blair reminds us, are technologies of knowledge accumulation and distribution.[93] Lists set apothecaries in motion, animating their trade by distributing knowledge of local drugs and prices across long distances. The wider dissemination of botanical knowledge via popular print in the sixteenth century, coupled with the growing variety of exotic

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[90] Tanya Pollard astutely points out that the reoccurring appearances of "narcotic soporific drink[s]" in early modern drama reflect, in their "ambiguous position between medicine and poison," the underlying ambiguity of sixteenth century genre distinctions: Will the play end in tragedy or comedy? Will the drug confer pleasure or death? Tanya Pollard, "'A Thing Like Death': Sleeping Potions and Poisons in Romeo and Juliet and Antony and Cleopatra," *Renaissance Drama*, 32 (2003), 95.

[91] C. A. Bayly's concept of "bio-moral substances" as a factor in global trade is relevant here. Christopher Alan Bayly, *The Birth of the Modern World 1780-1914: Global Connections and Comparisons* (London: Blackwell, 2004), 44.

[92] Valentino Pugliano, "Specimen lists: artisanal writing or natural historical paperwork?" *Isis*, (2012) 103(4), 716-726.

[93] Ann Blair, *Too Much to Know: Managing Scholarly Information before the Modern Age* (New Haven, Conn.: Yale Univ. Press, 2010). See also Brian W. Ogilvie, "The Many Books of Nature: Renaissance Naturalists and Information Overload," *Journal of the History of Ideas*, 2003, *64*:29–40.

drugs available in markets, meant that apothecaries frequently exchanged what Valentino Pugliano calls "specimen lists," or notes on desired drugs, interesting specimen, or new wares that had become available. The exchange of these lists, along with printed texts and medicine receipts [recipes], knitted apothecaries into a transnational community which (rather like the jewel merchants studied by Francesca Trivellato) was in open competition yet also bound together by favors exchanged and credit owed.[94] By the mid seventeenth century, these apothecary networks had become more formalized and more self-consciously situated in a Republic of Letters framework. When the Lisbon-based gardener and apothecary Gabriel Grisley offered a list of drugs and garden herbs available in Portugal to Henry Oldenburg at the Royal Society, he did so not only out of a desire to impart knowledge but likely also with an eye toward winning a name for himself as a natural philosopher.[95] The apothecary also relied on lists in the form of prescriptions. The process of "knitting together the string of basic information supplied in a narrative of processes (from crushing and mixing to boiling) that he knew by heart or could consult in a manual" linked what Pugliano calls "humanist reference techniques" with the alchemist-like labors of the apothecary.[96] Apothecaries were intelligentsers who gathered information about the prices, virtues and locations of novel drugs, but they were also artisans who reshaped these raw materials using trade secrets.[97]

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[94] Trivellato, *Familiarity of Strangers.*

[95] Archives of the Royal Society (London, UK), Cl. P. 10, "Plants available to Grabriel Grisley in London," May 20, 1669.

[96] Pugliano, "Specimen lists," 725.

[97] On artisanal knowledge in medicine see Claudia Swan, "Making Sense of Medicall Collections in Early Modern Holland: The Uses of Wonder," in Pamela Smith and Benjamin Schmidt, eds. *Making Knowledge*

While clergyman like Godfrey Goodman fixated on the "heathenish" and non-European origins of Indies drugs, many seventeenth-century consumers seemed more preoccupied by the problem of counterfeit drugs. Laws entered the books in both Iberia and England that attempted to insulate drug buyers from the risk of purchasing compound remedies with medically suspect ingredients or dangerous ingredients. A 1555 law in issued by the court of Charles V in Spain offered an early insight into the ways that sixteenth-century lawmakers differentiated between the medical professions, mandating that "physicians, surgeons, apothecaries and barbers" be examined by a court physician, or protomedico, but that "the examination must not include midwives, druggists [*drogueros*] or spicers [*especiaros*]."[98] By the seventeenth century, these "druggists" had fallen under increased scrutiny. The ordinances of the city of Zaragoza feature a 1669 statute attempting to rein in the abuses of "Boticarios y Drogueros," levying fines on their sale of "false and sophisticated medicines, and stale drugs [*drogas añejas*]."[99] With the increasing sophistication and complexity of apothecary's manipulations of drugs, however, it became increasingly difficult for consumers (and even physicians) to determine when they were being bilked. Pharmaceutical texts of the seventeenth century frequently addressed this problem, and many began supplying detailed descriptions of the sensory characteristics of popular seventeenth-century drugs. These writings emphasized the degree to which drug buyers tasted, smelt, and experimented with their purchases.

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in Early Modern Europe (Chicago: University of Chicago Press, 2007), 199-213.

[98] Alonso de Azevedo, *Repertorio de todas las pragmaticas y capitulos de Cortesm hechas por su magestad, desde el ano 1552 hasta 1564* (Salamanca, 1566), 78.

[99] *Ordinaciones de la Imperial Ciudad de Zaragoza* (Saragosa: Diego Dormer, 1675).

Donzelli identified the proper characteristics of "perfect opium" [*l'Opio pefetto*] as:

> dense, heavy, bitter to the taste, somniferous in odor, dissolvable in water, smooth, white, not rough, non granulated, which does not move like wax when touched, which when placed in the Sun liquefies, which burns with a black flame, and which loses its virtue along with its odor.[100]

For drugs like opium, of course, there was another, much more direct method of determining purity: consuming the drug itself. It was not until the early seventeenth century that published drug manuals began to describe the psychoactive and subjective characteristics of drugs in extensive detail—a shift that mapped onto the emergence of drugs like opium and tobacco as recreational commodities as well as *materia medica*.[101]

Yet despite an increasing correlation with intoxication over the course of the early modern period, it remained unclear precisely what distinguished medicinal drugs from spices, foods, and aromatics. Indeed, two of the leading historians of early modern medicine, Timothy Walker and Harold Cook, have recently argued that in early modern usage, "the word for 'spice' and the word for 'drug' were practically interchangeable." They go on to note a small but important distinction between the two substances, however:

> Spices were natural substances that, when properly prepared and mixed even in small amounts with other ingredients, released potencies (or 'virtues') to alter the state of the body for the better. In this sense, medicines were a subcategory of the spice trade, being those parts of it that had virtues for the preservation or restoration of health.[102]

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[100] Donzelli, *Teatro Farmaceutico,* 341.

[101] On the emergent sense of human bodies as interchangeable subjects for pharmacological testing of "specifics" like cinchona bark and opium, see Harold Cook, "Markets and Cultures: Medical Specifics and the Reconfiguration of the Body in Early Modern Europe," *Transactions of the Royal Historical Society*, 21 (2011), 130-138.

[102] Harold Cook and Timothy D. Walker, "Circulation of Medicine in the Early Modern Atlantic World," *Social History of Medicine* 26:3 (2013), 2.

In other words, the early modern drug trade was a commerce of *potential* potencies: it transported substances that, when paired with appropriate knowledge, could unlock virtues that altered the mind and body. But without this knowledge, the substances alone were of ambiguous utility. Apothecaries were the go-betweens in this schema, the artificers who drew the active virtues out of "simples"—the term of art for unmixed, individual drugs bought directly from drug merchants (druggists)—and transformed them into remedies.

The licensed physician John Moyle proposed a similar distinction in 1704. "We must distinguish betwixt Drugs," Moyle urged, "and the *Medicins* prepared of them." For Moyle—whose comments appeared in the context of a larger argument about the merits of fixing the prices of key medicines— "No certain Price indeed can be put upon Drugs, but then it does not properly belong to the Apothecary to sell these, but to the Druggist."[103] In Moyle's estimation, "drugs" referred to the raw materials of healing, traded as commodities. "Medicins" are what results when drugs fall into the hands of apothecaries, who use their art to create proprietary blends, or compounds, of combined individual drugs (simples) that have undergone various mechanical (grinding, decocting, pounding, infusing) or iatrochemical (distilling, fermenting) processes. "Drugs rise and fall for the same reason as other Commodities, viz. the plenty or scarcity of them," Moyle explained. "But in pricing medicinal preparations, especially the compound, the greatest regard by far is had to the skill and pains of the Preparer, which is always of the same

[103] John Moyle, *The Present Ill State of the Practice of Physick* (London, 1704), 27.

value." In other words, Moyle was advocating for the commercial primacy of licensed physicians and apothecaries. The true value of a medicament, he argued, resulted from the artifice of the individual who prepared it, not the scarcity or exotic nature of the drugs of which it was composed ("though the cheapness or dearness of Drugs have a little influence upon the price of such preparations, 'tis scarce worth the speaking of.")[104]

FIGURE 1.5 A detail of a 1721 satirical print of an apothecary brandishing the tools of his trade—including a primitive syringe, drug jars, bundles of poisonous snakes, and what the caption identifies as a "a vase for opium" worn as a hat, perhaps poking fun at the subject's drug-addled brain. Martin Engelbrecht, "Un Apoticaire/ Ein Apotecker," c. 1721, via Wellcome Images.

[104] Moyle, *Present Ill State*, 27-28.

These debates about the lexical boundary and meaning of "drugs" hinged upon questions of commerce. In *A Short View of the Frauds, and Abuses Committed by Apothecaries*, Christopher Merret portrayed the apothecaries of London as power-hungry monopolists intent to dethroning physicians as the leading medical practitioners. [105] They were achieving their ends, according to Merret, due to commercial fraud, selling cheaper drugs as more valuable ones and exploiting the ignorance of their patients. Here again, apothecaries appear as the artificers of the drug trade, the craftsmen who transform the raw materials of the druggists into compound medicines imbued with virtues—but for Merret, as for the creators of numerous satirical prints poking fun at the pomposity of apothecaries (like Figure 1.5), this artifice opensedthe door to shady dealings.

Margaret Pelling and other historians of early modern medicine have extensively studied diatribes like Merret's, keying in on institutional battles and the carving out of professional authority. In the existing literature, these are battles waged in the context of state formation and urbanization. The apothecaries are an emerging group of urban tradesmen eager to gain special privileges and to assert their corporate identity.[106] This interpretation of apothecaries as an upstart profession attracting opprobrium from more traditional rivals certainly comes across in many accounts. An anonymous "gentleman of quality of north Britain" recorded his astonishment at the newfound popularity—and

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[105] Merret, *Short View*, op. cit. Interestingly, Merret's message appears to have been influential enough to pass into Portugal. In his *Polyanthea Medicinal,* João Curvo Semedo writes of a certain "Doctor Christovao Merrete [who] followed this decree of the English Republic, advising, that Doctors prepare with their own hands, or watch the remedies being prepared, which they give to the sick" (Semedo, *PM*, 724).

[106] Michelle A. Laughran, "Medicating With or Without 'Scruples': The 'Professionalization' of the Apothecary in Sixteenth-Century Venice," *Pharmacy in History*, 45: 3, (2003), 95-107.

ethical laxness—of apothecaries in the City of London: "I saw, passing your Streets," he complained in a 1707 pamphlet, "eight or ten Shops in every one, and the Prentices prattling and playing; no Preparation making, not a Remedy compounded; they are more numerous than the Sick."[107] What gets left out of this formulation, however, is the uniquely transnational component of what apothecaries actually did: by serving as the middle men between the more shadowy realms of the long-distance drug merchants and the comparatively well-documented works of the licensed physicians, apothecaries were among the most important hubs in an emerging system of global long-distance trade that depended as much on knowledge *gaps* as it did on knowledge transfers.[108] They profited from their connections to the non-European world, even as they endeavored to keep the precise nature of that world hidden from public view, encoded as proprietary formulas and trade secrets.

1.5 Globalization and the apothecary's art

Even as some in Europe agonized about the consequences of European bodies ingesting Indies drugs, their contemporaries who smoked Brazilian tobacco, drank Mexican cacao, or took "physicke" with West Indian guiacum and Persian opium demonstrated that the material worlds of Europe, the Americas, Africa and Asia had

[107] Anonymous, *Fair play for one's life, or, The sovereign preservative of the royal family, nobility, &c* (London: printed for M. Wotton, 1708), 2.

[108] On knowledge disruption as a factor in early modern globalization see Benjamin Breen, "No Man Is an Island: Early Modern Globalization, Knowledge Networks, and George Psalmanazar's Formosa," in *The Journal of Early Modern History* 17 (Winter, 2013), 391-417.

already become irrevocably interconnected. Robert Pitt, the author of a 1702 tract lamenting the high prices of drugs, complained of "Trading Physicians returning from the *Indies*" who had "impos'd upon" a gullible public by arguing that bezoar stones were capable of "subduing all sorts of Poysons," when in reality they were little more than "pretty Trifle[s]."[109] Though addressing English readers and medical consumers, Pitt was also taking oblique aim at the Iberian figures responsible for popularizing bezoars: in the Spanish West Indies, Nicolas Monardes and Francisco Hernandez; in the Portuguese East Indies, Cristobal de Acosta and Garcia da Orta.

As we have seen, Pitt was far from the only seventeenth-century commenter who lamented that familiar European herbal drugs were being neglected in favor of "the rarer Productions of both the *Indies*," echoing the complaint of figures like Goodman and King James almost one hundred years earlier.[110] Yet by the eighteenth centuries, these complaints acquired a retrospective quality: Indies drugs had triumphed, and the damage had already been done.[111] In Portugal, vernacular guides to tropical drugs began appearing around the end of the seventeenth century. João Vigier, for instance, presented his *Pharmacopea Ulyssiponense* [Lisbon Pharmacopea] (1712) as a practical manual undertaken "for the health of the sick, who each day are continually asking for *receitas* [medical

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[109] Robert Pitt, *The Craft and Frauds of Physick Expos'd: the very low Prices of the best Medicines Discover'd. The Costly Medicines now in greatest Esteem, such as Bezoar, Pearl, &c.… Censur'd.* (London: Tim Childe at the White-Hart in St. Paul's Church-yard, 2nd edition, 1703), 37.

[110] Pitt, *Frauds of Physick,* 35.

[111] Harold Cook, "Markets and Cultures." The globalization of non-European "specific-minded" medicines created a more flattened out, commoditizable marketplace of patients because they began to regard all bodies as basically interchangeable.

recipes]."[112] The book included an appendix titled "Treatise on the virtues and descriptions of diverse plants and animal parts from Brazil and from other parts of America or the Western Indies, along with some from the Eastern discoveries of the past century… and the most common plants which come from America, Asia and Africa."[113] Vigier referred to these new substances as "modern drugs" [*drogas modernas*].

TABLE 2. João Vigier's list of "the virtues of modern drugs," 1716.

Name:	*Origin:*	*Virtues:*
Caju [Cashew]	Brazil	Tree yields a red gum which is "drying, cooling and condensing."
Ambia [?]	Brazil	"Comforting, sweetening, resolutive;" used to treat "cold wounds."
Ananas [Pineapple]	Brazil	"So corrosive that it will eat away the iron in a knife left in it overnight."
Anda [?]	Brazil	"Purgative, somewhat emetic… the bark of the fruit in powder is good against curses, and kills fish, as does the *coca* to the west [of Brazil]."[114]
Andira [Brazil wood]	Brazil	"A tree of great strength." Its fruits are used to treat worms.
Andiraguacu [Vampire Bat]	Brazil	"The tongue and the heart are poisons."
Anhima [Horned Screamer]	Brazil	Aquatic bird whose "horn" is a "highly esteemed antivenom" [*cotraveneno*].
Anil [Indigo]	America	A dye, but it also treats wounds and headaches "when applied in powder."
Anime or Minaea [?]	America	"White resin" which "resolves cold humors" and "comforts the brain."
Anisum Chinae [Star anise]	China	Carminative; "comforts the stomach;" of good taste. The Dutch use it in tea.
Armadilho [Armadillo]	America	The tailbone, powdered and placed in the ears, "defends against deafness."
Balsam Judaicum [Balm of Gilead]	Arabia	"Comforts the vital parts and excites semen," however "the Grand Turk… has taken all of these plants… they are guarded carefully by his Janisarries."
Balsam Copahu [Copaiba]	Brazil	Good for the stomach and kidneys, "cures the stone and nephritic colics."
Balsam de São Thomé	S. Thomé	"It has the same virtues as Copaiba, but more efficacious for wounds."
Balsam de Tolu	Cartagena	Similar to the two above, but especially good for asthma.
Balsamum Peruvianum	Peru	"Comforts the heart, the stomach and the nerves." Also comes from Brazil.
Bangué [Cannabis]	India	"Indians eat the seeds and leaves for appetite, to sleep well, and to free them from disgust and pains. If they wish to have sweet dreams, they mix it with camphor, nutmeg and mace."
Bezoar	E. Indies	"Comforts the heart, cures the plague and most epidemic diseases."
Bezoar Occidental	Peru	"Has the same virtue as Oriental Bezoar, with less efficacy."
Pedro do Porco Espinho	Malaca	"A great preservative against poisons… effective against smallpox."
Bezoar Simiae	Macassar	"More sudorifick… than most other types."
Bezoar serpentinus	Mombasa	"Ground into powder, it is a sovereign remedy for melancholy."
Pedras de cobra	E. Indies	Cures bites from cobras "and other venomous animals and insects."
Pedra quadrada	Tartaria	"Aleviates melancholy, purges the humors, releases wind."

[112] Jean (João) Vigier, *Pharmacopea Ulyssiponense* (Lisbon, 1716,)"Prologo," n.p. "…para a saude dos enfermos esta quotidianamente pedindo por repetidas receitas."

[113] João Vigier, "Tratado das virtudes e descrições de diversas plantas e partes de animais do Brasil e das mais partes da América ou Índia Ocidental, de algumas do Oriente descobertas no último século, tiradas de Guilherme Piso, Monardes, Clusio, Acosta e de outros e ainda a História das plantas da Europa e das mais usadas que vêm da Ásia, da África e da América," in *Pharmacopea*, pp. 391-402.

[114] Note this rare early reference to the coca plant, source of modern cocaine. See Guttenburg, *Andean Cocaine*, ch. 1, on the early history of coca.

Patrick Wallis's research into English rate books suggest that drugs were "among the earliest group of exotic imports to boom" and that "the turning point in English consumption came in the early decades of the seventeenth century, and the period of greatest growth had ended by 1700."[115] Remarkably, his findings suggest a roughly fifteen-fold increase in English consumption of "exotic" or Indies drugs between 1600 and 1700.[116] Daniela Bleichmar is surely correct, then, in pointing out that "the great majority of Europeans came in contact with the New World in Europe: colonial science was often enacted at home, not abroad."[117] One could add that these domestic European contacts with New World nature took place substantially—perhaps even primarily—via the global drug trade. Drugs from the non-European world, by the early seventeenth century, had become the preeminent exotic commodity in Europe and beyond. They signaled engagement with global trade, stimulated the senses, and above all, held out the hope of new cures for the pandemics that were ravaging both the Old and New Worlds.

Yet how did these Indies drugs overcome the concerted attacks against them? Why did they become so prized as both consumer goods and objects of scientific inquiry? Apothecaries of the seventeenth century stocked an incredibly diverse range of goods from a variety of far-flung locales. Indeed, this proved to be one of the key points made against them in the conflicts between the apothecaries and the College of Physicians

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[115] Wallis, "Exotic Drugs," 18.

[116] Wallis, "Exotic Drugs," 10.

[117] Daniela Bleichmar, "Books, Bodies, and Fields: Sixteenth-Century Transatlantic Encounters with New World Materia Medica," in Londa Schiebinger and Claudia Swan, eds. *Colonial Botany: Science, Commerce, and Politics in the Early Modern World* (Philadelphia: University of Pennsylvania Press, 2007), 83.

studied by Harold Cook, as it was supposed that this left their trade open to counterfeiting and price markups. As Alix Cooper has noted in *Inventing the Indigenous*, this was bolstered by an emerging sense of pride in "home-grown" local remedies.[118] Yet in the context of the second half of the seventeenth century and the decades following, it was precisely the exotic nature of these medicines – or, more accurately, the ecological and geographical diversity of the plant, animal and mineral products that furnished the raw materials for early modern drugs – that led to their increased value in the marketplace and their sparked the fascination of scientists.

An idea of just how diverse these formulas could be is conveyed by the following (highly incomplete) list of the pharmaceuticals that Francisco Hernandez encountered in the *boticas* of Mexico City, the most populous city in the Americas in this period:

> Tusk of the narwhal… cochineals, crawfish, tumblebugs, toads, and frogs… Crawfish, vipers, serpents, deer antlers, human cranium, hoof of the tapir and blood of a she-mule… Powdered crawfish eyes alleviated problems with kidney stones, bladder contusions, hemorrhoids, and side aches. Dried frog intestines were said to dissolve kidney stones. Dried wolf's liver and also its intestines were good for windy colic. Pulverized swallow wings with blood on them combined with salt and certain powders helped with bladder infections. [119]

Other drugs included "dried fox lungs… tapir hooves [and] urine and excrement of animals including the goose, ass, peccary, ox, cow, goat, stork, serpent, horse, chicken,

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[118] Alix Cooper, *Inventing the Indigenous*, ch. 1.

[119] John Jay Tepaske, "Regulation of Medical Practitioners in the Age of Francisco Hernández," in Simon Varey, Rafael Chabrán, Dora B. Weiner, eds. *Searching for the Secrets of Nature: The Life and Works of Dr. Francisco Hernández* (Stanford: Stanford University Press, 2000), 60.

human being, sheep, sparrow, turkey, dog, buzzard, squab pigeon, and fox.[120]" In Lisbon, João Curvo Semedo stocked a similar set of medicaments—one that included, as well, "oil of elephant," rattlesnake rattles, Angolan wildebeest hooves, powdered pearls, and artificial, occidental and oriental varieties of bezoar stone (a calcic concretion found in quadruped stomachs, reputed a powerful antidote to poison).[121]

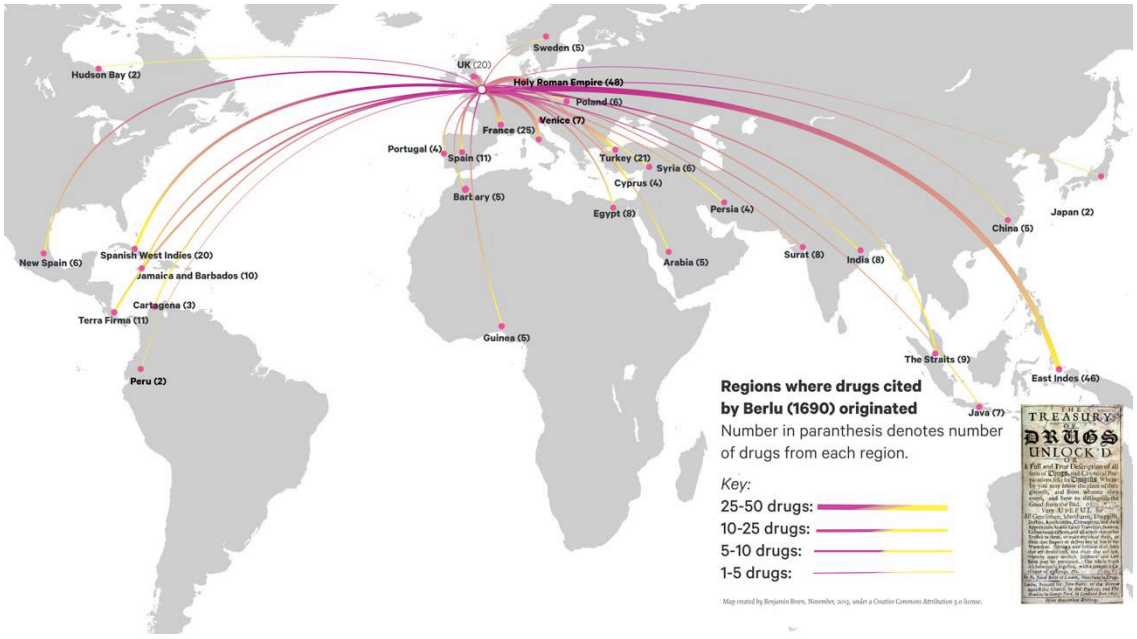

FIGURE 1.6 A rough visualization of the points of origin and number of drugs listed by the London wholesale drug merchant John Jacob Berlu in *Treasury of Drugs Unlock'd*.
Map by the author.

Pharmaceutical jars preserved in the Museum of the History of Science, Oxford attest to the widespread use of powdered fox lungs, bezoar, and cranium humanum, for instance, in much the same fashion as the apothecaries of New Spain and Brazil. Likewise, the French Huguenot turned Anglican convert and London drug merchant John Jacob

[120] Tepaske, "Regulation," 61, citing remedies in Félix Palacios, *Palestra Farmaceéutica, chimica-galénica* (Madrid 1706, 1723, 1730, etc.)

[121] João Curvo Semedo, *Memorial de Varios Simplices* (Lisbon, 1707?). For the complete list see Appendix A.

Berlu's *Treasury of Drugs Unlock'd* offered capsule descriptions hundreds of exotic drugs available for sale in London ranging from Hudson's Bay, Mexico City and Peru to West Africa, Java, and Japan.[122]

At the core of this newly globalized pharmacy was the belief that it was to the advantage of apothecaries—and their disease-ridden customers—to have access to a hugely diverse array of drugs from each region of the earth. New works on the theory of syphilis, most notably the Portuguese physician Duarte Madeira Arrais's unusual 1686 treatise *Method to Know and Cure the French Disease* [*Methodo de conhecer e curar o morbo gallico*] argued that the advent of global travel and population movements had given rise to new diseases and, with them, the necessity of having access to a wide range of cures unknown to ancient authors. The geographic and ecological extension of European imperial power thus directly correlated to the increasing diversity of the apothecary's medicine chests, and to popular demand for exotic medicines. But gaining access to unusual tropical drugs was a difficult business that depended upon a long chain of indigenous, mestizo and creole informants in tropical lands as well as on couriers, merchants, sailors, port surveyors and druggists. All of these figures played a critical role in shaping the cultural and medical practices surrounding these drugs *before* they could reach natural philosophers and become memorialized in printed texts.

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[122] John Jacob Berlu's *Treasury of Drugs Unlock'd* appeared in 1690 (London: John Harris and Thomas Hawkins), in a second edition in 1724 and a third in 1733 (both printed for Samuel Clarke), and a fourth in 1738 (printed for S. Ballard).

1.6 Exotic drugs, domestic dangers

By the end of the seventeenth century, then, 'Indies drugs' or *drogas modernas* had emerged as relatively common commodities purchased by a broad range of early modern consumers. The apothecaries who profited from this newly successful class of goods were a singularly diverse group of tradespeople. Female apothecaries proliferated yet attracted substantial distrust, and in the Iberian world many apothecaries came under the scrutiny of the Inquisition. As Timothy Walker has documented, licensed physicians turned to the Inquisition as an institutional bulwark against the destabilization of medical profession in the seventeenth century.[123] By the early decades of the eighteenth century physicians who doubled as Inquisitorial agents were prosecuting apothecaries, female medical practitioners and African healers in substantial numbers. No such institutional apparatus for the persecution of apothecaries existed in Britain outside of the increasingly ineffectual Company of Physicians, but the English-language print culture of the decades bookending 1700 abounded with vociferous attacks on apothecaries, quacks, "empirics," African "fetisheers," and other representatives of the newly globalized medical marketplace. Apothecaries also appear to have been a strikingly mobile group, crossing emerging national and confessional boundaries and forming new, hybrid national identities, like the German-Portuguese apothecary/gardener Gabriel Grisley, the Franco-Portuguese apothecary Jean (Jõao) Vigier, and the unlettered Portuguese teenager turned

[123] Timothy Walker, *Doctors, Folk Medicine and the Inquisition*.

self-proclaimed "physician" and Brazilian slave owner João Cardoso de Miranda.[124] Apothecaries, as a professional class, were aspirational, adaptable, and even protean.

Women played a particularly complex role in the emergence of apothecaries as global actors—and as the targets of criticism—in the seventeenth century. My sample of modern European medical recipe books suggests an upward trend in the proportion of 'household medicines' (i.e. drugs purchased and dispensed primarily by female heads of household) that came from Asia, Africa and the Americas. [125] In the 1500-1650 period, these "receipt books" had typically prescribed local European herbs. Yet by the time that Mary Kittilby printed her "Collection of Receipts in Physick and Surgery" in 1714, she assumed that her readers would have access to such exotics as balsam of Peru, crab eyes, "prepared pearls," sassafras, sarsaparilla, Virginia snakeweed, ambergris, balm of Gilead, "smaragd" [Persian emeralds?], "spic'd diatragacanth," tamarinds, and sandalwood.

Accounts like these emphasize the sensory experience of drugs: not only how they affected mental and sense perception when consumed, but also how purely surface-level and phenomenal characteristics influenced the economy of drugs. Seventeenth- and eighteenth-century writers reflected a tactile engagement with drugs—no less in the notebooks of natural philosophers as in the everyday work of drug merchants at docks. Robert Boyle refers in his notebooks to the medicinal drug known to early modern

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[124] I intend to write a standalone journal article on the medical practice of Cardoso de Miranda, whose writings about scurvy in colonial Bahia contain a number of detailed case studies involving both Portuguese slave merchants and Angolan slaves.

[125] On female apothecaries in the seventeenth century see Judith S. Woolf, "Women's Business: 17th-Century Female Pharmacists," *Chemical Heritage Magazine* 27:3 (Fall, 2009). Online at: http://www.chemheritage.org/discover/media/magazine/articles/27-3-womens-business.aspx?page=1

Europeans as "crabs eyes" as "soft enough to be spread, or suspended between ones fingers," suggesting that the natural philosopher was engaging in hands-on manipulation of exotic drugs.[126] But so too was the humble drug merchant John Jacob Berlu, who writes, for instance, of Peruvian balsam as having a "very fragrant sweet Smell, a reddish black colour, sinking under Water."[127] Berlu's drug list implies an array of practical experiments designed to offer clues as to the composition of drugs, including not only predictable trials like weighing, touching, smelling and examing the substance, but also more 'natural philosophical' exercises like observing the smoke produced by burning drugs, or studying whether their weight changed after submersion in water.[128]

Some tests of drug purity, however, depended not on material or sensory characteristics but on matters of the soul. The Catholic, Iberian and indigenous origins of tropical drugs and the hybrid medical knowledge associated with often repelled medical consumers in Protestant Europe. And in the cosmopolitan port cities of the Iberian empires, like Lisbon, African healers emerged as powerful but hugely stigmatized drug-vending competitors to traditional licensed physicians and apothecaries alike. In 1731, a slave named José Francisco Pereira, originally from the Mina Coast of Africa but at that time a resident in Lisbon, was brought before the Inquisition on charges of being a *feiticeiro* (one who crafts magical objects, a sorcerer or healer).[129] Pereira's crime was to

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[126] Archives of the Royal Society (London, UK) MS 189, Boyle's notes on hydrostatic medicine book, f. 116.

[127] Berlu, *Treasury of Drugs Unlock'd*, 16.

[128] This last technique was evidently very common in the assessment of bezoar stones, and is frequently mentioned in contemporary accounts.

[129] Arquivo Nacional da Torre do Tombo (Lisbon, Portugal), Inquisição de Lisboa, Processos, No. 11767, José Francisco Pereira (1731). Pereira's Inquisition file notes that he had previously spent time in Brazil, and

have crafted magical pouches known as *bolsas de mandinga* that were thought to confer special powers on the wearer, such as protection from disease or from knife wounds. Pereira had been successful enough to hire an assistant, one José Francisco Pedroso, and before being arrested he had conducted a lively trade in protective bolsas containing *pedras de corisco* ("lightning stones," usually meteorites but sometimes also Neolithic flint tools akin to the "thunderstones" of early modern Northern European magical lore), as well as sulfur, bones, and herbs.[130]

Africans were not the only group of drug-sellers that Christian European observers distrusted. Over the course of the seventeenth century, two groups that traditional licensed physicians strongly opposed—women and Jews/New Christians—developed strong ties to the emerging global trade in Indies drugs. The Countess of Arundell, Lady Anne Howard (1557-1630) stood out as an early and particularly notable case of an elite woman who not only performed chemical experiments and collected apothecary wares, but appears to have been regarded as a full-fledged medical practitioner. Her biographer described her as a public alternative to licensed physicians, providing "remedies to all kind of people who either wanting will, or means to go to Doctors and Chirurgeons, came to

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it's likely that the hybrid form of Luso-African healing he practiced was developed there, perhaps in Bahia. James Sweet has written extensively on the role of African healers and *mandingueros* in colonial Brazilian society, particularly in James H. Sweet, *Domingos Álvares, African Healing, and the Intellectual History of the Atlantic World* (Chapel Hill: University of North Carolina Press, 2011).

[130] Pereira's case is among the most well-studied instances of early modern African medicinal practice in a non-African context. It is summarized in Rachel E. Harding, *A Refuge in Thunder: Candomblé and Alternative Spaces of Blackness* (Bloomington: Indiana University Press, 2003), 25-26, and studied at greater length in James Sweet, "Slaves, Convicts, and Exiles: African Travellers in the Portuguese Atlantic World, 1720-1750," in Caroline A. Williams, *Bridging the Early Modern Atlantic World: People, Products and Practices on the Move* (London: Ashgate Publishing, 2009), 193-203, and Dider Lahon, "Inquisição, pacto com o demônio e 'magia' africana em Lisboa no século XVIII," *Topoi*, 5/8 (January, 2004), 9-70.

her."[131] Yet although the Countess undoubtedly performed some experiments, her noble status meant that she functioned as an overseer (rather than a participant) in the quotidian, laborious effort involved in preparing medicines:

> She order'd divers kinds of drugs to be bought every year to make her salves, and medicines, and her self in person would ever be present at the making of them to see and be more sure they should be well done and good.[132]

Arundell created and evidently distributed novel medical recipes, such as "A drink for the Plague or Pestilent Feaver proved by the Countess of Arundel in the year 1603," and "The Countess of Arundels drink for the Scurvy." These recipes were reproduced in a 1662 compendium of recipes and domestic instructions called *The Queen's Closet Opened*, which, as the flyleaf inscriptions on one copy imply, numbered among a growing genre of medical texts aimed at female heads of household (Figure 1.7).[133]

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[131] Henry Granville Fitzalan-Howard, *The Lives of Philip Howard, Earl of Arundel, and of Anne Dacres, His Wife* (London, 1857), 212

[132] Fitzalan-Howard, *Lives*, 213

[133] W.M., *The Queens Closet Opened* (London: printed by J.W. for Nath. Brooke, 1668), 25, 149-50. This book was typical of its era in terms of its inclusion of both medical and culinary recipes or "receipts." These were divided into three headings: "The Pearl of Practise" described medical remedies, "A Queen's Delight" was devoted to candies, and "The Compleat Cook" was general cookery recipes. Similar manuals circulated in manuscript, such as Penn Van Pelt, MS Codex 388, "Account book and recipe book," 1699-1703 and MS Codex 626, "Hopestill Brett, Her Booke," 1678. It would appear that although most *published* receipt books of the seventeenth century were attributed to men (or to cryptic initials like W.M.), manuscript receipt books were predominately authored by elite women.

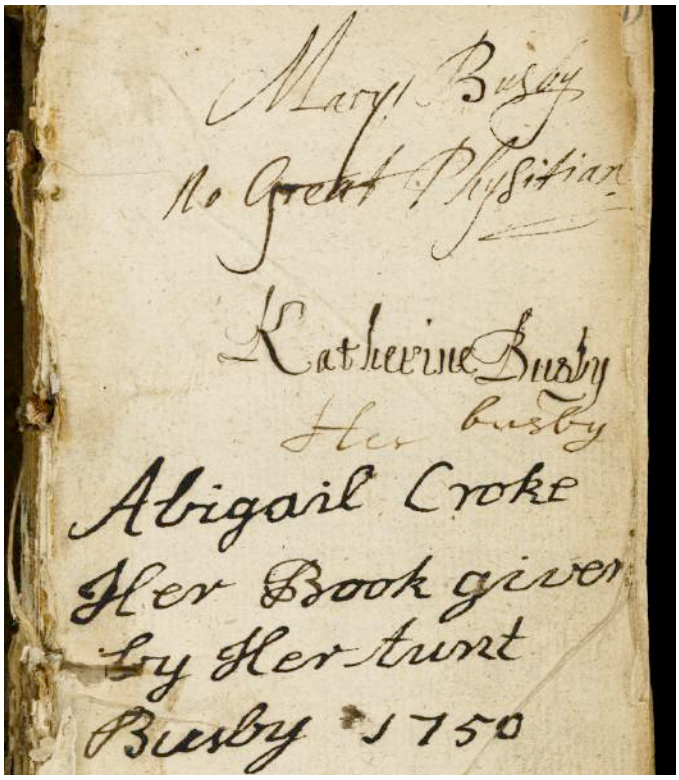

FIGURE 1.7 "No great physitian": inscriptions by three different female members of the Busby household on the flyleaf of a copy of *The Queen's Closet Opened* (1662) owned by the Wellcome Library. Courtesy of Wellcome Images.

The wording of books like this one points to an important shift in the demographics of women involved in drug and medicine preparation. In the sixteenth century, women involved in iatrochemical experiments and drug preparation were frequently married to noblemen or courtiers (like Arundel or John Dee's wife Jane, who Deborah Harkness has argued was instrumental in maintaining their "experimental household").[134] Yet the guidebooks of the mid- to late-seventeenth century began to target women of what Lawrence Stone called "the middling sorts." The shift can, I believe, be perceived at the level of such book titles that promised the revelations of "Queen's closets" or "Rich

[134] Deborah E. Harkness, "Managing an Experimental Household: The Dees of Mortlake and the Practice of Natural Philosophy," *Isis* , 88: 2 (Jun., 1997), 247-262.

Closet[s] of Rarities" to the public view.[135] Visitors to a seventeenth-century apothecary shop would have seen women at work, both at the counter and in the workshop, distilling, grinding, pounding and decocting medicines. Wolfgang Helmhard Hohberg's *Georgica Curiosa Aucta*, a popular proto-encyclopedia that was reprinted throughout the 1680s and '90s, offered up no less than three distinct images of female apothecaries or apothecary assistants physically preparing drugs. In one, two women attend to a complex distillation apparatus, while in another, a woman decocts a recently-prepared medicine beside a table covered with chopped roots, a drug vessel and a mortar and pestle.

FIGURE 1.8 Wolfgang Helmhard Hohberg, *Georgica curiosa aucta; Das ist: Umständlicher Bericht und klarer Unterricht Von dem Adelichen Land- und Feld-Leben, Auf alle in Teutschland übliche Land- und Haus-Wirthschafften gerichtet* (Martin Endters, Nuremberg: 1697).

[135] John Shirley, *The Accomplished Ladies Rich Closet of Rarities, or, The Ingenious Gentlewoman and Servant Maids Delightfull Companion* (London, 2nd ed, 1687). On "the closet" as a private and female space, see Alan Stewart, "The Early Modern Closet Discovered," *Representations*, 50 (Spring, 1995), 76-100.

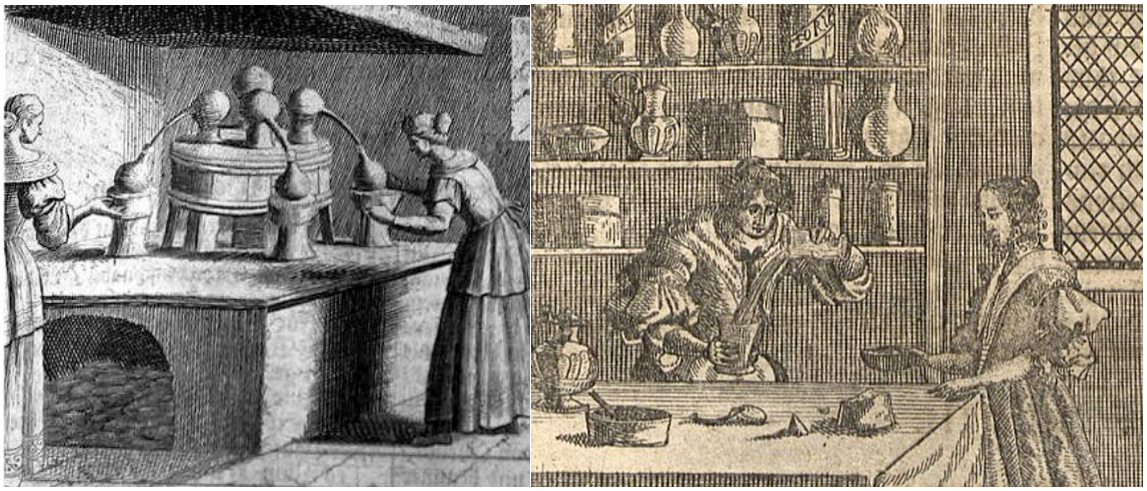

FIGURE 1.9 Women performing distillations using alchemical retorts and making a medicinal beverage, also from Hohberg's *Georgica curiosa aucta*. Wikimedia Commons and Deutsche Fotothek.

FIGURE 1.10 Anonymous (French school), Drug Warehouse, c. 1740. University R. Descartes in the Faculty of Pharmaceutical and Biological Sciences in Paris, France.

These images highlight the physical labor of preparing drugs—a labor that was frequently passed on to female assistants—as well as offering rare glimpses into the material circumstances of the workplaces of apothecaries, the back sections of shops that were closed to public view. But perhaps most interesting is the print (Figure 1.8) which depicts a male and female apothecary working alongside an apprentice boy (possibly their own child). The male apothecary stands at a work table and appears to be in the final stages of making a drug saleable: the mixing vessels and mortar and pestle beside him have already been used, and now paper, scissors and twine are being used to wrap the resulting medicine and deliver it to the customer. A boy is doing the actual physical labor of drug preparation and blending, while a man oversees the planning and packaging and a woman serves the final product.

As contemporaneous visual evidence shows (like Figure 1.10, a French painting of a grand apothecary warehouse in Paris, or the two prints of female medicine-makers in *Georgica,* Fig. 1.9) this arrangement was not necessarily typical. In the Paris painting, two women, one with a pipe clenched jauntily between her teeth, are doing the actual drug preparation while an African boy waits on a male apothecary. Yet in most surviving images, a clear division of gender roles between men (managing, overseeing, packaging) and women, boys, and slaves (physical labor) is evident. Visiting shops like the one depicted in Hohberg's book allowed shopping for drugs and other exotic items to "be appropriated into a socially and sexually exclusive pattern of leisure activity, a more refined form of entertainment, distinct from searching markets for necessities or the

disordered, inclusive, and sometimes grotesque pleasures of the fair."[136] In other words, the apothecary shop not only *reflected* changing gender roles—it actively helped reshape them.

Several plays of the era also shine an unexpected light on the role of women as traders and preparers of Indies drugs. The anonymously authored 1608 play *The Family of Love*, for example, features a sexual entanglement between an apothecary and his wife (Master and Mistress Purge) and Glister the physician. Characters describe the apothecary's wife, Mistress Purge, as "ominous" because the drug she prepares "makes civil wars and insurrections in the state of my stomach." Another character complains that she smells like an apothecary shop and "she takes too much of that [e]lectuary to stoop to love." Yet in truth, the physician Glister and the Mistress Purge are engaged in an affair—one that the apothecary condones, because Glister's prescriptions drive up business ("drugs would be dog-cheap, but for my private well-practised doctor").[137] And to complicate matters further, the apothecary, his wife, and the physician are all members of the notorious religious sect that lends *The Family of Love* its name. Here, the various anxieties surrounding exotic drugs—their links to unorthodox religious practices, the role of women in preparing them, their unusual sensory characteristics, their positive or negative sexual effects, their price—congeal into a popular entertainment with a distinctly anti-apothecary message.

Portuguese print culture was substantially more restricted than that of England,

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[136] Patrick Wallis, 'Consumption, retailing and medicine," 28.

[137] Anonymous [Thomas Middleton?] "The Family of Love," in *The Works of Thomas Middleton*, 128 and 131.

and no medical texts written by or for women appear to have been published in Portuguese prior to the nineteenth century. However, a remarkable find in the Portuguese archives offer some hints of the role of women in the exotic drugs trade. Circa 1668, a Coimbra apothecary named José Coelho filled a notebook with extracts from Latin medical texts, inventories of his wares, and numerous drawings, including a self-portrait of Coelho and a female figure working together in their apothecary shop, the Botica da Rua Larga (Figure 1.11).[138]

FIGURE 1.11 Possible portrait of Maria Coelho, sentenced to exile in Brazil for "judaísmo." BNL Reservados codigo 2259. José [Jozeph] Coelho, *Pharmaca, de Jozeph Coelho que fes sendo boticario no anno de mil e seis sentos e sesenta outo* (Coimbra, 1668).

[138] BNP, Cod. 2259. José [Jozeph] Coelho, *Pharmaca, de Jozeph Coelho que fes sendo boticario no anno de mil e seis sentos e sesenta outo na botica da rua larga* (Coimbra, [1668]), fol. 76r; Benjamin Breen, "The Pharmaca of Jozeph Coelho: A Family of Converso Apothecaries in Seventeenth-Century Coimbra," *The Recipes Project* [recipes.hypotheses.org], November 20, 2014.

Cross-referencing Coelho's "Pharmaca" with the records of the Coimbra Inquisition reveals the skeletal contours of a family tragedy. In 1666, a female apothecary (*boticaria*) named Maria Coelho was arrested in Coimbra on suspicions of 'Judaizing.' After three years of captivity and questioning, she was sentenced to an *auto-de-fé* involving public humiliation and confiscation of her possessions, including her medicinal drugs.[139] Maria's father, Filipe Coelho, was also an apothecary based in Coimbra. Given Coimbra's small population, it seems highly likely that these three Coelhos (José, Maria, and Filipe) were involved in a family business of importing and selling medicinal drugs—nearly half which, according to a list recorded in José Coelho's notebook, originated in the East Indies or the Americas.[140] When we consider that Coimbra was a provincial town occupying the interior of Portugal, so high a proportion suggests a widespread diffusion of Indies drugs throughout the kingdom.[141]

Maria herself ultimately became a traveler to the Indies: after her *auto-de-fé* she was banished to Brazil as a *degredado* (transported criminal), where her ultimate fate is unknown. Although the Coelho "Pharmaca" largely consists of extracts from Greco-Roman authorities like Dioscorides or medieval Islamic and Byzantine physicians like Mesue (Yuhanna ibn Masawaih) and Nicolaus Myrepsus, the presence of Indies drugs in the Coelho's inventories and Maria Coelho's role as a *degredado* to Brazil reveals the

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[139] Arquivo Nacional de Torre do Tombo (AN/TT), Inquisição de Coimbra, Processo 352, "Processo de Maria Coelho."

[140] BNP, Cod. 2259. José [Jozeph] Coelho, *Pharmaca,* "de Simplisibus," fol. 13r-22v.

[141] See table 3, origin of drugs listed by José Coelho, in appendix B. Granted, Coimbra was a university city, and therefore would have likely had more privileged access to exotic drug merchants than other provincial towns.

interpenetration of materials from Portugal's tropical colonies even in a provincial shop. This archival fragment also points to the large number of individuals involved in the global drug trade who had Jewish or 'New Christian' (*converso*) backgrounds – something which made drug merchants, apothecaries and physicians frequent targets of the Inquisition.[142] As we have already seen, the sixteenth century's leading authority on East Indian drugs, Garcia da Orta, was exhumed by Portuguese Inquisitors who mutilated his body because it was posthumously discovered that he had been a crypto-Jew. In response, many *conversos* closely associated with Indies drugs (like Doctor Fernão Mendes, a Sephardic-Portuguese physician credited with inventing the cinchona-based 'Agua da Inglaterra') fled to London or Amsterdam to escape persecution. [143] Among the Sepahardim who fled prosecution in Portugal to set up mercantile communities in Amsterdam, Livorno and London, trading in exotic consumer goods from the West and East Indies often became a tightly knit family business. This made them natural go-betweens in the medicinal drug trade, and the mingling of medical professions with long-distance commerce is evident in Portuguese Sephardic family histories. For instance,

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[142] Walker, *Doctors, Folk Medicine And The Inquisition,* ch. 5.

[143] Trading in exotic consumer goods from the West and East Indies was a core niche business of the Sepahardim who fled prosecution in Portugal to set up mercantile communities in Amsterdam, Livorno and London. This made them natural go-betweens in the medicinal drug trade, and the mingling of medical professions with long-distance commerce is evident in Portuguese Sephardic family histories. For instance, the little-known physician Fernão Mendes (who is studied in more detail in chapter 5 of this dissertation) had two sons who became important London-based importers of corals, gems and other exotica from the Indian Ocean region. On the role of Sephardim in the Indies trade see, Francesca Trivellato, *The Familiarity of Strangers: The Sephardic Diaspora, Livorno, and Cross-Cultural Trade in the Early Modern Period* (New Haven: Yale University Press, 2009).

Doctor Fernão Mendes da Costa had two sons who became important London-based importers of corals, gems and other exotica from the Indian Ocean.

Despite the drug trade's associations with women, foreigners and crypto-Jews, however, some important figures in the Lusophone medical establishment freely adopted *drogas modernas*. The court physician and proprietary drug seller João Curvo Semedo was especially amenable to therapeutics from overseas. In the introduction to his *Memorias* regarding Indies drugs, Semedo cited the practices of "Gentile" [i.e. Hindu] physicians, and defended a wide range of Indies drugs, including bezoar.[144] Figures like Semedo and João Vigier straddled the boundary between metropolitan European medical practice and the more cosmopolitan world of Jewish, female and non-European actors who sustained the global drug trade. Indeed, Semedo almost half of a pamphlet advertising the exotic drugs he sold to African animal and root medicines, describing the medicinal virtues of the bones of various Angolan creatures and implicitly demonstrating his reliance upon indigenous knowledge by citing (in at least two cases) the Bantu names for the *materia medica* he was describing. Semedo boasted that he had gathered this knowledge from "certain persons who have travelled in the Indies and other regions of the earth," and had also himself "discovered various manuscripts which have informed me of the virtues of the aforesaid stones, powders, roots and fruits [from the Indies]."[145]

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[144] Semedo, *De Varios Simplices,* 1.

[145] Semedo, *De Varios Simplices*, 11.

1.7 Conclusion: hybrid pharmacy and drug diasporas

The late seventeenth-century mélange of Indies drugs, iatrochemistry, traditional Greco-Roman medical lore and non-European healing methods surveyed in this chapter commingled, by the 1670-1730 period, to create what I call a "hybrid pharmacy." Although widely variable, this style of pharmacy utilized a globally-sourced array of medicaments. It freely combined Galenic/Aristotelian theories of climate and the body with more recent developments in 'chymistry' and a materialist natural philosophy that regarded diseases as global entities and human bodies as functionally interchangeable.[146] It was trans-imperial, combining knowledge gleaned from da Orta and other Iberian authorities on Indies drugs with iatrochemical expertise from the Low Countries, Germany, France and England. It drew upon a global network of informants ranging from medical elites to European cunning women, urban apothecaries, Pitt's "trading Physicians," travelers, and enslaved and indigenous healers.

The expansion and growing variety of the drug trade was closely linked to the European "discovery" of the tropics. Of particular importance was the linking of what ecologists call the "Paleo-" and "Neotropics." Sustained trade links between the most biodiverse regions of the globe—Amazonia, the East Indies and equatorial Africa—created a host of new invasive species and encounters between "traditional" natural knowledge and novel botanicals and animal products. As explored in more detail in chapters two and four, the biodistribution of many tropical plant families across the

[146] Harold Cook, "Specifics."

equatorial belt meant that even if particular botanicals or animal products were not precisely the same as "traditional" ones, they were similar enough to be usable. For example, apothecaries identified both occidental bezoars (found in Persian goats) and oriental (found in Peruvian llamas).[147] A French Jesuit, perusing a report about a Chinese medicine called ginseng, was surprised to discover the same plant growing in the Canadian wilds in 1715.[148] African slaves found that cures for snakebite utilized American plants that belonged to the same genus as traditional remedies in Africa. So-called "Pepper" (*pipra*) was found to grow in Africa and Brazil as well as the East Indies, as was "wild cinnamon" and "wild cloves."[149]

This globally-distributed *materia medica* caused anxiety among traditional medical practitioners even as it became increasingly amenable to everyday consumers. Apothecaries emerged as global actors in the seventeenth century in response to this expanding gap between what consumers wanted—exotic, non-traditional, sensually rich, and globally-sourced drugs—and what traditional licensed physicians believed was efficacious. This shift isn't necessarily attributable to the superior effects of new remedies like cinchona and guaiacum. Rather, Indies drugs became global commodities in the seventeenth-century because they imparted novel sensory and neurochemical experiences,

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[147] Marcia Stephenson, "From Marvelous Antitode to the Poison of Idolatry: The Transatlantic Role of Andean Bezoar Stones during the Late Sixteenth and Early Seventeenth Centuries," *Hispanic American Historical Review* 90: 1 (2010).

[148] Joseph-François Lafitau, *Mémoire ... concernant la précieuse plante du ginseng de Tartarie, découverte en Canada* (Paris, 1718); Steven J. Harris, "Jesuit Scientific Activity in the Overseas Missions, 1540–1773," *Isis*, 96: 1 (March 2005), 71-79; Christopher Parsons, "Ginseng in Canada?" *I Found It at the JCB,* July, 2008.

[149] Duarte Ribeiro de Macedo, "Discurso sobre a Transplantação das Plantas de Especiarias da Asia para a América," AN/TT, T/TT/MSBR/39, discussed in more detail in Chapter Four of this dissertation.

because they possessed associations with an exotic non-European world, and because the pandemics of the seventeenth century (which were, themselves, another manifestation of globalization) opened the door for arguments about novel drugs being the most fit to treat novel illnesses, like syphilis.

By the late seventeenth century, the boundaries of the medical professions in both Europe and the Atlantic world were growing increasingly porous. Licensed physicians were no longer able to police medical practice according to guild norms or to enforce non-licensed practitioners, particularly in colonial cities. In Bahia, for instance, figures like Doctor João Cardoso de Miranda emerged as prominent local physicians despite the fact that they lacked formal medical training and licenses to practice. As explored in more detail in Ch. 5, the print and manuscript culture of the period allowed for the notion of drugs and drug consumption to become increasingly untethered from the confines of the physician's office or the apothecary's shop. Physician-author-apothecaries like João Curvo Semedo and William Salmon openly sold drugs out of their own homes and wrote popular tomes that professed to make the secrets of the apothecaries publicly available for the price of an octavo volume, reflecting a blurring of boundaries that would come to define the global drug trade in the centuries to come.

Archival sources for the Portuguese empire, such as the Conselho Ultramarino's "Angola" series at the Archivo Histórico Ultramarino (studied in more detail in Ch. 3), suggests that a similar process of upheaval in professional boundaries was happening in the colonies. For instance, in the case of seventeenth century Angola at least two letters

survive from *barbeiros* or *cirurgioes* without formal educational qualifications who nevertheless successfully obtain posts as "Chief Physician" (*fisico-mor*) owing to an absence of trained doctors in the colonies.[150] Like William Salmon in London, who was rumored to have begun his career as a mountebank's assistant and who references his travels in "the New World" at several points in his books, these figures came from non-elite and non-educated backgrounds yet successfully obtained high status as medical practitioners owing to their embededness in the colonial system.[151] Yet it was their success in the realm of print culture, as authors imparting knowledge of guild secrets to a mass audience, that would have the most far-reaching impact.

If the seventeenth century had been the era when licensed physicians were dethroned by a diverse and globally-distributed network of drug merchants and apothecaries, then the eighteenth century was the age of hybrid pharmacy. No longer were apothecaries or physicians inviolable guilds that guarded secret knowledge: the institutional destabilizations mapped by Cook and Walker in regards to licensed medical practitioners, the loose enforcement of laws relating to medical practice in the colonies, and the proliferation of cheap printed works containing complex medical recipes all combined to make drugs and knowledge about them available to a far wider range of practitioners than ever before. The practice of trading, preparing and consuming drugs had, by the early decades of the eighteenth century, emerged as a constellation of activities

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[150] AHU, Cx. 11, doc. 34, Nov. 22, 1674, Francisco Tavares de Athayde to the Conselho; Cx. 9, doc. 151, April 4, 1669 Provedor da Fazenda Lourenço de Andrade de Colaço to the Conselho.

[151] Louise Hill Curth, "Medical Advertising in the Popular Press: Almanacs and the Growth of Proprietary Medicines," *Pharmacy in History*, 50: 1 (2008), 3-16.

that was open to slaves, tradesmen, laborers, women and other non-elite figures. The apothecaries, rising from humble origins to become the *noveau riche* of the seventeenth century, were laid low by the fruits of their own success.

Abena Dove Osseo-Asare, in her recent book *Bitter Roots*, coins the phrase "healing plant diasporas" for the dissemination of African pharmaceutical knowledge and materials in the early modern era.[152] It's a useful reminder that the human movements of the Columbian Exchange and the Atlantic slave trade also produced environmental and pharmaceutical diasporas.[153] The process of European empires co-opting and adapting tropical healing plants that Osseo-Asare documents in the nineteenth century began in the decades examined here. Without American and African pharmaceutical and ecological expertise, the extractive economies of the early modern empires would have been impossible. Yet, given the presence of animal and mineral products in the early modern "Indies drugs" trade, I would propose an amended variant of Osseo-Asare's term: from "healing plant diasporas" to "drug diasporas." For the same process that globalized the remedies of the tropical world also served to categorize them. The various healing products of diverse medical traditions, from minerals to oils and unguents, from mithridate to mercury, and from chamomile to opium, coalesced in the seventeeth century to become a readily classifiable category of goods: *drogas de botica,* drugs sold by apothecaries. Even as the profession of the apothecary was undergoing tremendous flux,

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[152] Abena Dove Osseo-Asare, *Bitter Roots: The Search for Healing Plants in Africa* (Chicago: University of Chicago Press, 2014), 3.

[153] Robert A. Voeks, "Disturbance Pharmacopeias," *Annals of the Association of America Geographers* (2004), 870-1.

controversy and change, the labors of the drug cultivators in the colonies and of the apothecaries in the metropole served to fix this emerging category. Yet what happens when we try to trace the pathways from consumption to production? Where precisely did this new breed of exotic drugs come from? Who found them, how, and with what motives? The answer takes us from Europe to the Amazon.

CHAPTER 2

'To Make Discoveries of Drugs': Bioprospecting in Seventeenth-Century Amazonia

> As for the *china china*, what will be necessary to know it, is for the people to see a painting with the colors of the trunk, branches, leaves and fruits, because with samples of the bark alone it will be very difficult to be certain of the tree, not knowing what name the Tapuyas have given it.
>
> —FRANCISCO DE SÁ DE MENESES, 1683[2]

1.1 Introduction: *descobrimentos* and *drogas*

In 1683, a Portuguese infantry captain named Andre Pinheiro de Lacerda ventured into southern Amazonia in search of a medicinal tree bark that he called quina.[154] Also known as cinchona, china china, or Peruvian bark, the medicine rose to fame in the middle decades of the seventeenth century as a miraculously effective treatment for fevers. By the early nineteenth century, quina had become one of the planet's most valuable crops—and a key tool of European imperialism—thanks to the discovery that a powerful antimalarial alkaloid called quinine could be extracted from its bark.[155] Yet in 1683, quina was still a mysterious and costly rarity that most experts believed grew exclusively in

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[154] Arquivo Historico Ultramarino, Lisbon [hereafter AHU], Pará, caixa 3, doc. 219. Francisco de Sá e Meneses to Dom Pedro II, Belem do Pará, 30 December 1683 ["Carta do governador… sobre o descobrimento que mandou fazer de drogas no sertão."] See also Biblioteca da Ajuda, Códice 51-V-43, "Ordem p.a por cap.m Andre Pinhr.o tirar alguns cavaleirotes das aldeas," Belém, November 15, 1682, ff. 24-24v, and Rafael Chambouleyron, "A Prática dos Sertões na Amazônia Colonial (Século XVII)," *Outros Tempos,* 10/15 (2013).

[155] Alkaloids are a class of naturally occurring chemical compounds that are notable for their psychoactive properties in humans. Some of the most famous alkaloids include caffeine, nicotine, morphine, psilocibin, ephedrine, and quinine (any chemical name ending with -ine in pharmaceutical nomenclature is an alkaloid). The concept of alkaloids as a category of related drugs emerged in the 1820s following the isolation of quinine from cinchona bark. See Michael Wink, "A short history of alkaloids," in *Alkaloids* (1998), 11-44; William B. Cohen, "Malaria and French Imperialism," *The Journal of African History* 24: 1 (1983), 23-36; Mark Honigsbaum, *The Fever Trail: Malaria, the Mosquito and the Quest for Quinine* (New York: Macmillan, 2001); Fiammetta Rocco, *Quinine: Malaria and the Quest for a Cure That Changed the World* (New York: Harper Perennial, 2004).

Loxa, a Spanish-controlled tropical valley south of Quito.[156] Lacerda and the man who gave him orders, Governor Francisco de Sá e Menezes, hoped to prove these experts wrong by discovering valuable a new variety of quina in the *sertão* (backlands) of the Estado do Maranhão e Grão Pará, an independently-administered Portuguese colony straddling the southeastern quadrant of the Amazon basin.[157]

In a report sent to the Overseas Council in Lisbon, De Sá wrote that he had brought "two small samples" of quina bark with him to Pará, Maranhão's administrative center. De Sá exhibited these samples to "the Indian leaders there who had kin in the *sertão*" and asked them to bring him plants that looked similar. Despite receiving "a great number of medicinal barks," de Sá failed to find what he considered to be adequate match for his quina samples. Yet he remained convinced that a form of quina existed somewhere in the vast river valleys stretching to the south and west of the Portuguese coastal outposts, and he dispatched Pinheiro, "a great *sertanejo*" (backwoodsman), to "make discoveries of *drogas*… among the flora and fauna" of the interior. In a sense, the ambitions of da Sá and Pinheiro would be vindicated: a new variety of Amazonian quina—or of a plant purported to be quina—would indeed emerge as a controversial yet

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[156] The most comprehensive study of quina in the eighteenth century Atlantic World is Matthew James Crawford's "Empire's Experts: The Politics of Knowledge in Spain's Royal Monopoly of Quina (1751-1808)," (Ph.D. Dissertation, University of California, San Diego, 2009); see also Matthew James Crawford, "'A 'Reasoned Proposal' against 'Vain Science:' Creole Negotiations of an Atlantic Medicament in the Audiencia of Quito (1776-1792)." *Atlantic Studies* 7: 4 (2010): 397-419. Unfortunately, no comparable monograph on quina's role in the crucial 1600-1750 period exists.

[157] The vast Estado do Maranhão was administratively distinct from Brazil until 1750, when it was folded into the Brazilian colonial state. Long regarded as a backwater, today it remains a highly understudied segment of the Portuguese empire and the Atlantic World more generally. A recent survey of the Estado's environmental and cultural history can be found in Chambouleyron, *Povoamento, Ocupação e Agricultura.*

popular new remedy in the *boticas* of late eighteenth-century Brazil. Yet seventeenth-century bioprospectors struggled to convert theoretical suspicions into commercially exploitable intelligence. De Sá reported in 1683 that verbal descriptions, names, and even physical samples had failed to bring his imagined Amazonian variant of quina into Portuguese hands. The governor now pinned his hopes on a visual simulacrum created by artisans in Lisbon, "painted with the colors of the trunk, the branches, the leaves, and the fruit it bears," to communicate the "quina-ness" of quina with the indigenous peoples of the Maranhão interior.[158] As we shall see, de Sá's narrative was itself a kind of simulacrum, designed both to position himself—and not Pinheiro—as one who made "discoveries" (*descobrimentos*) of drogas, and to convert vague rumors of indigenous healing practices into concrete claims of efficacy that would pass muster with both natural philosophers and drug consumers in Europe.

This chapter explores the mechanics of drug discovery in seventeenth-century Amazonia. How and why did colonists look for novel drugs in tropical environments? What was involved in identifying, differentiating, naming, and describing a specific medicinal substance in a pre-Linnaean framework of natural knowledge? And how did non-European cultures, modes of environmental usage, and epistemologies shape this process?

[158] All quotes from this paragraph are from AHU, Para, cx. 3, doc. 219. See also AHU, Pará, Cx. 6, doc. 697 (Rolo 9), April 13, 1684, Lisbon. "Sobre uma carta do governador do Maranhão, Francisca de Sá, dando conta de varios descobrimentos que tem mandado fazer, na fauna e na flora, como, dentre outras, arvore china, salsa parrilha e minas."

In answering these questions, I seek not only to clarify what Portuguese colonists talked about when they talked about drogas, but also to reframe contemporary scholarly debates about bioprospecting and the origins of ethnobotany. I argue here for a revision in how we write and think about what Londa Schiebinger has called "colonial bioprospecting."[159] To be sure, de Sá's frustrated search for a source of Amazonian quina accords with Schiebinger's emphasis on the disjunctures between European, indigenous American, and African botanical knowledge. Inequalities and misunderstandings predicated on emergent conceptions of racial and cultural difference—what Alexander von Humboldt called "the deceptions which everywhere arise from the relations between persons of unequal fortune and civilization"—were, as she notes, defining features of the "biocontact zones" of early America.[160] These misunderstandings could result from intentional erasures. Schiebinger calls this agnotology, or "the cultural production of ignorance," which in the context of the colonial drug trade typically involved the expurgation of Amerindian, African and creole cultural contexts surrounding remedies by European savants who sought to reframe them as objects of natural philosophical investigation.[161] Other gaps in the transmission of knowledge had less avoidable causes.

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[159] Schiebinger, *Plants and Empire*.

[160] Alexander von Humboldt and Aimé Bonpland, *Personal Narrative of Travels* (trans. Helen Williams, 7 vols. (London, 1821), vol. 5: 132, cited in Schiebinger, *Plants and Empire*, 89. On racialized bodies as a frame for ways of knowing in the colonial Atlantic world, see Joyce Chaplin, "Natural Philosophy and an Early Racial Idiom in North America: Comparing English and Indian Bodies," *William and Mary Quarterly,* 3rd Ser., 54 (1997) and Jorge Cañizares-Esguerra "New Worlds, New Stars: Patriotic Astrology and the Invention of Indian and Creole Bodies in Colonial Spanish America 1600-1650," *American Historical Review* 104 (February 1999), 33-68.

[161] Londa Schiebinger, *Plants and Empire,* ch. 1 and Londa Schiebinger, "Agnotology and Exotic Abortifacients: The Cultural Production of Ignorance in the Eighteenth-Century Atlantic World," *Proceedings of the American Philosophical Society*, 149: 3 (Sep., 2005), 316-343.

As Neil Safier has observed, many transcontinental efforts to transport materia medica succumbed to the difficulty of moving biological samples and manuscripts across harsh environments that constantly threatened to destroy both human lives and material artifacts.[162] In such cases, knowledge could quite literally be sunk, or go up in flames.[163]

Above all, however, these knowledge gaps arose from differences in how the cultures that came into contact following the Columbian Exchange understood, manipulated, and described the natural world. The words and images that de Sá used to communicate the quina-ness of the bark he sought, for instance, may hit have their mark in a Lisbon *botica*, but failed in the context of the Amazonian interior.[164] Indeed, even the early modern Portuguese category of *droga* did not necessarily have a direct correlate in the practices of the diverse Amazonian societies that de Sá lumped together as "the Tapuya." The endemic violence embedded in these encounters—the fact that Pinheiro and de Sá's efforts hinged on the labor of African slaves, or that backlands bioprospectors often doubled as murderers, rapists, and slave traders—further contributed to these disruptions in the exchange of natural knowledge. When Europeans sought access to indigenous drugs and medicaments, they confronted—and created—cultural divides that were not easily bridged.

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[162] Neil Safier, "Fruitless Botany: Joseph de Jussieu's South American Odyssey," in *Science and Empire in the Atlantic World*, ed. James Delbourgo and Nicolas Dew (New York: Routledge, 2007). See also Breen, "No Man Is an Island," in *The Journal of Early Modern History*, 409-10.

[163] The colonial Portuguese documents housed in the Archivo Historico Ultramarino (AHU), which frequently are so water-logged and stained as to be partially unreadable, offer a mute testimony to the role of the natural environment in shaping flows of knowledge in the seventeenth and eighteenth century.

[164] Although "quinquina" appears to have been in use as a name for the *Cinchona officinalis* plant among western Andean dialects (from whence it was adopted by Jesuits in Spanish America), the Tupí and Gê language families of eastern Amazonia employed a linguistically unrelated lexicon of plant names.

On the other hand, Schiebinger's influential study is by no means the final word on the subject of colonial bioprospecting.[165] Existing scholarship's heavy emphasis on botany—particularly botany of the sort conducted by eighteenth-century British and French savants like Hans Sloane—has shined light on only one facet of drug discovery in the colonial world.[166] Plants, to be sure, were the most important raw material for pre-modern medicine, and the Amazon basin's status as the site of the some of the world's greatest floristic diversity, then and now, was central to its allure for would-be drug discoverers.[167] Yet the learned networks of trained botanists represent only one sliver of a much larger story. Likewise, a dearth of research on the environmental and ethnobotanical aspects of the Portuguese empire has obscured the role of the Portuguese tropical outposts as sites where colonists and layfolk negotiated new ideas about medicine and nature. De Sá was not a botanist or a natural philosopher—nor were the officials he wrote to, the convict-soldiers (*degredados*), creole colonists, and African slaves he commanded, or the indigenous peoples he negotiated with, cajoled, and threatened. Yet

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[165] Other notable studies of bioprospecting in the New World include Christopher Parsons, "Plants and Peoples: French and Indigenous Botanical Knowledge in colonial North America, 1600 – 1760" (PhD Dissertation, University of Toronto, 2011); Lucile H. Brockway, *Science and Colonial Expansion: The Role of the British Royal Botanical Gardens* (New Haven: Yale University Press, 2002); and Richard Drayton, *Nature's Government*.

[166] Exceptions to this emphasis on French and British botanical bioprospectors include Harold Cook, *Matters of Exchange* (previously cited), Daniela Bleichmar, "Atlantic Competitions: Botany in the Eighteenth-Century Spanish Empire," in *Science and Empire in the Atlantic World*; Rafael Chambouleyron, *Povoamento, Ocupação e Agricultura na Amazônia Colonial (1640-1706)* (Pará: Editora Açai, 2011). Chambouleyron's thorough research into the Maranhão province as a space for Portuguese imperial ambitions in this work and in his dissertation "Portuguese colonization of the Amazon region, 1640-1706" (Ph.D. dissertation, University of Cambridge, 2005) have been especially helpful resources for the research presented here.

[167] G. Kier et al, "A global assessment of endemism and species richness across island and mainland regions," *Proceedings National Academy of Science* 106 (2009): 9322.

these figures were on the frontlines of the global drug trade. Their decisions profoundly shaped this trade's emergence as a force in world commerce—and the natural sciences—in the eighteenth century.

Likewise, scholarship on colonial botany and bioprospecting has failed to fully grapple with the complexity of what categories like 'medicine' or 'plant' actually meant for early modern Europeans and indigenous peoples.[168] Seventeenth-century individuals—Europeans and indigenous Amazonians alike—conceptualized and categorized plants in a manner quite foreign to post-Enlightenment scientific thought. Some colonists and travelers theorized that minerals 'grew' underground in a vegetate manner, and believed that plants could give birth to animals; others conceptualized the search for natural knowledge as a hunt (*venatio*) steeped in Hermetic and alchemical lore.[169] Native Brazilians had very different understandings of plants, seeing them as potentially sentient natural forces that spiritual initiates could commune with or control. Yet they, too, operated within a mental universe in which formalized, Linnaean definitions of plants did not apply.[170] In addition, as we have seen in chapter one, seventeenth-century medicine

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[168] Londa Schiebinger and Claudia Swan, eds., *Colonial Botany: Science, Commerce, and Politics in the Early Modern World* (Philadelphia: University of Pennsylvania Press, 2004).

[169] Henry Lee, *The Vegetable Lamb of Tartary* (London, 1887) remains the most complete guide to early modern European beliefs about animals born from plants. On the search for early modern natural secrets as *venatio*, see William Eamon, *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture* (Princeton: Princeton University Press, 1996), ch. 8.

[170] My thinking here is informed by recent studies in the human-animal boundary, which I believe can be also be applied fruitfully to the historical relationships between humans and plants. See for instance Rane Willerslev, "Not Animal, Not *Not*-Animal: Hunting, Imitation and Empathetic Knowledge among the Siberian Yukaghirs," *Journal of the Royal Anthropological Institute*, 10 (2004), 629-652 and Roger M. Carpenter, *The Renewed, the Destroyed and the Remade: the Three Thought Worlds of the Iroquois and the Huron, 1609-1650* (Lansing: Michigan State University, 2004), 78-90. In their concern with mapping the subjective and cultural boundaries between varieties of personhoods, these studies build on philosopher Thomas

relied upon mineral and animal-based sources to a far greater degree than has previously been assumed. Bioprospecting for *drogas* in the Amazonian hinterlands could just as easily have involved hunting for healing mineral waters, bones, bezoars, pearls, muds, hoofs, claws, and gemstones as it did searching for plants.

Our understanding of early modern drug discovery is thus radically altered when we confront it from the perspective of creole colonists and indigenous peoples, rather from that of the European botanists who would, in the eighteenth and nineteenth centuries, follow them in search of valuable new natural products. Exchanges of knowledge about drugs in the early modern world moved along these vernacular colonial pathways well before they reached the networks of natural philosophers. And as Carla Nappi has noted, the act of translating knowledge about early modern exotic drugs also helped *constitute* that very knowledge.[171] Thus, the cumulative effects of "making discoveries of drugs" in the colonial tropics—naming, describing, and hunting for a nebulous class of substances that fluctuated almost beyond recognition as they moved between different ecological, medical and cultural contexts—was itself an act of creation. By searching for drugs, bioprospectors actually helped invent them.

Nagel's insights in "What Is It Like to Be a Bat?" *The Philosophical Review* LXXXIII, 4 (October 1974): 435-50.

[171] Carla Nappi, "Bolatu's Pharmacy: Theriac in Early Modern China," *Early Science and Medicine* 14/6 (2009): 737-764.

2.2 From brazilwood to *drogas do sertão*

Scientists have recovered grains of mountain sediment over two billion years old in the central lowlands of the Amazon basin, attesting to a history of continent-spanning waterways that predate multicellular life.[172] These proto-Amazons flowed westward, emptying into the Pacific Ocean as they passed through the foothills that would eventually become the Andes. Then, around twenty-three millions years ago, the tectonic plate supporting the region subducted back into the magma of the earth's mantle. Vast sheets of earth buckled and formed jagged peaks. Starting at first as lone trickles of snowmelt, then as streams, the waters of the newly born Andean range reversed course and began to flow eastward, toward the Atlantic. They dripped from regions of eternal snow to arid mountainsides, oxbowed through rolling grasslands, and finally carved deep channels in the red clay soils of the interior. The waters nourished eagles with twenty-five foot wingspans, giant sloths, camel-like *lipopternas*, saber-toothed cats, and a dizzying profusion of insect life. Seasonal replenishment of alluvial topsoil sustained increasingly dense thickets of shrubs, grasses, vines and trees. In the green twilight below the forest canopy, creatures waged evolutionary war with chitin claws, prying fingers, hallucinogenic toxins, and parasitic guile. Biodiversity proliferated. These arteries carved by Andean snowmelt become the vital, beating heart of life on Earth.[173]

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[172] Russell W. Mapes, "Past and Present Provenance of the Amazon River," (Ph.D. Dissertation, University of North Carolina at Chapel Hill, 2009).

[173] This paragraph is a reconstruction based on geological data in Mapes, "Past and Present Provenance."

When *Homo sapiens* reached the Amazon Basin sometime between 30,000 and 15,000 years ago, we began to reshape these crowded ecosystems. The earliest groups to settle Amazonia primarily relied on shellfish harvesting for sustenance, leaving middens or *sambaquis* of up to 300 meters long.[174] Evidence of maize cultivation appears in the archeological record around 2,000 BCE, and subsequent settlements in Amazonia and coastal Brazil began to rely on a mixture of agriculture (primarily manioc, legumes and maize), shellfish harvesting, and hunting of tapirs and smaller mammals.[175] Charles C. Mann has synthesized a growing body of archeological literature that collectively points to significant pre-Columbian manipulation of the Amazon River valley as an environmental space, including zones of intensive farming and complex regimes of labor.[176] As Mann notes, the peoples of the pre-Columbian Amazon basin "created one of the largest, strangest, and most ecologically rich artificial environments on the planet."[177]

The earliest Europeans to reach Brazil tended to lump together the diverse cultural and linguistic groups of eastern South America because sixteenth-century Europeans interacted primarily with the Tupi-Guarani peoples of the coast. Yet, like the Mesoamerican states encountered by Cortés, the indigenous societies of Brazil were a

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[174] Warren Dean, *With Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest* (Berkeley: University of California Press, 1995), 24.

[175] Michael J. Heckenberger, James B. Petersen and Eduardo Goés Neves, "Village Size and Permanence in Amazonia: Two Archaeological Examples from Brazil," *Latin American Antiquity*, 10: 4 (Dec., 1999), 353-376

[176] Charles C. Mann's *1491: New Revelations of the Americas Before Columbus* (New York: Knopf, 2005); Heckenberger et al, "Village Size and Permanence in Amazonia."

[177] Mann, *1491*, 14. See also See also W. M. Denevan, *Cultivated Landscapes of Native Amazonia and the Andes* (Oxford: Oxford University Press, 2003).

patchwork of dozens of unrelated linguistic groups. Some (like the Gê people) had resided in the area for millennia, while others, like the Tupí, were newcomers.[178]

FIGURE 2.1 Amazonian Indians harvesting tropical tree bark (likely brazilwood) alongside exotic birds and a dragon in a detail from the Miller Atlas. The map is attributed to a group led by the cartographer Lopo Homem and thought to have been created in 1519. Bibliothèque nationale de France, "Atlas nautique du Monde, dit atlas Miller," fol. 5r. Accessed via Gallica.

[178] The Tupi-Guaraní, for instance, reached the Brazilian coast from the south, moving from present-day Paraguay to the eastern coastal regions around 400 CE, and approaching the southern banks of the Amazon shortly thereafter. Warren Dean has attributed this rapid expansion to the structure of Tupí culture, which was fixated around a masculine warrior ethos that prized territorial expansion and the capture of enemies. The Gê people, who may have been remnants of the original groups that settled Brazil, were pushed into the flat and relatively dry plains of the Cerrado. See Dean, *Broadax*, 29-30; and John Hemming, "The Indians of Brazil in 1500," in Leslie Bethell, ed. *The Cambridge History of Latin America* (Cambridge: Cambridge University Press, 1985), 119.

The one feature that bound together all of these linguistic and cultural groupings, the core commonality, was a profound reliance on the floristic biodiversity of rainforest ecosystems. Whether they were intensive agriculturalists or hunter-gatherers, these societies depended on their ability to identify and harvest what the Portuguese would learn to call "drogas do sertão"— drugs of the backlands.

Although it took decades for Portuguese settlers and administrators to recognize the potential importance of *drogas do sertão*, mapmakers devoted considerable attention to the natural products of the interior. The Miller Atlas, thought to have been created by a team of Portuguese cartographers in 1519 as a gift from Manuel I of Portugal to Francis I of France, devoted much of its pictorial space to an imaginative reconstruction of plant harvesting in the Amazonian interior. In lieu of toponyms or other concrete geographic data about these non-coastal regions, an accompanying map legend informed readers that "the people here are truly of a black color," and they "feed on the flesh of humans," hunt "innumerable birds, generally monstrous," and harvest "a tree called *brasil* that dyes clothes a purple color."[179] The miniaturist who worked on the map illustrations, António de Holanda, took this description as inspiration, painting strange birds alongside a fierce dragon and a group of native Brazilians harvesting purplish brazilwood within a grove of chopped-down trees.

[179] Transcribed from an inscription on the Miller Atlas, Bibliothèque nationale de France, folio 5r, accessed online via Gallica.bnf.fr. Thanks to Charles McNamara of Columbia University for translation and paleography help.

Far from depicting Amazonia as an untouched wilderness (as nineteenth and early twentieth century scholars did), these early maps linger upon depictions of ecological manipulation by native peoples. Felled trees and harvested plants are in fact the dominant visual theme of depictions of Brazil in both the Miller map and the more famous Vallard Atlas, a book of portalan charts with unusually vivid gauche illustrations created in Diepe, France in 1547 (Figure 2.2).[180] Although the overwhelming focus of early sixteenth-century Iberian voyagers in the New World was on mineral wealth, these iconographies also point to the importance of natural products like dyestuffs and medicinal drugs, whose true value was only apparent after experimentation and interaction with indigenous experts. The tree that the Tupí called *ibirapitanga* ("red tree") was the first New World plant to attract significant attention in Europe, garnering intense scrutiny from Portuguese merchants as early as the first decade of the sixteenth century.

The first Europeans to reach the Brazilian coast, impressed by the brilliant vermilion color of the powdered bark, began to call it *pau-brasil* ("emberwood") after the Portuguese word for glowing embers, *brasa*. The chronicler Gaspar Correia described how a servant of the crown, Andre Gonçalves, was tasked circa 1505 with "making experiments with the *pau*, and found that it yielded a very fine vermillion color, so that very quickly he set up contracts with merchants [in Lisbon] who bought the wood from him by weight and who began shipping this *brasil*."[181]

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[180] Vallard Atlas, gouache on vellum, HM 27, Huntington Library, San Marino, CA. Hosted online at http://sunsite.berkeley.edu/hehweb/HM29.html

[181] Gaspar Correia, *Lendas da India*: *Collecção de monumentos ineditos para a historia das conquistas dos Portuguezes*, vol. 1 (Lisbon, 1858), 152.

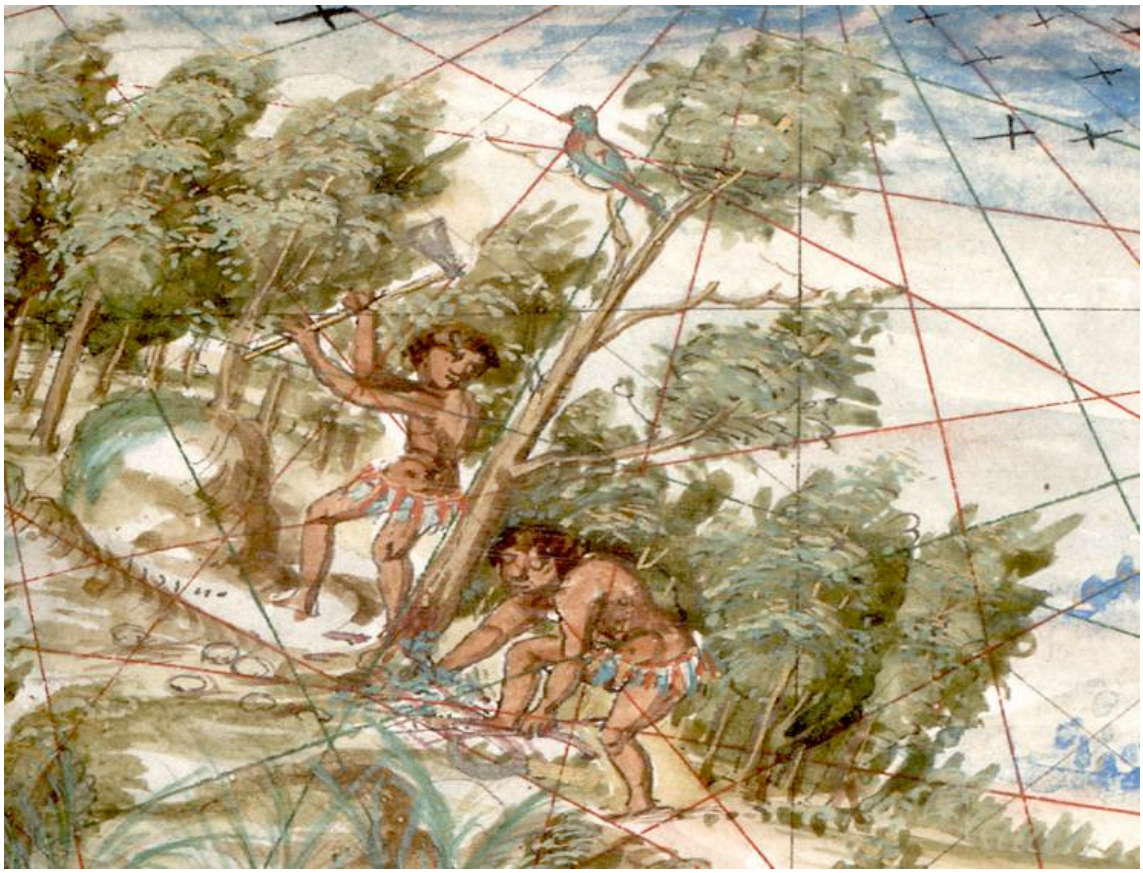

FIGURE 2.2 Native Brazilians harvesting brazilwood using a European-made metal axe in a detail from the Vallard Atlas, a book of fifteen highly detailed nautical charts created in Dieppe, France in 1547. Huntington Library, HM 29, fol. 11.

The merchants who Gonçalves consulted were soon predicting "great profits for the King." This was because they conceived of the new substance as an American correlate to the Asian sapanwood, one of the most coveted dyes in the medieval world, as well as a valued materia medica.[182] Pau-brasil upended the commercial viability of this older trade,

[182] First described in Europe by Marco Polo, by the fifteenth century sapanwood had moved out of its southeast Asian ecological homeland to become a truly pan-Eurasian commodity: Korean and Chinese elites imported vast quantities of the wood owing to its perceived medicinal properties while, half a world away, Irish monks employed it to add rich crimsons to illuminated manuscripts. See S. M. Hong-Chunk, "An Aspect of East Asian Maritime Trade: The Exchange of Commodities betweek Korea and Ryuku (1389-1638)," in Angela Schottenhammer, ed. *Trade and Transfer Across the East Asian "Mediterranean"* (Wiesbaden, 2005); Jo Kirby, "Paints, Pigments, Dyes," in Thomas F. Glick, ed. *Medieval Science,*

making it possible to import a less expensive but more potent and equally versatile substance.[183]

Although brazilwood grows in both Amazonia and coastal Brazil, it was most easily harvested in the Atlantic forests along what was then the southeastern coastline of the Estado do Brazil. By the 1550s, the tree had become the premier non-mineral resource in the entire New World and the ports that exported the plant, Salvador da Bahia and Rio de Janeiro, had grown into prosperous towns. But as Warren Dean documented, brazilwood was also one of the earliest ecological casualties of a developing network of transatlantic resource extraction. By forcing enslaved Tupí Indian laborers to venture into the coastal hinterlands, locate the trees, fell them and then strip their bark, coastal merchants were shipping well over a thousand tons of the dyewood per year by the 1530s.[184] By 1605, the Portuguese crown was warning against wasteful harvesting practices that might "finish off" the remaining supplies of the tree, and in 1607 the crown placed a quota of 600 tons a year on brazilwood exports (which were also deemed royal property, harvestable only with permission).[185] Brazilwood remained a valuable commodity until the nineteenth century, but increasing scarcity meant that it could no longer be relied upon to function as the backbone of the Portuguese America's economy in the seventeenth century.

Technology and Medicine: an Encyclopedia (London: Routledge, 2005), 379.

[183] In the early nineteenth century, chemists would learn that sapanwood and brazilwood contain the same pigment, brazilin. See Andrew Ure, *Elements of the Art of Dyeing, Vol II* (London, 1824), 201.

[184] Dean, *Broadax*, 46.

[185] Bernardino José de Souza, *O Pau-brasil na história nacional*, 2nd ed (São Paulo, 1978), 70.

As the Atlantic forest (*mata Atlantica*) that ringed the original Portuguese settlements on the coast became increasingly depleted, colonists looked northward to the Estado do Maranhão and the vast interior rainforests of the Amazon.[186] The two forest systems had once been joined together and shared many species, but the pharmacological knowledge of the *mata Atlantica* didn't necessarily translate to an Amazonian context. The go-betweens who had made brazilwood extraction possible by locating and prepping trees in the interior were harder to come by outside of the Tupí heartlands, where locals spoke unfamiliar languages and guarded their knowledge of plant species deemed sacred or useful. [187] By the close of the sixteenth century it had become more economically viable, safer, and less challenging to move from extraction of brazilwood in forest hinterlands to the cultivation of sugar in coastal plantations, and from Tupi Indian labor to slaves carried from Angola and West Africa.[188]

By the 1660s, however, Brazilian sugar trade prices had fallen into a steep decline as the crop became increasingly cultivated in the Dutch, English, and French West Indies.[189] Meanwhile, the Spanish crown was busy consolidating its control over the Viceroyalty of Peru, dispatching missionaries and royal officials to establish inland missions and overland routes joining the Andes with the Atlantic. The most famous of these was Pedro

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[186] See Santiago Mora, "Early inhabitants of the Amazonian tropical rain forest: A study of humans and environmental dynamics" (PhD Dissertation, University of Calgary, 2001), ch. 2.

[187] Florestan Fernandes, *Organizaçao Social dos Tupinamba* (São Paulo, 1948), 29-44.

[188] Stuart Schwartz, *Slaves, Peasants and Rebels: Reconsidering Brazilian Slavery* (U. Illinois Press, 1992), ch. 2; Stuart Schwartz, *Sugar Plantations in the Formation of Brazilian Society*, ch. 3, and Stuart B. Schwartz, ed. *Tropical Babylons: Sugar and the Making of the Atlantic World, 1450–1680* (University of North Carolina Press, 2004).

[189] On the rise of the West Indies sugar trade at the expense of Brazil in the 1660s, see Schwartz, *Sugar Plantations*, 177-185.

Texeira's successful 1637 expedition on the Amazon, moving westward from Belém in Maranhao to Quito in Ecuador.[190] Following the break up of the Hapsburg joint monarchy and the restoration of Portuguese independence in 1640, administrators and colonists grew understandably worried about the prospect of a Peruvian Amazon, as well as the arrival of French and Dutch independent colonists and traders lured by the promise of wealth in the *sertao*. The commercial triumph of brazilwood and sugar now served as inducements to further inland exploration. If the increasingly deforested coastal regions could yield such valuable products, what natural riches awaited prospectors in the far more ecologically diverse interior?[191]

The steep decline of brazilwood stocks and sugar prices in the middle decades of the seventeenth century thus made the *drogas do sertão* of the Amazonian interior (like copaiba, guiacum, sarsaparilla, ipecacuanha, wild nutmeg, cinchona, and even local subspecies of tobacco) increasingly commercially attractive to both the Portuguese and their Dutch rivals. As early as 1630, the Dutch West India Company had launched a successful attack on the Portuguese port of Pernambuco and seized it as Company property. A decade later, under Governor Johan Maurits, the Dutch Brazilian city of Recife witnessed the construction of Brazil's first botanical garden. At over one hundred acres, it was an elaborate undertaking designed both to highlight the ecological reach of

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[190] Christobal de Acuña, *Nuevo descubrimiento del gran Rio de las Amazonas* (Madrid, 1641). For a secondary source survey see Anthony Smith, *Explorers of the Amazon* (Chicago: University of Chicago Press, 1994) and Evaristo Eduardo de Miranda, *Quando o Amazonas corria para o Pacífico* (Petrópolis: Editora Vozes, 2007).

[191] See Walter Ralegh, *The Discoverie of the Large, Rich and Bewtiful Empyre of Guiana,* ed. Neil L. Whitehead (London, 1596; reprint 1997); Gaspar de Carvajal, *Relación… del Nuevo descubrimiento del famoso Rio Grande* (Madrid, 1944); Simão Estacio da Silveira, *Relação Sumária das causas do Maranhão* (Lisboa, 1624).

the Dutch (bananas, newly transplanted from West Africa, were a special focus) and to serve as a test site for experimenting with new plantation crops. According to Caspar Barlaeus, who would later collaborate with the naturalist Georg Marcgraf on a detailed map of Dutch Maranhão, the garden featured indigenous Amazonian plants such as "mamoeiros, jenipapeiros, mangabeiras, cabaceiras, cajueiros, uvalheiras, palmeiras, pitangueiras, romeiras, araticuns, jamacarus, [and] pacobeiras."[192] Plants weren't the only import from the Brazilian sertão. Manuel Calado, a Portuguese friar who visited the gardens, wrote that "the inhabitants of the land [in the sertão]" brought "strange animals which they found in the interior" to please Maurit's "appetite" for natural oddities and potentially lucrative new natural specimen. Local Indians, Calado writes,

> brought parrots, araras, jacis, canindes, jabotis, mutuns, Guinea fowl, ducks, swans, peacocks, turkeys, and chickens [in] great number, so many pigeons, that one couldn't count them, there they had tigers, the onqa, the suuarana, the tamandua, the bagio, the quati, the saguim, the apetea, Cape Verde goats, Angolan sheep, the cutia, the paca, the anta, the wild pig, a great multitude of rabbits.[193]

The Dutch States General summoned Maurits back to Amsterdam in 1643, and by 1645, the failure of the Dutch to forge effective alliances with sugar planters had combined with political instability in Holland to make Dutch Brazil increasingly untenable. But the forested interiors of Brazil had by this time became a landscape of ecological possibilities in the imaginaries of the European empires, one where valuable new crops of foodstuffs,

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[192] Caspar Barlaeus (1584-1648) cited in Maria Angélica da Silva and Melissa Mota Alcides, "Collecting and Framing the Wilderness: The Garden of Johan Maurits (1604-79) in North-East Brazil," *Garden History* 30, 2 (Winter, 2002), 167.

[193] Manoel Calado, *O Valoroso Lucideno e Triunfo da Liberdade* (Lisbon, 1648), 111-12; see also da Silva and Alcides, "Collecting and Framing," 167.

dyes, logwood and *drogas* lay waiting to be discovered. The jungle was no longer a forbidden zone, but a gateway.

The frontispiece to *Historia Naturalis Brasiliae*, a treatise written jointly by the German naturalist Georg Marcgrave and by Maurits' personal physician, Willem Piso, turned palm trees into classical columns (or Pillars of Hercules?) and the arbors of forest trees into an archway. Inside, riches beckoned.[194] Art historian Rebecca Brienen calls the image "orderly but lush," with two Tapuya figures doubling as a Brazilian Adam and Eve and the overflowing fruits, plants and fish of Amazonia arranged as baroque borders framing the work's title and publisher credits. With its quasi-perspectival "doorway" of trees leading to an Edenic array of natural wonders, the frontispiece highlights the emergence of the Brazilian interior as a potentially knowable—and exploitable—space. Brienen thus interprets the frontispiece as representing a new perception of the Amazonian interior as inviting and open.[195] Yet we may also profitably frame the image within the context of the seventeenth century grotto. With its prominent scallop shell, twisting and heavily bearded allegorical river figure, and its blending of an ordered landscape with natural abundance, *Historia Naturalis Brasiliae's* frontispiece recalls the allegorical grottos and artfully untamed gardens that become fashionable among

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[194] On the strained professional relations between Markgraf (also spelled Marcgrave) and Piso see C. R. Boxer, *The Dutch in Brazil 1624-1654* (Cambridge, 1973) and P. J. P. Whitehead, "The biography of Georg Marcgraf (1610-1643/4) by his brother Christian, translated by James Petiver," *J. Soc. Bib. Nat. Hist.*, 9 (1974): 301-314.

[195] Rebecca Parker Brienen, *Visions of Savage Paradise: Albert Eckhout, Court Painter in Colonial Dutch Brazil* (Amsterdam University Press, 2006), 16.

landowners of the Dutch Golden Age.[196]

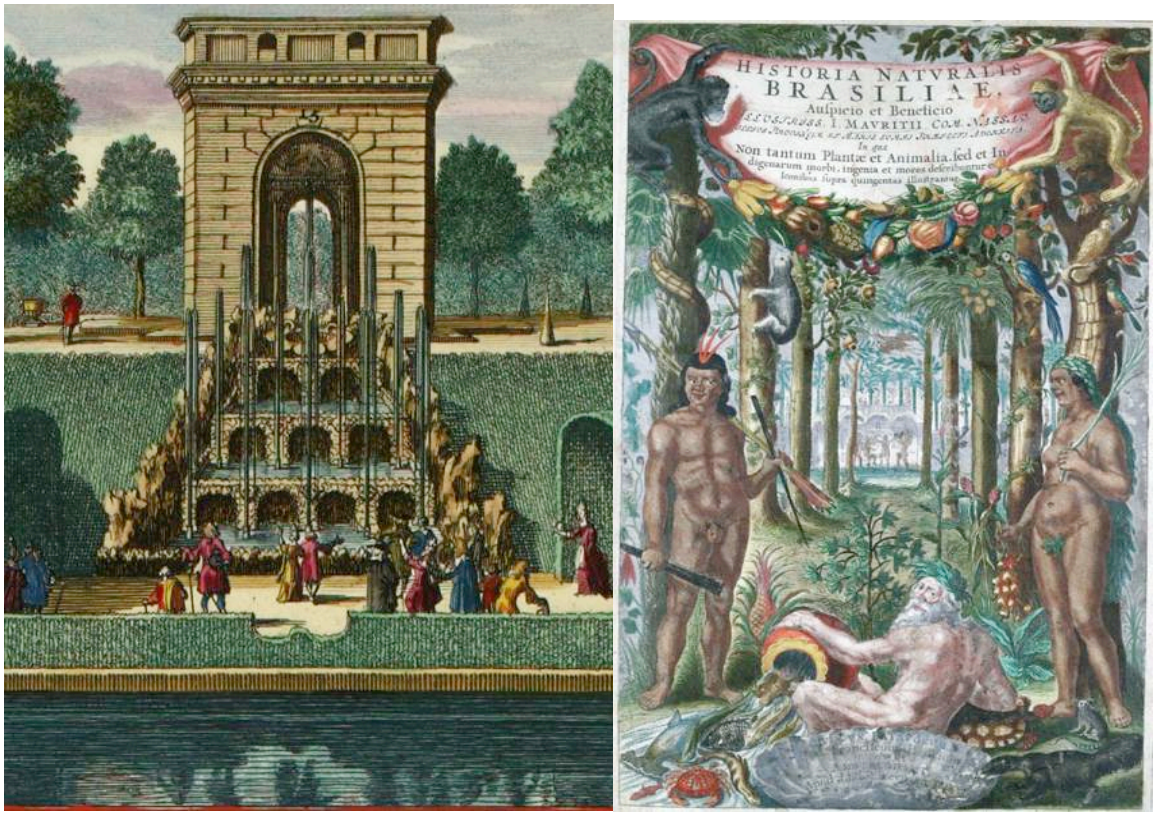

FIGURE 2.3 The frontispiece of *Historia Naturalis Brasiliae* (right) alongside a 1680s image of a Dutch grotto (left). Both images display an orderly framing surrounding untamed nature. Hand-colored engraving of the grotto at the Hague by Nicolaus Visscher (Amsterdam, 1690). The hand-colored frontispiece engraving of the first edition of Willem Piso and Georg Marcgrave, *Historia Naturalis Brasiliae, Auspicio et Beneficio Illustriss.* (Amsterdam: Franciscus Hack, 1648).

The book's patron, Johan Maurits von Nassau, was himself an avid collector of shells and stones for his grotto at Mauritshuis, and it seems reasonable to assume that Maurits' fascination influenced the shape of both the frontispiece and the actual botanical garden tended by Piso and Margrave at Recife.[197] These grottos and allegorical gardens of

[196] Malgorzata Szafranska, "The Philosophy of Nature and the Grotto in the Renaissance Garden," *The Journal of Garden History*, 9: 2 (1989), 76-85.

[197] See Vanessa Bezemer-Sellers, "The Bentinck Garden at Sorgvliet," in *The Dutch Garden in the Seventeenth Century,* Volume 12, edited by John Dixon Hunt (Dumbarton Oaks, 1988), 114, citing a 1679 letter written by an aged Johan Maurits to his secretary in which he donates "the stones and shells of his

the Baroque era were far more than architectural ornaments: Frances Yates has argued that the influential grotto at Heidelberg Castle, built in the 1620s, featured complex alchemical and natural philosophical allegorical staging that dramatized the difficulties of the hunt for hidden knowledge (*venatio*).[198]

Whereas gardens on the French style (Fig. 4) demonstrated harmonious control over natural abundance, the grotto embraced disorder, monstrosity, and the unknowable. Significantly, while the friendly Tapuya couple framing the *Historia Naturalis* frontispiece echoed other seventeenth-century allegorical depictions of the four continents offering up their riches, the figures at the image's center stand with their backs toward the viewer, engaged in a ceremony. For natural philosophers like Piso and Markgrav, the grotto represented an untamed natural space that could be demystified and rendered profitable—yet not necessarily stripped of its wildness—by the powers of the intellect. The image is not exactly an open doorway so much as an ambivalent invitation to plumb hidden mysteries of tropical nature.

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grotto" to a friend. One wonder whether any of these shells hailed from Dutch Brazil.

[198] Frances Yates, *The Rosicrucian Enlightenment* (London: Routledge, 1972), 4-104. On *venatio* see Eamon, *Science and the Secrets of Nature,* ch. 8.

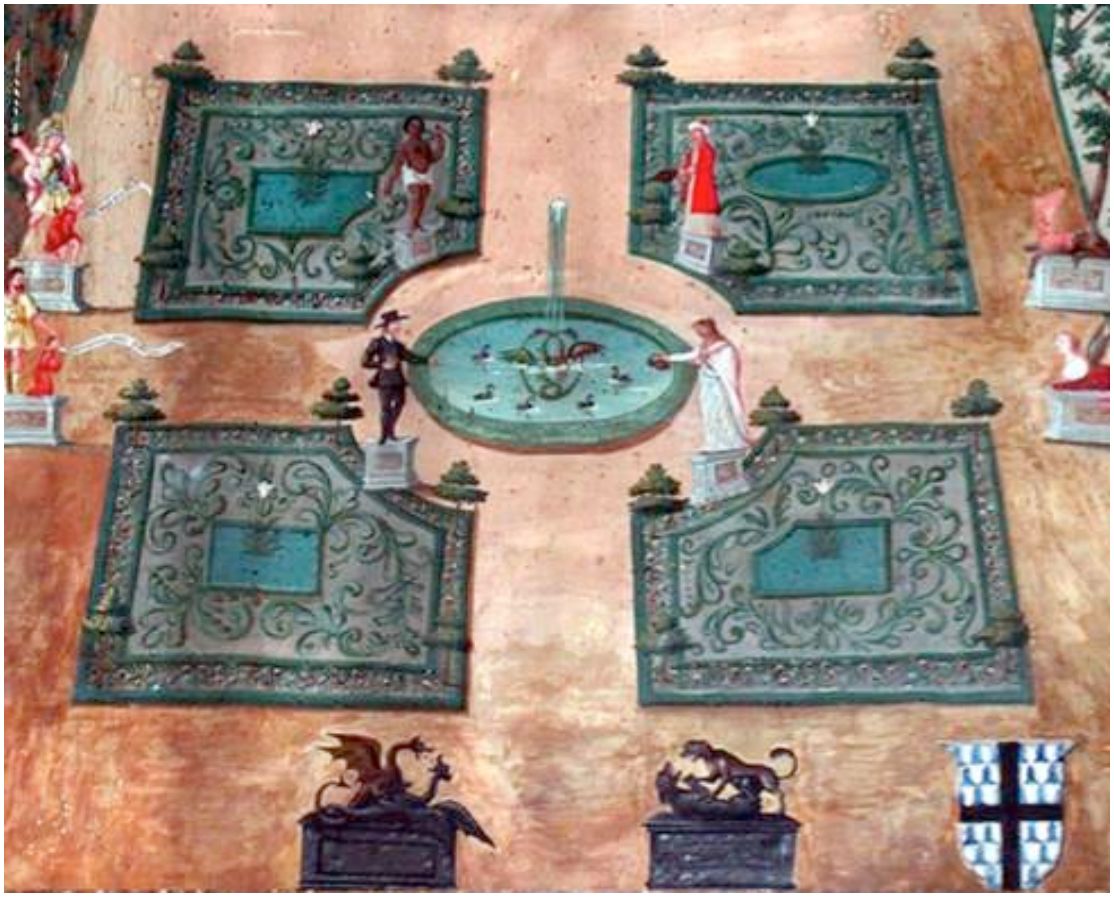

FIGURE 2.4 The four continents offering their natural products to one another in a formal garden. Anonymous artist (French school), "An Allegorical Garden," gouache on parchment, seventeenth century, via the Arader Gallery, New York.

The Portuguese failed to produce printed works to match those of Piso or Margrave in terms of analytical richness and depth of observation, and they did not construct formal botanical gardens on natural philosophical principles like Maurits. Yet they were well aware of this emerging Dutch fascination with Brazilian nature, and they engaged in the same competitive search for new drugs and medicines in the interior. An expedition led by Manuel Furtado had navigated the Amazon from east to west again in October of 1646 with the explicit objective of obtaining samples of "cravo" (wild nutmeg)

in Quito, then "returning to show it to the king."[199] Two years later, the crown issued a proclamation that more sailors should be enlisted to ensure the safe transport of "sugar and other drugs from Brazil" and encouraged the formation of a "company of men of business" (*companhia dos homens de negócio*) to rival the Dutch West Indies Company. [200] In 1650, a crown servant named Manuel Fernandes Cruz composed a long letter detailing future plans for Pernambuco after its reconquest from the Dutch, writing of its "good airs and splendid waters... fertile soil... [and] drugs which it commonly yields, not only sugar but also pau-brasil, cotton, tobacco and ginger." Significantly, Cruz didn't stop there, but also alluded to a future of resource extraction and bioprospecting: in the jungles of the interior, he adds, "there are also many other products which we have not yet improved [*aproveitado*]."[201]

Early European commenters on Brazil's interior often assumed that the region's dangers and its natural abundance went hand in hand: God had seeded the *sertão* with innumerable threats, but had also created a "pharmacological landscape" that provided local cures for local dangers. The Jesuit Manuel da Nóbrega, writing in 1550, had described the hinterlands of Bahia as "a land very healthy to live in" where "not one person has died from fever," but also noted that many did in fact die from the mal gallico (syphilis) and "hidropisia" (dropsy). While the water "is very good," the foods

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[199] "Mercé a Manuel Furtado," 17 October, 1646, *Inventário dos livros das portarias do Reino*, vol. 1, 194.

[200] Letter from the King, (Lisbon, January 8, 1649), in Virginia Ray and Maria Fernanda Gomes da Silva, eds., *Os Manuscritos do Arquivo da Casa de Cadaval Respeitantes ao Brasil*, Vol. 1 (Coimbra, 1956), 82.

[201] Manuel Fernandes Cruz, Pernambuco, August 20 1650, in Ray and Gomes da Silva, eds., *Manuscritos do Arquivo da Casa de Cadaval*, 90.

> as a general rule are difficult to digest, but God has remedied this with an herb [tobacco], whose smoke greatly aids the digestion along with other bodily illnessess, and which purges phlegm from the stomach. At present there are none among our Friars who use this, and so too few of the other Christians use it lest they emulate the infidels who relish it greatly.[202]

Nóbrega even acknowledged that "I have had need of [tobacco] owing to the humidity and my cough, but I abstained, wishing *non quod mihi utile est sed quo multis ut salvi fiant* [not for my benefit but for that of the multitude, so that they might be saved].[203] As Warren Dean has noted, this episode documents an early epistemological battle between the medical knowledge of Jesuites and Tupí healers in which Europeans refused even beneficial knowledge on the grounds of spiritual superiority and fears of contamination.[204]

As the Atlantic forest ringing Pernambuco and Bahia fell to the growth of sugar plantations and early fears about the dangers of non-European medicines abated, the drugs of the Amazon basin to the north emerged as viable products for European bodies. Nonetheless, when bioprospectors and colonists ventured inland in search of new crops to replace brazilwood and sugar, they did so with a deeply ingrained belief that this pharmacological richness imposed paradoxical dangers.[205] The risks were twofold, threatening both the soul—spiritual corruption caused by ingesting "heathen" drugs—and personal safety. João de Moura, a Portuguese clerk stationed in Belem in the 1680s, observed that the Maranhão was "the most well-appointed Province in the World," and

[202] Manuel da Nóbrega, ed. Serafim Leite, *Cartas do Brasil e Mais Escritos* (Coimbra, 1955), 82.

[203] Nóbrega, *Cartas*, 83. The Latin is a quote from 1 Corinthians 10:33.

[204] Dean, *Broadaxe and Firebrand*, 36-7.

[205] I am indebted here to the exceptional scholarship of Rafael Chambouleyron which has elucidated the emergence of this dichotomy between Edenic and dystopian visions of Amazonia; see especially Rafael Chambouleyron, "Portuguese Colonization of the Amazon Region, 1640-1706" (Ph.D. Dissertation, University of Cambridge, 2005), 99-110.

thus a place toward which many nations had "great intentions."[206] In addition to the Portuguese, he noted, "already in France we have seen a memorandum offered to the Cardinal Mazarin" regarding its conquest, "and another relation has been seen regarding the province in England, offered to the tyrant Caramuel [Cromwell]… regarding the ease with which they could occupy this land." De Moura, however, hoped that these efforts would be thwarted by the Amazonian environment: the landscape was simply too dangerous and intractable to be "reduced" by any one kingdom.[207]

The region's *drogas do sertão* ("wilderness drugs") stood at the center of this dichotomy between Amazonia as dangerous no-mans land and Edenic paradise. Domingos Antunes Tomás, the Vicar-General of Maranhão, enthused in 1679 that the region could become "a monarchy of great advantages" both in terms of "souls… for God" and "revenues… for Your Highness."[208] For Tomás, these benefits flowed not only from "the extent of this conquest" and "the goodness of climate," but

> also because of the abundance of drugs that can be found in it, such as sugar, for which there are large, many and sufficient lands… There is also an immensity of wild cacao, and it can exist cultivated, by industry, such as in the Indies of Castile. Forests of clove, whose bark is taken by cutting the trees, its fruit looking like the Indian clove… There are many trees, which they call nutmeg [*cravo*], because of the fruit, similar to the nut that comes from India.[209]

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[206] João de Moura, BNP, cod. 585, *Descripção Historica, e Relação Politca, do grande Estado do Maranhão* (1684), fol. 24v.

[207] João de Moura, BNP, *Descripção*, fol. 24v-25r.

[208] Domingos Antunes Tomás, Biblioteca de Ajuda (Lisbon), codex 50-V-37, "Sobre o Maranhaõ e Parà e cativo dos Indios e forma de os haver cõ augmento do Estado," 3 November 1679, f. 394. For more details on this document see Chambouleyron, "Portuguese Colonization," 100.

[209] Tomás, Biblioteca de Ajuda, codex 50-V-37, f. 394.

FIGURE 2.5 João Teixeira Albernaz's circa 1629 map of the mouth of the Amazon showing the city of Belem (far left), destroyed forts "which we lost to the Dutch" and one "lost to the English," and the (reputed) locations of indigenous groups like the Tocantins and the Tapuyas. João Teixeira Albernaz, "Descripção de todo o maritimo da terra de Santa Cruz, chamado vulgarmente, o Brazil," 1640 (AN/TT Colecção Cartográfica 162).

Yet Tomás did little to hide his frustration with the crown's failure to extract these resources, complaining outright that the Brazilian nutmeg (*Cryptocarya moschata*), which promised to have commercial and medicinal virtues to rival its East Indian counterpart, was "lost because no one knows how to benefit from it."[210] Tomás further lamented that he has heard "news about gold and silver" in the interior, but these regions "are so scarcely populated and faraway, that nobody extracts the metals." The result was an "abundant and fertile land" growing "poor and miserable."[211]

2.3 Contextualizing bioprospecting

In one of the earliest European maps of the region that would come to be called Amazonia, a note has been inserted: "[The inhabitants of this land] exercise so much in the salubrious air that they live more than one hundred and fifty years. They are rarely sick, and then they cure themselves solely with the roots of plants."[212] Writing one hundred years later, the French traveller Pyrard de Laval repeated the sentiment. The people of the Brazilian interior, he wrote, were "very healthy; you never see any sick, and when they fall ill they cure themselves with the juice of certain herbs which they know to be suitable to them; nor have they any physicians or surgeons."[213] Pyrard's observation is

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[210] In the same period (1675) but a world away in Paris, the Portuguese diplomat Duarte Ribeiro de Macedo was also writing to the Portuguese Crown about the untapped commercial potential of 'wild nutmeg' and 'wild cloves' (*cravo*) from Amazonia. See Duarte Ribeiro de Macedo, "Discurso sobre a transplantação," ANTT, T/TT/MSBR/39.

[211] Biblioteca de Ajuda, codex 50-V-37, f. 394.

[212] Note on a map of Brazil in Ptolemy's *Geography* (Rome, 1508), cited in Arthur James Weise, *The Discoveries of America to the Year 1525* (London, 1884), 216.

[213] François Pyrard, *The Voyage of François Pyrard of Laval to the East Indies, the Maldives, the Moluccas and Brazil,* ed. by Albert Gray (London: Hakluyt Society, 1890), vol. 2, 318.

all the more striking given what historians now know about the "virgin soil" epidemics which were devastating New World populations at precisely the time he visited Brazil, in the first decade of the seventeenth century. Although Pyrard acknowledged that the indigenous peoples of Brazil were "much subject to the small-pox," he claimed that "they think little of this ailment" owing to their possession of a medicinal drug he called "the Gayac" (*Guaiacum officinale*).[214] Guaiacum bark was mainly known to Europeans of Pyrard's time as a syphilis cure, but Pyrard seems to have regarded it as a panacea for all serious diseases.

Yet dangerous poisons, sorcerers, and drugs of unknown potency and powers also lurked in the *sertão*. As he made his way down the Amazon in 1639, Cristobal de Acuña wrote with a perceptible undercurrent of anxiety that "all of the people [of the Amazonian Indian nations] hold their sorcerors [*hechizeros*] in great esteem, not so much out of the love they bear them, but out of the dread they forever live under of the damage that they can do." Acuña, a Jesuit from Burgos, believed that their powers were very real. "They speak with the demon," he wrote. Their occult knowledge gave them many roles in the indigenous societies of the Amazon, as "Teachers, Preachers, Councilors, and guides." And as poisoners: Acuña recorded that the Amazonian *hechizeros* offered "poisonous herbs [*yervas venenosas*] with which to take vengeance against enemies."[215] Acuña had encountered *payés*: shamans of the Tupi Indians and other Amazonian groups.[216] Building

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[214] Pyrard, *Voyage*, 318.

[215] Acuña, *Descubrimiento,* fol. 19r-19v.

[216] Irving Goldman, edited by Peter J. Wilson, *Cubeo Hehénewa Religious Thought: Metaphysics of a*

on fieldwork in Northwestern Amazonia from the 1930s, Irving Goldman described an initiation sequence for the *payé* which depends upon intoxicants like *chicha*, coca leaves, and tobacco. A period of "fits of visions and dreams" passed into a stage during which the *payé* was believed to gain physical power over nature, such as the ability to "cause small creatures to be born and grow" and "propagate fruits."[217] Profound knowledge of tropical remedies followed, and ultimately an appointment to a line of succession, allowing the *payé* to create disciples.[218]

However, as Irving puts it, there is "a demonic underside to the healer." The experienced *payé* controls forces that can turn "in unexpected and unwanted directions, usually against the self and close kin." The ability to heal brings with it an ability to poison, curse or kill. Different *payé* specialize in different realms—in the context of the Cubeo people, there are "chanters/blowers," "Water Pourers," (healers both) and, on the more malevolent side of the spectrum, "sorcerors."[219] Colonial European understandings of both tropical nature and of indigenous Amazonian power over it frequently reflected

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Northwestern Amazonian People (New York: Columbia University Press, 2004). Although Goldman is here analyzing a single group of Tucanoan speakers in the Vaupés region of present-day Colombia, the *payé* is/was a figure with broadly comparable cultural roles in a large expanse of the Amazon. Goldman notes that *payé* (which etymologically means "Thunderer") is in use as part of a lingua franca in the region.

[217] Goldman, *Cubeo*, 370.

[218] I am aware of the dangers of conflating observations from the 1930s and the 1630s. Because early modern accounts of Amazonian cosmologies and magical practices tend to dismiss them as simply "of the devil," it is necessary to draw upon more detailed later accounts to try to capture something of how Amazonian spiritual-medical practices would have functioned from a non-Eurocentric perspective. In citing Irving Goldman's field work, I've tried to stay within the realm of broad generalities which were transferrable across culture groups and time periods; for instance, the powerful dichotomy between healing and poisoning is evident in both seventeenth-century and twentieth-century accounts. For a nuanced discussion of how we might use such accounts to write deep histories of Amazonian cultures, see Neil Safier, "Global Knowledge on the Move: Itineraries, Amerindian Narratives, and Deep Histories of Science," *Isis,* 101, (March, 2010).

[219] Goldman, *Cubeo*, 370-1.

this dichotomy between beneficent medical practice and malevolent magic. Yet for observers like Acuña and his Spanish, Portuguese, French, and English successors in the *sertão*, fears about poison and curses were outweighed by the miraculous effects of tropical plants. Even as he remarked on the dangers of Amazonian sorcerers, for instance, Acuña rejoiced in the natural abundance of the basin. Under a section headed "Disposicion de la tierra, y la drogas medizinales," Acuña enthused that "in these uncultivated forests, the natives have, for their sicknesses, the greatest apothecary shop of medicinal simples [*botica de simples*] which has yet been discovered."[220]

Acuña's fulsome descriptions of Amazonian nature were clearly motivated by more than impartial regard for the healing of the world's sick: his book was written with an aim to encourage new missions and *feitorias* [trading posts] to be built on the river's banks. Yet Acuña was not exaggerating in the slightest when he wrote that the basin was home to "a thousand kinds of herbs and trees with very peculiar effects." His call for a "second Dioscorides, or a third Pliny" to "investigate their properties" was no mere rhetorical flourish. It was an appeal that was answered in the decades to come by Dutch and Portuguese physicians, surgeons, colonial officials, soldiers and *sertanejos*.[221] While it was easy for travelers to gesture toward the pharmacological richness and commercial potential of Amazonian drugs, however, colonists on the ground found it far more

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[220] Acuña, *Descubrimiento*, fol. 14r.

[221] Acuña, *Descubrimiento*, fol. 14r-15r. An interesting parallel may be drawn between the *sertanejos,* or backlands travellers, of colonial Brazil, and the *coureurs des boís* of Nouvelle France in the same period. Both were engaged in resource extraction (*drogas do sertão* on the one hand, furs on the other), and both were deeply reliant on indigenous communities for food sources, information and water-based modes of transport.

difficult to put these plans into action. With the epidemic and demographic crises of the middle decades of the seventeenth century, which witnessed both virgin soil epidemics in the New World and economic and demographic crises in the Old World, the question of how to efficiently extract this medicinal wealth and sell it to global consumers grew more prominent.[222] Simultaneously, would-be bioprospectors grappled with the spiritual dangers and epistemological challenges of translating their own conception of drugs/materia medica into the radically different framework of indigenous Amazonians. Acuña's *botica de simples* was, after all, also the tool kit of the *payé*.

What, then, did it mean to be an expert in finding, locating and transporting New World drugs in the seventeenth century? Were these men performing scientific acts of botanical description, or were they conquistadors searching for "green gold," or cultural translators searching out new commercial opportunities? One of the most under-recognized aspects of colonial bioprospecting was its multiplicity. Not only were bioprospectors embodying multiple roles simultaneously—they also applied overlapping categories to the natural quarry they sought.

Put another way, the boundaries between plants, animal products and minerals were virtually nonexistent in the seventeenth century. This helps explain why the Portuguese term 'drogas do sertão' [wilderness drugs] could encompass both quina and gold: both were regarded as substances that 'grew' in a particular region according to

[222] Geoffrey Parker, "Crisis and Catastrophe: the Global Crisis of the Seventeenth Century Reconsidered," *The American Historical Review* 113: 4 (October 2008), 1053-1079; David Noble Cook, *Born to Die: Disease and New World Conquest, 1492-1650* (Cambridge: Cambridge University Press, 1998).

ecological principles. For instance, in 1675 the French apothecary and chemist Nicolas Lemery wrote about minerals as organic substances effected by "growth," "agglutination" and "fermentation."[223] Lemery attributed minerals and metals with organic characteristics, conjecturing that "Metal is the Effect of Fermentation" caused by heat from "the Sun, or some subterraneous Fires."[224] Lemery's vision of the formation of metals and minerals effectively posited that the earth itself was like a human body, its "vital force" composed of fires within the earth or heavens, and its "food" being earthly substances that this force digested and fermented. Just as the vital forces of animals were transmitted from food into nerve, muscle and tissue "by means of Juices that insinuate and spread in the Vessels and Fibres," metals "grew" by means of "an Agglutination of congealed Waters."[225] Lemery envisioned veins of ore in mines as "like great Trees, which spread their Branches toward all Sides; whence it is, that many have thought they were nourished, as Plants and Animals, by Juices which run and circulate in the Veins or Vessels supposed to be within them."[226]

This mode of thought was very much prevalent in colonial South America as well.[227] A mining official in Peru, for instance, wrote about the mystical correspondence between metals and plants. "The way that metal is created in mountains is similar to how a tree

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[223] Nicholas Lemery, *Cours de chymie* (Paris, 1675). Quotes are from the English translation: Nicholas Lemery, *A Complete Course of Chymistry* (London, 1720), 51.

[224] On the alchemical, bodily and plant-based language of metals and mining, see Allison Bigelow, "Mining Empire, Planting Empire: The Colonial Scientific Literatures of the Americas" (Ph.D. Dissertation, University of North Carolina, 2012).

[225] Lemery, *Complete Course*, 51.

[226] Lemery, *Complete Course*, 52.

[227] On the language of mining and conceptions of ore deposits as organic and plant-like, see Bigelow, "Language of Empire, 212-215 and *passim*.

pushes its branches out from its trunk," was one representative claim.[228] Antonio Vieira came away from two years of missionary travels in the Maranhão convinced that gems, drugs, and natural philosophical secrets lay hidden in the "bowels" of Brazil.[229] Likewise, in his *Historia natural y moral de las Indias*, Acosta had likened the mineral wealth of Spanish America to "plants hidden in the entrails of the earth" (*plantas encubiertas en las entrañas de la tierra*) whose underground structures featured *ramos* (branches) and *troncos* (trunks) just like the trees sought by bioprospectors aboveground.[230] This blurring of the boundaries between plant and mineral becomes even more striking when we consider that apothecaries and drug merchants classified a dizzying range of substances as 'drugs': many were derived from plants, but a large proportion were animal byproducts, minerals, fungi and even components of the human body, from iron shavings, unicorn horns, and pulverized gems to "fat of a man," powdered human skull, crab's eyes, and chamomile tea.[231]

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[228] Juan Manuel de Orozco, *Directorio de beneficiadores* (Potosí[?],1737). Copy in Center for Southwest Research, University of New Mexico Libraries. Albuquerque, NM. Cap-o 8º, "En q-e se comparan las betas o venas de metales con los arboles" and "Cap-o 9º Rasones q-e comprueban el tratado anterior", ff. 22v-24v. I would like to thank Allison Bigelow for bringing this document to my attention and sharing her transcription with me.

[229] Antonio Vieira, *Cartas do Padre Antonio Vieyra da Companhia de Jesus a Duarte Ribeiro de Macedo* (Lisbon: Eugenio Augusto, 1827), 211-12.

[230] José de Acosta, *Historia natural y moral de las Indias* (Madrid: Ediciones de Cultura Hispánica y Agencia Española de Cooperación Internacional, 1998 [1590]), 222, as cited in Bigelow, "Language of Empire," 212.

[231] John Jacob Berlu's *The Treasury of Drugs Unlock'd* (London, 1690).

FIGURE 2.6 The anonymous French author of the Drake Manuscript emphasized the ecological and botanical spaces in which New World mining took place, as well as the medicinal virtues of landscapes that harbored emeralds. The caption describes the water around this mine in Panama as "very nourishing for having passed through gold, and has besides a particular virtue so that whoever drinks it urinates promptly and frees his kidneys of gravel and other things." Anon., "Histoire Naturelle des Indes," Illustrated manuscript, known as the Drake Manuscript, ca. 1586, Morgan Library, fol. 99.

Bioprospecting, then, needs to be re-envisioned by historians. It was emphatically *not* the same thing as a botanical hunt for plant specimen. For early modern individuals, plants, animals and minerals had all been created by God, all were organic, and all could profoundly shape bodily health. Bio-prospectors might search for gold, animal horns, and rare botanicals in the same conceptual framework, using the same methods, and in the same places. Moreover, unlike naturalists, they *consumed their quarry*. Rather than seeking

ideal specimen to display or reproduce in learned works, bioprospectors sought potency, accessibility, and replicability of results. And rather than the pristine, isolated representations of plants isolated from their surroundings favored in works of botanical description, bioprospectors needed "thick descriptions" of the surroundings in which drugs might be located: not only information about the drug itself, but the way it existed within its environment, its colloquial names, its cultural roles in local societies, its price. The conduit for this information was often not in works of botany at all, but in the more cheaply-printed (and image-scarce) manuals of apothecaries.[232]

The most prominent of these was João de Vigier, a leading Lisbon apothecary and expert in what he called "modern drugs" [*drogas modernas*], who wrote at length on quina. Vigier offered a description of the plant that reflected a close firsthand knowledge of the bark but offered few clues for potential bioprospectors who needed to know ecological details like the height of the tree, plants that grow near it, the altitude at which it grows, et cetera. His description instead evoked qualities like color and taste, and offered guidelines for the plant's consumption.

> Quina is a bark from a tree called quina-quina which grows in the kingdom of Peru in the province of Quito on the hills near the city of Loxa; it is shaped like a cherry tree, the leaves round and tooth-like, the flower long and somewhat red, following a bark, or bean, which contains a flat 'almond,' white, and covered with thin hairs… Quina ought to be compact, of a red color, and with a bitter taste. It cures intermittent fevers, reduced into powder and divided into two *oitavas*. It can also be infused into wine or other liquors .[233]

[232] I intend to pursue the book history of apothecary manuals in a separate journal article that explores the question of why printed images are so scarce in Iberian medical and natural philosophical texts relative to those of France, England, and the Dutch.

[233] Jean Vigier, *Pharmacopea Ulyssiponense* (Lisbon, 1716), "de Quina," n.p.

Descriptions like these emphasized the characteristics of the plant from the perspective of the apothecary and consumer, not the harvester. This emphasis on the final product was unhelpful for bioprospectors, who sought a living organism embedded in a complex ecological context rather than a prepared and processed drug in a marketplace. Yet it did contain a detail that might have given hope to the search for other forms of the drug in regions outside Spanish control. Vigier argued that quina did not take only one form: "there are two species," he wrote, "one wild (*brava*) and one cultivated; the cultivated species is better than the other, the Spanish call it *calenturas* or *cascarilha*."

2.4 Tracing de Sá's drugs from colony to court

If wild nutmeg, wild cloves, and wild pepper were all to be found in the Maranhão, as was frequently averred in print, then why not wild quina? De Sá and Pinheiro de Lacerda's quest for quina hinged on the ecological reasoning that if the cultivated quina thrived in the western reaches of the Amazon, a postulated second variety may well occupy the eastern. But their hunt for this potential plant took place in the context of a much larger, highly improvisational and haphazard search not only for novel botanicals, but also for gold, gems, dyewoods, "curiosities," and even human beings. For instance, in a letter sent to the Capitão-mor of Ilha Grande de Joanes (an island now known as Marajó in the mouth of the Amazon, near Belem), Francisco de Sá relayed "orders from His Majesty to go and make discoveries in the *sertão*," but also noted the presence of a *quilombo* of fifty-seven escaped slaves on the nearby Rio Guamá, ripe for

recapture.[234] De Sá's backwoodsman captain, André Pinheiro de Lacerda, ultimately won a promotion from the crown not only due to his search for quina but because of his "discoveries of gold" (the mythical *Lago Dourado*, no less) and his transmission of samples "of what seems to be silver, and another of bark (*pao*), as also of ebony and sarsaparilla."[235] These efforts culminated during the era of the short-lived Companhia de Comércio do Maranhão (1682-1695) which held both a slave trading contract and a twenty-year Crown monopoly on Amazonian exports. The convergence of these two privileges thus put a premium on the rapid discovery of new drugs and minerals, as well as their exploitation via enslaved labor.[236]

As Rafael Chambouleyron has observed, the Maranhão was markedly distinct from Brazil in that it was an extractive rather than agricultural colony. Its administrators were virtually obsessed with making "discoveries" [*discubrimientos*] of new trade goods, to the extent that, as Chambouleyron puts it, "one has the impression sometimes that the *sertanejos*... were sent without even knowing what they were seeking."[237] The push came not only from the colonial administrators themselves, but from wealthy magnates and crown officials elsewhere in the empire who hoped that their insider knowledge would

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[234] Biblioteca da Ajuda, April 22, 1683, "Ordem para qual of Governador Francisco de Sa de Meneses, manda ao Capitao-mor da Ilha Grande de Joanes, em cumprimento de ordens recibidas de S.A., que va fazer descobrimento pelos sertões," 51-IX-31 f. 52.

[235] AHU, códice 268, f. 37v, May 25, 1684, cited in Rafael Chambouleyron, "A Prática dos Sertões na Amazônia Colonial," *Outros Tempos*, 10: 15 (2013), 85.

[236] On this short-lived trading company see Rafael Chambouleyron, "Escravos do Atlântico equatorial: tráfico negreiro para o Estado do Maranhão e Pará (século XVII e início do século XVIII)," *Revista Brasileira de História* 26: 52 (Dec. 2006).

[237] Rafael Chambouleyron, "Cacao, Bark-Clove and Agriculture in the Portuguese Amazon Region in the Seventeenth and Early Eighteenth Century," *Luso-Brazilian Review*, 51: 1 (2014), 4.

allow them to corner the market in newly-discovered drugs and spices. In January of 1684, for instance, Francisco de Sá had asked another lieutenant in the *sertão* (the Capitão-Mor of the indigenous village of Tapuitapera) for samples of "drugs and other curiosities to send to Dom Lourenco de Almada," an ambitious young nobleman at the Portuguese court who would go on to become the ninth count of Avranches and the Governor of Madeira (1687), Angola (1705) and finally of Brazil itself (1709). This search for new *drogas* also represented a challenge to the Jesuit presence in the hinterlands of Portuguese America, whose finances relied upon the enslaved labor of mission Indians charged with harvesting drugs and spices. Already by 1681, a Jesuit named Padre Pedro Pedrosa had complained to the king that a merchant in Belem had "made a contract with the Indians to take wild cloves [*cravo*]" from the environs of the Xingu Indian *aldeia* of Taconhape.[238]

In his December 30, 1683 letter to the Overseas Council reporting Lacerda's search for quina, de Sá had also mentioned that he was sending samples of drugs to Almada. During his search for quina, de Sá elaborated, Lacerda had found two plant samples with "medicinal virtues": "a bark like *huanó*" which the *sertanejo* promised he "would do more diligence to discover the tree of, it not being easy to find because the sample had been cut from the trunk a long time ago," and a bark much like sarsaparilla. This last, de Sá wrote, "I sent to Dom Lourenco de Almada, and it conforms to the tokens [*sinaes*] which the authors who have written about it attribute to the plant, though seeming to be better."

[238] Rafael Chambouleyron and Vanice Siqueira de Melo, "Aleivosias e extorsões do gentio na Amazônia colonial," *Anais do XIX Encontro Regional de História: Poder, Violência e Exclusão* (São Paulo: ANPUH/SP-USP, 2008), 2, citing Biblioteca Publica de Evora, códice CXV-2-16, fol. 11v.

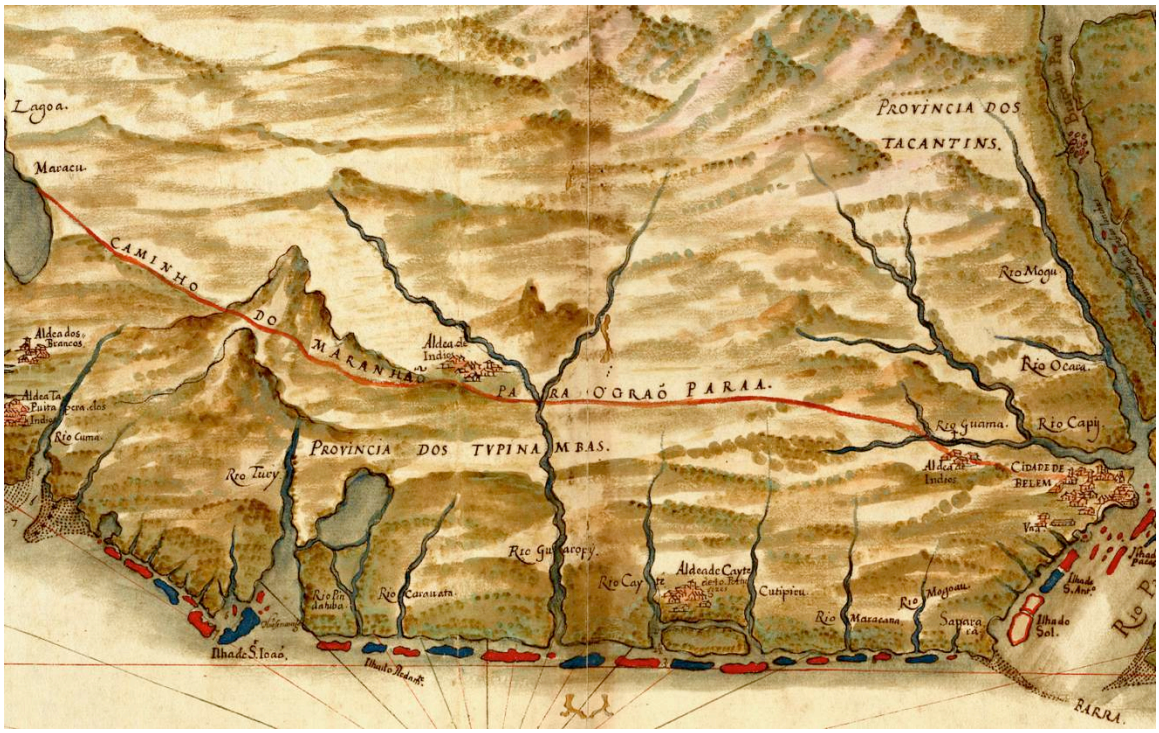

FIGURE 2.7 A circa 1629 Portuguese map showing (at far left) the location of the village of the Tapuitapera Indians, whose capitão-mor Francisco de Sá asked to "send drugs and other curiosities." At far right another "Aldea de Indios" (village of the Indians) is visible on the Rio Guama, where de Sá had mentioned the presence of a *quilombo* of runaway African slaves in another letter to a lieutenant demanding "discoveries." The road through the *sertão* from the Maranhão's capital at Belem to the Estado do Pará is shown as a red line cutting through the middle of the map. João Teixeira Albernaz I, "Pequeno atlas do Maranhão e Grão-Pará," c. 1629.

De Sá explained that he had refrained from purchasing sarsaparilla from Lisbon's apothecaries because he expected to find it in the backlands:

> In this land one hears that there is much *Salçah* [sarsaparilla], and this is why the Provisioner [*Acentista*] has not added it to his contract. Thus I have ordered it to be searched for along the rivers, where they have found some, and brought me a little, which the medical surgeon [*cirurgiao medica*] did not deem to be devoid of profit. And the surgeon himself has done great diligence to bring some from this Kingdom, which they give to their sick...[239]

[239] AHU Para, caixa 3, doc. 219, Gov. Francisco de Sá e Meneses to Dom Pedro II, Belem do Para, 30 December 1683.

It would seem that the Governor's interest in "bitters" (*amargosas*) like quina and sarsaparilla had created a local drug trade between the Indian *aldeias* and the small Portuguese settlement in Belem, because de Sá added that "today this medicine is sold by a woman for a quarter thousand reis," which was apparently being purchased by the colony's surgeon. "The surgeon assures me that this is better, and more efficacious than before," de Sá wrote, "because with time it loses part of its effectiveness. And all of this is ordinarily eight or ten thousand reis a pound, though a cleric arrived here to sell it for sixteen."[240]

Three months later, on the 4th of March, 1684, the secretary of the Overseas Council wrote to Nuno Alvares Pereira de Melo, the powerful Duke of Cadaval, regarding a shipment of twenty pounds of "chinachina" that an official in Madrid had promised to send to Lisbon.[241] This secretary, one Mendo de Foios Perreira, added that Nuno de Mendonça (the Count of Vale de Reis and the president of the Overseas Council) had also sent along "a memoranda regarding the trees of Maranhão," wanting to know whether a sample of Maranhão quina had been "falsified" [*falsicava*]. The Count "has some *Chinachina* of a more white color," the secretary wrote, "and it possesses lesser medicinal virtue."[242] Given the timing of this letter and the fact that a *consulta* (memorandum) offering an executive summary of de Sá's earlier report regarding quina

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[240] AHU Para, caixa 3, doc. 219, ibid.

[241] Biblioteca Mendo do Foios Pereira to the Duke de Cadaval, Madrid, 4 March, 1684, *Cartas Varias,* Cod. 890 (K VII 17), fl. 84, reprinted in Virginia Ray and Maria Fernanda Gomes da Silva, eds., *Os Manuscritos do Arquivo da Casa de Cadaval Respeitantes ao Brasil*, Vol. 1 (Coimbra, 1956), 272. Foios Pereira was at this time acting as an emissary to Spain.

[242] Carta do Mendo do Foios Pereira to the Duke de Cadaval, 4 March, 1684, in *Cartas Varias*, 272.

and salsaparilla was prepared for the Overseas Council in April of 1684, we can surmise that Foios Perreira was here referring to the samples gathered by Lacerda and sent by de Sá to Lourenço de Almada. [243] The Council's Secretary, perhaps, had been charged by either Almada or the Duke of Cadaval with the task of investigating "true" quina in Madrid and determining whether the Amazonian drugs sent from Belem matched it. Lacerda's samples had passed from the indigenous villages of the Amazonian backlands into the hands of some of the mightiest grandees in Portugal, and they were interested.

The Duke of Cadaval was extremely well connected in the medical circles of imperial Lisbon—both the royal surgeon Joseph Ferreyra de Moura and the royal apothecary João Vigier dedicated books to him—and it would seem that he cast doubts on the Maranhão sample's authenticity.[244] Although Secretary Mendo continued to make inquiries about drugs and medical matters among the administrators of colonial Brazil, de Sá's novel *drogas* appear not to have had the commercial impact he hoped for.[245] Instead, De Sá was forced to spend his remaining term as Governor quelling Beckman's Revolt (February of 1684), an uprising led by a disaffected New Christian colonist who

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[243] The timing also fits in terms transatlantic shipping. According to Joseph Miller, *Way of Death: Merchant Capitalism and the Angolan Slave Trade, 1730–1830* (University of Wisconsin Press, 1997), 321, average shipping time from Maranhão to Lisbon was approximately 30 days. De Sá's letter would likely have reached the overseas council in around February 1, 1684 (approximately thirty days after he postmarked it in December 30, 1683). De Sá's letter to his lieutenant Henrique Lopes da Gama regarding "drugs and other curiosities to send to D. Lourenço de Almada" is dated 16 January 1684. Allowing for a week or so for de Gama to send his samples of *drogas* to Belem, then another thirty days in transit to de Almada's palace in Lisbon, an investigation of the authenticity of these samples in Lisbon by March and April 1684 would make sense.

[244] See the dedications in Joseph Ferreyra de Moura, *Syntagma Chirurgico Theorico-Practico* (Lisbon, 1713) and João Vigier's *Thesouro Apollineo* (Lisbon, 1714).

[245] In 1692-3, for instance, Mendo and the Governor of Bahia corresponded regarding "the experience of a stranger regarding those sick with the contagion, and his anatomy of their corpses" as well as the possibility of transplanting cinnamon. Biblioteca de Ajuda, July 16 1692 and July 18, 1693, 51-IX 30 f. 20.

complained—pointedly—that "Governors arrive at Maranhão poor, and using their powers and despotism, return to Portugal with enormous fortunes."[246] In 1689, Artur de Sá e Meneses (Francisco de Sá's kinsman and the new Governor of Maranhão) again wrote to the Overseas Council with samples of *drogas* that included pepper, quina, and a tea-like plant, along with a report on the continuing backlands adventures of Pinheiro de Lacerda, who was by now trying and failing to discover cochineal.[247] Yet despite pervasive uncertainty about the identity of quina from the Maranhão—and the scantiness of pre-earthquake shipping records from early eighteenth-century Portugal—the arrival of fifteen *arrobas* of "quina-quina" from Maranhão in Lisbon in 1749 (roughly five hundred pounds) suggest that the trade in quina (or a drug called quina) from Portuguese Amazonia had indeed become a commercial reality by at least the mid-eighteenth century.[248]

2.5 From quina to Quinology

> Still one does not know what variety of tree such a bark as this might be taken from…
>
> —José Ferreira da Silva, *Observações sobre a… Quina do Brasil*, 1801

[246] Manuel Beckman, "Reprezentaço a S.M.," (original in Biblioteca da Ajuda, reprinted in Maria Liberman, *O levante do Maranhã* (São Paulo, 1983), 73. On Beckman's revolt and its historical context see Lúcia Helena Costigan, "New Christians in the Periphery of the Iberian Empires," in Ralph Bauer and José Antonio Mazzoti, eds. *Creole Subjects in the Colonial Americas* (University of North Carolina Press, 2009), 259-264.

[247] AHU, Pará, caixa 3, doc. 279, Artur de Sá to the Overseas Council, November 30, 1689

[248] Biblioteca Municipal de São Paulo, Codice Costa Matoso, fol. 506. The complete imports of the Duke are recorded in Appendix VI of C.R. Boxer, *The Golden Age of Brazil*, 353.

The dilemma faced by de Sá and by other bioprospectors in the Atlantic world was one of inadequate representation: early depictions of quina were usually either allegorical representations (Fig. 2.8) or simplified copperplate engravings and woodcuts that lacked critical details (Fig. 2.9). These depictions rarely depicted the different parts of the plant, and were in black and white (hence de Sá's request for a painting showing "the colors of the trunk, branches, leaves, flowers and roots.") No seventeenth-century depiction of quina showed the plant in its native ecological context. Just as prospectors for minerals in South America sought telltale sensory traces of silver, gold or gems in the environment, bioprospectors required contextual environmental knowledge to reliably locate novel plants. No contexts are available in these early images: the plant appears either against a blank background, or in a generic allegorical landscape modeled on classical antiquity rather than on actual tropical ecosystems. The iconographic ambiguity of early images of quina lent itself well to the aesthetics of late seventeenth-century European medical writing, which emphasized classical references and elegance of form.[249] But it also made it impossible to locate quina in its actual ecological contexts by relying upon European-made images alone.

[249] As the art historian Elizabeth Athens has argued, Baroque aesthetics and notions of elegance played an important role in shaping how European engravers and artists depicted New World nature in the late seventeenth and eighteenth centuries. Elizabeth Athens, "Scientific Ornamentation: William Bartram's Visual Rhetoric," a paper presented at the Traces of Early America Conference at the McNeil Center for Early American Studies, September 27, 2013.

FIGURE 2.8 Frontispiece engraving showing an allegorical representation of the *Deœ Febri* ("God of Fever") decapitated by the powers of quina, which is presented to personifications of Europe and the medical arts by an indigenous child wearing the feathered skirt typical of European depictions of Tupí Indians. Francesco Maria Nigrisoli, *Febris china chinae expugnata* (Ferrara, 1687), Courtesy of the New York Academy of Medicine Library.

FIGURE 2.9 From the same text, the quina tree ("*Arboris Chinœ Chinœ*") depicted with scarce attention to details like the shape of its roots, flowers, or seeds. The tree appears out of context, with no hints as to the ecological niches where it flourishes. Francesco Maria Nigrisoli, *Febris china chinae expugnata* (Ferrara, 1687), Courtesy of the New York Academy of Medicine Library.

It remains unclear what, precisely, the Overseas Council was investigating. Potentially, these investigations could have concerned the sample de Sá believed to be a form of sarsaparilla, or the "bark like *huanó*" he also mentioned, or the Tapuyas' "medicinal barks and bitters" mentioned by de Sá a year earlier, or indeed an entirely different Maranhão sample entirely. At a larger level, it is worth reflecting on the inherent vagueness of the

entire enterprise of de Sá and company. Shall we say that they were seeking a wild, uncultivated twin to the plant we now call *Cinchona officinalis*? Or was it the unrelated yet fever-reducing plant that, by the 1790s, had come to be known as "Quina do Brasil" and given the Linnaean name *Portlandia hexandria* (Fig. 2.10)? Or, indeed, was "wild quina" some other plant entirely, and was its identity as quina, its 'quinaness,' more dependent on perceived fever-fighting properties or on some other cultural or natural characteristic than in any botanical or sensory resemblance with the quina of Loxa in Peru? De Sá's attempt to make "discoveries of drugs" in the Amazonian interior leaves us, as it did him, with far more questions than answers.

Early modern naturalists engaged in what Janice Neri calls "specimen logic," turning "nature into object by decontextualizing select creatures and items... removing them from their habits, environments, and settings."[250] This practice of decontextualizing nature worked well for apothecaries striving to make foreign remedies amenable to suspicious European consumers or for printers seeking to sell books and engravings of exotica *curiosa*. But it was a formidable roadblock for bioprospectors. "Pinheiro told me that he took efforts to discover [quina] trees," Governor de Sá told his superiors, but that "it will not be easy to find them by showing [the Indians] the trunk cut into pieces, all by itself without branches, or leaves, for the Indians do not recognize them."[251]

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[250] Janice Neri, *The Insect and the Image: Visualizing Nature in Early Modern Europe, 1500-1700* (Minneapolis: University of Minnesota Press, 2012), xiii.

[251] AHU Para, caixa 3, doc. 219.

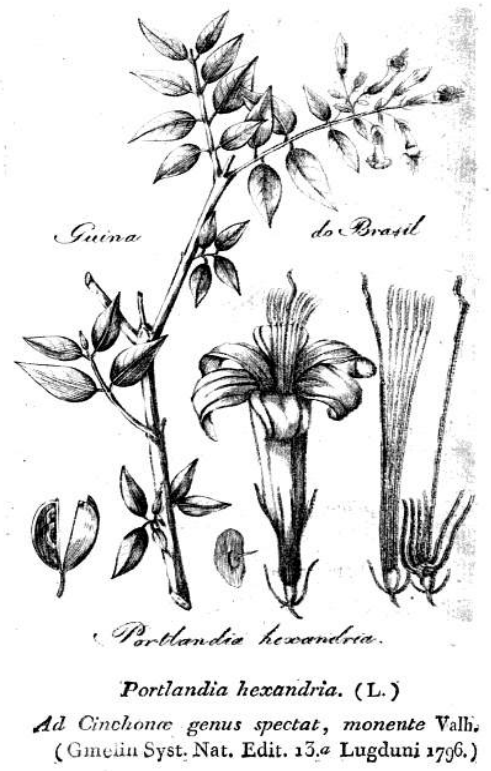

FIGURE 2.10 The hand-colored frontispiece illustration to José Ferreira da Silva, *Observações sobre a propriedade da Quina do Brasil* (Lisbon, 1801) which identifies "Quina do Brasil" as the Linnaean *Portlandia hexandria*. Courtesy of the John Carter Brown Library.

FIGURE 2.11 The "true" Quina of Loxa, Peru, from Hipólito Ruiz, *Quinologia, o tratado del árbol de la quina ó cascarilla* (Madrid, 1792). Courtesy of the John Carter Brown Library.

The properly prepared bark described by drug-merchants like Vigier as ideal —carefully sorted, processed, chopped, and packaged—was here blamed as the reason for the failure of Europeans to locate new sources of the plant itself. The "specimen logic" of both the printed medical treatise and the apothecary's drawers conspired to prevent bioprospecting on the ground.

By the second half of the eighteenth century, the iconographic strategies of naturalists had made botanical illustrations more functionally useful in the context of bioprosecting. These new depictions lavished attention upon characteristics like color or the shapes of discrete parts of the plant like the stamen or seeds, reflecting the fact that they were increasingly being used as guidelines for the new Linnaean classifications of botanists rather than as illustrations in medical texts aimed at European physicians. These images were also disseminated across long distances, both in popular books like Hipólito Ruiz's *Quinologia* (see Fig. 2.11), and in painted form. In the late 1790s, for instance, Fernando Jose de Portugal, the Governor of Bahia, ordered an artist to paint a plant that he believed to be 'true' quina. In 1800, he sent the image "drawn on paper with watercolor tints of yellow, beige, black, green and red... describing the natural colors of the branches, leaves, flowers and fruits" across the Atlantic to Lisbon.[252] The move was the reversal of what de Sá had requested: whereas in the 1680s, colonists in the tropics struggled to obtain knowledge of tropical nature from indigenous go-betweens and European experts, by the end of the eighteenth century, colonists had come to regard the tropics—and their own creole societies—as a center for knowledge production in its own right.[253] Even at this later date, however, the ambiguous nature of Brazilian quina persisted. The Governor's letter accompanying the painting announced "the discovery of a tree imagined to be quina," in the backlands west of Bahia. Yet the letter concluded with a characteristic note

[252] AHU, Icon M. 005 E, d. 90, letter from Gov. e Capitao General da Capitania da Bahia, D. Fernando Jose de Portugal, 1st Conde de Agiuar, to Secretario do Estado da Marinha e Ultramar, Rodrigo de Sousa Coutinho, 5/12/1800.

[253] This reflected the larger shift toward "patriotic epistemologies" of nature studied by Cañizares-Esguerra in *How to Write the History of the New World*.

of ambiguity and doubt, admitting "that the most experienced apothecaries disagreed" about the identity of the plant.[254]

Thus, although "quina-like" anti-fever drugs originating in Portuguese America had become common by 1800, and despite the rise of Linnaean nomenclature and the dissemination of ever-more accurate botanical representations, it remained impossible to determine the true nature of plants "imagined to be quina" with any certainty.[255] It was not until the 1810s and 1820s, with the rise of chemical processes designed to isolate the active principles of drugs, that savants began to draw conclusive distinctions between Peruvian quina and quina do Brazil.[256] Breakthroughs in chemistry allowed scientists of the 1820s to isolate a certain class of bioactive chemical compounds present in many plants—called 'alkaloids'— that conferred their medicinal or psychoactive properties. By measuring the alkaloidal content of different plants purported to be quina, chemists of the

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[254] AHU, Icon M. 005 E, d. 90-91. ("Uma arvore que se imaginava ser a quinera, mas… os boticarios mais experientes discordavem.")

[255] It is, however, true that the classifications of quina-like plants had become more precise by this period. By 1811, for instance, Alexander von Humboldt was drawing a distinction between what he called "the quinquina of Loxa" (i.e. 'true' Peruvian cinchona) and the *quina do Brasil* (which he called "the portlandia hexandria... at Cayenne") along with other tropical febrifuges found in the East Indies, the Orinoco River, and Mexico. Humboldt theorized that there was a "natural affinity" between true quina and the plants which resembled it, and that all contained some innate "febrifuge principle." Here, Humboldt was anticipating the chemical breakthroughs of the 1820s, which resulted in the discovery of alkaloids and the means of extracting them, and essentially inaugurated the 'modern' era of pharmacy, which was based on the identification and synthesis of active principles in nature rather than the holistic consumption of drug preparations made from entire plants. See Alexander von Humboldt (trans. John Black), *A Political Essay on the Kingdom of New Spain* (London, 1811), 354. On Humboldt's knowledge of quina see Karl S. Zimmerer, "Humboldt's Nodes and Modes of Interdisciplinary Environmental Science in the Andean World," *Geographical Review*, Vol. 96, No. 3 (Jul., 2006), 348-9.

[256] As John E. Lesch notes, the 1810s and 1820s were periods of frenetic activity in the realm of pharmaceutical chemistry. John E. Lesch, "Conceptual Change in an Empirical Science: The Discovery of the First Alkaloids," *Historical Studies in the Physical Sciences* 11/2 (1981), 305-328.

1820s were finally able to determine conclusively whether a plant sample was 'true' quina (*Cinchona officinalis*) or a related species.

Although two French chemists are popularly credited with synthesizing quinine in 1820, the Luso-Brazilian surgeon Bernadino Antonio Gomes identified the same alkaloid in 1811, calling it 'cinchonin.' His discovery was the culmination of two decades of close observation of how Brazilian fever patients responded to Peruvian, Brazilian, and other varieties of 'quina.'[257] Given the prolonged ambiguities surrounding its identification, it is no coincidence that this, the first alkaloid ever isolated, was derived from the quina plant – nor that the discoverer was a Portuguese naval surgeon with long experience in the Brazilian tropics.[258]

2.6 Conclusion: do bioprospectors discover drugs, or invent them?

Although most official expeditions to locate drugs in the Amazon met with failure, these failures, misunderstandings and missed opportunities profoundly shaped the formation of the global drug trade. A more mature phase of resource extraction in the

[257] Bernardino Antonio Gomes's original casebooks from Brazil (1798-1808) still survive, and represent an untapped resource in the history of medicine. To my knowledge, they have yet to be studied. They are owned by the University of Coimbra's Faculdade de Ciências e Tecnologia, and have recently been digitized here:
http://bibdigital.bot.uc.pt/obras/UCFCTBt-Cofre-Man-04/UCFCTBt-Cofre-Man-04_item1/P1.html

[258] Bernardino Antonio Gomes, "An Essay upon Cinchonin, and its Influence upon the Virtue of Peruvian Bark, and other Barks," in *The Edinburgh Medical and Surgical Journal* (1811), 420-431 (a translation of a report Gomes circulated with the Academia de Ciencias in Lisbon) and Bernardino Antonio Gomes, *Ensaio sobre o cinchonino, e sobre sua influencia na virtude da quina, e d'outras cascas* (Lisbon, 1812). Bernando Gomes, a naval surgeon who had treated fever patients in 1790s Brazil, performed parallel chemical analyses of both 'true' quina (*Cinchona officianalis*) and quina do Brasil (*Portlandia hexandria*), creating extracts of their barks and subjecting them to chemical reactions like "precipitate with potassa" and oxygenation. Pierre Joseph Pelletier and Joseph Bienaimé Caventou are usually credited with the isolation of quinine, but in fact they merely published a more detailed and easily replicable version of the extraction process described by Gomes (this is described in further detail in chapter 5).

tropical world emerged as competing maritime empires moved from costal outposts to vast inland zones—middle grounds, in Richard White's parlance—beyond the reach of European hegemony. Figures like de Sá, Pinheiro de Lacerda helped constitute the very nature of the drugs they sought out.[259] In moving between European, creole, Amazonian, and African worlds, these individuals collectively created a hybrid understanding of drugs and tropical nature that attempted to mesh European "authorities" with indigenous informants and the vernacular, practical know-how of creole *sertanejos*. Their confusions, their miscommunications, even their failures all became part of a shared realm of expectation, assumption and vernacular knowledge about exotic drugs that would have unexpected repercussions: there could be no "quina do brasil" in the late eighteenth century or quinine in the nineteenth without the failed hunt for quina in the seventeenth.[260]

Although the findings presented here accord with other recent works on botany and empire that stress the discontinuities and creative misunderstandings between European and indigenous botanical knowledge, they also highlight the prolonged epistemological ambiguity of drugs as a medical, cultural and ecological category. For bioprospectors, "drugs" (*drogas*) was an extremely capacious semantic field. The theoretical basis behind conceptualizations of where drugs grew and how they might be used tapped into mystical

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[259] "Pharmaceutical go-betweens" is my own phrase, influenced by Alida Metcalf's enumeration of go-between roles in *Go-Betweens in the Colonization of Brazil, 1500-1600* (University of Texas Press, 2005).

[260] On the larger question of how confusions about names and identities influenced "the fuzzy logic of encounter," see Richard Drayton, "Synchronic Palimpsests: Work, Power and the Transcultural History of Knowledge," in Gesa Mackenthun and Klaus Hock, eds. *Entangled Knowledge: Scientific Discourses and Cultural Difference* (Munster: Waxmann, 2012), 38-9.

understandings of the workings of nature. At the same time, it also drew on nascent environmental knowledge grounded in what Junia Ferreira Furtado calls "tropical empiricism," like noting that certain visual clues indicated mineral deposits or using makeshift chemical and sensory analyses to verify if drugs were "true" or "false."[261] "Empiricism in the colonial context," writes Furtado,

> became a way to extract practical knowledge from natives without embracing their heathen and superstitious beliefs about nature, magic and their gods. By cementing this new knowledge in written language, Europeans converted it into an erudite framework. They adopted practical medical techniques from the indigenous populations, but they insisted on divorcing these techniques from the native's superstitious accounts of why they functioned the way they did.[262]

Sometimes this processing of divorcing described by Furtado was successful: yet more commonly, these different epistemological modes of identifying and assaying novel drugs failed to establish even the baseline amount of mutual comprehensibility necessary to move from the stage of gathering knowledge to the commercial exploitation of a novel commodity. The verbal naming of a plant by a European, or the display of a sample or botanical illustration of it, assumed a parallel understanding of the visual and verbal lexicon of drugs in the minds of native audiences. Yet these parallels did not always exist: the epistemological categories that allowed de Sá or Pinheiro to sort medicinal barks into "quina" and "not quina" were by no means self-evident.

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[261] Antonio Barrera-Osorio, *Experiencing Nature: The Spanish American Empire and the Early Scientific Revolution* (Austin: University of Texas Press, 2006).

[262] Junia Ferreira Furtado, "Tropical Empiricism" in Delbourgo et al, *Science and Empire*, 136-7.

Morever, as Daniela Bleichmar has recently noted in the case of late eighteenth-century bioprospectors in Peru and Ecuador, even the seemingly-successful identification of a drug was not enough to render it commercially or scientifically useful: "Naturalists' methods based on visual epistemology," she notes, "were insufficient for determining issues of yield and effectiveness that necessitated other techniques, such as chemical analyses and medical trials."[263] Just as bioprospectors encountered gaps between their own classificatory schemas and those of indigenous societies, they, too, were frequently unable to bridge the gap between their colonial "discoveries" and metropolitan practices of scientific knowledge-production that depended upon techniques of chemical analysis, specialized medical erudition, and social credibility as reliable witnesses which were unavailable to them.[264]

Recent studies of the early modern world and the history of colonial science have placed a priority on narrating the origins, exchanges, and itineraries of objects.[265] Yet the

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[263] Daniela Bleichmar, *Visible Empire: Botanical Expeditions and Visual Culture in the Hispanic World* (University of Chicago Press, 2012), 138. It is important to note a key differenence between the cases examined here and Bleichmar's 1780s naturalists, however: the century that stood between them. In the 1680s, the "chemical analyses and medical trials" that Bleichmar refers to were still in a highly nascent and undeveloped form. Indeed, only a handful of savants in Europe (figures straddling the worlds of chemistry and medicine like Robert Boyle, Pierre Pomet, and João Curvo Semedo) were capable of assaying the chemical makeup of tropical drugs in the manner that would become relatively common by the end of the eighteenth century. The emerging links between these European "iatrochemists" (medical chemists) and colonial actors feature in chapter five.

[264] On metropolitan European concerns with the replicability and reliability of colonial knowledge, see Lorraine Daston, "The Empire of Observation, 1600-1800," in *Histories of Scientific Observation*, ed. Lorraine Daston and Elizabeth Lunbeck (Chicago, 2011), Simon Schaffer, "Newton on the Beach: The Information Order of Principia Mathematica," *History of Science* 47 (2009): 243-276, and Jorge Cañizares-Esguerra, *How to Write the History of the New World: Histories, Epistemologies, and Identities in the Eighteenth-Century Atlantic World* (Stanford, 2001), 15-17.

[265] Carla Nappi, "Surface Tension: Objectifying Ginseng in Chinese Early Modernity," in Paula Findlen, ed., *Early Modern Things: Objects and their Histories, 1500-1800* (Routledge, 2013): 31-52; Carla Nappi, "Following Ghosts: Skinning Science across Early Modern Eurasia," presented at the Empires of

forms of exchange that mattered most, Carla Nappi has recently argued, were those which instantiated meaning and knowledge by the very act of movement itself. Put another way, speaking of "networks," "circulation," "itineraries of objects," and other formulations currently en vogue has the potential to conceal as much as it clarifies, because it implicitly conveys a sense of commodities as unchanging, fixed, and clearly defined. Some objects, like a coin, do indeed retain inherent properties that are either wholly independent of cultural contexts (a gold coin may melt into an ingot, but its elemental nature stays intact) or partially so (gold's intrinsic properties let it retain value across cultural and linguistic boundaries). Yet early modern drugs—like early modern texts—were not "immutable mobiles."[266] They lost and reacquired coherence according to their circumstances. Bioprospecting in the early modern world was not simply an act of searching for a pre-established category of goods and transporting them back to a metropole for sale or study—it was a creative act in itself. If we follow this train of logic, "to make discoveries of drugs" (*fazer descobrimentos de drogas*), as de Sá put it, thus contains an etymological contradiction at its core.

"Discovery/descobrimento" (from late Latin *discooperire*, to uncover) implies the revelation, the uncovering, of an existing thing. Yet the interpretive work that went into "finding" drugs—amassing knowledge of existing remedies, gathering visual simulacra of the desired drugs, surveying the landscape, interrogating local inhabitants—was actually

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Knowledge conference, Stanford University, May 2, 2014.

[266] On immutable mobiles see Bruno Latour, "Visualization and Cognition: Thinking with Eyes and Hands" *Knowledge and Society* (1986), 6, 1-40 and Bruno Latour, "Circulating Reference" in *Pandora's Hope* (Cambridge, Mass: Harvard University Press, 1999).

an act of *inventio*. A drug, after all, is not a fixed object like a gold ingot, but a biological entity with a lifespan that lasts only from the point when the drug is harvested to when it is consumed and incorporated into the fabric of a human body. This existence as a drug typically lasted only for a few weeks, months or at most a few years—and it was predicated at every turn on the perceptions of those who harvested, sold, prepared, and consumed the substance, and not on any inherent property of the substance itself.[267] Put more directly: how does our understanding of bioprospecting change if we conclude that "discovering" drugs actually meant *inventing* them?

Although this chapter has taken it for granted that quina corresponds to a febrifuge plants of the *Chinchona* genus—an assumption based on the fact that numerous seventeenth-century medical texts use the terms cinchona and quina interchangeably— it is worthwhile to step back and question the lexical boundaries of early modern drug names. Portuguese colonists in the Maranhão never refer to quina as cinchona, rather employing froms like "quina," "china," "Kina," or "chinachinae." This was a relatively common usage in the decades bookending 1700—Anthony van Leuwenhoeck, in 1707, described his microscopic observations of the "the bark called china chinae, or Peruvian bark."[268] But it was also a deeply confusing one. It led to confusion between quina (genus

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[267] I am not arguing here for the cultural construction of the medical action of drugs—I would allow that the biologically-active alkaloids in *Cinchona officinalis* exert a febrifuge action on human bodies regardless of the names or categories applied to the bark that contains them. But I am arguing for the social/cultural construction of drugs as a category of goods, from which it follows that rather than thinking about the itineraries of drugs as immutable objects, we ought to think of how their objecthood was continually being refashioned as they cross cultural boundaries.

[268] Anthony Van Leuwenhoeck, "Microscopical Observations of the Peruvian Bark," 1707, reprinted in *The Philosophical Transactions of the Royal Society (1665-1800)*, ed. Charles Hutton et al (London, 1809), 372.

Cinchona) and china root (*Smilax china*, known to early modern Portuguese as "pau da china"), and raised doubts as to whether the different names of the plant signaled different points of origin, grades of purity, or medicinal virtues. Leuwenhoeck wondered in passing "whether the china chinae be of two sorts of trees," and, as we have seen, he was far from alone. By the time that Charles Alston compiled his two volume treatise on "the natural history of drugs" in the 1750s, the plant had amassed over a dozen ostensibly synonymous names:

> Cortex, Cortex Peruvianus, China China, Quinaquina *office[inalis*], Arbor febrifuga Peruviana, China Chinae, Quinquina, Gannana, Hispanis Palos de calenture, cortex arboris, pulvis partum, pulvis Cardinalis de Lugo, the Jesuit's powder, Kina Kina, Cinchona, the Jesuit's bark, or the bark, or Peruvian bark.[269]

Yet the act of translating quina into multiple languages, functions and social settings also altered it. "Jesuit's bark" evokes an entirely different set of associations than "Arbor febrifuga Peruviana," and these shifting associations cannot be extricated from the historical trajectory of the drug. One might say, therefore, that the seventeenth-century search for Amazonian quina was a failure because Portuguese weren't able to marshal the human capital and natural knowledge necessary to locate the plants in the genus *Cinchona* that actually are native to eastern Amazonia. Or one might say that it failed because European bioprospectors, traders, and buyers weren't wholly comfortable with the conceptual leap of searching for *similar but different* febrifuges, then simply relabeling them quina—of constituting quina-ness on the basis of perceived efficacy rather than

[269] Adapted from Charles Alston, *Lectures on the Materia Medica: Containing the Natural History of Drugs, their Virtues and Doses*, 2 vols (London and Edinburgh: Edward Dilly, A. Kincaid and J. Bell, 1700), 2: 10.

sensory characteristics. But perhaps de Sá and Pinheiro de Lacerda failed to find quina for a reason both simpler and more complex: they had failed to invent it.

The contested nature of drugs thus flows backward to the act of creating that category—and to the continuous colonial improvisation that created meaning out of the raw materials of nature. This is not to say that substances like quina were not also scientifically-constructed commodities. Yet the intersections between elite science and everyday commerce made drugs liable to counterfeiting, fraud, mistaken identities, and cross-cultural confusion. And it was this vernacular confusion that most profoundly shaped the global drug trade of the seventeenth, eighteenth and nineteenth centuries. Tropical drugs and knowledge about them travelled along the interstices between radically foreign—yet converging—cultures of healing, natural knowledge, and ecological manipulation. In a very real sense, this vernacular entanglement of materials and sensibilities helped construct the modern conception of 'drugs' itself.

Chapter 3

Fetishizing Drugs: *Feitiçaria* and Poison in West Central Africa, 1660-1740

> We submit to your Majesty that one of the causes of the contagion and sickness that frequently occur in this city has been shown by experience to be an infection of the air occasioned by the great number of cadavers of slaves, which the wolves of the night disinter from the field where they are buried.
>
> —City Council of Luanda, 1688

> They... readily ascribe something supernatural to any Materials used about them, which had any Influence to please or hurt them, and would regard them, under what Name soever, as *Fetishes*.
>
> —John Atkins, 1735

Introduction: the King of Cups

A white-washed fortress, its walls pierced here and there by narrow embrasures, juts out over the rise of a hill overlooking a forested valley. Outside it is bright daylight, but inside the fortress's chapel it is gloomy. Two hands lift a surplice and hammered silver chalice from a wooden chest behind a humble altar. The man who dons the surplice, triumphant in his conquest, is an African lord. Along with the fortress, he has also captured a group of slaves destined for Brazil. He lifts the communion vessel to his lips and drinks a deep draught of red wine: the sacred blood of the Savior, profaned.[270]

This scene, the stuff of nightmares for any early modern Portuguese Catholic, took place in the frontier *presidio* of Caconda south of Luanda in February of 1688. The captor was a man known to the Portuguese as the Jaga (war leader) of Kakonda. The Jaga

[270] This description and the quotations in the following paragraphs are gathered from AHU, Conselho Ultramarino Angola, cx. 13, doc. 51, Feb 7, 1688. See also cx. 13, doc. 88 for further documentation related to Caconda (which is spelled Caconda in the primary sources I consulted, though I've used Kakonda here to match the spelling used by Candido and Heywood and Thornton).

Kakonda, in rebellion some seven years after his lands had sworn vassalage to the Portuguese Crown, had already won a number of victories against the embattled and disease-ridden battalions of Angola's southern frontier.[271] Word of his "sacrilege" reached the Overseas Council in Lisbon months later, in a repentant letter written by the leaders of Luanda's city council. They explained that the Jaga had lured the hundred-odd soldiers of the newly-built presidio at Caconda into the backlands, which they called the *sertão,* echoing their compatriots in Amazonia. Jaga Kakonda's forces were able to circle back and "invade the Presidio without resistance," taking as prisoners both the remaining soldiers and "the slaves of the whites." Although the Jaga was eventually expelled from the presidio, it was a disastrous setback in the colonial government's attempts to subdue the "principes vizinhos" (neighboring princes) who surrounded Portugal's colony in Luanda.

The dynasty of Queen Nzinga of Matamba and Ndongo had been defeated over two decades previously, removing one of the most powerful native African states from the

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[271] On the Jaga of Kakonda (or the Jaga Caconda, as the Portuguese styled him) and his previous battles with Portuguese forces in the central highlands of Angola in 1685, see John K. Thornton, *Warfare in Atlantic Africa, 1500-1800* (Routledge, 2000), 112 and on Kakonda see Mariana Candido, *An African Slaving Port in the Atlantic World: Benguela and Its Hinterland* (Cambridge University Press, 2013), 73-5 and 245-8. *Jaga* as a title reflects contemporary Portuguese usage of the term as an ethnonym once thought to be synonymous with Imbangala, but now (as Mariana Candido argues) more plausibly interpreted as a "Portuguese creation" to "refer to nameless enemies, whose political and social structure was foreign to the Portuguese" (Candido, *Slaving Port*, 59-60). In this it is somewhat analogous to the blanket use of "Tapuya" as an identifier of unfamiliar Indian tribes in Amazonia. Caconda was a contested interior region with occasional control over the slave trade in Benguela. On the debate over the meaning of *Jaga* see Joseph C. Miller, "Requiem for the 'Jaga'" *Cahiers d'Études Africaines,* 13/48 (1973), 121-149 and Beatrix Heintze, "The Extraordinary Journey of the *Jaga* through the Centuries: Critical Approaches to Precolonial Angolan Historical Sources," *History in Africa* 34 (2007). On the larger context of warfare and the slave trade in seventeenth-century Angola see Roquinaldo Ferreira, "Transforming Atlantic Slaving: Trade, Warfare and Territorial Control in Angola, 1650-1800," (PhD dissertation, University of California, Los Angeles, 2003).

region and clearing the way for a Portuguese invasion of the Angolan interior.[272] Yet Portuguese plans for a territorial empire in the African interior failed to materialize, and rulers like Kakonda continued to lead independent polities in the interior. Kakonda—a "most cruel enemy" as the Luanda city council called him—had, four years earlier, slain the colony's top military officers, the Capitão-mór and Sargento-mór.[273]

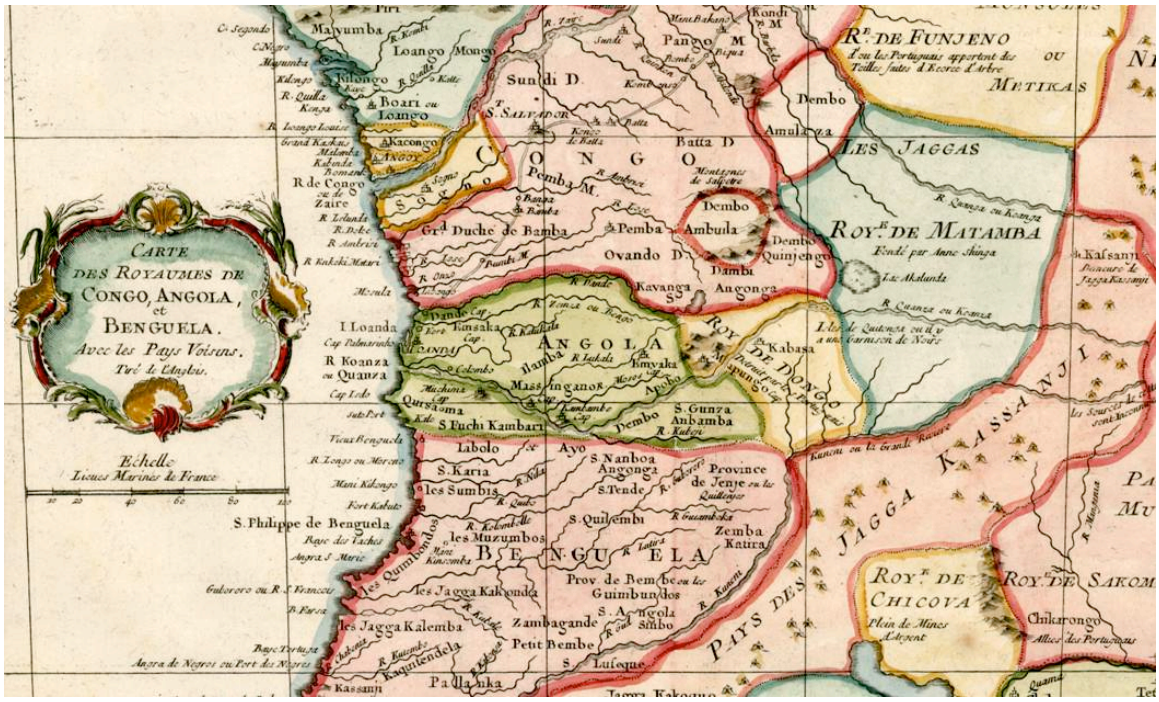

FIGURE 3.1 An eighteenth-century map of Congo, Angola, and Benguela showing the Portuguese fortress at Luanda, the Kingdom of Dongo ("destroyed by the Portuguese") and Nzinga's Kingdom of Matamba to the east, and territories of various *jagas*, including those of the "Jagga Kakonda" (labelled directly below the "B" in "Benguela") and Dembo Ambuila. Jacques Nicolas Bellin, "Carte des Royaumes de Congo, Angola, et Benguela," in François Prévost, *Histoire Générale des Voyages* (Paris, 1754), Vol. 4, courtesy of the Library of Congress.

[272] On the rule of Queen Nzinga see John Thornton, "Legitimacy and political power: Queen Njinga, 1624-1663," *Journal of African History* 32:1 (1991): 25-40.

[273] J. C. Feo Cardozo de Castellobranco e Torres, *Memorias contendo a biographia do vice alimirante Luiz da Motta Feo e Torres* (Paris, 1825), 211.

Fearing further attacks, the city officials wrote that "munitions, gunpowder and six bricklayers," were now urgently needed in order "to better secure the lands of the blacks." Although the officials at Luanda were reticent to elaborate on the Jaga's precise activities in the fortress for fear of "offending the Catholic zeal of your majesty," they wrote that he had "conjured all the Africans against the whites… to destroy the fortress, and to kill all of the whites." This choice of word—*conjurar*—is significant. To *conjurar*, in early modern Spanish and Portuguese, could either mean to conspire in a plot or oath, or to exorcize, to struggle against evil spirits.[274] Conversely, however, it could mean to *invoke* evil spirits, or to enchant in a sinister fashion. This was the usage employed by Francisco Xavier de Menezes, in his 1741 epic poem of the Portuguese empire:[275]

Morfeo contra o mundo se conjura	Morpheus who conjures 'gainst the globe
De opio lethal no imperio deshumano…	Deadly opium in his otherworldly abode…

Conjurar, in short, is a word that opens up our understanding of events which appear on their surface to have been military skirmishes, but which were also imbued with both spiritual and pharmacological significance.[276] The Portuguese typically interpreted West and West Central African herbalists and spiritual healers (*gangas*), as practitioners of

[274] For contemporary usage of *conjurar* as "to exorcize" or "to banish evil spirits" see Luis de la Concepción, *Practica de Conjurar, en que se contienen exorcismos, y conjuros contra los malos espiritus* (Madrid, 1721).

[275] D. Francisco Xaver de Menezes (Count of Ericeira), *Henriqueida: Poema Heroico* (Lisbon: Printed by Isidoro da Fonseca, 1741), 279. The count was a distant kinsman of Francisco de Sá de Menezes, as well as one of the earliest Portuguese members of the Royal Society of London. Translation is my own.

[276] See also AHU Cx 14, doc. 89, Feb 15, 1692, ("list of expenses"), the minutes of a Luanda council that met in the presence of Senhor Goncalo da Costa de Menezes and decided on the cost of items and services needed for the campaign against another *jaga* named Dembo Ambuila. According to the document, it is "necessary and needed… to fight for the respect of the Catholic Church," because of Dembe Ambuila's "maleficios," a word that could mean either simply "misdeeds" or an act of sorcery.

sorcery or conjuring *(feitiçeiria)* in alliance with the devil.[277] Yet they believed their powers to be very real, and feared the magical forces that non-Christian African spiritual and political leaders could wield on the battlefield, as well as the more stealthy curses and poisons they could dispatch in domestic spaces.[278] In the case of Jaga Kakonda's attack, these fears were realized. "The said Jaga has in his possession images of Christ our Lord, and of the Virgin Mary our Lady… and has profaned the sacred vestments that were in the Presidio" the disgraced city officials admitted. And worst of all, the Jaga "sacrilegiously drank of the sacred chalice." In the opinion of the municipal council of Luanda, these acts demonstrated the demonic inspiration of the Jaga and his followers.

But how did this incident appear to the man the Portuguese called Jaga Kakonda himself, and to those he lead? Drinking communion wine from "the sacred chalice" was a charged and multivalent act in the context of seventeenth-century Angola. This was a world where wine and alcoholic spirits were not only newly-introduced trading goods, but also emerging elements in the ritual practices of *feitiçaria*. This chapter argues that exchanges of novel drugs helped shape an emerging creole culture of healing and spirituality in both West Central Africa and in the African diaspora of the South Atlantic

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[277] *Ganga* was a West Central African term in wide use which described figures who practiced spiritual possession, made sacrifices, healed, and/or wielded spells or curses; early modern Europeans typically called *gangas feitiçeiros*, fetisheers, or sorcerers or conjurors (*sorcieres*). Roquinaldo Ferreira, in his *Cross-Cultural Exchange in the Atlantic World: Angola and Brazil During the Era of the Slave Trade* (Cambridge University Press, 2012), defines *ganga* simply as "spiritual leader," a suitably broad definition that I also employ here.

[278] James Sweet has written perceptively on the various forms of spiritual or magical power yielded by slaves in Portuguese Africa and in diaspora. See his *Domingos Alvares* (UNC Press, 2011) and James H. Sweet, "Slaves, Convicts and Exiles: African Travellers in the Portuguese Atlantic World, 1720-50" in Caroline Williams, ed. *Briding the Early Modern Atlantic World*. See also Daniela Buono Calainho, 'Jambacousses e Gangazambes: Feiticeiros Negros em Portugal, Afro-Ásia, 25-6 (2001), 141-76. For comparative perspectives on African magical practices in the West Indies, see J. Handler, "Slave medicine and Obeah in Barbados, circa 1650 to 1834" in *New West Indian Guide/ Nieuwe West-Indische Gids* 74 (2000), 50-79.

world. Novel drugs like high-proof sugarcane liquors (*cachaça* and *gerebita*) and the distinctively potent, molasses-soaked tobacco that Luso-Brazilian merchants traded in Africa emerged both as disruptive novelties and as analogues to existing substances (like palm wine and cannabis) used by *gangas* in Angola, the Congo and Benguela. Building on José Curto's study of alcohol in Luanda and Mariana Candido's recent work on the transformations of material culture and social relations in early modern Benguela, I argue here that novel *drogas* like alcoholic spirits and tobacco—as well as African cures like the Angolan "bark of life" endorsed by the cavalry officer Francisco de Buytrago—played a key role in the creation of "Atlantic creole" societies in Brazil and West Central Africa. These drugs were novelties, but they could also be readily integrated into existing practices for preserving health and combating *feitiçeiria*.

As Mariana Candido has argued, the influx of Portuguese-traded weapons like muskets, handguns as well as New World food crops and the Catholic faith profoundly altered the fabric of societies that stretched far beyond the small area of formal Portuguese control around Luanda. However, this was not a simple imposition of Portuguese or European technologies and beliefs, but a creation of a novel social fabric that included Portuguese *filhos de terra* (African-born whites), mixed-race local elites, and itinerant merchants (*pombeiros*), many of them women and some semi-autonomous slaves, who amassed substantial fortunes trading in enslaved captives to be shipped to the Brazilian plantations along with novel goods like *cachaça*, tobacco, European and Indian

textiles, and guns.[279] The same material and ecological exchanges across the seventeenth-century Atlantic that made the plantation system possible also helped to establish a transcultural framework for pharmaceutical healing, poisoning, and spiritual practice. When healers and political leaders in Africa and in diaspora sought access to the benevolence of ancestors and gods via offerings of palm wine and mixtures of roots, animal products, and herbs, they did so in a shared framework of *feitiçaria* that was understood as effective by both Europeans and Africans. Within this context, Catholic rituals and European-traded materials became reconfigured within a hybridized practice that employed drugs to invoke protection from both human violence and the dangers of tropical disease.

3.2 Tropical Africa as "poisoned landscape"

Writing in 1611, the traveler François Pyrard de Laval explained why he had feared to visit Angola during his voyages throughout the Atlantic world:

> It is the poorest country in the world… No other traffic is carried on but in negro slaves; the Portuguese hold it solely for this, and would not otherwise inhabit it, for the land produces only some fruits and cattle, and but small store of these… The cause that more ships go not to Angola is that the air is very intemperate and noisome.[280]

French, English and Portuguese accounts of West and West Central Africa portrayed it as a place of venoms, toxins and psychoactive powers. As Jorge Cañizares-Esguerra has noted, seventeenth and eighteenth century Europeans who passed intro the 'Torrid Zone'

[279] Candido, *African Slaving Port,* 14.
[280] Pyrard, *Voyage*, 218-9.

demonstrated an abiding fear of the corrupting effects of tropical nature.[281] Tropical drugs, therefore, had a complex, negotiated and ever-shifting role in early modern zones of encounter: they were coveted by Europeans who regarded their consumption as necessary evils imposed by the rigors of tropical climates. But because they regarded these diseases as arising directly from the malignant vapors and venoms of the African landscape itself, African cures and the healers who supplied them coexisted uneasily with a pervasive fear of tropical poisons.

An anonymous English traveler in late seventeenth-century Guinea, for instance, described a litany of poisons lurking in the African undergrowth. The author's chapter on the fortress of Winnebah devotes only a brief paragraph to the site itself ("it hath 18 Guns, and 50 Europeans besides slaves to defend it"), then launches into a bravura eleven page description of the "monstrous creatures" lurking in the hinterland beyond, culminating in an extended translation of Lucan's description of African vipers. The emphasis throughout is on physical and mental transformations induced by the African landscape, from flesh-eating poisons to snake bites that destroy the body's moist humors:

> But alas, did fiery Venom deep
> Into his Marrow and scorcht entrails creep,
> which quite drunk up all Moisture that should flow
> Into his vital Parts, his Palate now
> And Tongue so scorch't and dry, no sweat could go
> to his tir'd Joints, from's Eyes no Tears could flow.[282]

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[281] Jorge Cañizares-Esguerra, "New World, New Stars: Patriotic Astrology and the Invention of Indian and Creole Bodies in Colonial Spanish America, 1600- 1650," *American Historical Review* 104: 1 (1999).

[282] Anonymous author ["R. B."], *The English Acquisitions in Guinea & East-India* (London, 1700), 46-47.

Other venoms perform similarly hideous transformations, distending one unfortunate's body "far/ past humane growth" until he becomes "A Globe deform'd... an heap confus'd."

40 *The* English *Forts and Factories*

on the Coast of Guinea. 41

A ſqualid filth, and mouldineſs had made.
From whence exhaled ſteams and fumes invade
The upper Air; Whilſt *Cæſar* in amaze
Doth nearly view the horrour of the place
His longing thoughts an *African* there by
(Taught by Tradition) thus doth ſatiſfie.

This Den O *Cæſar* which for many a year
Hath empty ſtood and freed the Land from fear,
A monſtrous Serpent by Heavens Vengeance bred
The plague of *Africk*, once uninhabited.
The Earth a greater Monſter never bare
Not *Hydra* might with this dire Snake compare,
Nor though the Sun the mighty *Python* ſlew,
Did ere the Sun a greater Serpent view.
The ſeveral Snakes that out of *Africk's* ſlime
Are bred, might all have been in him combin'd,
An hundred Feet in length was his extent;
When he upon this ſide the River went
With his long neck ſtretcht out, what ere he ſpy'd
With eaſe he ſeized from the other ſide.
With Lions here he filled his hungry maw,
That came to drink the ſtreams of *Bagrada*,
And fierceſt Tygers all beſmear'd with Blood
Of Cattle ſlain, became themſelves his Food.

When firſt the *Roman* Armies Sailing o're,
And threatning *Carthage* on the *Africk* ſhore
Were led by *Regulus*, whoſe Tragick fall
Sadly renown'd the *Spartan* General,
Here then this hideous Monſter did remain;
The Army marching on yon ſpacious Plain,
Three *Roman* Soldiers by ill Fate drew near
To quench their fiery thirſt i'th River here,
And tempted by theſe ſhady Trees, to ſhun
A while the ſcorching fury of the Sun
Entring the Wood, down to the ſtream they ſtoop,
And in their Helmets take the Water up,
When ſuddenly ſurpriz'd with chilling fear

A

FIGURE 3.2 "The Snakes that out of *Africk* slime/ Are bred": seventeenth-century European accounts typically depicted Africa as filled with poisonous beasts, harmful 'miasmas' and malign astral influences. Venemous snakes, serpents, lizards and dragons were particularly associated with the sub-tropical African coast between Guinea and Angola, the region where European slave-traders were most likely to frequent. R. B., *The English acquisitions in Guinea & East-India containing first, the several forts and castles of the Royal African Company...* (London: Printed for Nath. Crouch, 1700).

Beyond these extended descriptions of poisoning, however, the author emphasizes the transformative powers of the landscape. The gorilla, for instance, is recast as a human rendered bestial by "the alteration and change" of the African jungle:

> a monstrous Creature which the Portugals call *Salvage*, that is a Satyr, it hath a great head, a heavy body, fleshy and strong arms, no tail, and goes sometimes upright, and otherwhile upon all four like an Ape. The Blacks affirm it is of the Humane Race, but by the alteration and change of the Woods and Wilderness it is become half a beast... The Negro's relate strange things of them.[283]

Likewise, the hyena appears in the text as "another strange Beast which some have thought to be Male one year, and Female another."[284] The overarching message is that the African climate not only puts bodies at risk of disease and death, but of fundamental transformation—of metamorphosis.

Letters from soldiers and missionaries in Portuguese Angola echoed the transformative power of African landscapes, and the dangers that awaited bodies incapable of adapting. A partially damaged dispatch to the Overseas Council by a missionary in 1678 warned that "the climate of this backland, experience shows, is harmful and opposed to the [constitution] of Europeans and white men who enter into it."[285] The report also noted that "horses sent from Brazil and foreign lands… [tend to] die, or become incapacitated, due to the change of climate, particularly in the sertão" and described "tests" (*experimenta*) involving attempts to adapt non-native horses to the

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[283] R.B., *English Acquisitions,* 35.
[284] R.B., *English Acquisitions,* 38.
[285] AHU Angola Cx 11, doc. 100, March 26, 1678.

climate.[286] However, the missionary concluded, "horses born as natives of the climate are stronger, and less prone to illness, as has been tested with three or four native [horses] of the land." The parallels were clear: just as their European-bred horses succumbed to illness brought on by a "malignant" climate, so too might the Portuguese themselves.

Likewise, the Capuchin missionary Antonio Zuchelli described Benguela as having "a climate so malignant and pestilential, that all of the fruit produced by this land communicate a venomous power [*una qualitá venefica*]." As a result, Zuchelli wrote, "those few white men who survive continually have such pale faces, and are so emaciated and exhausted, that it seems that they are in the jaws of death."[287] The African rains also aroused fears of strange maladies. The Jesuit Jeronimo Lobo envisioned the Guinea coast as radiating "excessive heat" and stirring up hot rains that "as they fell on one's skin, made sores, and in woolen clothing they bred noxious white worms."[288] A French traveler to the Gold Coast, Nicolas Villault, complained in the 1660s of "nipping winds and rains" and "the Evening dew" that he was convinced bred "worms which grow betweixt the skin and the flesh," causing "the most violent pain." Villault even advanced a theory based on his own "experiment," as follows:

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[286] AHU Angola Cx 11, doc. 100, March 26, 1678. Maria Portuondo (*Secret Science*, 93) argues that 16th and 17th century Iberian *experimenta* of this kind might viably be translated as "experiments" full stop. Following Peter Dear's definition of a scientific experiment as "involving a specific question about nature which the experimental outcome is designed to answer," we could, for instance, classify this 1678 dispatch as reporting on *experimenta* with horses as fitting the bill. The *experimenta*, which I tend to translate as "trial" or "test," did indeed seek to answer a specific question about tropical nature (do European animal and human bodies succumb more quickly to tropical diseases?). See Peter Dear, *Discipline and Experience*, 11-31.

[287] Antonio Zucchelli, *Relazioni del viaggio e missione di Congo* (Venice: Barolomeo giavarina, 1712), 91.

[288] Lobo, *Itinerario*, 3. Nicolas Villault, a French traveller along the West African coast in the 1660s, similarly blamed "nipping Winds and Rains" for making "those parts so subject to worms." Nicolas Villault, trans. John Starkey, *A Relation of the Coasts of Africk Called Guinee* (London, 1670), 212.

> We may affirm therefore tis the raine, as well as the dew, which produces these worms, how, or which way, I leave to the Philosopher, and Phisitian to resolve; but this I am sure, having many times put out a bitt of flesh in the raine, or in the evening dew, I found as soon as the beams of the Sun glanc'd but upon it, it turn'd all into Worms, which experiment I made very often, and am convinc'd by it.[289]

Significantly, Villault turned to an African healer to rid himself of these "venomous" worms, finding European surgeons incapable of the task.

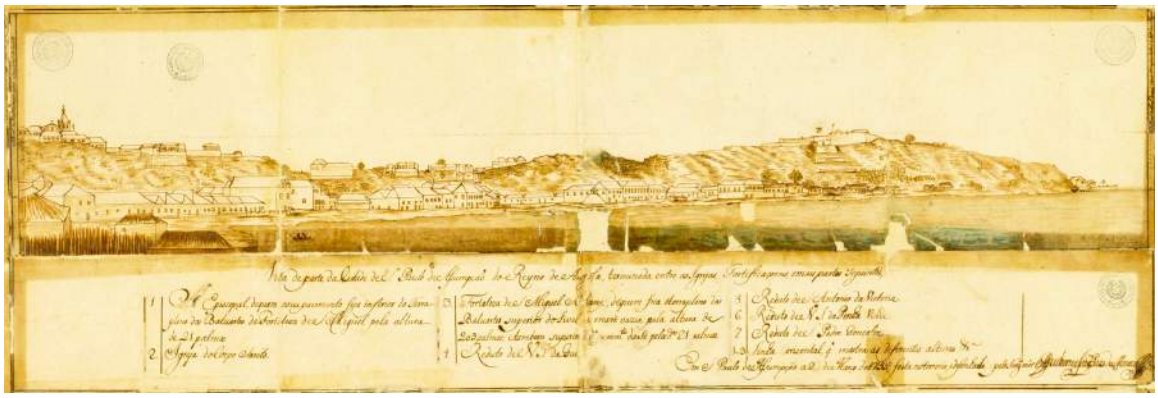

FIGURE 3.3 A seventeenth-century ink wash drawing of Luanda (then known as São Paulo da Assunção de Loanda). Arquivo Historico Ultramarino.

The surviving letters and memoranda sent between the Overseas Council in Lisbon and the leaders of seventeenth-century Luanda (see Figure 3.3) amply demonstrates the failure of the handful of European physicians and surgeons who survived in the colony to effectively treat the tropical diseases and poisons they encountered there. More than one petition to the crown by a sick or injured soldier in

[289] Villault, *Relation*, 208. Villault's account also offered a description of an African medical technique to remove the rain-bred worms: "If they perceive them advancing, they may hasten their journey, and pull them out by little and little, if they find any stop or reluctance in the Worm, they must let them alone (least they break them) and tye a haire or a piece of silk about them… for thay are of so venemous a quality, there is no way to preserve the person against its virulence but by cutting off the part" (Villault, *Relation,* 214-215).

Africa explicitly demanded redress owing to "the lack of doctors" able to "treat illnesses in Angola."[290] In 1664, during the preparations for the 1665 war against the Kingdom of Kongo, Luanda sheltered a full slate of early modern European medical professionals, from a well-paid physician to a surgeon-major, an assistant surgeon, an apothecary and the humble barber-surgeon (*barbeiro*, often the medical attendant on slave ships). In addition, a French surgeon named Daniel de Sena who had ventured into the Benguela hinterlands petitioned the crown in the same year for an additional 10,000 reis for the purchase of "medicines for the apothecary shop" in Luanda—presumably drugs purchased from African healers in the *sertão*—as did Pedro da Silva, the Surgeon-mór of the colony's outpost in Benguela (a post which doesn't reappear in later letters), who requested 16,000 reis "to buy purges for the apothecary shop."[291]

Several petitions from the missionaries in Luanda asking for funds to set up a hospital, combined with the scarcity of references to physicians after the 1670s, suggest that this state of affairs did not continue. The medical professions in Portuguese Angola suffered from chronic staffing problems throughout the late seventeenth century and early eighteenth centuries. It would appear that the efforts of Daniel de Sena and Pedro de

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[290] See for instance AHU Angola Cx 10, doc. 125 July 6, 1673, in which one Balthezar van Dunen (perhaps a Dutchman turned Portuguese loyalist following the expulsion of the Dutch from Angola?) "makes petition to the Council, resident of Angola, where he has lived for thirty-three years with satisfaction and service for your Highness. He thinks himself to be old in age, with many ailments, and he believes there are no remedies for his illness in Angola, for lack of doctors. In respect of which, he desires to leave Angola with his household and family, and work on his health… Because he is not a *degredado*, and has no obligation to stay at his post… he asks to go to Brazil with all of his family and goods."

[291] AHU, Angola, Cx 8, Doc. 37 1664, Aug 13 "Petition of Daniel de la Sena, cirurgião Frances." AHU Angola, CX 8, Doc. 32 1664 Aug 11, Petition of surgeon Pedro da Silva for "purgas para a botica." The latter author's name is also spelled Daniel Serre. I've been unable to find any further information on this potentially very interesting figure.

Silva to find new stocks of drugs for the apothecary shop there were unsuccessful, or that the drugs simply failed to treat the fevers prevailing in the colony. In 1666, Governor of Angola Tristan da Cunha reluctantly paid a visit to the Benguela outpost, "despite being very ill from the climate, for which reason no other governor has visited the place."[292] A request for funds in the same year from the surgeon-major Luiz Goncalves, the apothecary Agosto Reuiz and the surgeon Alexandre Mugras "to acquire medicaments to make two apothecary boxes [*caixas de botica*]... to cure the infantry that goes off to discover mines [in the *sertão*]" was likely a reference to this expedition. Tristan da Cunha's letters of appointment as governor had emphasized the dire state of medical care in the colony, and offered him further funds to spend "in the ways that they ought to cure the aforementioned sick folk."[293] But these funds were insufficient. Da Cunha explained that the soldiers in the interior were not receiving regularly salaries and were instead being paid in "the drugs imported from this land" [*drogas da terra importada*], a vague reference that nonetheless hints at the role of African drugs as a makeshift currency in the interior. Even chaplains and missionaries in the area were by this time receiving "a limited wage paid in *Libongos*, and *drogas*, for the service which they make to God and your Majesty."[294]

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[292] AHU Angola Cx 9, Doc. 62 Oct 20, 1666.

[293] AHU, Cx 9, doc. 25 April 10 1666.

[294] AHU Angola Cx 9, Doc. 62 Oct 20, 1666. The *libongo* was a Portuguese-minted coin used in Angola, roughly equivalent to fifty *reis*.

TABLE 3. Salaries of medical professionals in Portuguese Angola, 1664-1692 [295]

	Physician	*Surgeon-Mor*	*Surgeon*	*Barber*	*Apothecary*
1664	192,000	48,000	33,600	28,800	
1666		40,500	23,000		65,200
1669	70,000		30,000		
1692			60,000		

We can speculate that the sick soldiers in the interior, who were being paid in "drugs imported from this land" also turned to these substances in times of sickness, either self-administering or drawing on African healers in the absence of a well-established class of European health professionals resident in the colony. By 1692, the specified wages for surgeons had doubled, perhaps reflecting the increasing shortage of competent professionals in the colony. Meanwhile, the posts of apothecary, barber and physician were going unfilled.[296] In 1684, even the captain of infantry for the city of Luanda, one of the highest military offices in the region, demanded a change of posts because his illnesses were deemed incurable in the African climate.[297] The truly dire state of Luanda's population was driven home in a missive sent by the city council in 1688, which offered a macabre explanation for the "infection of the air" causing "contagion and sickness" in the city: the corpses of slaves, the council explained, had been repeatedly

[295] AHU Cx 8, Doc. 6, April 23, 1664, AHU Cx 9, doc. 151 April 4, 1669, AHU Cx 14, doc. 89, Feb 15, 1692.

[296] AHU Cx 14, doc. 89, Feb 15, 1692, a list of expenses which includes ten arrobas of sugar, hatchets and sickles, two barrels of biscuits, vinegar, and 60$000 for the surgeon's wage. For comparison, the total cost of the sugar was 16$000.

[297] AHU, Angola, Cx 12, doc. 122, Feb 10 1684 petition from Francisco de Bivar Mascarenhas, captain of the infantry in Luanda, that "the ailments that he suffers require a change of climate, and of going away from the Kingdom to cure himself."

disinterred by *lobos de noite* ("wolves of the night," likely jackals) and the corpses strewn in the street contributed to the poisonous miasmas of the place.[298]

As this disturbing image suggests, it was not only the bodies of humans and animals, but the mind and soul, that the African tropics threatened to corrupt. One of the most vivid accounts of hallucination caused by tropical fevers reaches us via the Portuguese Jesuit Jeronimo Lobo's account of his first voyage along the coastline of West and West Central Africa, referenced in the introduction of this dissertation.[299] Although Lobo, an inquisitive and highly observant man, was at first delighted by his sightings of the high peaks of the Canary Islands and of natural wonders like a water spout and St. Elmo's fire, he became increasingly concerned as the ship neared the Equator. The "burning of the sun" caused food to spoil, and "malignant fevers" broke out. Lobo himself fell ill, and believed he had only survived owing to well-timed treatments: "my illness responded to the remedies" of the two doctors and several surgeons on board, he wrote, which consisted of the "universal remedy of scarification and application of cupping-glasses" followed by the consumption of bezoar stones, "the effect of which is to cause sweating."[300] There were so many "extremely pitiful" stories of sailors dying from fever, Lobo wrote, that "I omit [them]… in order not to further frighten the reader of this narrative, in case, perhaps, he plans to see and experience for himself these happenings so

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[298] AHU, Angola, Cx 13, doc. 72, Feb 10, 1688.

[299] Jeronimo Lobo, trans. Donald M. Lockhart, *Itinerario* (The Hakluyt Society, London: 1984). Although Lobo's *Itinerario* is a classic source for information about early modern Ethiopia, the sections of his narrative dealing with West Africa are little studied. The bibliographic history of this work is fascinating in itself, and is related in great detail in the introduction to the Hakluyt Society edition.

[300] Lobo, *Itinerario*, 4.

typical of the India voyage." But Lobo could not resist relating one interesting consequence of the tropical fever: "this illness caused and causes many to lose their minds, giving way to wild delirium." He described how he met a sailor dying of fever who

> when I asked him… where he was going, he answered that he was bound for Alcántara [a dockside neighborhood in Lisbon], which must have been where he was from or a place with which he had some connection. But as this was on the coast of Guinea, when I asked him what way he planned to go, he replied, looking at the sea through the gangway which was open, that he was going through that field. And he doubtless would have thrown himself into the water, so feverish was he… if he had not been held back and confined.

"I heard of many such cases," Lobo added grimly.[301]

How did Europeans conceptualize this "delirium" caused by tropical fever? Was its action conceived of as a purely physical response to illness, or was it something more sinister: a corruption of the rational faculties brought about by exposure to the tropics, and indeed perhaps even a kind of curse or witchcraft generated by the "malignant" African landscape itself? It is important to remember that the etiology of diseases—the reasons for their causes—was extremely broadly interpreted by seventeenth-century Europeans in the tropics. Lobo, for instance, sounds surprisingly modern when he attributes his own illness to sitting "very close" to a "contagious" sailor. Yet Lobo visualized the transfer of the disease as an exhalation of harmful humors rather than a transfer of germs.[302] Elsewhere, Lobo attributed "mortal illnesses" on the African coast to the moon. Shipwrecked on the coast of Mozambique, he observed that "the moonlight,

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[301] Lobo, *Itinerario*, 6.

[302] For more on early modern theories of the "transplantation" of diseases, see Chapter 4.

especially that of September, is so harmful that it causes mortal illnesses in those who stay out in it. Its ill effects are such that it damages even the bronze bells and cannon, causing them to crack." Lobo records the surreal image of shipwrecked sailors "walking in the streets at night wear[ing] hats," taking "great care against being touched by moonlight and night air."[303] This was by no means a quirk of Lobo's personal understanding of tropical disease: AHU letters sent from Angola blame the moon for hastening a soldier's illness, and in Brazil, Cardoso de Miranda speculated that "the repetition of the fevers is caused by the moon, which has an occult quality or force."[304]

The mysterious forces and poisons of the African landscape forced European suffering from these novel diseases to seek medical care from local healers. Fra Giovanni Merolla suffered from a persistent fever while evangelizing in the 1680s Kongo, and his description of the bleeding of another patient during his illness implies that he was treated by "a slave… that had been a surgeon."[305] Likewise, while the Capuchin friar Jean-François de Rome lamented that within Kongo "there is no Physician or Apothecary to be found in the whole country, their place being taken by the Sorcerors," he went on to acknowledge that "nevertheless many others abhor these sacrileges, and are served by natural remedies [such as]… decoctions which they make with the juices of herbs and other ingredients that purge benignly," as well as local African "Surgeons" [*Chirurgeons*]

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[303] Lobo, *Itinerario*, 41.

[304] AHU, Angola, Cx 9, doc. 33, "Certificate of Luiz Goncalves de Andrade, surgeon-mor." João Cardoso de Miranda, *Relação cirurgica e medica* (Lisboa 1741), 112.

[305] "The son of a Mulatto being sick, was ordered by a physician to be let blood; and a slave of his that had been a surgeon, undertaking to perform the operation, thro' an unsteady guidance of his lance, happened to prick an artery." Merolla in Churchill, 613.

who "serve for bleeding."[306] Across the Atlantic but in the same period (1676) William Dampier, the circumnavigator and naturalist, recorded that he was healed of worms by an enslaved African blacksmith in Jamaica. The healer employed "a little rough Powder, which looked like Tobacco-Leaves dryed and crumbled small," Dampier recorded, while "mumbling some Words to himself," then enacted a similarly laborious and painful process of drawing the worm out with a silk string.[307] Dampier also noted that African healers in Jamaica used "*Hyacinth, Alkermes* or *Clarie* [claret wine], to keep ones self clean" and free of them.[308] Dampier's account points to the importance of African healing traditions on the American side of the Atlantic, but also to the hybrid nature of diasporic African medicine: the three substances he mentioned came from the European and Islamic pharmacopeias, not those of sub-Saharan Africa.[309] Yet even as European and Amerindian trading goods and medicines became adopted by African consumers, Europeans in Angola suffered from novel diseases identified with the "venemous climate" of the region which European physicians, surgeons, and apothecaries were incapable of curing or even explaining.

The Capuchin missionary Giovanni Cavazzi described *gangas* in the Kingdom of Kongo whose cures performed using powdered animal parts were "something truly marvelous." Yet he regarded them as off limits to Europeans due to his fears of spiritual

[306] Jean-François de Rome, *Relation brieve et fidelle du succez de la mission des Freres mineurs capucins* (Paris: printed for Pierre Muguet, 1649), 166-7.

[307] William Dampier, *A Continuation of a Voyage to New-Holland, &c., in the Year 1699* (London: Printed for James and John Knapton, 1729), 93.

[308] Dampier, ibid.

[309] Alkermes was an Arabic panacea made from raw silk, while hyacinth was a mixture of precious gems and clarie was likely an alternate spelling of claret.

corruption: "it would be good for healing Europeans also if it did not involve invocating to the Devil," he complained.[310] The result was an intense European fear of African poisoning, particularly of poisons conveyed under the guise of food or medicine. An account of such a bait and switch by a "young Negro woman of quality" in Africa even found its way into the natural philosophical treatises of Robert Boyle, who, in a treatise on the "occult qualities" of novel drugs, described his conversations with a "gentleman, who was governor of a colony in the torrid zone, and had sailed far up the river Gambra in Africa." This man, Boyle continued,

> assured me, that the blacks had a poison, slow, and mortal, the dose whereof is so small, that they usually hide enough to kill a man under one of their nails; from whence they very dextrously convey it into any liquid aliment, for the person they design it. He added, that in another part of Africa, a famous knight who commanded the English there, and lately died in his passage home, was in this manner poison'd by a young Negro woman of quality.[311]

In his 1706 treatise *Culture and Opulence of Brazil as Revealed by Its Drugs and Mines* (*Cultura, e opulencia do Brasil, por suas drogas, e minas*), the Portuguese Jesuit André João Antonil described Fulano slaves on Brazilian sugar plantations who "kill themselves with poison, or with *feitiços*: not lacking among themselves Masters who are expert in this Art."[312] Elsewhere, Antonil wrote of slaves who flee to *mocambos* (hideouts or *quilombos*)

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[310] Cavazzi, *Missione Evangelica*, Book 1 Chapter 8, fol. 75. From the online edition of Cavazzi's manuscript translated and edited by John Thornton: http://www.bu.edu/afam/faculty/john-thornton/cavazzi-missione-evangelica-2/book-1-chapter-8/

[311] Robert Boyle, "The Notion of Specific Remedies Prov'd agreeable to Mechanical Philosophy: with the advantages of simple Medicines consider'd; and their Use recommended," in Peter Shaw, ed. *The Philosophical Works of the Honourable Robert Boyle, Volume 3* (London, 1725), 550.

[312] André João Antonil, *Cultura e opulencia do Brasil, por suas drogas, e minas* (Lisbon, 1706), 24. ["dahi por diante os deixão conversar entre si, como se já fossem recebidos por Marido e Mulher: e dizem, que os nao casão, porque temem que enfadando se do casamento, se matem logo com peconha, ou com feiticos: não

in the jungle who, "if caught, kill themselves when the Senhor catches them, or take their vengeance with *feitiço* or with poison."[313]

3.3 Tobacco and alcohol as "Atlantic creole" commodities

The rapid adoption of European-traded alcohol and tobacco in West Central Africa contributed to these fears of tropical mortality, even as it helped shape the ritual practices of local healers. As João Curto has noted, the introduction of Portuguese-traded wine and spirits via the port of Luanda had a transformative effect on both sociability and spirituality in the hinterlands surrounding the city.[314] Indeed, Brazilian spirits became so integral to colonial Angolan society that the very words *gerebita* and *cachaça* are borrowed from pre-existing words for alcoholic brews used by the peoples of West Central Africa. (*Kachasu*, from which the Brazilian liquor gets its name, is a maize-based brew still consumed in western Mozambique).[315] A 1678 report to the Overseas Council from the city council of Luanda placed the blame for the "deaths and illnesses" crippling the colony squarely on the widespread abuse of these liquors (*agoas ardentes*) among both Europeans and Africans. The authors advised alcohol abuse for "deaths and infirmities, the diminution of industry, and the ruin of the defenses" and advised that the crown "ought to order the prohibition of *agoas ardentes*."[316] A partial ban was ultimately enacted, but

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faltando entre elles Mestres insignes nesta Arte."]

[313] Antonil, *Cultura e opulencia*, 28.

[314] José C. Curto, *Enslaving Spirits: The Portuguese-Brazilian Alcohol Trade at Luanda and Its Hinterland, c. 1550-1830* (Brill, 2004).

[315] John T. Schneider, *Dictionary of African Borrowings in Brazilian Portuguese* (Verlag, 1991), 62.

[316] AHU Angola Cx 11, doc. 107, June 10 1678. This document is in very bad condition and is heavily water-

largely ignored by the inhabitants of the port. Nine years later, the Governor of Angola was complaining to the crown that crates of "alcoholic liquors from Brazil which are called *gerebitas*… are unloaded and sold, publicly, with notorious scandal," in open disregard of the crown's attempt to prohibit sales to a small cabal of merchants, referred to in this document as the Syndicate (*Sendicato*).[317]

In 1689, officers at the royal treasury in Luanda argued that the ban be lifted entirely because of the "great utility that would accrue to the kingdom if *agoas ardentes* from Brazil are allowed entrance into this land."[318] A letter from the Overseas Council in response argued that the prohibition be upheld because the liquors "are known to be very harmful to the health of all the white residents and negroes of the Kingdom of Angola, having lost by this means a great part of the infantry of the *presidios* of the entire conquest."[319] Another proposal by the Governor of Angola to the city council hedged on the matter, admitted that the illnesses "are partly due to drinking *agoa ardente* from Brazil," but adding "there is no doubt that it also results from the heat of the sun and the malignity of the climate… for the climate of this part of Africa has been known by experience to be contrary to the natures of Europeans. Thus in a little time…the

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damaged, leaving much of it illegible. These quotes are fragments from a much larger block of text that I was unable to decipher.

[317] AHU, Angola, Cx 13, doc. 36, Jan 29, 1687. The archival note attached to this document attributes it to Gov. João da Silva e Sousa, but it appears to be signed by one Bento Teixeira da Saldanha, identified by a Conselho Ultramarino secretary as one who "made residence in Angola during the reign of Gov. João da Silve e Sousa." According to Mariana Candido (*African Slaving Port in the Hinterland,* ch. 1), Saldanha (who appears repeatedly in letters from Angola relating to liquors) was the provedor da fazenda (treasury commissioner) for the colony of Angola in the 1650s.

[318] AHU Angola, Cx 13, doc. 97, Feb. 23, 1689.

[319] AHU Angola, Cx 13, doc. 97, 20 October 1689

malignity of the lands saps their natural powers."[320]

FIGURE 3.3 A French trader offering a pipe-toting West African Alcaty (leader) a present of "eau de vie" in exchange for fresh water. François Froger, "Relation du Voyage, fait en 1695, 1696 & 1697, aux Côtes d'Afrique," etc. (Paris, 1698), facing page 7. Courtesy of the John Carter Brown Library.

[320] AHU Angola, Cx 13, doc. 97, 20. Feb. 5, 1689,

Others, however, argued that spirits could actually prove to be useful cures. In 1694, two physicians working at Luanda's sole hospital petitioned the crown to lift them ban. Though some argue "that excess of liquor, being all too common among everyone, can be the cause of various dropsies," they wrote, "after assisting many years in this land, we have never seen either in or outside the hospital any case of *gerebita* causing illness, and indeed up to this point on many occasions we have applied it as a remedy for some infirmities."[321]

In the end, Brazilian spirits were too simply too integral to the economics of the slave trade in Angola to be permanently banned. As João Curto, Joseph Miller and Mariana Candido have documented, inland traders called *pombeiros* made healthy livings by venturing into the interior of Angola, Kongo, and Benguela stocked with these imported Brazilian liquors, which were produced cheaply using the cast-off byproducts from the sugar refineries of the Bahian coast.[322] *Cachaça* was *gerebita*'s higher-status cousin, a sugarcane rum made from the molasses itself rather than from byproducts of the refining process. Together, the two liquors became mainstays of Portuguese-African trade. In the process, they also became embedded in spiritual and medical battles between *feitiçeiros* and Christian missionaries. When Fra Merolla first began evangelizing among the people of Sogno in the Kongo, one of his attempts to "inveigh against the wizards, who bear a mighty sway in this country" included inviting a local citizen into his house

[321] AHU Angola, cx. 15, doc. 37 November 12, 1694. The physicians (of whom I could find no other records) identify themselves as A. Perez Lima and Andre de Silva.

[322] See Miller, *Way of Death*, 296, and Curto, *Enslaving Spirits*, ch. 2.

"and treating him with *aqua vitae* and roll tobacco."[323]

In both West and West Central Africa, the fermented sap of palm trees of the genus *Raffia* (palm wine) had figured prominently in healing and spirituality for centuries prior to the arrival of Europeans. The traveler Nicolas Villault described a funeral in Sierra Leone in which a religious leader takes "Palm-Wine in his mouth, and squirts it upon the most ancient of the Fetiches," then mixes it with herbs and grease and "distributes [it] to the whole company."[324] A similar practice seems to have occurred in the Kongo, with the missionary Jean-François de Rome noting that local palm wine (*malavu*) "evoked the tears of mourners."[325] Palm wine was so central to West Central African spiritual and ritual life that, as Curto notes, "one of the worst atrocities which belligerents could commit was cutting down the raphia trees of their opponents."[326]

The introduction of Brazilian sugarcane liquors, which were substantially more alcoholic than even the strongest palm wine, represented a decisive shift in how alcohol functioned in West Central African societies. Yet as high-status alcoholic drinks, they also became integrated into the ritual practices surrounding palm wine. So, too, did tobacco, a novel intoxicant that nonetheless found a ready consumer base in Africa due to the pre-existing practice of smoking implements, evidently used to consume cannabis.

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[323] Merolla in Churchill, *Voyages*, 612. This reflected the contemporary practices of missionaries in the North American interior, who used brandy in ritual gift exchanges that took advantage of the perception that alcohol intoxication could confer spiritual power. Peter C. Mancall, *Deadly Medicine: Indians and Alcohol in Early America* (Cornell University Press, 1995), 75.

[324] Nicholas Villault, *Relation of the Coasts of Africk* (London: printed for John Starkey, 1670), 200. The original is Nicholas Villault, *Relation des costs d'Afriques appelées Guinée* (Paris, 1669).

[325] Jose C. Curto, *Enslaving Spirits*, citing Jean-François Rome, *Fondation de la Mission des Capucins au Royaume de Congo* (Paris, 1648), 122.

[326] Curto, *Enslaving Spirits*, 36.

(Although Judith Carney has argued that the trans-Atlantic transmission of Mesoamerican tobacco in the sixteenth century also marked the introduction of the pipe to the Old World, archaeological evidence actually demonstrates the presence of Sub-Saharan cannabis pipes from the thirteenth and fourteenth centuries CE.)[327]

Chewing and inhalation of a potent variety of tobacco—most likely the more intoxicating of the two tobacco species, *Nicotiana rusticum*—can be dated in the Kingdom of Kongo to as early as 1611, and the plant soon became one of the most popular crops and trading items throughout Kongo, Angola, and the hinterlands to the east.[328] According to António de Oliveira de Cadornega, writing in the middle of the seventeenth century, aristocrats in the Dembo region were buried "with pipes and tobacco to smoke," as were the severed heads of some Dutchmen who offended a local king befriended by John Atkins.[329] The longtime enemy of the Portuguese, Queen Nzinga, appears with a large pipe in both of the surviving contemporary portraits of her, executed by the Italian Capuchin missionary Giovanni Antonio Cavazzi in the 1670s (Figure 3.4). Tobacco smoking became so thoroughly Africanized in the era of the slave trade, in fact, that the Kimbundu word for pipe (*cachimbo*) was adopted throughout the Portuguese empire by the eighteenth century: to this day, while Spaniards puff on *pipas* and the French smoke

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[327] For instance, ceramic pipes have been excavated in Ethiopia which have been carbon-dated to circa 1320 and found to contain traces of cannabis residue. Brian M. du Toit, "Man and Cannabis in Africa: A Study of Diffusion," *African Economic History* No. 1 (Spring, 1976), 19. In Zambia, pipe fragments have been found at an even earlier date of circa 1200 CE. John Edward Philips, "African Smoking and Pipes," *The Journal of African History* Vol. 24, No. 3 (1983), 310.

[328] Adam Jones, *German Sources for West African History, 1599-1669* (Coronet Books, 1983), 63, citing Samuel Brun's *Schiffarten* (1624).

[329] António de Oliveira de Cadornega, *História geral das guerras angolanas* (written 1680), edited by José Matias Delgado (Lisbon, Agência-Geral do Ultramar, 1972).

les pipes, Lusophones smoke *cachimbos*. This African-style *cachimbo* was clearly a powerful cultural marker in Angolan society, and (as excavations of the grave of an Obeah practitioner buried with a *cachimbo*-like pipe in seventeenth-century Barbados hint) may well have marked spiritual power in diasporic African communities as well.[330]

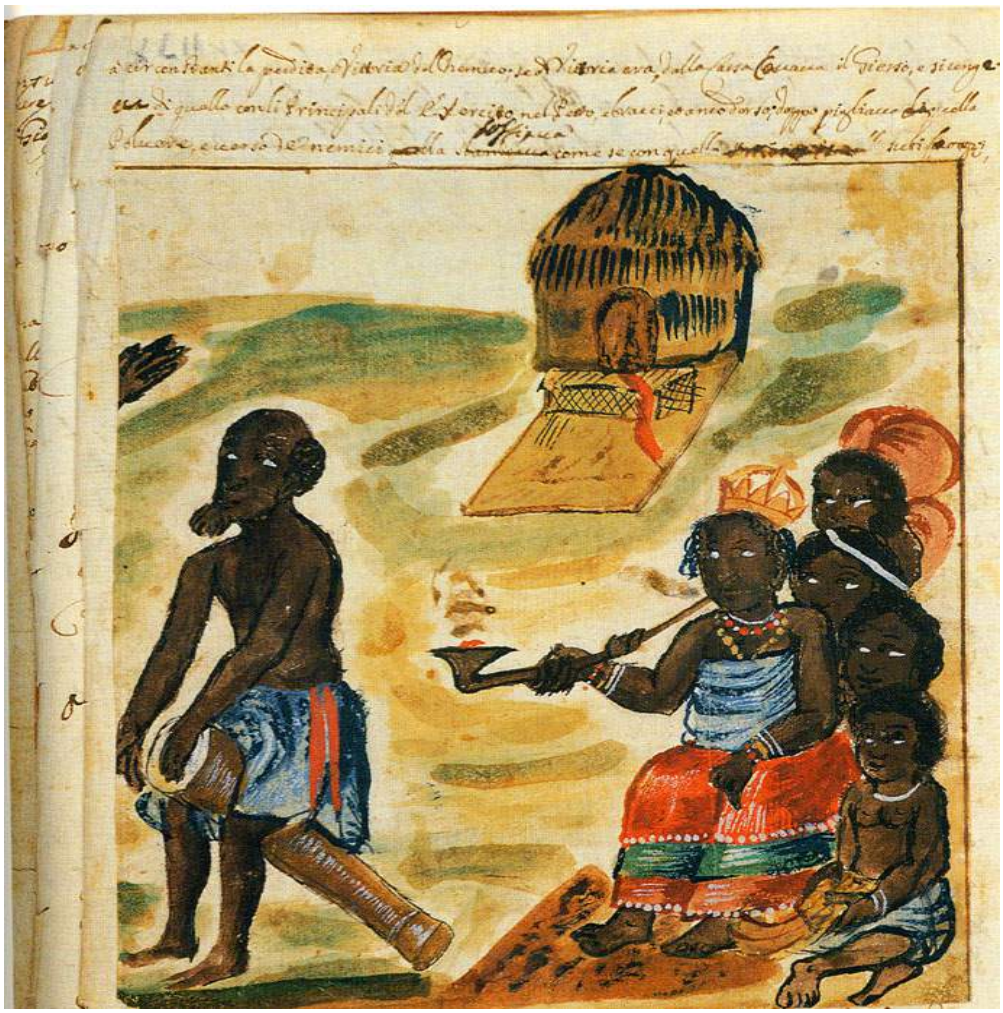

FIGURE 3.4 Queen Nzinga with pipe, from the Cavazzi manuscript, 1670s.

[330] Archeologists Jerome Handler and Neil Norman interpret a Barbados plantation burial dating to the "late 1600s or early 1700s" as belonging to an "obeah man" (healer) which included a notably rich range of artifacts, such as "an iron knife, several metal finger rings and bracelets, an elaborate necklace" and an African-style clay pipe. Although Nzinga's pipe does not match their description of the Barbados pipe exactly, it does display the acute angle and fitting for a plant reed noted in the Barbados specimen. Jerome Handler and Neil Norman, "From West Africa to Barbados: A Rare Pipe from a Plantation Slave Cemetery," *The African Diaspora Archeology Newsletter*, September 2007.

Peter Mancall has noted in the context of seventeenth-century North America that "liquor's ability to alter perception led many Indians to consider it a sacred substance." In one Sioux dialect, brandy was called *mni wakon*, "sacred water," while Ojibwe spiritual leaders "integrated alcohol into healing rituals."[331] A similar process was occurring across the Atlantic in precolonial Ghana, argues Emmanuel Kwaku Akyeampong, who writes that alcoholic spirits became "closely linked to conceptions of power," because the intoxication they produced offered a point of contact between the spiritual and material worlds.[332] I argue here for a parallel process, too, in West Central Africa, where local elites appropriated spirits and tobacco into existing spiritual-medical practices that prized "rituals of rapture."[333] Intoxication in early modern Africa, was not simply a form of recreational sociability, if deployed in a ritual context.[334] By the late seventeenth century, novel Luso-Brazilian intoxicants like the potent, molasses coated tobacco of Bahia and cachaça had become material constituents of what Linda Heywood has called the "Atlantic creole culture" of West Central Africa, with Portuguese-traded

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[331] Mancall, *Deadly Medicine*, 75-6.

[332] Emannuel Kwaku Akyeampong, *Drink, Power, and Cultural Change: a Social History of Alcohol in Ghana, c. 1800 to Recent Times* (Porstmouth: Heinemann, 1996), 4.

[333] I borrow this term from David Gordon, "From Rituals of Rapture to Dependence: The Political Economy of Khoikhoi Narcotic Consumption, 1487-1870," *South African Historical Journal*, 35 (1996) 62-88.

[334] There exists a rich body of scholarship on the anthropology and neuroscience of altered states of consciousness which I believe can be usefully deployed here during book revisions, for instance Emma Cohen, *The mind possessed: The cognition of spirit possession in an Afro-Brazilian religious tradition* (Oxford, 2007), Patrick McNamara, *The Neuroscience of Religious Experience* (Cambridge, 2009), and Erika Bourguignon, Possession (Chandler and Sharp, 1976).

wine and sugarcane rums being used at the funeral of Queen Nzinga in 1663 and rituals in Mbamba during the 1710s.[335]

To return to where we began, then: the Jaga Kakonda was not merely making a mockery of the Communion, as the Portuguese believed, but was performing an act of spiritual appropriation. By consuming the ritual intoxicant of his enemies, he was gaining pharmacological access to—and asserting mastery over—one of their sources of supernatural power.

3.4 Fetishizing drugs

> I am Zé Pelintra. I am known throughout Brazil as a marijuana smoker and *cachaça* drinker, anything at all you want to call me. In this house I work doing charity, doing good, removing *feitiço*, healing.
>
> — Afro-Brazilian religious leader in a possessed state (2002) [336]

In June of 1721, a young British ship's surgeon named John Atkins sat down to dine with the ruler of a small independent state in present-day Ghana — a man known to Europeans as John Conny (ca. 1670-ca. 1725). The year before, Atkins learned, Conny's forces had ambushed a group of Dutch slave traders, "cut them in pieces" and "pav[ed] the entrance of his Palace soon after, with their Skulls." Finding the skulls no longer present, however, Atkins inquired of Conny (whom he called, seemingly unironically, "a man of very great Civility") "what was become of the *Dutchmen's* Skulls, that lately paved the

[335] Linda Heywood, "Portuguese into African: The Eighteenth-Century Central African Background to Atlantic Creole Cultures," in Linda Heywood, ed. *Central Africans and Cultural Transformations in the American Diaspora* (Cambridge, 2001); Curto, *Enslaving Spirits*, 199.

[336] Emma Cohen, *The Mind Possessed: The Cognition of Spirit Possession in an Afro-Brazilian Religious Tradition* (New York: Oxford University Press, 2007), 4.

entrance of his House." Conny revealed to Atkins that he had forgiven the Dutch in death, and offered them what he believed to be a fitting burial:

> He told me very frankly, that about a Month before our Ship's Arrival, he had put them all into a Chest with some Brandy, Pipes, and Tobacco, and buried them; for, says he, it is time that all Malice should depart, and the putting up a few Necessaries with the Corps, such as they loved, is our way of respecting the deceased.[337]

The word John Atkins used to describe these burial practices, "Fetish," was a Portuguese one. As we have seen *feitiçaria* was a term that early modern Portuguese authors employed to describe African spirituality. But it was not invented for this purpose. In fact the word originated in medieval Iberia, where it referred to the crafting of charms and amulets both by Christians, Jews, and Muslims.[338] It was a pan-confessional catch-all term that gained new utility when Portuguese slave traders and missionaries in African encountered the practices of the *ganga* and other herbalists, healers, and poisoners.

From at least the late sixteenth century, the word *feitiço* had a wide currency in Portuguese writings about American, Asian and African cultures. Even a cursory sample of early Portuguese mentions of *feitiços* reveals that the phrase was applied both to indigenous Brazilian, West African, East African and South Asian contexts. Among the Carijos (a Tupi-Guarani speaking group in coastal Brazil) the Jesuit priest Simão de Vasconcellos wrote that "there are such eminent *feitiçeiros*, and they are so admiring of them, that they give notice of them by speaking of a River of Magic, and a Valley of

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[337] John Atkins, *A Voyage to Guinea, Brasil and the West-Indies* (London, 1735), 79-80.

[338] On the etymology of *feitiço* see William Pietz, "The Problem of the Fetish II: The Origin of the Fetish," in *RES: Anthropology and Aesthetics* 13 (Spring, 1987) and Roger Sansi, "Sorcery and Fetishism in the Modern Atlantic," in Luis Nicolau Parés and Roger Sansi, eds., *Sorcery in the Black Atlantic* (University of Chicago Press, 2011).

Incantations, and other similar names, no doubt multiplying their numbers by this."[339] Yet African healing practices and religiosity appear to have stood at the core of the concept of the *feitiço* by the seventeenth century. In his extensive writings about the *feitiçeiros* of seventeenth-century indigenous Brazil, for instance, Padre Vasconcelos claimed that the "most detestable type" were those who used their magic to kill, and that they did so by summoning "a visual apparition of the demon" which "took the form of a little black African [*Negrinho Ethiope*], and when they sought to make *feitiços* against any person, they communicated their intentions with the *Negrinho*."[340] The protective pouches and amulets that diasporic African *feitiçeiros* fashioned (called by the Portuguese *bolsas de mandinga*) contained local African herbs, tobacco, pieces of animals, fragments of the Quran and Bible, and earth taken from geographic locations with special significance to the wearer and to the wearer's protective deity. The *feitiço* thus occupied the interstices between the pharmacological and spiritual traditions of the European, African and even indigenous American worlds. *Feiticeria* was a point of both contact and conflict—and drugs, poisons and healing pouches or amulets literally embodied these mixings, giving them material substance.

By the late seventeenth century, as James Sweet has shown, African-born *feitiçeiros* had established themselves among the sugar *engenhos* and coastal cities of Brazil.

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[339] Simão de Vasconcellos, *Vida do P. Joam d'Almeida da Companhia de Iesu, na provincia do Brazil* (Lisbon, 1658), 124.

[340] Vasconcellos, *Vida*, 124-5.

Domingos Alvares, labeled a *feitiçeiro* early upon his arrival as a slave in Recife, was a representative case.[341]

Antonio Franco, a Jesuit historian writing about the conquest and conversion of Luanda in 1719, remembered it as a medico-spiritual battle between the sacraments of the Catholic Church and the *feitiços* of the devil. Franco described a Padre who "threw the instruments with which they summon the Devil into a fire... and the Holy Spirit entered into all of the people, and they threw these things in the fire." All, that is, except "an old woman, who said that Gods would come to visit her, that all of them gave her *feitiços*, that she was the daughter of God."[342] Franco regarded these *feitiços* as offering a chance for the padres to demonstrate God's power by curing sufferers. However, he noted, those afflicted by *feitiços* "listened to the catechism coldly, giving clues that they only desired the health of the body that it brought."[343] In the interior region of Cassanje, likewise, Franco described a padre who braved "the *sertão* of Angola, with its climate extremely poisonous to foreigners" to do spiritual battle with "a famous *feitiçeiro*, who all feared because of his great arts." The Padre ultimately succeeded in casting "all of the pharmacies of his art" [*todos as boticas da arte*] into a fire.[344]

In some cases, the fetish object was itself a vehicle for medicinal drugs. Writing at the end of the 18th century about the interior region of Cazembe, east of the Benguela

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[341] Sweet, *Domingos Alvares*.

[342] Antonio Franco, *Imagem da virtude em o noviciado da Companhia de Jesus* (Coimbra: Real Collegio das Artes da Companhia de Jesus, 1719), 734-5.

[343] Franco, *Imagem da Virtude*, 735.

[344] Franco, *Imagem da Virtude*, 612.

highlands, Francisco de Lacerda described "hollow idols in which they store their medicines before drinking them."[345] However, the most well documented instances of the fetish object as a container for medicines come from Inquisition trials involving *bolsas de mandinga*.[346] What linked together all of these *feitiços* was their functional role: they were material technologies of mediation between the human body, the natural, and the supernatural worlds. They offered bodily health, but also threatened (from the perspective of the Portuguese) to bring the venomous landscape of Africa to bear on European bodies and minds.

FIGURE 3.5 An Italian capuchin destroys a Congolese "house of a feitiçeiro [*casa d'un Faticchiero*] filled with diabolical superstitions" in this watercolor from the 1740s. Note the gathered fetish objects in the foreground, including plants, venomous snakes, horns, a fetish idol and a human hand. Source: Paolo Collo and Silva Benso, eds., *Sogno: Bamba, Pemba, Ovando e altre contrade dei regni di Congo, Angola e adjacenti* (Milan: published privately by Franco Maria Ricci, 1986), 163.

[345] Francisco José de Lacerda e Almeida, *The Lands of Cazembe: Lacerda's Journey to Cazembe in 1798* (London: John Murray, 1873), 45.

[346] Archivo Nacional da Torre do Tombo (Lisbon, Portugal), Inquisiçao de Lisboa proc. 2097; Daniela Buono Calainho, "Metrópole das Mandingas: religiosidade negra e inquisição portuguesa no antigo regime." (PhD Dissertation, Universidade Federal Fluminense, 2000).

Tracing the complex meanings of the *feitiço* and European conceptions of Africa as a poisonous landscape suggests one answer to an important yet rarely posed question in the history of medicine: why did drugs from the East and West Indies become global commodities, whereas the equally biodiverse ecosystems of tropical Africa failed to yield many global medicaments before the nineteenth and twentieth centuries? The concept of the *feitiço* emerged as a middle ground not only between Portuguese and African epistemologies, but also between the concepts of medicine and poison. By invoking supernatural powers to influence bodily health and drawing on physical and oftentimes consumable substances to achieve this, African *feitiçeiros* blurred the lines between benevolent cures and concealed curses in a manner that anticipated the later bifurcation between licit and illicit drugs.

African *feitiçaria* then, was not only a manifestation of the emergence of an Atlantic creole culture, but of a globalizing drug trade. Within a matter of decades, this trade had marshalled sugar (a medieval Iberian transplantation from South Asia) and *Nicotiana rusticum* (a sacramental plant from Mesoamerica) along with the technologies of distillation and the agricultural system of the Brazilian plantations in the service of the West Central African slave trade. An unintended consequence of such commercial globalization, however, was that healers and spiritual leaders in West Central African co-opted these novel intoxicants and integrated them into a hybrid medico-spiritual system which was Atlantic in scope and pervaded not only diasporic African but also European society. When Portuguese padres threw fetish objects in the fire and replaced them with

crosses, books and communion wine, they were not only attempting to substitute one set of spiritual beliefs for another—they were competing in this larger, Atlantic sphere of creolized commerce and healing. The communion wine and wafer, the breviary and the altar became new *feitiços*, as did the tobacco and *gerebita* and *cachaça* liquors that the Portuguese carried with them. Turning Marx on his head, we might conclude not that commodities became fetishes under systems of capitalist exchange, but that *feitiços* became commodities.

3.5 Buytrago's bark

A uniquely detailed medical report of experiences in 1710s and 1720s Angola and Brazil written by a cavalry officer named Francisco de Buytrago offers a glimpse into how Catholic Iberian cultures of healing began to merge with African *feitiçaria* and pharmacy. The title of Buytrago's manuscript, "Arvore da Vida, e Thesouro descuberto" (*Tree of Life, and Discovered Treasure*), evoked both the Garden of Eden and the obsession with making profitable "discoveries" in the *sertão* documented in Chapter Two.[347] The structure of his text reflected this dual concern with "treasure" and spirituality, with the first half narrating the "miraculous" cures of demon-possessed people (*demoninhados*) in Angola, Brazil, and

[347] BNL, F.R. 437 (Microfilm), codigo 13114, Francisco de Buytrago, *Arvore da Vida e Thesouro descuberto* (the manuscript was apparently written in Lisbon in 1731, but describes events in Angola in the 1710s and 1720s: Buytrago describes it as the work of "Sargento Mor Francisco de Buytrago, knight of the Order of Christ, in the space of twenty years in this kingdom"). An internal reference to Buytrago's writings "seeing print" suggests that he intended to publish the MS as a book; one suspects that, if Buytrago indeed pursued this plan, he was rebuffed by Inquisition censors. The provenance of the manuscript itself is highly obscure; as far as I can determine, it has only been described in scholarship once, and even then merely in passing. See Isabel Monteiro, "A Escrita da História: Oriente, Occidente," *Revista Camões*, 1 (1998), 80-1.

Portugal that Buytrago attributes to the medicinal bark of the "Arvore da Vida," and the second half transitioning into a more workmanlike descriptive list of "the names of the most unique things which are found in the Kingdom of Angola, and their virtues."[348] From the opening pages of his text, Buytrago argued emphatically for the medical value of African nature:

> In the Kingdom of Angola and in the provinces and neighboring lands of that region, there exists such a profusion of barks, and herbs, and other things of such singular virtue and efficacy… that they exceed those of all of the world in power, and in the greatness and variety of the plants and herbs that these folk employ. [349]

Unlike his compatriots, Buytrago also unreservedly praised the skills of African healers, lauding the transparency of their "surgeons and physicians, who do everything in the sight of the Sick, in order to free them from any ill suspicion." For Buytrago, the *botica* (pharmacy) used by these healers was indeed nothing short of "perfect":

> They have for their *botica* the barks, roots, herbs, leaves, fruits and other *materia medica* that exist in these lands, bestowed by divine Providence with singular virtues, as also are teeth, bones and skins of a great variety of animals, giving them remedies to serve for their infirmities which are so easy and perfect.[350]

In order to begin understand Buytrago's manuscript, we need to consider its dual contexts as an early modern European medical text and an artifact from the hybrid world of the South Atlantic slave trade—a world that was if anything more African in character than

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[348] As Buytrago put it in an introductory note "to the pious reader," "I have divided this book into two tracts. The first is about the bark or tree of life and its great virtues. The second is about the extremely singular things which exist in the Kingdoms of Angola, Congo and other provinces, and of their singular virtues, and other very curious things." BNL, Buytrago, "Arvore da Vida," fol. 4v.

[349] BNL, Buytrago, "Arvore da Vida," fol. 5v.

[350] BNL, Buytrago, "Arvore da Vida," fol. 5v-6r.

European.[351] In many ways, of course, Buytrago's rhetoric regarding the powers of his "Arvore da Vida" was typical of an early modern Christian. When he called its cures 'miraculous' and used language connecting the tree to Eden, Buytrago was following a medieval precedent of associating tropical drugs and spices with the Biblical Paradise.[352]

In the Portuguese context, this link was drawn in 1650 by the physician Duarte Madeira Arrais, whose treatise on the *Arbor vitae* was one of the few medical texts from early modern Portugal to be translated into a foreign language. [353] Arrais' inquiry into the physical nature of the Edenic tree of life concluded that the plant functioned both "as Aliment, and as Medicament."[354] He believed that its medical virtues were connected both to its anti-poison ("alexipharmic") properties, and to its ability to intoxicate, or "stupefy the Sense… as Narcotick Medicines do."[355] Although Arrais was vague about precisely where he regarded the Tree of Life to have existed or what it looked like, Buytrago describes his *Arvore da Vida* as a "a small and skinny tree, numerous in the Kingdom of Congo, called *emcassa* or *cassa* by the local folk" which was "very good against worms and the most singular antidote for poisons (*contraveneno)* in the entire world."

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[351] See James Sweet, *Recreating Africa*, and Pablo Gomez, "Bodies of Encounter: Health, Illness and Death in the Early Modern African-Spanish Caribbean," (Ph.D. dissertation, Vanderbilt University, 2010) for two complementary articulations of the case for an 'Africanized' Iberian Atlantic world.

[352] Paul Freedman, *Out of the East: Spices and the Medieval Imagination* (Yale, 2008).

[353] Duarte Madeira Arrais, *Arbor vitae, or a Physical account of the Tree of Life in the Garden of Eden.* (London: Thomas Flesher, 1683.) Arraes' original work was entitled *Novae Philosophiae et Medicinae de Qualitatibus occultis* [*The New Philosophy and Medicine of Occult Qualities*] (Lisbon, 1650). For more on the larger debate about "occult qualities" or "virtues" in drugs and diseases in which Arrais was participating, see Chapter 5.

[354] Arrais, *Arbor vitae,* 52.

[355] Arrais, *Arbor vitae*, 51, 74. Arrais writes later of "*Opium* and other Stupefying Medicines," suggesting that this was the particular "Narcotick" he had in mind for his comparison (93).

Above all, Buytrago wrote, this "bark of life" was "most singular and miraculous in combating *feitiços*… and demon possession."[356] To be sure, Buytrago was not the only European writer in the early eighteenth century to acknowledge the medical skills of African healers or the "virtues" of African plants. But what is unusual here is that whereas other European accounts tend merely to describe the healing techniques and medicines of what Hans Sloane called "Negro Physicians," Buytrago goes into considerable detail describing the cures that he *himself* had performed using skills he learned from Angolan "physicians" (*medicos*).

As Buytrago explained, his introduction to the bark came during a bioprospecting mission along with a more experienced comrade to investigate the properties of a cure "much used and esteemed among all of the [Angolan] folk and many of the whites" early during his time in Africa:

> Since I have always been very curious and inquisitive in everything I did in all my years, and having no knowledge of [Angola] before being sent to this Kingdom, a friend of mine, being diligent in these matters, introduced me to another fellow, who I observed going continually to the blacks of this Kingdom, asking that I likewise go and see [this bark] in quantity. This sufficiently persuaded all of them, such that they purchased it [from me?], declaring its virtues, it being pre-eminent for the treatment of *feitiços*, poisons and wounds, [this last] the sole virtue which it was known to confer when it was discovered in the year [16]66.[357]

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[356] BNL, Buytrago, "Arvore da Vida," fol. 7r.

[357] BNL, Buytrago, "Arvore da Vida," fol. 7r-7v. "He usada é muito estimada de todo aquelle gentio e de muitos brancos, os que a tinhao a nao descobriao assim por lha nao tirarem, como por outras causas para se livrarem e com ella, de sorte que sendo eu muito curiozo e especulativo de tudo o mais em tantos annos, nao tive conhecimento della sendo estando para vir para este Reino, que antes me descobrio um amigo e fazendo deligenica por esta, e encomendandoa a outro, que veio vir continuamente os pretos daquelle Reyno, para que amandasse vir como veio em quantidade, de que tive bastante induzindo a todos, que a comprassem declarando lhe parte das suas virtudes, sendo a primeira para os feitiçs e veneno e dores, que era so a virtude que lhe davão, e a descobri no anno de VI VI."

As Mariana Candido notes, the economy of Portuguese Angola increasingly relied on local go-betweens in late seventeenth and eighteenth centuries, and Buytrago's guide who he observed "going continually to the Blacks" may well have been a mixed-race *filho da terra* (a term used both for Afrian-born Portuguese and children of Portuguese soldiers and local women). Significantly, however, Buytrago claimed that his "first experience" of healing with the bark occurred not in Africa but in Bahia, where he used it to cure "the slave of a relative, who was dying… from what I perceived to be *feitiços* that had been cast on her."[358] Buytrago then proceeds to describe a number of case studies of different maladies and enchantments he cured with the bark, including the cure of an entirely family suffering from *feitiços* which prevented them from attending mass. This was performed by "the Blessed Antonio" in Bahia, who "knowing that I, for love of God, sold this remedy, came to my house to buy some." Like the missionary in Angola described by Franco, Antonio also "burnt the *botica*" (drugs) that a *feitiçeiro* had been adding to the family's food.[359]

Buytrago's conviction that *casca da vida* was a "miraculous" drug gifted by God to restore victims of *feitiçaria*-induced possession to the Catholic faith helps explain his unusually receptive attitude toward African healing. It is important to keep in mind that the use of medicines and natural magic like amulets to cure possession was common in early modern Europe. A Portuguese contemporary of Buytrago wrote in 1711, for instance,

[358] BNL, Buytrago, "Arvore da Vida," fol. 8r.
[359] BNL, Buytrago, "Arvore da Vida," fol. 9r-9v.

that diabolical curses could be cured not only via herbs such as artemesia, but also by performing acts involving blood and excrement:

> If one suffers from a curse… take the manure of the person who you love, and put it in the right shoe of the loved one, and they who first notice the stench dissolve the curse. Some have affirmed that they have tested the aforesaid, and that it is true. And likewise …if one streaks the walls of ones house with the blood of a black dog, it will break a curse upon the house or the men in it. The gall of a crow mixed with sesame oil can also dissolve curses.[360]

In both early modern African and European contexts, the sufferer of a curse or spell was cured by a mixture of performative acts (such as anointing with blood, oil, or wine) and the application of *materia medica* such as powdered herbs and roots. As William Eamon has noted in the context of late medieval Europe, the blurred lines between demonic possession and disease "made it possible for popular healers to appropriate the role of exorcist, and for exorcists to play the role of doctor"—a state of affairs which also existed in the hybrid healing practices of the South Atlantic world.[361]

As Buytrago's account demonstrates, a trans-Atlantic medical culture based on Africanized *feitiços*, tropical drugs, and spiritual rituals was beginning to emerge by the first decade of the eighteenth century. Circa 1710, for instance, a missionary priest named Alberto de Santo Tomás attacked the *feiticeria* that he observed in the plantation societies of Bahia and Pernambuco, warning that Christians "should not consult the Negro *feitiçeros*, nor any other person they might believe had dealings with the devil," and

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[360] Joseph Ferreyra de Moura, *Syntagma Chirurgico Theorico-Practico de Joam de Vigo… accrescentado com hum Tratado de Feridas, e um Catalogo de remedios para muitas, e varias enfermidades do corpo humano* (Officina Real Deslandesiana, Lisbon, 1713), 541.

[361] William Eamon, *Science and the Secrets of Nature*: *Books of Secrets in Medieval and Early Modern Europe* (Princeton: Princeton University Press, 1994), 189.

instead, they should restrict themselves to the traditional "exorcisms of the Church."[362] Yet as James Sweet notes, Father Alberto himself practiced to "Africanized" techniques (such as crafting *bolsas* to sell to *demoninhados* and others with spiritual afflictions) in order to "remain a viable and salient option" in the changing medical marketplace of colonial Brazil.[363] Nor was Father Alberto the only such case. A man who called himself Padre Januário wandered 1730s Brazil posing as an official of the Portuguese Inquisition, toting a quasi-magical stone he called *pedra d'arca* as he went. James Wadsworth writes that the *pedra d'arca* was usually carried in a bag (*bolsa*) and became tied up with the concept of the *bolsa de mandinga* in colonial Brazilian society. Both were "consecrated object[s]" that were "imbued with mystical and magical powers."[364] Januario's actions conform with those of the African healers in Lisbon reported in Inquisition trials from the same period: he travelled the *sertão* and demonstrated the healing powers of his amulet and *bolsa* by inviting a crowd to shoot a stray dog with a gun.[365] When the dog was touching the *bolsa*, Januario said, it would be uninjured—a claim borrowed from the magical toolkit of the African *ganga*.

Similar reports of a hybridizing medical culture emerged from the slave entrepôts of West Africa. Circa 1720, the naval surgeon John Atkins complained that the Captain-

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[362] ANTT, Inquisição de Lisboa, Processo no. 597.

[363] Sweet, *Domingos Alvares*. The Inquisition trial of Miguel Ferreira Pestana, an "indio" arrested in Espirito Sancto in 1737 who who "consorted with negros" and created healing *bolsas*, offers an intriguing suggestion that African healing practices were beginning to be adopted by indigenous Brazilians as well. ANTT, Inquisição de Lisboa, Processos, No. 6982.

[364] James E. Wadsworth, "Charlatan in the Backlands: Inquisition and Imposture in Colonial Brazil," *Luso-Brazilian Review* 49-1 (2012), 75.

[365] ANTT, Inquisição de Lisboa, Processo no. 3693, "Informação of Father Francisco Ferreira, Rodellas, January 18, 1740" fol. 19. See also Sweet, *Recreating Africa*, 183.

General of the Cape Coast Castle had "give[n] the preference of *Fetishing* to any Physical Directions of mine, wearing them on his wrists and neck." Atkins ascribed what he called this "silly custom, created by our fears [of disease]" to Phips' marriage to "a *Mulatto* Woman" who was "a strict Adherer to *Negrish* Customs."[366] Likewise, in 1714, an anonymous Englishman on a slave ship off the Guinea coast recorded in his journal that he "was blam'd" by several of his crewmates "for venturing to drink [Palm wine], the Negroes being very dextrous at managing Poisons, tho' I found no ill effects from it." [367] Early eighteenth-century slave entrepots were sites of brutal assertions of European power over African bodies, but they were also places where African ways of *healing* bodies began to be actively taken up by Europeans. Although fears of poisoning were ever-present among Europeans who began consuming medicines from Africa, they were not enough to stop their widespread adoption. Indeed as Buytrago's case demonstrates, an African drug could even be esteemed "the greatest antidote in the world."

The healing cultures of the Portuguese Atlantic of the 1720s and 1730s were exceptionally eclectic, representing a fusion not so much of "European," "Indian," and "African" healing techniques and remedies, but of the local medical traditions embedded *within* these overly-general classificatory schema. As local studies by James Sweet (in Bahia) and Pablo Gomez (in Cartagena) remind us, colonial port cities in Latin America were not simply African in character—they were distinctively *pan*-African, featuring

[366] Atkins, *A Voyage to Guinea*, 94-5.

[367] British Library, Add MS 39946, "Voyage to Guinea, 1714-5: English gentleman's account of a slave ship, written for the amusement of his sister," fol. 5r. The same author also mentioned that the Africans along the Guinea coast carry "*Ephra*… in a little bag amongst their pipes, and *Tobacco*, which hangs about their neck" (fol. 2v).

communities of slaves whose linguistic and geographical origins were enormously varied. Despite the brutality of the Middle Passage and the Brazilian plantation system, Jim Sweet has argued, many distinctive, localized healing traditions from West and West Central Africa survived intact among ethno-linguistic enclaves of slaves in Brazil. For instance, Sweet demonstrates that the *asen* (a sort of portable altar used in healing by the Gbe peoples of Dahomey) was employed by Gbe-speakers in 1740s Minas Gerais. One, a healer named Francisco Axê, employed the *asen* in a complex series of disease-curing rituals involving an invocation of "the father of the *feitiços*," verbal exhortations directed at the *asen* itself, the creation and burial of a clay figure of a man along with the patient's hair, ritual sprinkling of cachaça over an iron altar, the sacrifice of a white rooster, and the use of a healing root known as *melão de São Caetano*.[368] Though the *asen* used by healers like Axe were almost certainly forged by Afro-Brazilian blacksmiths in Minas Gerais, the ritual practices surrounding them demonstrate a remarkable level of fidelity to the healing culture of Gbe peoples within Africa. The level of particularity and local detail in this case study unearthed by Sweet reminds us that each of the dozens of ethno-linguistic groupings of Africans within early eighteenth-century Brazil practiced distinctive (and sometimes dissimilar) approaches to *feitiçaria*, ritual, and pharmacy.

Within this ferment of African local knowledge, techniques, and material culture, however, what we might call a shared vocabulary of healing did begin to emerge. This medical *lingua franca* was continuously being improvised and reshaped by the

[368] Sweet, *Domingos Alvares*, 133-138.

contingencies of colonial Brazilian demographics and the specific needs of patients, but we can identify a few common threads: the sacrificial white rooster was a common trope, as was the creation of a clay doll, the exorcism of *feitiços*, and the burial of an item from the patient's body, like hair. So too, was the sacramental use of alcohol and tobacco. Yet while healers like Axê employed *cachaça*, a century later, wielders of the *asen* were demanding that patients make a sacrificial payment of gin. Indeed, by the early twentieth century, gin had largely replaced the Brazilian sugarcane liquors as the pre-eminent high status drink of West and West Central Africa—and, tellingly, "became strongly associated with rituals" in the process.[369] Ritual uses of alcohol may be thought of as a common thread linking early modern African and Afro-Brazilian healing practices—but the *type* of alcohol shifted, from palm wine to cachaça to gin. European-traded drugs were repurposed in the service of healing practices that offered Africans in diaspora a degree of agency and a connection to a continuous tradition, but they also inflected the shifting materiality of that knowledge. Buytrago's manuscript shows the other side of this equation: a European adopting the *material*s of West Central African medicine, while packaging them using themes that would have been familiar to a medieval European Catholic, like the concept of a miraculous demon-expelling remedy with ties to the Garden of Eden.

It is difficult to say with any certainty whether Buytrago's *emcassa* bark was widely adopted by physicians in Brazil, Portugal, or elsewhere in the Atlantic world, particularly

[369] D. Van den Bersselaar, "Negotiating Beer and Gin Advertisements in West Africa," p. 403-4:

because of the vagueness of his description. But Buytrago's contemporary João Curvo Semedo did prescribe a number of similar remedies from Angola (see Appendix A), including "Mubamgo, a tree with a white bark from Embaça" whose root, when powdered and mixed with tobacco, aid "the accidents of the mother."[370] The Angolan drug that Semedo elaborated in the greatest detail was the "Minhaminha" or "Quiminha" root, which exhibited a miraculous ability to "swallow up the virtues of poisons":

> This root has such a virtue against venom as to equal or exceed the *pao Cobra*, as has been experimented by a foreign Surgeon named Monsieur Estruque. He gave it to two chickens who had poison in their stomachs, enough to kill them, and giving one of them *Minhaminha* mixed with water and giving to the other the *Pao Cobra* with a mind to test which of these roots had more virtue against poison, he observed that both chickens escaped death.... This tree grows in parts of Embaça, and is a small tree, which creates many skinny shoots.[371]

Could Semedo's *embaça*, a rare toponym that occurs only in other references to these two passages, be a corruption of Buytrago's *emcassa*? Perhaps more likely, though still difficult to prove, is the theory of the manuscript's present curators at the Biblioteca Nacional de Portugal that Buytrago's *emcassa* refers to a species of acacia bark. The Sweet Thorn or "cassie" tree (*Acacia karroo*) is a small acacia with a range that extends from the Congo to South Africa and Mozambique. It is still used today by traditional healers to treat convulsions, pains, and curses, and likely contains tryptamines—potentially even the potent, LSD-like hallucinogen DMT, which appears naturally in a number of acacia

[370] Semedo, "Memorial de Varios Simples," 30.

[371] Semedo, "Memorial de Varios Simples," 29.

species—that render it psychoactive.[372] Although far more work needs to be done to tie together the many threads of Buytrago's complex text, it stands as clear evidence for the use of African drugs and pharmaceutical knowledge within a distinctively Atlantic material and cultural framework. Substances like the "Casca da Vida" operated at the locus of European, Central West African, and Brazilian influences, including the long tradition of Catholicism in the Kongo, the medieval Iberian concept of *feitiçaria*, the local knowledge of healers in Angola, and the boundary-crossing eclecticism of the colonial Brazilian medical marketplace. This religious aspect, in particular, is a dimension of the early modern drug trade that has been notably absent from existing works on the subject. Harold Cook's *Matters of Exchange*, for instance, argues that Dutch collectors of natural knowledge thrived in part because they "escaped the constraints of religious doctrine."[373] I would contend that this was not a general phenomenon, but one particular to the Dutch physicians and merchants studied by Cook (who, in Japan for instance, intentionally adopted secular personae in order to avoid being conflated with expelled Iberian Catholic missionary orders). The case of Buytrago's bark exemplifies how some colonial medical practitioners embedded their healing practices in explicitly spiritual frameworks, like the exorcising of demons, and moved fluidly between the realms of African, American, and European healing.

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[372] Michael Gelfand, *The Traditional Medical Practitioner in Zimbabwe: His Principles of Practice and Pharmacopoeia* (Mambo Press, 1985), G. Stafford, G. et al."Review on plants with CNS-effects used in traditional South African medicine against mental diseases," *Journal of Ethnopharmacology* 119 (2008), 513-537. Like many medicines used in non-Western healing, research into the pharmaceutical properties of *A. karroo* is still in its infancy.

[373] Harold Cook, *Matters of Exchange,* 84.

3.6 Conclusion: the fetish in world history

The concept of the "fetish" emerged as a durable concept by which Europeans framed African spirituality and medicine throughout the colonial and modern periods. Yet today it has two more prominent meanings in popular consciousness: its sexual connotation and Marx's "commodity fetishism." Roger Sansi has noted perceptively that Marx's use of the term "fetish" to denote the invisible power relations involved in capitalist systems has, in effect, drawn a line between the word as used in its original Iberian and African context and "fetish" as a metaphor for a distinctive feature of modernity. This sets up a false opposition, according to Sansi, "between magic, *feitiçaria* and traditional practices on one side, and modernity, science, and rationality on the other."[374] In point of fact, the fetish was as much a product of an emerging European/imperial modernity as it was a relic of traditional cultures. The resulting hybridization of cultures of pharmacy, healing, and spirituality has mainly been studied in the context of Brazil, Colombia, and Mexico. But it also a phenomenon across the Atlantic, present as much in Portuguese Africa as in Brazil—and even cropping up in Europe itself. The rise of the African fetish was a manifestation of the larger hybridization and globalization of natural knowledge that drove the drug trade.

In African healing traditions, novel stupefacients such as tobacco and alcoholic spirits became integrated into longstanding techniques of *feitiçaria*. Divinatory practices

[374] Roger Sansi, "Feitiço e fetiche no Atlântico moderno," *Revista de Antropologia*, 51: 1 (Spring, 2008), 124.

and ritual offerings which might once have included palm wine were, by the eighteenth century, featuring European-traded liquors like *gerebita* and (after the nineteenth century) gin. Some Europeans balked at these practices and regarded them as evidence of African "barbarism," yet others celebrated the pharmaceutical and healing knowledge of Africans. African healers in diasporic slave communities acquired a similar renown—but this dichotomy of Africans as demonically-inspired "sorcerers" and as miraculously gifted healers continued to persist in the Atlantic world, as it had in Portuguese Africa.

From one perspective, a similar state of affairs would appear to have emerged in sixteenth-century New Spain. As Jorge Cañizares-Esguerra notes, Spanish commentators on the natural wonders of New Spain debated whether the healing plants used by the indigenous peoples of Mesoamerica had a "demonic" essence—i.e. their medical or psychoactive effects were directly inplanted by Satan—or whether their supposedly malign effects simply accrued from their being employed in non-Christian healing practices.[375] This question was faced by Buytrago as well: could a non-European cure unknown to the traditional authorities yet celebrated by local healers be repurposed as a tool of Christian bodily and spiritual health? The New World focus of most existing work on these themes has obscured an important difference between these two cases. As John Thornton often points out, the early modern Kingdom of Kongo was (arguably) a Catholic society of long standing.[376] By the time that Buytrago reached the Kongo, it had

[375] Cañizares-Esguerra, *Puritan Conquistadors*, ch. 4.

[376] Linda Heywood and John Thornton, Central Africans, *Atlantic Creoles, and the Foundation of the Americas, 1585-1660* (Cambridge and New York: Cambridge University Press, 2007); John Thornton, *The Kingdom of Kongo: Civil War and Transition, 1641-1718* (Madison: University of Wisconsin Press, 1983).

been officially Catholic for well over two hundred years. It is thus unclear from his account whether Buytrago adapted the Casca da Vida into a Catholic exorcism framework or whether the experts he learned of the cure from had already made the epistemological and ritual leap from invoking *voduns* to expelling Satan. (It is important to note, however, that these two aims often co-existed, and may well have done so here).

Yet this existing Christian and magical framework for understanding the action of African cures did not translate into a widespread adoption of African drugs on a global stage. Among the data samples of the geographic origins of drugs mentioned in printed and manuscript texts featured in Appendices B and C, Africa has a minor presence. Although specimen of the *materia medica* of "the Portugal negroes" reached the Royal Society in the 1670s as curiosities that were potentially sourced from Curvo Semedo (as we will explore in Chapter 5), these samples of African exotica did not emerge as quotidian remedies in the same way as contemporaneous exotic cures from the New World and Asia like china root, quina, guiacum, and the various artificial bezoars. The simultaneous globalization of practices of *feitiçaria* alongside the larger globalization of drugs studied in Chapter One may have caused these African remedies to became tarnished by association with enslaved healers and colonial mountebanks, and with fears of venomous beasts and poisoned landscapes. Adding Africa to the story of the origins of the global drug trade thus opens up our understanding of the medicine/poison

dichotomy, a characteristic of early modern medicine frequently alluded to yet rarely studied in detail.[377]

It also throws practices of drug discovery or bioprospecting in the New World into a more stark relief. As in early modern Africa, the interior regions of North and South America remained what Daniel Richter calls a "Native Ground," largely unknown to Europeans. Yet the long-standing association of Africa with poisons and venoms, which persisted from Greco-Roman times to the nineteenth century, contrasts with the more ambiguous New World myths of mineral wealth and health, like el Dorado and the Fountain of Youth.[378] Indigenous American pharmaceutical expertise was an eagerly sought after commodity and European empires struggled to send expeditions deep into the interior in the conviction that new drugs to rival quina or nutmeg lay waiting to be found. European experiences of Africa in the eighteenth century, by contrast, remained largely coastal, and European merchant companies and natural philosophers failed to send as many expeditions into the African interior as their counterparts working in the New World or in Asia.

Yet those natural philosophers who *did* seek out African drugs, curiosities and natural knowledge invariably relied upon the networks of the South Atlantic, Luso-Brazilian world. Understanding this submerged role of the Portuguese tropics as a space for the production of natural knowledge and experimental understandings of health and

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[377] On the understudied field of poison history, see Frederick Gibbs, "Poisonous Properties, Bodies, and Forms in the Fifteenth Century," *Preternature* 2.1 (2013): 19-46.
[378] Safier, *Mapping the New World* on continuing importance of el Dorado legends into the first half of the eighteenth century and Richter, *Facing East from Indian Country*.

medicine—not just regionally but on a global scale—means moving from the African littoral to London, and from the fortresses of soldiers and slaves to the salons of proto-scientists. This is the thread that will be taken up in the fifth and concluding chapter of this work. But for now, we move to consider the question of transplantation and transmission of drugs, shifting from local case studies to a broader, thematically-oriented discussion of transplantation as a schema for understanding not just the ecological movement of drug specimen and seeds, but of the terrifying new diseases that Indies drugs professed to heal.

Chapter 4

"A New Force to the New Guests": Transplantations in the Torrid Zone

> As experienced farmers, wanting to plant certain delicate plants, shore them up against some mighty trees in order to defend them against tempestuous winds and strong rains and harsh frosts, so would I plant this fragile plant under the protection of your lordship, with which it will be defended against most of the world.
>
> — Garcia da Orta, 1563

> This proposition of the King of Great Britain is the death of the Dutch East India Company. It seems to me we have discovered the Philosopher's Stone, for there is no doubt that if Brazil can produce cloves, peppers, cinnamon, and all the most [valuable] plants that Nature yields, and which are cultivated in the East, then Brazil will yield greater riches, and require fewer costs, than the Mines of Peru or of Sofala.
>
> — Duarte Ribeiro de Macedo, 1675

Introduction: Dutch masters

On a cloudy day in 1641, a Dutch master sat down at his easel. As he mixed his pigments, primed his canvas, and blocked in figures with washes of umber, ochre, and viridian, the Groningen-born painter used the same techniques as contemporaries like Jan Vermeer, Rembrandt van Rijn, and Frans Hals. The painting's subject—a mother and child—was a genre convention familiar from countless other works of the Dutch Golden Age. Yet this woman's world was radically different from those found in the canvasses of other Dutch painters: here there are no the red brick houses and well-swept courtyards, no clavichords, brocades, and leaded windows—though there is the same crystalline quality of the light. The subject of painting was indeed not an inhabitant of the Low Countries at all, but an African in Pernambuco, the center of the short-lived colony of Dutch Brazil.

FIGURE 4.1 Albert Eckhout, *African Woman and Child*, 1641, oil on canvas. National Museum of Denmark.

Albert Eckhout filled his pictorial space with exemplars of New World nature. A humid sky in rosy gray glowers over a South Atlantic seascape, where four tiny ships surmount a horizon line rendered in pearlescent white. On the shore, indigenous fisher-folk haul their catches to land beneath a wooden watchtower that stands guard against Portuguese invasion. A papaya tree occupies the middle distance, while a Brazilian wax palm dominates the left foreground, its fronds shading prickly pear cacti and a flowering vine. Yet what of Eckhout's subject? Although her surroundings are unmistakably Brazilian, the intricate patterns of her woven reed basket display motifs from the seventeenth-century Kingdom of Kongo, her hat has been identified with the region of Sonyo in Angola, and her necklace of red coral beads is African. [379] On the other hand, the art historian Rebecca Brienen notes that her teardrop pearl earrings and necklace "are of a type worn by middle class women in contemporary Dutch paintings," and the oranges in her basket were recent transplants from China.[380] To judge from his lighter complexion and the demographics of early colonial Brazil, the boy whose head this woman touches with a gesture of maternal care is likely her son born of a union with a Dutch or Portuguese father. His right hand holds a corncob, that most American of plants—yet the bird perched on his left is the red-face lovebird (*Agapornis pullaria*), a native of central Africa.

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[379] Adam Jones, "A Collection of African Art in Seventeenth Century Germany. Christoph Weickmann's *Kunst-* and *Naturkammer*," *African Arts* 27.2 (1994), 42 and Jean Michel Massing, "Albert Eckhout, Frans Post and the Imagery of Afro-Americans in Seventeenth-Century Brazil," *Studies in Imagery Vol II: The World Discovered* (London: Pindar Press, 2007), 141-71.

[380] Rebecca Parker Brienen, *Visions of Savage Paradise: Albert Eckhout, Court Painter in Colonial Dutch Brazil, 1637-1644* (Amsterdam University Press, 2007), 149.

The tobacco in the Dutch-style pipe tucked behind her sash, too, was a long-distance traveler.[381] A ritual sacrament from indigenous America had become, in a matter of decades, a medicine for Mughal emperors, an intoxicant for European tavern-goers, and a rare source of consolation for Afro-Brazilian plantation slaves.[382] The work that Eckhout began that day in Brazil was not only a painting of a woman and her child: it was a visual record of intersecting transplantations, a crystallization of a world in flux.

In *The Columbian Exchange* (1972) and in *Ecological Imperialism* (1986), Alfred Crosby offered the most influential analysis to date of the ecological transformations of the early modern world.[383] The plantations and colonies of the Americas, Crosby argued, became refashioned into "Neo-Europes." This is a vision of early modern globalization that privileges European actors and perspectives, particularly French and British attempts to transplant wine grapes, pigs, cattle, and wheat into North America. Yet Eckhout's painting suggests an alternative narrative of early modern globalization, one that locates the centers of change in the tropical rather than the temperate belt, and which highlights the hybrid nature of colonial encounters instead of the creation of Neo-Europes. We might say that the painting gives a human face to the Columbian Exchange—and it is no coincidence that this face is African, nor that the setting is Brazil.

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[381] On the diffusion of Dutch-style tobacco pipes in the seventeenth-century Atlantic basin see Thurstan Shaw, "Early Smoking Pipes: In Africa, Europe, and America," *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 90: 2 (Jul.-Dec., 1960), 272-305.

[382] Marcy Norton, *Sacred Gifts, Profane Pleasures*.

[383] Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* (Cambridge: Cambridge University Press, 1986), 131 and *The Columbian Exchange*.

Up to four fifths of all immigrants to the New World prior to 1800 were forced migrants from Africa.[384] Of these, almost one half came to Brazil, primarily to mine silver, gold and gems and to labor on plantations growing sugarcane, tobacco, indigo, and later cotton and coffee.[385] In recent years, Judith Carney has contested Crosby's original vision of the Columbian exchange by studying the active role of these African transplants in the ecological transformations in the Atlantic world.[386] Africans in the New World, Carney argues, retained a degree of agency and autonomy through their specialized knowledge of tropical medicines and food crops.[387] Virtually every scholar of early modern environmental change, from Crosby to Carney, has acknowledged the importance of the Portuguese empire as a site for these ecological exchanges. Yet few have drawn on Portuguese sources.[388] This chapter engages both the theory and practice of transplantation in the early modern world, moving from the salons of natural philosophers in Europe to the "disturbance pharmacopeias" of the Portuguese tropics. It marshals new evidence to locate the origins of intentional global transplantation

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[384] David Eltis, *The Rise of African Slavery in the Americas*, (Cambridge: Cambridge University Press, 2000), pg. 97. Eltis estimates that the proportion of children who immigrated to the Americas in the pre 1800 period was up to 90% African.

[385] David Eltis and Martin Halbert, "The Transatlantic Slave Trade Database" [slavevoyages.org].

[386] Stuart Schwartz, *Slaves, Peasants and Rebels: Reconsidering Brazilian* Slavery (U. Illinois Press, 1992), ch. 2; Stuart Schwartz, *Sugar Plantations in the Formation of Brazilian Society: Bahia, 1550–1835* (Cambridge: Cambridge University Press, 1985), ch. 3.

[387] Judith Carney with Richard Nicholas Rosomoff, *In the Shadow of Slavery: Africa's Botanical Legacy in the Atlantic World* (Berkeley: University of California Press, 2010).

[388] See for instance Crosby, *Ecological Imperialism,* Virginia deJohn Anderson, *Creatures of Empire*, and J.R. McNeil, *Mosquito Empires.* I should note that I am not critiquing these works, which have been foundational to the research presented here. Rather, I'm pointing to what I believe is a fertile field for future environmental historical scholarship that takes the big-picture outlines of the global ecological (Crosby), epidemiological (McNeil), and zoological (Anderson) changes outlined by these historians as a starting point for research in underexplored archives that tries to recover local narratives and sources.

schemes in the late seventeenth century—schemes that grew out of both European natural philosophy and the "tropical empiricism" and vernacular knowledge of the colonial drug trade. [389] Memoranda like "Discourse on the Transplantation of Spices from Asia to America," written by the Portuguese diplomat Duarte Ribeiro de Macedo in 1670s Paris, offer an intimate perspective on the local contingencies and relationships that undergirded the massive (and often abstract) changes documented by scholars like Crosby, Richard Grove, and Judith Carney. While most of these early attempts at global ecological manipulation failed to bear fruit, they helped establish a blueprint for successful drug transplantations in the eighteenth and nineteenth centuries that would transform both tropical ecosystems and global trade.

4.2 Transplantation as technology

In the beginning, humans were "sustain'd by the Fruits of the Earth" that divine providence had ordained to grow nearest them.[390] Over time, some began to barter foods and medicines: "this was the first Original of Trade, which from a narrow commerce between the Hills, the Vallies, the Woods, the Plains, and the Rivers, that border'd one upon another, is since extended to the whole compass of the Earth." As this trade grew in extension and scale, the "Rude multitude" of primeval times began to

[389] Recent work by James Delbourgo exploring the materiality of Hans Sloane's collecting practices in Jamaica offers an excellent roadmap for more scholarship in this vein. See Delbourgo, "Divers things: Collecting the world under water," *History of Science* 49: 163 (2011), 149-185; and "'Exceeding the Age in Every Thing': Placing Sloane's Objects," *Spontaneous Generations: A Journal for the History and Philosophy of Science* 3: 1 (2010): 41-54.

[390] Thomas Sprat, *History of the Royal Society* (London, 1668), 379-80.

wear "the face of Civility" and "the delights of Cities, and Palaces, the delicacies of Food, the Curiosities of Clothing, the varieties of recreations took their rise."

Such, at least, was the take on human origins promulgated by Thomas Sprat, in his *History of the Royal Society* (1668). Sprat believed that the current state of mankind "may still be advanced to a higher perfection" by two means: either "the discovery of new matter, to imploy mens hands; or by a new Transplantation of the same matter."[391] The first method, he argued, would eventually become possible as commerce with "more Countreys, which are now hidden from us" brought Europeans into contact with unimagined animals, plants, minerals, and handicrafts. The "observation" of these curiosities would in turn lead to new discoveries and new manual arts.[392] Sprat believed that the interior regions of the New World had failed to offer up all the "Philosophical discoveries" that they harbored because so much of this territory remained under the control of the Spanish, whose focus on "the transportation of Bullion" had led them to overlook "many other of its Native Riches," and whose proud "humours" made them "disdain to exercise any Manual Crafts."[393] For Sprat—and for many of his fellow members of the Royal Society—the New World "remain'd a Part of the unknown

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[391] Sprat, *Royal Society*, 381.

[392] Ibid. "If any more Countreys, which are now hidden from us, shall by reveal'd, it is not to be question'd, but there will be also opened to our *observation*, very many kinds of *living Creatures*, of *Minerals*, of *Plants*, and of *Handicrafts*, with which we have been hitherto unacquainted. This may well be expected [pg. 381] if we remember, that there was never yet any *Land*,discover'd, which has not given us divers new sorts of *Animals*, and *Fruits*, of different Features and shapes and virtues from our own or has not supply'd us with some new artifical *Engine*, or *Contrivance*."

[393] On perceptions of Spanish America as "unimproved" among 1670s Britons see Eva Botella-Ordinas, "Debating Empires, Inventing Empires: British Territorial Claims against the Spaniards in America, 1670-1714," *The Journal for Early Modern Cultural Studies* 10/1 (Spring/Summer 2010), 142-168.

World," a refuge of hidden "Rarities both Natural and Artificial" comparable to the invisible kingdom of the microscopic creatures "in the bowels of the *Mountains*, in the bottoms of *Seas*, and in the shades of *Forests*" which Robert Hooke had recently revealed with his microscope.[394]

Yet the most promising method to increase the manual arts and the wealth of nations, Spratt believed, lay not in discovering new riches in undiscovered lands, but in "Transplanting… the several Natural Commodities of all Nations, to other Airs, and other Soils, and other ways of Cultivation." Whereas the Spanish furnished Sprat with a negative example of how the discovery of new curiosities could be delayed by despotism and sloth, the Portuguese provided a success story of transplantation. Spratt argued that the similar climates, soils, astral influences, and latitudes of the East and West Indies meant that "Eastern Spices, and other useful Vegetables" could easily be transplanted to the new British plantations in the West Indies, as had been demonstrated by the lucrative transplantation of "the Orange of China" into Portugal earlier in the century.[395] Spratt urged future natural philosophers, merchants, and agents of empires to take action on an ecological scale, concerning themselves not only with collecting seeds and specimens for "Cabinets and Gardens" but with large-scale transplantations that transformed commerce, science, and the arts.

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[394] Spratt, *Royal Society*, 383. Spratt hoped that "other senses" might similarly be enlarged: "This Mr. *Hook* has undertaken to make out, that *Tasting, Touching, Smelling* and *Hearing,* are as improvable as the *Sight :* And from his excellent *Performances* in the one, we may well rely on his *promise* in all the rest."

[395] Spratt, *Royal Society*, 385-6. The China or sweet oranges (*Citrus sinensis*) lauded by Sprat can still be plucked from trees planted alongside the southern wall of the Cathedral of Lisbon. Interestingly, the Portuguese were so associated with the orange trade that the fruit is actually named "Portugal" in several languages, such as Albanian (*portokall*), Greek (*πορτοκάλι* or *portokali*) and Turkish (*portakal*).

As Benjamin Schmidt has noted, tropical drugs and curiosities grew to become a focus not only of natural philosophical interest but of a larger cultural fascination in the decades bookending 1700.[396] European writers on the "torrid zone" drew upon an emerging network of vernacular informants like pilots, sailors, merchants, and missionaries to construct new knowledge of a unified climactic space—a global tropics—that they now acknowledged had been badly misrepresented by earlier authorities who lacked first-hand experience.[397] "[The Ancients] thought [the Torrid Zone] not habitable, because the Sun darts its Rays perpendicularly upon it," wrote the cartographer John Senex in 1721,

> but Experience has prov'd the contrary, for… the long Nights thro' most of that Zones, and the frequent Rains, and great Dews, refresh it sufficiently, to make the Earth not only habitable, but so abundantly fertile, that in many Places it yields two Harvests a Year, and produces not only all sorts of Spiceries and Drugs, but furnishes a greater Quantity of perfect Metals, precious Stones and Pearls, than all the other Zones together… in that part of Africa, which lies under the Torrid Zone, there are Countries extremely fertile… and 'tis the same as to what lies under it in America, so far as is yet known.[398]

The seventeenth-century Portuguese and British travelers in Africa examined in Chapter 3 believed that the Torrid Zone gave rise to malignant "conjunctions of the moon," poisonous rains, venomous beasts, and demonic curses. Yet Senex argued that Europeans

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[396] Benjamin Schmidt, "'Imperfect Chaos': Tropical Medicine and Exotic Natural History Circa 1700," in *Medicine and Religion in Enlightenment Europe*, ed. Andrew Cunningham and Ole Peter Grell (Aldershot, 2007), 145-173 and *Inventing Exoticism: Geography, Globalism, and Europe's Early Modern World* (University of Pennsylvania Press, 2015).

[397] Ashley L. Cohen deploys a similar concept, albeit for a later period, in "The Global Indies: Reading the Imaginative Geography of British Empire, 1763-1871," (PhD Dissertation, University of Pennsylvania, 2013), and my thinking here has been influenced by conversations with her on the topic.

[398] John Senex, *A New General Atlas* (London: printed for Daniel Brown, 1721), 4.

were in fact uniquely well-suited to exploit the "Spiceries and Drugs" of the tropics because their constitutions were supposedly better suited to travelling between ecological and climactic zones, and their intellects were best able to assemble the overwhelming sensory complexity of tropical nature into a coherent pattern. "Divine Providence has fitted the Europeans for those great Undertakings beyond the Inhabitants of the other Parts," Senex wrote, "they are of stronger Constitutions… having better Notions of Learning, Religion and Liberty than others." European minds, he continued, "are thereby more adapted to generous and bold Attempts, and to despise Dangers, than those of the Asians, Africans and Americans, who never were a Match for them in any thing upon equal Terms."[399] Spratt, likewise, recast the deadly fevers of the tropics as a beneficent "kindly heat" to which "the Oriental nations are supposed to owe their advantages," but argued that the exploitation and transplantation of tropical nature was the special province of Europeans.[400]

As Joyce Chaplin has argued, early modern Europeans frequently attributed this supposed superiority to their theories and technologies for improving nature, or *artes*—the "better Notions of Learning" alluded to by Senex.[401] Yet Englishman in the age of Frobisher—no less than the Portuguese stationed in seventeenth-century Agnola—retained many Aristotelian assumptions about the dangerous effects of the Torrid Zone on "Northern" bodies, and the providential distribution of local cures for local diseases.

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[399] Senex, *New General Atlas,* 11.
[400] Spratt, 386. "Transplantation" in 1660s
[401] Joyce Chaplin, *Subject Matter*, 1-2.

As Chaplin notes, Richard Ligon had argued that Barbados harbored native "Simples" that "are more proper for the bodies of the Natives, than any we can bring from forraigne parts, and no doubt would be so for our bodies too, if we knew the true use of them."[402] For Ligon, European-traded drugs were poor substitutes for local cures—yet this was because these local simples were "more proper to cure the diseases that are bred there," not because of their virtue as "specific" medicines which could effect a universal cure regardless of where they were consumed.[403] Ligon (born circa 1585), reflected a prevailing sentiment of his time when he argued that it would it would be inadvisable to transplant the flowers of Barbados to England because "to transpose these, and set them in contrary places, were to strive against nature."[404] By contrast, Sprat articulated a new vision of both human bodies and natural products as *improvable* by the technology of transplantation: transplantation allowed local remedies to become universal, and even promised to improve their God-given virtues in the process, giving "a new force to the new Guests."[405]

By the late seventeenth century, many travelers in the tropics were no longer content simply to use local cures in local environments: they sought to carry physical

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[402] Richard Ligon, A True and Exact History of the Island of Barbados (London, 1657), 118 and Chaplin, Subject Matter, 217.

[403] Although the early members of the Royal Society, notably Samuel Hartlib and John Evelyn, praised Ligon's book, by c. 1700 Ligon's approach was beginning to be considered outmoded. Karen Kupperman, "Introduction," in Kupperman, ed., *A True and Exact History of the Island of Barbados* (Hackett Publishing, 2011), 34.

[404] Ligon, *True and Exact History*, 180.

[405] Although he acknowledged that it did not always have a beneficial effect, Sprat argued that "transplanting *living creatures* and *Vegetables* from one Climat to another" was "will be very beneficial… Sometimes the *Soil* and the *Air* being chang'd, will give a new force to the new *Guests*; as the *Arabian Horse*, by mingling with our *Breed*, produces a more serviceable *Race* than either of them single" (Sprat, 386).

samples across long distances, both to explore their potential as universal or "specific" remedies and to experiment with the types of beneficial transplantations advocated by Sprat. William Dampier, a privateer with a keen eye for natural curiosities, worked with Dr. Thomas Woodward of the Royal Society to preserve botanical samples from his voyages to Australia—a region Dampier had targeted in the first place because, as he put it, "the *Terra Australis*" was "situated so very advantageously in the richest Climates of the World."[406] Dampier speculated that this "hitherto almost unknown" land would thus contain "rich Fruits, Drugs, or Spices" to match those of other lands along the Tropic of Capricorn (Mozambique, Angola, and Brazil) or "at least a Soil and Air capable of such, upon transplanting them hither" from these other tropical zones. The "pirate surgeon" Lionel Wafer, a crewmate of Dampier's who practiced medicine among a Kuna Indian tribe while stranded on the Mosquito Coast for almost a year in the 1680s, became convinced that a species of mangrove he encountered there was "the Tree from whence the Peruvian or Jesuit's Bark is fetch'd." To convince skeptics, Wafer managed to obtain "several Bundles of this Bark, and I found it to be the right Sort, by the frequent use I made of it in Virginia and elsewhere." A decade later, when Wafer published his own travel account, he apparently continued to carefully preserve a sample of the bark at his

[406] At least one of Dampier's specimens (*Clianthus formusus*) still survives in Oxford Ashmolean Museum. Woodward authored a 1696 manual for philosophical travelers like Dampier called *Brief Instructions for Making Observations and Collections in All Parts of the World in Order to Promote Natural History*, but he was ultimately expelled from the Royal Society for repeatedly insulting Hans Sloane. See Adrian Mitchell, *Dampier's Monkey: The South Seas Voyages of William Dampier* (Wakefield Press, 2010) 181, note 257, and Joseph M. Levine, *Dr. Woodward's Shield: History, Science, and Satire in Augustan England* (University of California Press, 1977), 85-92

home in London.[407]

Yet as the "philosophical gardener" John Beale put it in a 1664 memoranda to the Royal Society, "transplanting East-indies spices" was a task filled with "difficulties and discouragements."[408] Written observations of nature could be protected from the rigors of tropical travel via makeshift preservation techniques such as the bamboo tube, "clos[ed] with wax" that Dampier constructed to preserve his journal during his peregrinations in Panama. Likewise, prepared drugs could be stored in a water-tight case like the "box of five remedies... sealed up with mother of pearl, for greater security," which the Lisbon physician Antonio de Monrava y Roca recommended to "the Surgeons of the Fleets which sail to Brazil and the Portuguese Indies."[409] Yet preserving *living* samples presented a considerable technical challenge. Thomas Woodward, who solicited plant samples from William Dampier, wrote that long-distance travelers could hope to preserve certain tuberous plants *in vivo* "in very dry Moss, Coton, or Sand," and recommended that they simply hang succulents like aloe and prickly pear "in the Air, at the top of some

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[407] Lionel Wafer, *A new voyage and description of the isthmus of America* (London, 1695), 107. "I have some of it now by me," Wafer wrote in reference to the supposed cinchona bark.

[408] RSA, EL/B1/37, "Enquiries concerning the transplanting [of] East-indian Spices," May 11, 1664. Beale parted ways with Sprat in his belief that the act of transplanting caused Indies plants to "loose…their best qualities," although he still advocated for pursuing transplantation schemes in an effort to experiment with new methods that retained a plant's native vigor.

[409] Antonio de Monrava y Roca, *Breve curso de nueva cirugia, vol. 2* (Lisbon: printed at the Officina de la Musica, 1728), "Advertencia," n.p. Monrava y Roca, an interesting and understudied figure, was a Catalonian physician who was the Chair of Anatomy at the Royal Hospital in Lisbon and the self-described "President and Founder of the New Physical-Medical-Anatomical-Surgical Academy " (*Nueva Academia Phisico-Medico-Anatomico-Cirurgica*). Oddly, his book is in Castilian despite having been printed in Lisbon and written by a Catalan. Like João Curvo Semedo, Monrava y Roca also sold proprietary formulae (the "Cinco Remedios" depicted in the engraving reproduced below) out of his house, along with copies of the *Breve curso* and his numerous other works, at least one of which appears to have been a humorous attack on other physicians that likened them to parrots.

Cabbin, to keep them from rotting," after which they "will, if set, grow afterwards, and thrive." Yet for the most part, Woodward acknowledged the difficulty of preserving living samples from being "tumbled and shaken" along seaways or "broken, or rifled and confounded by the Custom-house," emphasizing instead either make careful written records or preservation of non-living samples in alcohol or between the pages of a book.[410] It was not until the final decades of the eighteenth century that systems for transplanting plants across oceans, like John Ellis's box of West Indies seedlings, became formalized and routinely successful.[411]

Yet this certainly did not mean that successful transplantations did not occur earlier, outside the ambit of the Royal Society or of natural philosophy. On the contrary, Portuguese merchants, travelers and slaves transformed global ecologies in the sixteenth and seventeenth centuries, carrying tobacco to the Old World, chili peppers to Asia, and corn to Africa, tomatoes to Italy. The geographer Jean Andrews has argued that the spread of spices and peppers from Mesoamerica to Europe was actually a *tropical* dissemination along the equatorial pathways of the Portuguese colonies—a diffusion pattern that initially by-passed Western Europe altogether.[412]

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[410] John Woodward, *Brief instructions for making observations in all parts of the world* (Society for the Bibliography of Natural History, 1973 [facscimile of 1696 original]), 13.

[411] John Ellis, *Directions for Bringing Over Seeds and Plants, from the East-Indies and Other Distant Countries, in a State of Vegetation* (London, 1770); Christopher Parsons and Kathleen S. Murphy, "Ecosystems under Sail: Specimen Transport in the Eighteenth-Century French and British Atlantics," *Early American Studies*, 10: 3 (Fall 2012), 526.

[412] Jean Andrews, "Diffusion of Mesoamerican Food Complex to Southeastern Europe," in Helen Wheatley, ed., *Agriculture, Resource Explioitation and Environmental Change* (Brookfield, VT: Variorum, 1997), 10. According to Andrews, the "Mesoamerican crop complex" (maize, beans, squash, peppers and ancillary spices) "diffused by way of the Portuguese Atlantic islands, Angola, Mozambique, India and the Ottoman Empire to the Balkans by the 1530s."

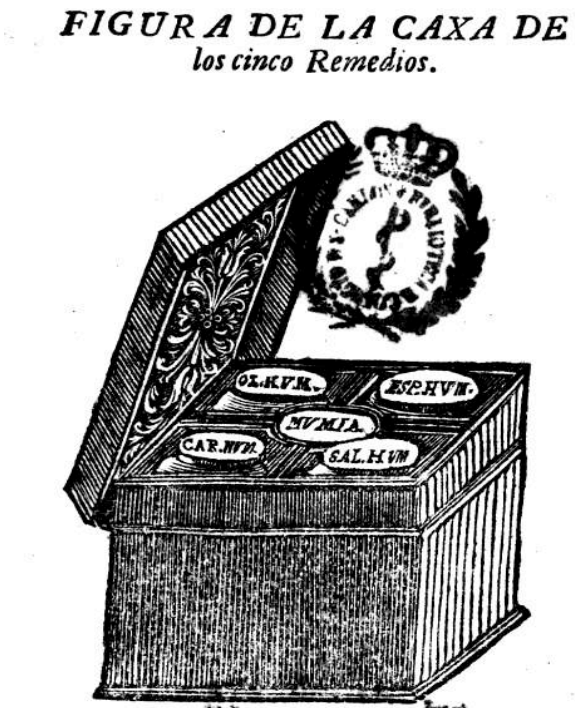

FIGURE 4.2 A sea-surgeon's chest for preserving five valuable and macabre drugs sold by the Lisbon chemical physician Monrava y Roca: *Oleo humano* (human fat), *espiritu de sangre humano* (spirits of blood), *sal humana* ("human salt"), *craneo humano* (powdered skull) and *mumia* (mummy). Antonio de Monrava y Roca, *Breve curso*(Lisbon, 1728).

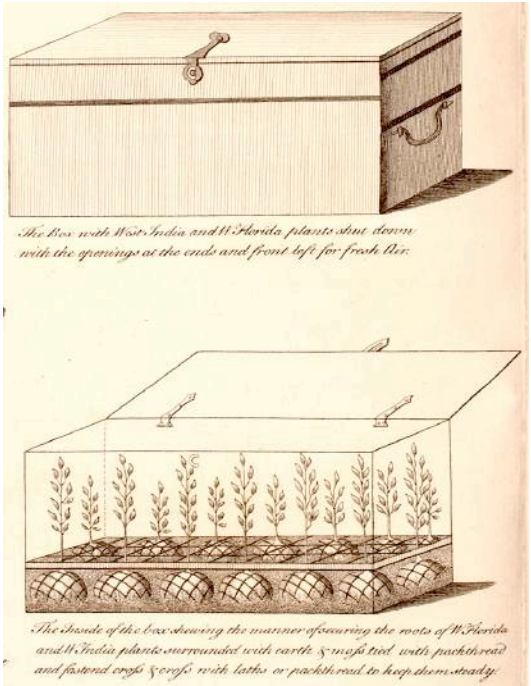

FIGURE 4.3 John Ellis's design for a water-tight box to transplant living West Indies plants across the Atlantic. John Ellis, Directions for Bringing Over Seeds and Plants, from the East-Indies and Other Distant Countries, in a State of Vegetation (London, 1770).

Remarkably, rather than following the far more direct route across the North Atlantic, these crops apparently travelled via tropical pathways that passed across Africa and looped *back* toward Europe only after they had reached as far east as Mughal India. This argument answers a long-standing puzzle of historical nomenclature: why do so many European languages identify New World crops using Turkish or Eastern epithets?[413] It also points to the limitations of Crosby's initial formulation of the

[413] E.g., words like "Turkey" in English, *dinde* (from India) in French, *pomo di Moro* [Moorish apple] for tomatoes, *granoturko* [Turkish grain] for maize, etc.

Columbian exchange paradigm. African slaves and other non-Europeans were not only passive toilers within the labor regimes of the colonial plantation system. They were also active consumers and shapers—ecologically, culturally, and epistemologically—of newly-globalized drugs.[414]

4.3 Duarte Ribeiro and the Philosopher's Stone

The Portuguese statesman Duarte Ribeiro de Macedo was a man of wide interests that converged on a single goal: restoring the Portuguese empire to global supremacy.[415] He was painfully aware of the setbacks presented by the loss of most of the Éstado da India, as well as the hugely expensive royal dowry paid in yearly installments to the British Crown and the post-1650s decline in the Brazilian sugar trade, because he had been a firsthand witness to them. Macedo, born in 1618, had indeed come of age in an epoch of unrelenting disasters for the Portuguese state—a time of what one contemporary chronicler called "monstrosities of fortune."[416] But in his twilight years, this lifelong imperial servant began to outline an energetic plan for

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[414] Elinor G. K. Melville, "Land Use and the Transformation of the Environment," in *The Cambridge Economic History of Latin America Vol. 1*, Victor Bulmer-Thomas et al, eds., (Cambridge: Cambridge University Press, 2006), 125. On "Neo-Africas" see also James Belich, *Replenishing the earth: the Settler Revolution and the Rise of the Anglo-World, 1783-1939* (Oxford: Oxford University Press, 2009), 25-7 and Judith Ann Carney and Richard Nicholas Rosomoff, *In the Shadow of Slavery: Africa's Botanical Legacy in the Atlantic World* (Berkeley: University of California Press, 2010).

[415] On Macedo's life and thought see Ana Maria Homem Leal de Faria, "Duarte Ribeiro De Macedo: A Modern Diplomat (1618-1680)," *e-Journal of Portuguese History*, 4/1 (Summer, 2006) and Maria Teresa Trigo Neto e Cova, "O Pensamento Politico de Duarte Ribeiro de Macedo," *Do Tempo e da História*, Vol. III, Instituto de Alta Cultura, Centro de Estudos Históricos, Faculdade de Letras da Universidade de Lisboa, 1970, which reprints original documents.

[416] Archives of the Academia das Ciencias, Lisbon, Manuscript 620 (Vermelho), "Monstruosidades do Tempo e da Fortuna vistas em o Reino de Portugal desde 1662 até 1680."

Portuguese renewal based in large part upon the ideas of Thomas Sprat. Macedo coordinated his ambitious plant transplantations and commercial scheme with a loose-knit network of confidants ranging from Padre Antonio Vieira in Rome to the Royal Society patron Lord Ralph Montagu and even a renegade son of the Dutch statesman Hugo Grotius living in Paris. In 1675, Macedo wrote to King Alfonso VI with a plan to restore Portuguese power that, he boasted, had been inspired by a "proposition" of King Charles II of England himself.[417] "I have had correspondence in Paris with Lord Montagu, ambassador of the King of Great Britain in this court," Macedo reported to Lisbon:

> During our conversations, in which we spoke vaguely [*vagamente*] regarding the English colonies in Virginia and the Portuguese in Brazil, he remarked to me that the first time that the King [of England], his Lord, saw the powder that we call *Cravo*, the King remarked in the presence of various subjects of his court that only his brother the King of Portugal had the means to destroy the Dutch.[418]

In the detailed "Discourse on Transplantation" (*Discurso sobre a transplantação*) that he attached to this report, Macedo argued that the Portuguese crown should finance

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[417] Macedo's transplantation letters are discussed briefly in Carl A. Hanson, *Economy and Society in Baroque Portugal, 1688-1703*, f. 87, and by Visconde de Santarem, *Quado Elementar*, 18:112-13, but have not been analyzed in any detail to date.

[418] Duarte Ribeiro de Macedo, "Discurso sobre a Transplantação das Plantas de Especiarias da Asia para a América," AN/TT, T/TT/MSBR/39. Transcriptions here were made from the manuscript at the ANTT, the text of which was later reproduced in a slightly altered form in *Obras Ineditas de Duarte Ribeiro de Macedo* (Lisbon: Impressão Regia, 1817) 103-133. An unusual amount of uncertainty surrounds the dating of this letter due to a number of transcription errors: the document is misdated to 1633 in the AN/TT's catalogue, and is misdated to 1782 in the printed transcription produced in 1817. The final page of the second section of the original manuscript reads: "Paris, 15th of March, 1675," however fol. 6v of the same section mentions that "after I had written these pages I found in the *Jornal de Scavans* of July 3, 1675 an extract from the *Jornal du Inglaterra* [*Philosophical Transactions*] where is discussed a discovery of the Royal Society regarding the cinnamon tree." The final phrase entered into the manuscript reads "December 20, 1633, Duarte Ribeiro de Macedo." Since Macedo was a fifteen-year-old schoolboy in 1633, I interpret this as a mistake which should read "December 20, 1675."

attempts to transplant not only *cravo* (cloves) from the East Indies to Brazil, but also a wide range of spices (*especiarias*) and drugs (*drogas*)—terms which he used interchangeably to refer to the natural commodities of the Indies.

The expansion of the Dutch trading companies in the early decades of the seventeenth century coincided with a period of Portuguese weakness immediately before and after the dissolution of the Hapsburg "joint monarchy" that had united Portugal and Spain between 1580 and 1640. The leaders of the Dutch trading companies were quick to understand the commercial implications of these events. The *Groot Desseyn* ("Grand Design") formulated in the 1620s by the directors of the newly-formed Dutch West India Company hinged on a confluence of imperial, commercial and ecological ambitions: by seizing the Portuguese colonies in Africa and the East and West Indies, Dutch merchants hoped to corner the global market on a wide range of rare tropical commodities.[419]

Yet developing a drug and spice monopoly was far more complex than blockading a port or seizing a silver mine. This is because many of the most valuable drugs came from tropical plants and animals that could potentially be established in new ecosystems along the equatorial belt.[420] For instance, the sugarcane and indigo that Dutch planters

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[419] On Dutch ambitions in the West Indies see Benjamin Schmidt, "The Dutch Atlantic: From Provincialism to Globalism," in *Atlantic History : A Critical Appraisal: A Critical Appraisal* edited by Jack P. Greene (Oxford University Press, 2008). For the ecological and commercial ambitions of the Dutch mercantile companies in the seventeenth-century see Siegfried Huigen, Jan L. De Jong, Elmer Kolfin, eds. *The Dutch Trading Companies As Knowledge Networks* (Brill, 2010), and Harold Cook, *Matters of Exchange*.

[420] On "pan-tropical networks of circulation" and transplantation see Paul S. Sutter, "The Tropics: A Brief History of an Environmental Imaginary," in the *Oxford Handbook of Environmental History*, edited by Andrew C. Isenberg (Oxford University Press, 2014). "People from outside the region constructed the

nourished in Pernambuco found new homes in the Dutch West Indies and in the sophisticated botanical garden at the Cape Colony, which the VOC had established as a way station for acclimatizing and transplanting valuable specimen in the 1650s.[421] These transplantations allowed Dutch planters to wage economic war on their Luso-Brazilian rivals long after the demise of Dutch Brazil in 1654.[422] Battles for control of the global spice and drug trade thus hinged not only on the force of arms and territorial conquest, but on the circulation of information and materials. To control the trade in a medicinal plant, one needed not only to control the ecological spaces in which it *currently* grew, but also to control the flow of cuttings and seeds, and of knowledge about how to transplant it to new regions.[423]

Macedo believed that the Dutch-Portuguese conflicts of the first half of his century could have been avoided. Disregarding confessional differences, he insisted that Portugal's "captivity" under the rule of the Spanish Hapsburgs (1580-1640) had set the Portuguese empire in an artificial opposition to "the nations of the North, with whom we had formerly enjoyed friendship and useful exchanges." [424] When the Portuguese

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tropics in countless acts of consumption" that obscured the labor which produced tropical commodities, Sutter writes, encouraging the belief that "that tropical commodities were the products of a fecund nature and could be had with little or no labor" (185).

[421] Alette Fleischer, "Exchanging knowledge and nature at the Cape of Good Hope, circa 1652-1700" in *Dutch Trading Companies as Knowledge Networks*.

[422] As Stuart Schwartz documents, competition from new sugar plantations in the Dutch, French, and British West Indies fragmented the global sugar market and caused a period of economic instability in mid-17th century Brazil. Stuart Schwartz, *Sugar Plantations in the Formation of Brazilian Society: Bahia, 1550–1835* (Cambridge University Press, 1986).

[423] Christopher Parsons and Kathleen Murphy, "Ecosystems under Sail," 503-529.

[424] Duarte Ribeiro de Macedo, "Satisfação Politica a Maximas Erradas" (1660?) reprinted in *Obras*, Vol. 1 (Lisbon, 1767), 240.

became "vassals of the Kings of Castille," he elaborated, they were forced to become "enemies of England, of Holland, and of France, and this evil resulted in the greater part of the losses of our conquests. When we were ruled by our own Kings many nations came to our ports in search of the drugs of the Orient [*drogas do Oriente*]... but after we became subject to Castile they ceased their commerce."[425] In Macedo's vision, Portugal and her "conquests" possessed immense natural resources but a poverty of technical expertise, or *artes*. The ultimate negative example of this type of imbalance was (predictably) the Spanish, who Macedo derided for having squandered the riches of their American empire by failing to develop technical and scientific skills. "Charles V liked to say that the Spanish seem prudent but are mad," Macedo wrote, "and that the French seem mad but are prudent":

> The reason for this distinction is clear. The Spanish had all of the materials, and disdained the Arts; and the French had no materials, but esteemed the Arts. The Spaniard thus sells raw materials to the Frenchman and buys finished products from the same, but at a greatly increased price. Who could not say, therefore, that one nation is barbarous and the other civilized, one insane, and the other wise?[426]

Macedo's emphasis here was on textiles, but throughout his writings he returned again and again to the question of *drogas*, for drugs were the most unique and valuable of the commodities that the Portuguese could lay claim to—and (like cotton spun into fine fabric) they could be rendered far more valuable by the proper application of technical expertise. Naturally, Macedo was far from alone in making such an assertion. Similar

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[425] Macedo, *Obras*, 240.

[426] Duarte Ribeiro de Macedo, "Se he facil no Reino a introducação das Artes," (undated treatise) collected in *Obras Ineditas*, Antonio Lourenço Caminha, ed. (Lisbon, 1817), 40-41.

calls for the cultivation of industry and technical skills were being made by many in London, Paris, and elsewhere at the time.[427] Likewise, as we saw in Chapter 1, early modern apothecaries and their opponents engaged in extensive debates about the degree to which "art" could add value to the raw materials of drugs. What set Macedo apart was his focus not only on the apothecary's transformation of raw materials into valuable proprietary remedies, but on using technologies of transplantation to *transform where raw materials originated.*

The Portuguese diplomat's vision was also distinguished by its grounding in the experiences of four separate empires. Macedo's thinking developed what one scholar calls "a markedly Colbertian tilt" during his residence in Paris—hardly a surprising development given his role as the ambassador to Louis XIV.[428] Yet Macedo also explicitly took the Dutch and British as inspirations, and in this he represented a radical vanguard at the Portuguese court that advocated for emulating the joint stock trading companies and natural philosophical theories of the Protestant nations. Remarkably, Macedo befriend no less than the "son of Hugo Grotius, one of the most celebrated Authors of this Age." Grotius *fils*, who Macedo lauded as "an experienced and knowledgeable man," discussed Brazil with Macedo and confessed that he was glad the

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[427] For a socio-economic perspective see Jan de Vries, *The Industrious Revolution: Consumer Behavior and the Household Economy, 1650 to the Present* (Cambridge University Press, 2008) and for an earlier period Deborah Harkness, *The Jewel House: Elizabethan London and the Scientific Revolution* (Yale University Press, 2007), ch. 4.

[428] Rodrigo Araújo Maciel, "Brasil Indo-Lusitano: As Influências Culturais das Índias Orientais no Brasil Colonial (1672-1712)" (Masters Thesis, Pontifícia Universidade Católica do Rio Grande do Sul, 2012), 76.

Dutch had lost their possessions there, because "the Dutch East India Company secretly desired the ruin of the Dutch West India Company." This remark, Macedo wrote,

> aroused in me a zeal to know upon what basis the proposition of the King of England was founded, because it seemed to me... that the method by which your Highness, as Lord of Brazil, could destroy the Dutch in the opinion of the King of England was precisely the same as that by which the Dutch West India Company could have destroyed the East.[429]

As Macedo elaborated, East Indian cinnamon and cloves "are the greatest drugs [*as mellhores drogas*], from which the Dutch receive enormous wealth." Producing these crops in the Maranhão, "with its short and easy navigation to Europe, at the same prices" would lead to the collapse of the commercial advantage upon which all Dutch power in the tropics rested.[430]

Macedo's plan was ambitious, but it was not necessarily a pipe dream. He was lucky to count as a friend one of the most influential figures in the early modern Portuguese empire: the Jesuit Padre Antonio de Vieira, who was at this time resident in Rome.[431] In January of 1675, Macedo and Vieira began a spirited correspondence about the theory of drugs and long-distance transplantations. Vieira argued for a shift in priorities away from defending the failing Éstado da India and toward ecological manipulations that would effectively turn Brazil into a *replacement* of India. Vieira reminded Macedo that spice transplantation had technically been banned by the royal decree of King Manoel in the 1510s, who sought to retain monopolistic control over

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[429] Macedo, *Discurso*, AN/TT, T/TT/MSBR/39, fol. 2v.

[430] Macedo, "Discurso," AN/TT, T/TT/MSBR/39, fol. 2v-3r.

[431] On Vieira and his time in Rome see Thomas M. Cohen, *The Fire of Tongues: António Vieira and the Missionary Church in Brazil and Portugal* (Stanford University Press, 1998).

goods like nutmeg and cinnamon by limiting their cultivation regions on pain of death.[432] The Jesuit advocated for abandoning this approach, declaring himself and Macedo to be "the true alchemists [*chimicos*] of Portugal" because "it seems to me that we have both discovered the Philosopher's Stone [in Brazil], and like alchemists we have profited little from it."[433]

What did Vieira mean by this? The Jesuit was poking fun at the skepticism surrounding alchemy, but also paralleling the alchemical concept of transmutation with the act of transplanting drugs and spices.[434] Vieira had been interested in the commercial potential of *drogas* from the Maranhão and Angola since his youth.[435] By carrying the most valuable drugs and spices of the East Indies halfway around the world, the Portuguese could transform their American colonial holdings into an impregnable foothold for the empire and for the Catholic faith. In his "Discurso" memoranda later that year, Macedo repeated Vieira's "philosopher's stone" metaphor but dropped the joke, writing that:

> It seems to me we have discovered the Philosopher's Stone [*Piedra Filizophal*], for there is no doubt that if Brazil produces cloves, peppers, cinnamon, and all the most [valuable] plants that Nature yields, and

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[432] Antonio Vieira in Rome to Duarte Ribeiro de Macedo in Paris, January 23, 1675, in Antonio Vieira, *Cartas selectas*, José Ignacio Roquete, ed. (Lisbon: Livraria Portugueza de J.P. Aillaud, 1856), 94.

[433] Vieira to Macedo, January 23, 1675, in *Cartas selectas*, 94.

[434] On transmutation and its cultural meanings see Jennifer Rampling, "Transmission and Transmutation: George Ripley and the Place of English Alchemy in Early Modern Europe," *Early Science and Medicine* 17 (2012), 477–499.

[435] For instance, Vieira's early writings about the threat of the Dutch in Brazil and the Éstado da India hinged on their seizure of the drug trade. See for instance BNP Cod. 9259, "Obras várias de Padre Antonio Vieira," fol. 9v-11v (dated 1644). This and other manuscripts are partially transcribed in *Obras Varis do Padre Antonio Vieira* (Lisbon, 1856).

> which are cultivated in the East, then Brazil will come to provide greater riches, and fewer costs, than the Mines of Peru or Sofala.[436]

Despite Vieira's influence, however, the internal evidence in Macedo's "Discurso" suggests that its motive force came from neither Vieira nor King Charles II, but from the circle of savants associated with Ralph Montagu—the "milord Montagu" with whom Macedo had discussed transplantations in Brazil and Virginia. An iconoclastic and ambitious member of a well-connected family (his cousin Edward, Earl of Sandwich, had traveled to Lisbon to negotiate the Infanta Catarina's marriage to Charles II), Ralph maintained a keen interest in experimental natural philosophy and was both a fellow and a prominent patron of the Royal Society. He was also an intimate of the Queen, becoming her master of the horse after his elder brother had been dismissed from the post for "making amorous advances."[437] Montagu was in Paris to negotiate peace between France and Holland, but he also maintained a cosmopolitan circle of natural philosophical acquaintances that included Robert Hooke (who designed Montagu House, the future home of the British Museum) and John Locke, who, while traveling in France, served for a time as the personal physician of Montagu's wife.[438] It would seem that Montagu functioned as a sort of emissary of the Royal

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[436] Macedo, "Discurso," AN/TT, T/TT/MSBR/39, fol. 3r.

[437] Basil Duke Henning, "Montagu, Hon. Edward (c. 1636-65)," in *The History of Parliament: The House of Commons 1660-1690,* ed. B. D. Henning (London, 1983). Ralph Montagu (whose father was a baron) would ultimately be elevated to the position of 1st Duke of Montagu in 1705. Before this time he had already amassed a considerable fortune, in part due to his infamous 1692 marriage to the eccentric heiress Elizabeth Monck. Montagu supposedly dressed as the Kangxi Emperor of China in order to placate her desire to marry into royalty.

[438] John Locke to Dr. Mapletoft, Paris, December 4, 1677, in Edmund De Beer, *The Correspondence of John Locke* (Oxford University Press, 1976-1989).

Society in Paris. Macedo noted that it was Montagu who had given him a French translation of Thomas Spratt's *History of the Royal Society* (1667). Macedo described the text as:

> A book called *Sociedade Real de Londres*, written in the French Language, which contains a History of this Academy, which is called the Royal Society, whose mission is the discovery of secrets of Natural Philosophy via Chemical experiments, and to search out the reasons for all natural phenomena, which seem to us to come from occult causes [*causas occultas*].[439]

"I read this book with curiosity," Macedo added, "and sought to discover the secrets of their discoveries."

In particular, Macedo keyed in on a passage in which Spratt reflected on the mechanics of "*Transplanting* out of one Land into another, of the same scituation in respect to the *Heavens*… Eastern *Spices*, and other useful *Vegetables.*"[440] He appears to have been inspired by Sprat's praise of the aforementioned Portuguese transplantation of oranges from China to Lisbon, a feat that also interested John Locke (who was affiliated with Montagu in Paris contemporaneously with Macedo's residence there). After returning to England, Locke wrote to his Parisian friend Nicolas Toinard in hopes of procuring the seeds of the same type of Portuguese-grown mandarin oranges that Spratt had praised as examples of a successful long-distance transplantation. Locke's friend Toinard evidently had Portuguese connections in Paris—quite possibly with Macedo himself, or a member of his household—because he subsequently sent

[439] Macedo, "Discurso," ANTT, T/TT/MSBR/39, fol. 5r. Macedo was referring here to the French translation of Sprat's book published as *L'Histoire de lad Société Royal de Londres* (Geneva, 1669).

[440] Thomas Spratt, *History of the Royal Society* (London, 1668), 385.

Locke a report abounding with insider knowledge of the Portuguese tropics: the narcotic effects of the New World drug *datura*, a translation of Cristobal de Acuña's Amazonian travel narrative, a report of a new kind of Brazilian animal, and even a description of the Jagas of Angola, whom we encountered in Chapter 3.[441]

In other words, Macedo's theories of transplantation were, themselves, a product of transplanted knowledge. His discussions stretched from Brazil and Virginia to Paris, London, Rome and Lisbon, and included both a renegade member of the Dutch government and (by proxy) the King of England himself. Not only natural philosophers but agents of empire with real political power were beginning to envision the tropical belt as a space that could be reshaped by human hands and minds. In his youth, Vieira's standing at court had been severely damaged due to his leadership role in the creation of the Companhia Geral do Comércio do Brasil, which was modeled directly on the Dutch VOC and the English EIC.[442] The endeavor ended in failure because Portugal's Old Christian aristocracy feared any effort to emulate the practices of the Jews and Protestants of "the North." But by the 1670s, the decline in Dutch power and the new alliance with a revivified British Empire seemed to offer a second chance. Macedo's plan represented the realization of Sprat's vision: a bold step away from collecting

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[441] See Locke's Journal entries for March 8, 1679, June 21, 1679, Sep. 9, 1679, October 5, 1680 in John Locke, *Locke's Travels in France, 1675-1678. As related in his Journals, Correspondence, and other Papers*, ed. by John Lough (Cambridge: Cambridge University Press, 1953). On this correspondence see Giuliana di Biase, "Natural Philosophy, Inventions and Religion in the Correspondence between John Locke and Nicolas Toinard (1678-1704)," *Philosophy Study* 3/7 (July, 2013) 569-595.

[442] On the short-lived Brazil Company see Charles R. Boxer, "Padre António Vieira, S.J. and the Insitution of the Brazil Company in 1649," *New Hispanic American Historical Review* 29:4 (Nov. 1949), 474-97.

curiosa for "Gardens and Cabinets" and towards ecological manipulation on a massive scale.

4.4 Transplantation, slavery, and tropical empiricism

Sprat and Macedo, however, were armchair travelers. Europeans who actually resided in the colonies retained a more ambiguous view of tropical nature, and a more realistic assessment of the difficulties that transplantation imposed. As Vincent Brown has pointed out in the context of Jamaica, local conceptions of the Torrid Zone as inherently dangerous to European constitutions persisted throughout the eighteenth century, even if they were beginning to be contested by natural philosophers in Europe.[443] John Tennent, among the earliest physicians from the Thirteen Colonies to publish in London, having emigrated to Virginia in 1722, offered up a rather modernized, Cartesian spin on familiar Aristotelian beliefs about torrid climates being unfit for northern bodies.[444] "The *Fibres* of Northern People become very lax on going into Southern Climates," Tennent averred, "and will be in that State in a greater or lesser degree, as the Atmosphere they go thro', or stay in, abounds more or less with moist or aqueous Particles." Tennent attacked Iberian-traded drugs, like cinchona and dragonsblood,

[443] Vincent Brown, *Reaper's Garden: Death and Power in the World of Atlantic Slavery* (Cambridge: Harvard University Press, 2008).

[444] Tennent, *Physical Enquiries, discovering the Mode of Translation in the Constitutions of Northern Inhabitants on going to …Southern* (London, 1742, 29. Tennent's "An Essay on the Pleurisy," published in Williamsburg, VA in 1736 may likewise be the earliest medical text printed in Virginia.

because such "astringents… would produce death [in more Northern climes], as appears by the Experiment [of injecting these drugs into dogs]."[445]

Yet Tennent was a colonial eccentric in the Benjamin Franklin mold, and did not necessarily echo popularity orthodoxy. In the trading worlds of the tropics, too, a new awareness of the changeability and transferability of nature began to emerge—in part, indeed, due to the global transplantations of the same formerly regional diseases, like yellow fever, syphilis, and malaria, that had contributed to the paradigm of a "venomous landscape" in the Torrid Zone discussed in Chapter 3.[446] As circumnavigation became a relatively quotidian practice, long-distance voyagers began to document the degree to which human artifice had already altered the original, providential distribution of both diseases and natural products.[447] The Indies began to take on a more unified character as the ancient ecological boundary between what biologists today call the Neo- and Paleotropics blurred. This erosion of earth's pre-human ecological boundaries was reflected in ambitious plans to transplant drugs and

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[445] John Tennent, *Physical Enquires*, 22.

[446] As John McNeil notes, yellow fever was actually a recent transplant from Africa (likely carried over the Atlantic via early slave trading voyages) despite early modern European assumptions that it was native to the West Indies. J. R. McNeil, *Mosquito Empires: Ecology and War in the Greater Caribbean, 1620-1914* (Cambridge University Press, 2010), 32-3. Likewise, while malaria was known to the Greeks and Romans and was endemic in the marshes near Rome throughout the medieval and early modern periods, it was the voyages of the early modern trading companies and the commerce in slaves that appears to have turned it into a globally-distribute disease, since it is not attested in Mesoamerican texts or in DNA evidence from the Americas. M. C. de Castro and B. H. Singer, "Was malaria present in the Amazon before the European conquest? Available evidence and future research agenda," *Journal of Achaeological Science* 32/3 (2005): 337–340; P. Reiter, "From Shakespeare to Defoe: malaria in England in the Little Ice Age," *Emerging Infectectious Diseases*, 6/1 (2000): 1–11.

[447] Richard Grove, *Green Imperialism* documents this emerging awareness of human-induced changes to local flora among eighteenth-century visitors to tropical islands, but more work needs to be done on early modern awareness of animal and epidemic transplantations that were happening in parallel with botanical ones.

spices between the East and West Indies, like those of Sprat and Macedo. But on an everyday level, it was powered by the regime of forced labor that fueled the plantation economies and resource extraction schemes of the New World. The Atlantic slave trade blurred the boundaries between tropical locales not only by forcibly uprooting millions of human beings, but also by transplanting natural knowledge and diseases across oceans.

Antonio Vieira's interest in Macedo's transplantation scheme derived directly from his youthful observations of African slaves and indigenous Amazonian drug harvesters in the Éstado do Maranhão. After Macedo's death, Vieira wrote to the influential nobleman Luis de Meneses with a reiteration of the King Charles story and the plan to "*passar as drogas da India ao Brazil*" (transfer drugs from the East Indies to Brazil). Yet the Vieira, drawing on his firsthand experience of tropical nature and plantation labor regimes, claimed that "[Macedo] did not discover the means, nor did Dom Francisco de Mello [the Portuguese ambassador in England] understand the conjectures, that it has occurred to me to put forward."[448] Veira was here positioning himself as a go-between who could leverage his ties with the experimental scientific community in Rome (including luminaries like Francesco Redi and Athanasius Kircher) as well as his first-hand experience of the plants and drugs of the Amazon.

[448] Antônio Vieira to the Conde de Ericeira [Luis de Meneses], undated [1688], in *Cartas selectas do padre Antonio Vieira*, 102-3. See also Antônio Vieira to the Conde de Ericeira, May 23, 1689, Number CCXXX in Antônio Vieira, *Cartas* (Coimbra: Imprensa da Universidade,1927) III: 557.

Despite the petitions of Vieira and Macedo, their plan was never implemented. Yet in 1885, a member of the Academia Real das Sciências in Lisbon (an organization modeled on the Royal Society of London) acknowledged that much of what they argued for had come to pass over the course of the eighteenth and early nineteenth centuries:

> He taught the proper way to transplant spices, saying that it would not be difficult to move the same types that thrive under the tropic of Capricorn to the tropic of Cancer. The existence today of cinnamon, as well as ginger, tamarind, and sesame, throughout almost all of Brazil verifies the suspicions of Duarte Ribeiro de Macedo, even though it required great industry to propagate them.[449]

Slavery still existed in Brazil in 1885, and all who read this mention of "great industry" would have known to whom it referred. Although Macedo's "Discurso" avoided addressing the question of *who*, precisely, would be putting his plan into action in the colonies, his other writings made the answer plain. In 1678, for instance, Macedo had written another lengthy memoranda about transplantation to the Overseas Council—yet this document concerned the movements of human beings rather than spices and drugs. Macedo set forth a plan for the Portuguese to dominate the Spanish *asiento*, the extraordinarily lucrative license to sell slaves to the plantations and ports of Spanish America.[450] The juxtaposition of these two imperial memoranda is telling. Even as natural philosophical dreamers—"alchemists"—like Macedo, Vieira, Grotius, and Montagu hatched plans over dinner tables in Paris, the real work of putting these plans

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[449] *Memorias economicas da Academia Real das Sciências de Lisboa, Vol. 1* (Lisbon: Typographia da Academia, 1885), 337.

[450] AHU, Angola cx 11 doc 103 April 7 1678.

into action took place in the colonies, among African and indigenous slaves, many of whom were, themselves, recent transplants.

These two interlocking forms of transplantation were both foundational to Portuguese commerce, and both rested on natural philosophical theories of the relationship between human bodies and local environments. Both African bodies and tropical drugs were conceived of as uniquely suited to the rigors of plantation labor, and were regarded as transferrable between equatorial regions. The drug trade, slavery, and imperial transplantation schemes were not only interconnected, but mutually constitutive of one another. "Without blacks there is no Pernambuco," Vieira had observed as a young missionary in Brazil, "and without Angola there are no blacks"—and no Philosopher's Stone, either.[451]

This was nowhere more evident than in the portside slave markets of Bahia. The surgeon João Cardoso de Miranda had arrived at these markets in the first decade of the eighteenth century as a teenager, most likely having served as a barber-surgeon's apprentice on a slave ship.[452] Within a decade, he established himself as an unlicensed

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[451] "Carta de Antonio Vieira ao marquês de Niza, de 12 de agosto de 1648". João Lúcio de Azevedo (ed.), Antonio Vieira. *Cartas* (Lisboa, Imprensa Nacional, Casa da Moeda, 1970): 1, p. 234

[452] João Cardoso de Miranda, *Relação Cirurgica, e Medica* (Lisbon: Officina de Manoel Soares, 1741). The full title of this rare book—which was based on observations stretching back to the early 1720s—is: *Relação Cirurgica, e Medica, Na qual se trata, e declara especialmente hum novo methodo para curar a infecção escorbutica, ou mal de Loanda, e todos os seus productos, fazendo para isto manifestos dous especificos, e mui particulares remedios.* ["A Surgical and Medical Relation, in which is discussed and specially announced a new method for currying the infection of scurvy, or 'Mal de Loanda,' and all of its products, making manifest in this regard two specific remedies, and many other particular ones."] On barbeiros in colonial Bahia see Mariza de Carvalho Soares, "African Barbeiros in Brazilian Slave Ports," Jorge Cañizares-Esguerra, Matt D. Childs, and James Sidbury, eds., *The Black Urban Atlantic in the Age of the Slave Trade* (University of Pennsylvania Press, 2013) and Júnia Ferreira Furtado, "Barbeiros, cirurgiões e médicos na Minas colonial," *Revista do Arquivo Publico* Mineiro (Belo Horizonte, 2005), 89-105, which devotes a brief discussion to

yet successful medical practitioner whose practice moved fluidly between the slave markets and the mansions of wealthy merchants. Indeed, Miranda himself was both a healer and a slave trader, who boasted that he was able to make enormous profits by purchasing sick slaves newly-arrived from Angola and curing them with his own proprietary remedies.[453] Miranda's approach to health was unorthodox: he railed against the practice of bleeding, pointing out that it could not be administered "in Bahia, where most of the sick are slaves" because many Africans couldn't communicate the precise nature of their diseases to the physician. Yet Miranda observed that the slaves "do not die for lack of bleeding," and concluded that the lancet of European physicians usually did more harm than good.[454] Miranda's writings on the diseases endemic to 1730s Bahia reflect a dawning awareness of tropical medicine as a truly global endeavor, one that depended on the analysis of the long-distance movements of peoples and diseases as well as on the traditional Hippocratic emphasis on "airs, waters and places." In his discussion of the treatment of the *Mal de Loanda* (disease of Luanda) which afflicted many slaves from Angola, Miranda wrote that "when I had reflected further on the cause of such a great illness, I found myself growing more and more confused": the cause could not be attributable to the specific humors of Africans, because it was also

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Cardoso de Miranda.

[453] "I can with very little trouble earn upward of fifty thousand cruzados each year with this cure, not counting what I earn from buying slaves at a price of six to twelve thousand reis; which after a few months by the grace of God alone are freed of their diseases and cured. These I sell for a just price, as I did the three which I bought from João Francisco de Carvalho, who lives on this beach in [Bahia]. I cured in his house a group [of slaves], having already given him the remedy with which to destroy this illness… and he offered to sell me the said three slaves for a price of six thousand reis each; and curing them all, I sold them for one hundred and fifty thousand reis." Cardoso de Miranda, *Relação,* 9-10.

[454] Cardoso de Miranda, *Relação*, 13.

caught by Luso-Brazilian crewman, nor was it due to the malign influence of the African climate, because it continued to afflict them in Brazil. "I realized that that it might be possible to utilize the same remedy for each one of the patients who appeared to suffer from various ailments," Miranda concluded.[455] He called his cures "*remedios especificos*"—specific remedies.

Harold Cook has argued that the rise of "specifics"—universal cures that, like Miranda's treatment for Mal de Loanda, could be applied to both African and European, male and female, young and old—gave rise to a new conception of human bodies as universal and functionally interchangeable.[456] Yet this shift relied not only on theoretical debates in Europe, but on the observations of lesser-known figures in the colonies like Cardoso de Miranda. By reflecting on the biological impact of long-distance transplantations of diseases, drugs and human beings across the Portuguese tropics, these authors offered up granular and individual viewpoints on the epochal transformations of the Columbian Exchange—and they highlighted the centrality of the Portuguese tropics and the South Atlantic slave trade in the process.

4.5 Transplanting diseases

Although *transplantionis* has a long history in classical and medieval Latin,

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[455] On local knowledge in the Atlantic world see Kathleen S. Murphy, "Translating the Vernacular: Indigenous and African Knowledge in the Eighteenth-Century British Atlantic," *Atlantic Studies,* vol. 8, no. 1 (2011): 29-48 and Neil Safier, "Global Knowledge on the Move: Itineraries, Amerindian Narratives, and Deep Histories of Science," *Isis,* 101, (March, 2010), 134-5.

[456] Harold Cook, "Markets and Cultures: Medical Specifics and the Reconfiguration of the Body in Early Modern Europe," *Transactions of the Royal Historical Society*, 21 (2011): 123-145

Macedo appears to have coined the term *transplantação* in Portuguese.[457] In seventeenth-century English, too, *transplantation* was a novel and malleable term. For figures like Robert Boyle or John Locke, the word held connotations not only of Indies spices and plantations in the East and West Indies, but also of Paracelsan theories of the transplantation of diseases. Not to mention Ireland. Robert Boyle's older brother, Roger Boyle, First Earl of Orrery, wrote extensively of the "transplantations" of the Irish in the time of Cromwell, and Spratt slyly alluded to this sense of the word when he noted that plants could be transferred north to south as well as east to west, like flax which "may prosper in *Ireland*, in many vast Tracts of Ground, now only possessed by wild *Beasts*, or *Tories* almost as wild."[458] Robert Boyle, however, concerned himself with the Paracelsan sense of the word: transplantations of diseases. In his manuscript list of natural philosophical "desiderata," Boyle had had recorded his hopes for "the Cure of Diseases at a Distance, or at least by Transplantation," and elsewhere he discussed cures "[such] as those which Chymists call... Transplantation," notably the weapon salve described by Paracelsus and championed by the eccentric English diplomat Kenelm Digby.[459] Though the skeptical Boyle acknowledged that transplantation of diseases was "wont to pass, either for Fabulous or Magical," testimonies from the Rome-based

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[457] This is a subjective assessment based on searches in OCR text repositories like Google Books; significantly, many of the other early uses of the term in the eighteenth century are in direct reference to Macedo's writings on transplantation.

[458] Roger Boyle, Thomas Morrice, ed. *A Collection of the State Letters of Roger Boyle* (London, 1742), 53, 140, 335, 345-7; Spratt, *Royal Society*, 385.

[459] RSA, Boyle Papers 36, fols. 77v-78. For more on this remarkable list see Anna Marie Roos, "Perchance to Dream: Science and the Future," in *The Appendix*, 2/3 (July, 2014) [http://theappendix.net/issues/2014/7/perchance-to-dream-science-and-the-future].

physician Domenico Panaroli, Kenelm Digby, and an anonymous family member who could only be Boyle's medically-inclined sister Katherine (a "great and excellent Lady" and "near Kinsman... very far from credulous") convinced him of its veracity.[460]

João Curvo Semedo, whose writings feature the only other seventeenth-century usage of *transplantação* I was able to find, likewise defined the term not as the long-distance movement of plants or peoples, but as the transfer of a disease between bodies using a rather gross form of natural magic:

> One can communicate, or transplant, the accidents suffered by man... as was confirmed by a case that passed into my hands in the year of 1668. The Doctor Antonio Roballo Freire, a judge in the village of Santarem, suffered from the most rebellious infirmities, and (because in that time we did not yet have news of *quina*, or of the Agua de Inglaterra, nor of any other specific remedies that treated all diseases) he, under the counsel of an old woman, trimmed the nails of his feet, and cutting them into very fine shavings, mixed them with bread and grated cheese. This was fed to a dog, and from that day forth his condition began to improve, and the dog became sad and so weak that it could barely stand, because his disease had been transplanted by means of the toenail clippings.[461]

Both Boyle and Semedo were thus alluding to the notion of "sympathetic" magic that drew out the malignant qualities in a disease or wound through occult action at a distance.[462]

While some descriptions of "transplantations" might strike modern readers as

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[460] Robert Boyle, *Some Considerations Touching the Usefulnesse of Experimental Naturall Philosophy* (Oxford: Printed by Henry Hall, 1664), 226-7. On the medical research of Boyle's sister Katherine Jones, Viscountess Ranelagh, see Michelle DiMeo, "Lady Ranelagh's Book of Kitchen-Phisick?: Reattributing Authorship for Wellcome Library MS 1340," *Huntington Library Quarterly* 77.3 (2014): 331-46.

[461] Semedo, *PM* (1st ed, 1697), 77. This chapter is entitled "On transplantation, or the passage of many diseases from one body to others."

[462] Elizabeth Hedrick, "Romancing the Salve: Sir Kenelm Digby and the Powder of Sympathy," *British Journal for the History of Science,* 41/149 (June, 2008).

attempts to explain the transmission of contagious diseases between people living in close quarters with one another, this was a theory grounded not only in medical observation, but in natural philosophical experiments with magnets and metals. The Schwarzburg Paracelsan physician Andreas Tentzel, for instance, wrote extensively of the "mystery of transplantation" [*transplantationis mysterio*] produced by natural philosophical manipulations of the "spirit of the mummy," which could be drawn out of the body by means of a magnet.[463] As another Paracelsan physician put it, "transplantations is, when by means of a magnetick, we put the Disease into a plant, or another living creature, the Patient being fooly and wholly cured."[464] The "transplantation" of disease to which Boyle and Semedo had referred was thus rooted in a Paracelsan conception of mummy (*mumia*) as a hidden force or quality which could pass between and through corporeal bodies, conferring either disease or health in the process. Paracelsus attributed the body's ability to heal itself to an "internal mumia" or "balsam" which flowed internally like quicksilver.

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[463] Andreas Tentzel *Medicina Diastatica. hoc est Singularis Illa Et Admirabilis ad distans, & beneficio mumialis transplantationis operationem & efficaciam haben* (Jena, 1629), 53.

[464] Christopher Irving, *Medicina Magnetica: or, the rare and wonderful art of Curing by Sympathy* (Edinburgh, 1656) 68. On Irvine see Allan G. Debus, *Chemistry and Medical Debate: Van Helmont to Boerhaave* (Canton, MA: Science History Publications, 2001), 111-113.

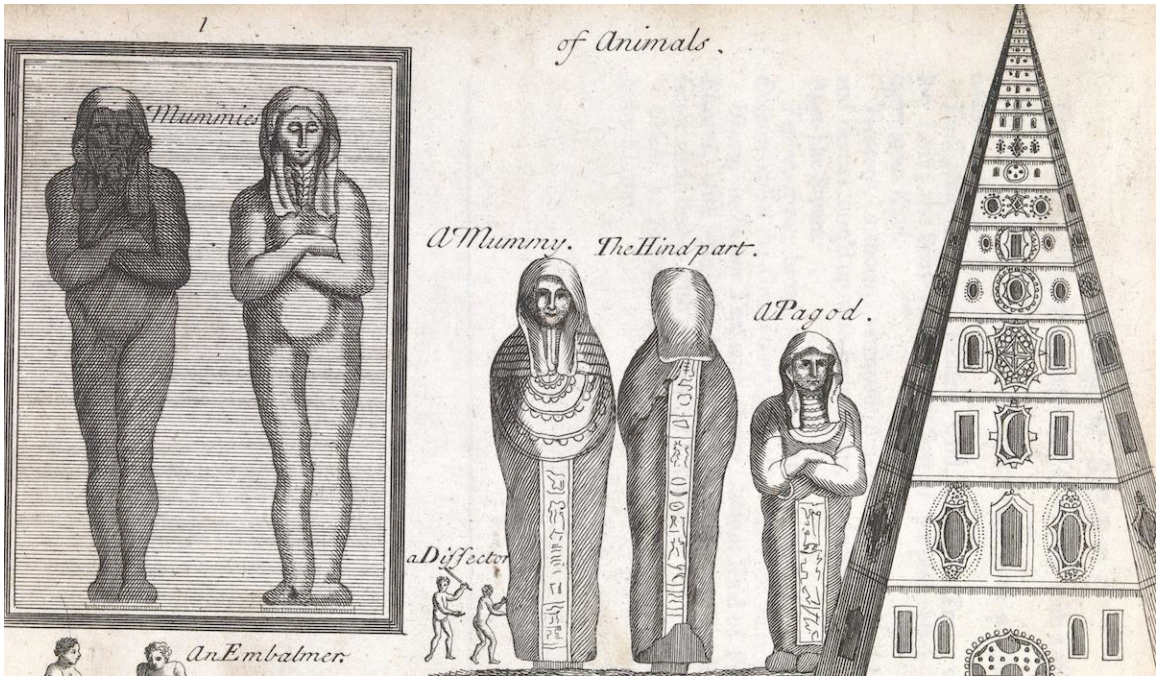

FIGURE 4.4 Pierre Pomet's *Histoire Generale des Drogues* (1682), shown here in an English translation, listed Egyptian mummy or *mumia* in a section on animal-based medicines. Pomet recommended that discerning buyers should purchase *mumia* "of a good smell" and noted that consuming it helped heal bruises. Pierre Pomet, *A Compleat History of Drugs* (London, 1712), via the Wellcome Library.

Confusingly, however, both Paracelsus and later natural philosophers who he influenced employed *mumia* to refer both to this theoretical transplantation of diseases and to the actual embalmed corpses sold by seventeenth-century drug merchants and apothecaries merchants like Pierre Pomet.[465] The Paracelsan chemical physician John French, for instance, prescribed "elixir of mummy" (four ounces of "man's flesh hardened" mixed with spirit of wine and horse dung, surely one of the most unsettling

[465] Walter Pagel described the Mumia of Paracelsus as "parts from a human body which met with sudden—preferably violent—death," yet as Phillip Ball has put it more recently "there was *mumia* in mumia." In other words, even when Paracelsus prescribed actual "flesh of a man," he was doing so within a theoretical framework of *mumia* as metaphysical "balsam." Walter Pagel, *Paracelsus: An Introduction to Philosophical Medicine in the Era of the Renaissance* (Karger AG, 1982), 55; Philip Ball, *The Devil's Doctor: Paracelsus and the World of Renaissance Magic and Scienc*e (Macmillan, 2006), 265.

of all early modern remedies) as a "preservative against all infections" that was "very balsamical."[466] Likewise, the Lisbon-based chemical physician Monrova y Roca numbered *mumia* as among the five must-have remedies that sea surgeons should carry in their waterproof case (see Fig. 1.2). Thus *mumia* figured in seventeenth-century pharmacy both as a theoretical explanation for the "transplantation" of diseases and as an actual exotic substance—true mummy—that was itself transplanted from the deserts of Arabia and Egypt into the bodies of early modern Europeans, whose horror at New World cannibalism takes on a curious new dimension in light of their propensity for eating body parts.[467]

When seventeenth-century physicians attempted to explain why syphilis was so prevalent in their own time yet completely unknown in the writings of the ancients, they had recourse to this theory of transplantation: though divine providence had seeded the world with local cures for local diseases, the "intercourse" of long-distance travelers in the post-Columbian era had thrown this natural order out of joint. As the Paracelsan Samuel Bolton put it, a "mixture of spirits" of love had resulted in many "dangers… for from this foundation floweth the transplantation of diseases from one man to another, and from the dead to the living."[468] Boulton feared that if this sympathetic magic were more widely known it would lead to sexual chaos:

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[466] Peter French, *The Art of Distillation, or, a Treatise of the Choicest Spagyrical Preparations*, (London, 1664). For more on French and other early writers about *mumia*, see Richard Sugg, *Mummies, Cannibals and Vampires: the History of Corpse Medicine from the Renaissance to the Victorians* (Taylor and Francis, 2012).

[467] I intend to explore this jarring contradiction in a future spin-off journal article.

[468] Samuel Boulton, *Medicina magica tamen physica: Magical but natural Physick, or a Methodical Tractate of Diastatical Physick* (Printed by T.C. for N. Brooke, 1656: London), 68.

> Fathers could not be safe from their daughters, nor any man from any woman, nor woman from any man, nor brothers from sisters, nor sisters from brothers; for the world would be turned upside down with philtres; and therefore I will say no more in this place.[469]

Possessing this power over human bodies could cause "too much exorbitant lust," he feared. It promised a kind of enslavement: the use of sympathetic drugs or "philtres" which could alter not only the composition of the body, but the mind and soul.

This conception of disease as both sexualized and occult was shaped by the predominance of veneral diseases in seventeenth century life, particularly the syphilis virus that was one of the most prominent components of the Columbian Exchange. In visualizing diseases as being "transplanted" between bodies, seventeenth-century medical practitioners were participating in a larger theory of transplantation that was shaped by early modern globalization and encounters with non-European biospheres in the tropics. Godfrey Goodman, the Anglican bishop we encountered in Ch. 1, even drew a (perhaps fanciful) linkage between *reading* about a novel disease and *contracting* it. The physician in training, Goodman, averred, "commonly in the middest of [his studies], sicknesse preuents him" because "setting the nature of diseases before his own eyes, they sease upon his flesh, notwithstanding his great learning, and the strong bulwarke of his physicke."[470] What Goodman called "new incroaching disease[s], unknowne to the Ancients, and wondred at by the professors" were the source of considerable anxiety in the seventeenth century, prompting new theories of how diseases

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[469] Boulton, 68.

[470] Goodman, *Fall of Man*, 96.

originated and spread. In his treatise *Methodo de conhecer e curar o morbo gallico,* the unorthodox Portuguese physician Duarte Madeira Arraiz maintained that the *morbo gallico* (syphilis) "was newly discovered in Naples in the year of 1493":

> And from there they spread the sickness throughout the world, each army bringing it to its respective country… and it was related by Christopher Columbus of his discoveries in the Occidental Indies to the *Reys Catholicos*, that in the lands he discovered he encountered many Indian men and women who suffered from the disease of the *morbo gallico*, and so those among the soldiers and men of arms who had communication with the Indian women and with the *mulheres publicas* of the land easily spread this contagion to the greater part of the Spanish army, and from thence, to the French.[471]

Crucially, Arraiz articulated a theory of the etiology of the *morbo gallico* that rejected climactic, astrological, or cultural causes. It did not originate from "celestrial fluxes," he argued, "nor from corrupt vapors," nor from lepers, corrupt menstrual fluid, impure foods, or "eating human meat," because any of these "specific causes" could have produced the disease in Europe or elsewhere in the Old World prior to the voyages of Columbus.[472] The fact that it did not means that the disease was simply *natural* to the New World, and that the voyages of the Iberians across the Atlantic had disturbed this natural order and transplanted what Arraiz called the "seeds" of the disease into lands where they were not meant to "grow":

> The seed of any plant (as Theophrastus says) transmuted into a soil that

[471] Duarte Madeira Arraiz, *Methodo de conhecer e curar o morbo gallico: primeira [e] segunda parte: propoemse definitivamente a essencia, species, causas … et cura do morbo gallico … e largamente se trata do azougue, salsa parrilha … et de todos os mais remedios desta enfermidade* (Lisbon: Antonio Craesbeeck de Mello, 1683), 72. "It said that evidently this illness is so ancient among the Western Indians that they have no memory of its beginnings," Arraiz continued. "And from this cause, it has communicated itself throughout all of Europe, and evidently later to Africa and Asia."

[472] Arraiz, *Methodo*, 72-3.

> cannot accommodate it, either fails to produce anything, or produces an entirely different plant. And even if it makes a perfect result, the seed that follows from this cannot produce another which is also perfect. It will diminish in strength producing other less noble types, as has been experimented with the seeds of many fruits which have been brought from the Indies to Europe… Thus it seems… that the seeds of the *morbo gallico*, brought from the Indians does not yield so perfectly as in their lands, or at least that when these were carried from one place to another, they were rendered each time less fresh.[473]

Here Arraiz was drawing directly on his compatriots' experiences with transplanting crops "from the Indies to Europe," yet drawing a novel, metaphorical link with the global transmission of diseases. Whereas a plant like the murcian fruit—the example of an Indies seed failing to thrive in European gardens that Arraiz offers—will simply become less tasty or medically useful when transplanted, in the case of syphilis, the disease becomes more deadly. This, then, was a sinister aspect of global transplantation that Macedo and Sprat did not mention.

4.6 Transplanting knowledge

Arraiz's emphasis on the unexpected and "modern" nature of the transplantation of syphilis reflected the dawning awareness on the part of seventeenth-century peoples that they were living in an age that was different from their forebears, not only materially and politically, but ecologically as well. The long-term repercussions of the post-Columbian movements of plants and animals were, by the end of the seventeenth century, beginning to become manifest, and to generate a body of vernacular knowledge and visual culture which often mistook recent imports for indigenous crops and blended

[473] Arraiz, *Methodo*, 73.

East and West Indies *naturalia* into a sort of exotic hodgepodge (Figure 4.5).[474] In 1695, the French merchant François Froger travelled to Bahia, were he was told that "the Jesuits were the first that brought [cinnamon trees] thither out of Ceylan, of which they took great care." Within a few years, however, "they grew very common, because that the Birds who eat the Fruit thereof, sow the Seed up and down every-where, being not able to digest it."[475] Even when intentional transplantation was successful, as in the case of the Jesuit transfer of cinnamon to Brazil, within a space of decades and centuries it could assume a form that the transplanters didn't expect.

FIGURE 4.5 A hybrid vision of the East and West Indies, showing fruit species native to both Brazil and tropical Asia. Albert Eckhout (attributed), 'Market Stall in the Indies' (1650s?), Rijksmuseum, Amsterdam.

[474] See Benjamin Schmidt, *Inventing Exoticism*, on the role of late seventeenth-century Dutch visual and material culture in propagating this jumbled and decontextualized vision of tropical nature.

[475] [François] Froger, *A Relation of a Voyage… [to] Africa* (London, 1698), 113.

By the mid-seventeenth century, the notion of which plants and animals were "indigenous" (or "created in" as the Portuguese tended to put it) to a certain region had become rather complex.[476] In several cases, seventeenth-century travelers wrote of local species as if they had been attested there since the beginning of creation, unaware that they were actually imports carried over just a few decades earlier. The botanical text *Flora Sinensis* (1656) described the papaya as native to China and even offered the local name for the plant in Chinese characters (Figure 4.6). Yet in fact the papaya, which is native to South America, had been carried to China in the late sixteenth century, likely via the Mania galleon route.

As the example of the Chinese papaya indicates, the transplantation of naturalia without such knowledge about it could result in a profound decontextualization: a situation in which neither local experts nor European visitors had any knowledge of a supposedly native plant. Yet in the case of the Africa to America transmissions studied by Judith Carney, slaves from West and West Central Africa possessed technical knowledge of tropical crops that Europeans did not, and in some cases passed this knowledge on to indigenous Brazilians.

[476] On the construction of a vision of tropical nature that draws on non-European knowledge see Richard Grove, "Indigenous knowledge and the significance of south-west India for Portuguese and Dutch construction of tropical nature," in Richard Grove, Vinita Damodaran, and Satpal Sangwan, eds., *Nature and the Orient: the environmental history of South and Southeast Asia* (Delhi, 1998).

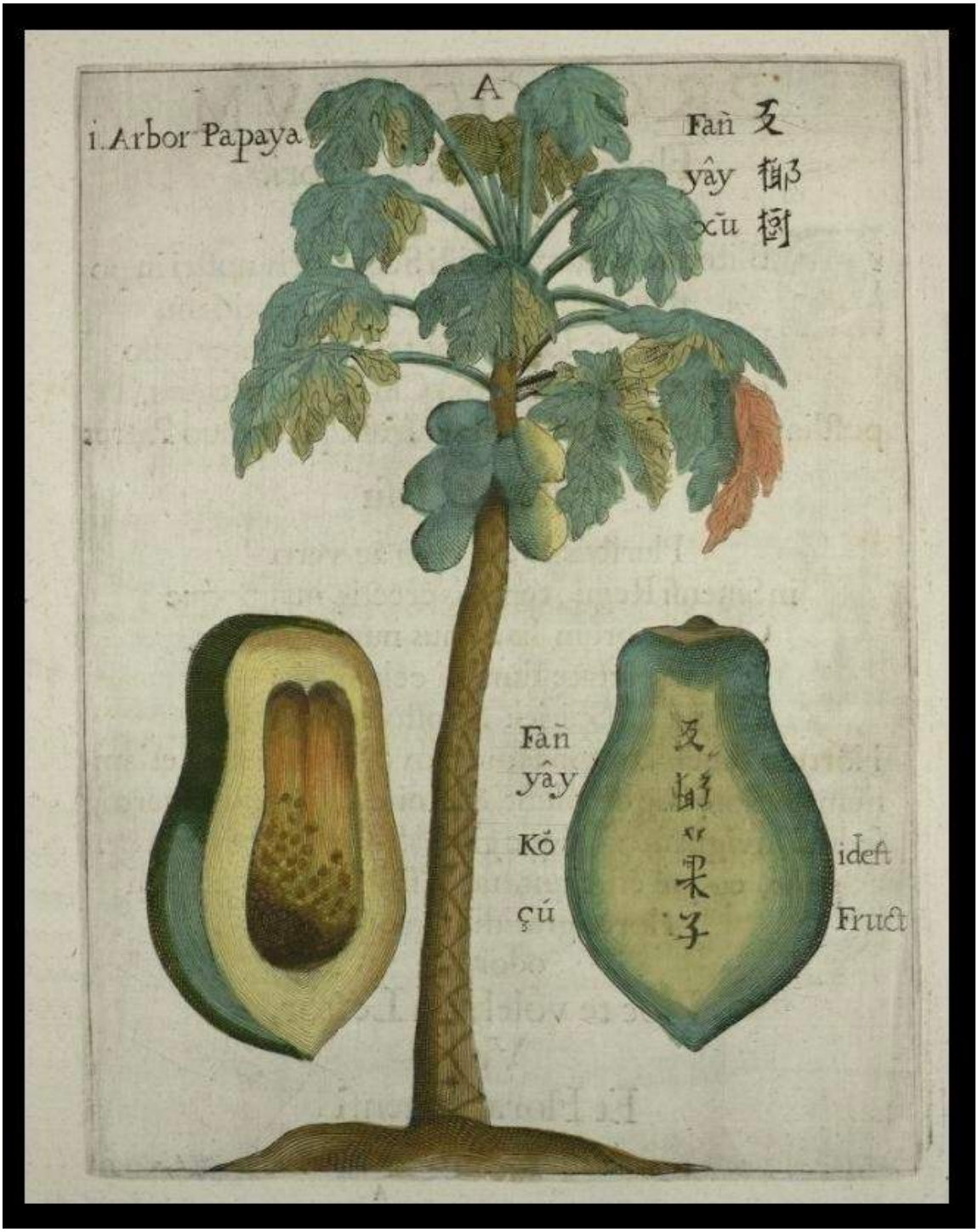

FIGURE 4.6 A Brazilian papaya tree (identified as *fan yây xù,* a native of China) in a hand-colored engraving from the first European botanical text about Chinese plants. Michael Boym, *Flora Sinensis* (Vienna, 1656).

The geographer Richard A. Voeks notes that early European attempts to transplant tropical crops failed because "tropical seeds are notoriously recalcitrant in regard to storage and germination," and the technologies of storage and acclimatization available to Europeans schooled in temperate agriculture proved insufficient.[477] In 1676, for instance, a British physician writing in favor of the medicinal virtues of chocolate complained that some hidden principle in cacao seemed to cause it to fail once it left tropical climates:

> The truth is, how well soever they [cacao seeds] seem to be cured when they are in the place where they grow, and how carefully soever stowed in the Ship; yet by transportation, the Air of different places hath such an operation upon them, that many are corrupted and spoiled before they arrive here; and so they are often, by reason of moisture, soon afterwards, if they are not carefully look'd unto, dryed, and used in time… So that I am perswaded there is no better Chocolate to be had in England, then that which Mariners and Sea-men bring; which is made up in the Country where the Cacao's naturally grow.[478]

Likewise, a member of the Royal Society reported on the strange case of the Indies salamander that lived for without food for months but died within three days of its home soil being replaced by "Italian Earth":

> he had kept it seven months without any other food but what it took by licking the earth, on which it crept and on which it was brought out of the Indies, which at first was cover'd with a thick moisture, but being dried afterwards, the Urine of this Animal stood to moisten the same. The eleven months being past when the Owner had a mind to try how it would do upon Italian Earth, it dyed three days after it had changed the Earth.[479]

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[477] Robert A. Voeks, "Disturbance Pharmacopeias," in *Annals of the AAG*, 2004, 870-1.

[478] William Hughes, *The American Physitian* (London, 1676), 110.

[479] RSA, Journal Book of the Royal Society Vol. 3: 1666-1668, letter from Monsieur Steno to Dr. Croon, Rome, May 23, 1666, fol. 10.

Writing of the introduction of "useful [African] herbs" into Brazil, Willem Piso admitted that in many cases "the Africans taught the indigenous Americans how to use and prepare them."[480] This debt is evident in Piso and Marcgrave's repeated citations of the "Angolensibus" and "Congensibus" (Angolan and Congolese) names for plants alongside their Tupí and Latin names. In most cases, for instance in the case of the yam (which was so new to Europeans that Piso could find no Latin name to list, calling it *Inhame de São Thome* or "in Congolese *Quiquosquecongo*,") this usage implies that a species had been *translata* (carried over or transplanted) from West Central Africa.[481] In an entry for another plant with no Latin or Brazilian name—"Micambe in Angolan"—Piso's co-author Marcgrave complained of the challenges of attempting to cultivate an unfamiliar plant from tropical Africa.[482] "Seeds of this plant were sent to us on several occasions, which were successfully sprouted, and especially in the summer of the year 1646 they produced not only leaves and stems, but flourished plentifully, and bore seed," he recorded. However, "with the slightest cold, at the beginning of October, the plant was ruined." As a parenthetical note implied "(it seems to have been carried out of Africa to Brazil)," it was not European natural philosophers but African slaves who were

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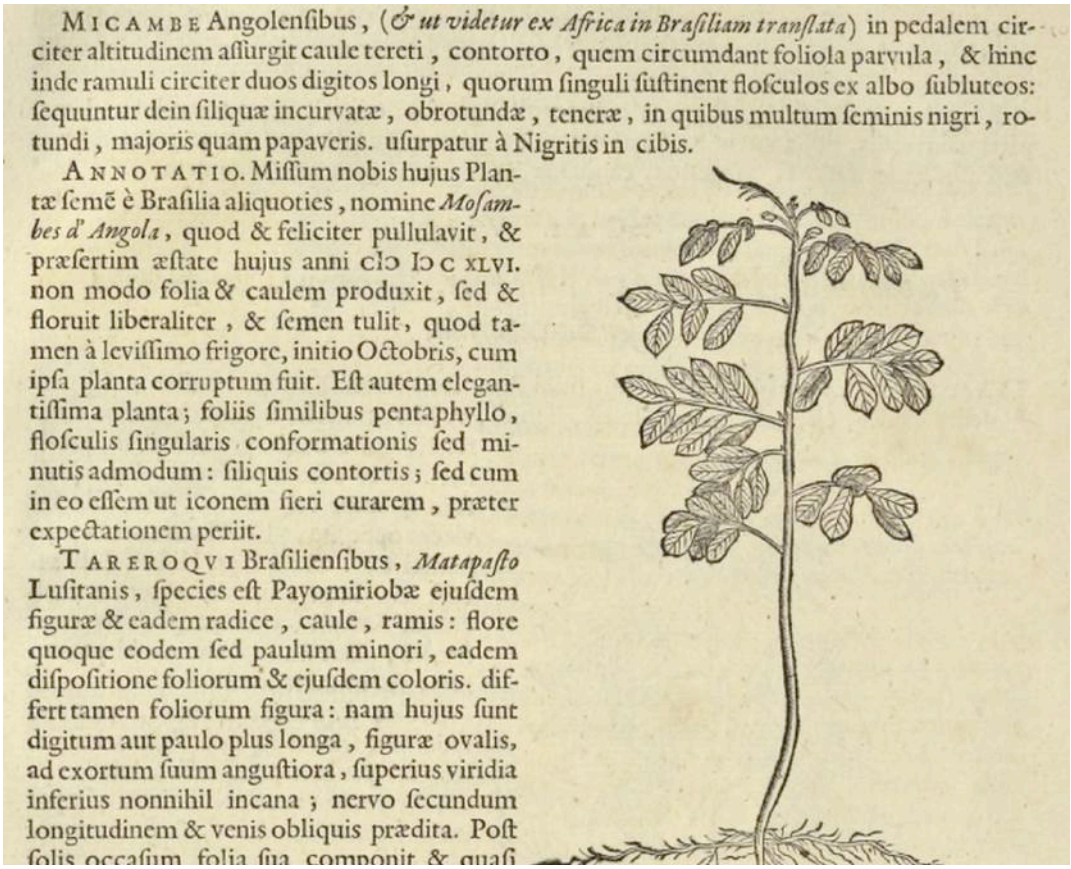
[480] Willem Piso, *História natural e médica da India Ocidental* (Felisberto Carneiro and Mario Lobo Leal, trans. and ed. (Rio de Janeiro: I. N. L., 1957), 445. Junia Ferreira Furtado has written perceptively of Piso's exchanges with indigenous experts in "Tropical empiricism: Making medical knowledge in colonial Brazil," in James Delbourgo and Nicholas Dew, eds. *Science and Empire in the Atlantic World* (New York: Routledge, 2008), 136-7.

[481] Willem Piso, "De Facultatibus Simplicium Lib. IV" in Willem Piso, Georg Marcgrave and Joannes de Laet, *Historia Naturalis Brasiliae* (Leiden: Elsevier, 1648), 93 [hereafter *HNB*]. Likewise, Marcgrave wrote of sesame that "it lacks a Brazilian name, because this is not naturally from this land, but was transplanted from Africa," ("Historia Plantarum Liber Primus," *HNB*, 21).

[482] Georg Marcgrave, "Historiae Plantarum, Liber Primus," in *HNB*, 10.

successfully performing this transplantation.[483]



MICAMBE Angolenſibus, (*& ut videtur ex Africa in Braſiliam tranſlata*) in pedalem circiter altitudinem aſſurgit caule tereti, contorto, quem circumdant foliola parvula, & hinc inde ramuli circiter duos digitos longi, quorum ſinguli ſuſtinent floſculos ex albo ſubluteos: ſequuntur dein ſiliquæ incurvatæ, obrotundæ, teneræ, in quibus multum ſeminis nigri, rotundi, majoris quam papaveris. uſurpatur à Nigritis in cibis.

ANNOTATIO. Miſſum nobis hujus Plantæ ſemē è Braſilia aliquoties, nomine *Moſambes d' Angola*, quod & feliciter pullulavit, & præſertim æſtate hujus anni CIↃ IↃ C XLVI. non modo folia & caulem produxit, ſed & floruit liberaliter, & ſemen tulit, quod tamen à leviſſimo frigore, initio Octobris, cum ipſa planta corruptum fuit. Eſt autem elegantiſſima planta; foliis ſimilibus pentaphyllo, floſculis ſingularis conformationis ſed minutis admodum: ſiliquis contortis; ſed cum in eo eſſem ut iconem fieri curarem, præter expectationem periit.

TARERQVI Braſilienſibus, *Matapaſto* Luſitanis, ſpecies eſt Payomiriobæ ejuſdem figuræ & eadem radice, caule, ramis: flore quoque eodem ſed paulum minori, eadem diſpoſitione foliorum & ejuſdem coloris. differt tamen foliorum figura: nam hujus ſunt digitum aut paulo plus longa, figuræ ovalis, ad exortum ſuum anguſtiora, ſuperius viridia inferius nonnihil incana; nervo ſecundum longitudinem & venis obliquis prædita. Poſt ſolis occaſum folia ſua componit & quaſi

FIGURE 4.7 The entry for Angolan "Micambe" in *Historia Naturalis Brasiliae*, noting the difficulty of cultivating it. Willem Piso, Georg Marcgrave and Joannes de Laet, *Historia Naturalis Brasiliae* (Leiden, 1648).

The result of this interplay of European, Amazonian, and African pharmaceutical and ecological knowledge, was what the ethnobotanist Richard Voeks calls "a wholesale floristic reorganization of the humanized landscapes of the tropical and subtropical zones, one that dramatically enhanced and augmented existing native plant pharmacopoeias." Voeks argues that ultimately, "as superstition surrendered to empiricism… the occult nature of folk herbalism, with its recourse to demonic spirits, arcane rituals, and unsavery

[483] Marcgrave, *HNB*, 10.

elements, drove these traditions into the backwaters of scientific investigation."[484] Yet as we saw in Chapter Three, this rather Whiggish analysis doesn't tell the whole story. Certainly, in the realm of poisons and antidotes, African slaves continued to be regarded as the preeminent experts in the plantation societies of the New World—and, via widely-read treatises like *Historia Naturalis Brasiliae*, in Europe as well.

In certain cases, however, Europeans intentionally avoided knowledge derived from African or American informants. For instance, although Portuguese administrators and Jesuit missionary leaders were constantly on the lookout for "discoveries of drugs" and knowledge about unknown *naturalia* in Amazonia, it is striking to observe how denuded of natural knowledge the earliest reports of hallucinogenic New World drugs had become by the time they reached print. The descriptions of these drugs (such as ayahuasca and peyote) present their effects as being a type of disease, a form of inverted medicine that afflicts the sufferer rather than curing him. Ayahuasca, for instance, was described by the Jesuit missionary Pablo Maroni, who in 1737 voyaged in Upper Amazonia, as "very effective at depriving the Indians of their senses, and even of their life."[485] However, while tropical diseases spread without human intervention, this damaging drug was taken intentionally: "in order to perform

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[484] Voeks, "Disturbance Pharmacopeias," 871.

[485] Pablo Maroni, "Diario de la entrada que hizo el P. Pablo Maroni de Ia C. d. J. por el rio coriño ó Pastaza ... el año 1737", in *Boletín de la Sociedad Geografica*, vol. 26-27 (1889), 54. Ayahuasca or *yagé* is actually a combination of at least two organisms: the *Banisteriopsis caapi* vine and a secondary plant that contains the hallucinogenic alkaloid dimethyltraptamine (DMT). The caapi vine functions as a monoamine oxidase inhibitor (MAOI), making the DMT in many other Amazonian plants orally active and inducing a powerfully altered state of consciousness. Recently, ayahuasca has become popular as an alternative remedy in the West, often billed as a more "natural" or "holistic" alternative to psychedelics like LSD or MDMA.

divination, some drink the juice of a white datura blossom with the figure of a bell, while others drink a vine vulgarly called *ayahuasca*," Maroni wrote.[486] Although he acknowledged that ayahuasca was also used as a medicine ("they also use it for curing common infirmities, principally headaches"), the priest emphasized that the drug's main function was as a tool for "those who want to prophesize," which for Maroni and his fellows was essentially equivalent with summoning the devil.[487]

Thus, hallucinogens like ayahuasca were being castigated by Jesuits even as others in their order were actively cultivating, documenting, and trading other novel tropical drugs. The key difference is that the psychoactive aspect of these drugs was associated with Satan. Maroni's account of ayahuasca users in the deep Amazon, which may be the first European mention of the drug by name, fixated on the state of sensory derangement that the drug produced ("being deprived of the senses from mouth to bottom… for even two or three days") and connected this loss of control over one's mind and body to the preternatural realm of demons. The Indians who believed in the "lies and fictions of the diviners" who used ayahuasca, Maroni believed, had fallen for "dreams that represent the Devil [*representa el Demonio*]" and superstitions which led them to attribute "all deaths that commonly happen to the effects of some spell" [*hechizo*].[488] Writing later in the eighteenth century about events that occurred in the

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[486] Pablo Maroni, "Diario de la entrada que hizo el P. Pablo Maroni de Ia C. d. J. por el rio coriño ó Pastaza ... el año 1737", in *Boletín de la Sociedad Geografica*, vol. 26-27 (1889), 54.

[487] Pablo Maroni, "Diario," 55.

[488] Pablo Maroni, "Diario," pg. 55. "Diario de la entrada que hizo el P. Pablo Maroni de Ia C. d. J. por el rio coriño ó Pastaza ... el año 1737", in *Boletín de la Sociedad Geografica*, vol. 26-27 (1889), pg. 54; Christoph Gottlied von Murr, *Journal zur Kunstgeschichte und zur allgemelnen Litteratur*, "Provinciae

1750s, another Jesuit named Padre Veigl regarded as "beyond doubt superstitious" the drink "known as *Hayac hausca* among the Amazonian Indians." The drug "makes one utterly powerless," Veigl wrote, "sweeping one away into a prolonged reverie in which they dream wonderful dreams, which they do not seek for, seeing them in visions." Veigl's first-hand, subjective account of the effects offer a tantalizing hint that he had tried the drug himself. Nevertheless, Veigl still associated the hallucinogenic vine with *choreas diabolicas* (demonic dancing or shaking) and use in *maleficia* (witchcraft or sorcery).[489]

Yet while psychoactivity offered a motive not to transplant a drug for some authors, this was by no means universally shared. João Curvo Semedo was a notable proponent of what he called "narcotic remedies" as well as an advocate for exotic African and Amazonian drugs.[490] Semedo's stated aim in publicizing what he called "the roots, powders, bones, stones, fruits, leaves, and seeds which come to this kingdom from India and other places" arose, he claimed, from his "zeal for the common good."[491] As a graduate of the University of Coimbra, Semedo was steeped in the classical tradition of

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Maynensis in America Medidionali, ad annum usque 1768."

[489] Christoph Gottlied von Murr, *Journal zur Kunstgeschichte und zur allgemelnen Litteratur*, "Provinciae Maynensis in America Medidionali, ad annum usque 1768," 55.

[490] Although Semedo appears to have been the most significant popularizer of Indies drugs in seventeenth-century Portugal, he remains relatively little known outside of the work of João Pedro Sousa Diaz, an historian of pharmacy at the Universidade Nova de Lisboa. For instance, José Pedro Sousa Dias, "Terapéutica quimica y polifarmacia en Portugal: la contribución de João Curvo Semedo" in Patricia Aceves Pastrana, ed. *Construyendo las ciencias quimicas y biológicas* (Universidad Autonoma Metropolitana, Mexico, 1998). A pamphlet by an early twentieth-century Portuguese writer named Luis de Pina entitled "A vida social lisboeta na 'Polyanthea' de Curvo Semedo" [The Social Life of Lisbon in the Polyanthea of Curvo Semedo] evidently exists, but the references to it I have been able to locate online locate the only copies in Bern, Switzerland and Madrid, so I intend to consult it on a future research trip.

[491] João Curvo Semedo, *Memorial de Varios Simples* (Lisbon, n.d. [1716?]), 1.

Hippocrates, Celsus, Galen and other Greco-Roman medical authorities. Indeed, in *Polyanthea Medicinal,* mentions of Galen and Hippocrates account for almost a quarter of all citations, despite the fact that Semedo references an astonishing range of authorities (numbering 527 in all).[492] Yet when we read his drug recipes more closely we find that he was prescribing decidedly non-classical things like wildebeest hooves from Mozambique and powdered cobra spines from Angola—cures that could only have originated with African healers (see Appendix A).

4.7 Conclusion: local knowledge and long-distance travels

The trading zones of the Lusotropics were characterized by the flow of peoples, plants and animals between ecological zones, cultures and continents, creating what A.J.R. Russell-Wood aptly called "a world on the move." In Macedo's transplantation scheme, tropical Brazil was conceptualized as a sort of hothouse laboratory for acculturating botanicals and producing vast profits from their production via African and indigenous labor and skills. Although this specific plans failed, it reflected a larger pattern of improvised and oftentimes undocumented transplantations within the Portuguese colonies that led to what Junia Furtado has called "a kind of local empiricism in which European and indigenous knowledge and practice merged before

[492] João Curvo Semedo, *Polyanthea Medicinal* (Lisbon, 1727). Semedo cites Galen 254 times and Hippocrates 190 times, whereas the remaining top ten most cited authors in the text amount to 491. The total number of marginal citations in *Polyanthea* numbers 2,054 by my count, although I do not claim complete accuracy.

ultimately finding their way into print within the larger community of intellectuals and savants on both sides of the Atlantic."[493]

Yet the Portuguese empire was, in truth, little more a thin scrim of underpaid and understaffed fortresses overlaid on a vast expanse of tropical ecosystems that remained almost completely independent from royal control in Lisbon. In such a situation, information did not equal power. Thus, while the Portuguese were central to the *networks* of the global drug trade in the sixteenth and seventeenth centuries, it fell to the English, the Dutch and the French in the eighteenth and nineteenth centuries to capitalize on the types of transplantations studied here on a global scale. For instance, plans to seize the cinchona monopoly from the Spanish emerged first in Portuguese networks of ambassadors and courtiers in the mid-seventeenth century, but did not reach fruition until the late eighteenth century—and the long-awaited feat of smuggling cochineal out of Spanish America was actually accomplished by a Frenchman. By the same token, despite the longstanding obsession with quina among Portuguese agents of empire throughout the period studied here, it was not until the early nineteenth century that British and Dutch agronomists succeeding in cultivating the plant outside of Amazonia, in Ceylon and Indonesia.[494]

By the time these later empires had assimilated Lusophone networks and knowledge, much of that knowledge had become blurred and destabilized. The "Calumba

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[493] Furtado, "Tropical Empiricism," 128.

[494] Bouda Etemad, *Possessing the World: Taking the Measurements of Colonisation from the 18th to the 20th Century* (Berghahn Books, 2007) 29-30.

root from Mozambique" recommended by João Curvo Semedo became confused with Columbo root from Sri Lanka; Amazonian quina was repackaged and sold back to Brazil as "English water" (*Agua da Inglaterra*); Chinese *chá* became English tea. And the importance of Portuguese theories and epistemologies of medicine became obscured too. As Gabriel Paquette has pointed out, Portuguese intellectual networks "represented a fusion of two worlds."[495] In the European context, Portugal was indeed "a minor player on the periphery," with a relatively small population, a miniscule industrial base, and a conservative intellectual culture centered around the Inquisition and the University of Coimbra. Yet if we restrict our analysis to Europe alone, we miss a far richer picture, one in which Lisbon and Rio de Janeiro are the twin capitols of an amorphous and cosmopolitan collection of tropical territories and spheres of influence that encircle the globe. It is in this second sphere that the global drug trade played out, and it would be difficult to overestimate the role of the Portuguese tropics in shaping the dynamics of this trade. Although Portugal had become a marginal player in European politics by the eighteenth century, individuals in a wider Portuguese tropical world played pivotal roles in shaping how consumers, merchants, and natural philosophers thought about Indies drugs.

This history of both human and ecological hybridity also made the Portuguese colonies among the most biodiverse regions on earth.[496] As Richard Voeks and Judith

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[495] Gabriel Paquette, "Political Economy, Local Knowledge, and the Reform of the Portuguese Empire, c. 1750-1810". In Jesús Astigarraga and Javier Usoz, eds., *L'économie politique et la sphère publique dans le débat des Lumières* (Madrid: Casa de Velázquez, 2013), 245-258.

[496] Robert A. Voeks, "Disturbance Pharmacopeias," in *Annals of the AAG*, 2004, 870-1.

Carney have noted, zones of high ecological diversity and human diversity frequently overlapped in the colonial era. Plantation crops (which flourished in the high-yielding tropical belt) and the biodiversity inadvertently created by large-scale population movements in these same regions created, in essence, a feedback loop productive of both hybrid ecologies—"disturbance pharmacopeias"—and creole cultures.[497] This emerging awareness of the dynamic nature of tropical ecologies is why both Macedo and Antonio Vieira refer cryptically to Brazil as the Philosopher's Stone: like the "Great Work" of the alchemists, Brazil's fertility could transform raw materials into gold.[498] The philosopher's stone had been conceived of by European imperial theorists from the time of John Dee onwards in an imperial context, as a means of achieving a global imperium and the conversion of the heathen populations of the East and West Indies to Christianity. Macedo and Vieira recast this aim but maintained its imperial character by conceptualizing the Stone not as a chemical preparation achieved by alchemy and occult study, but as a fertile tropical landscape. Exploiting this landscape allowed the Portuguese monarch—a figure of monumental world-historical importance in Vieira's famously millenarian worldview, founded on the belief in the mystical rebirth of the

[497] On the one hand, it could be argued that the very factor which created new hybridities between Amerindains, Africans and Europeans in the Portuguese colonies – the importation of African slaves to cultivate valuable plantation crops such as sugar – tended to decrease ecological and ethnobotanical diversity by encouraging monocultures of non-native crops which reduced the biodiversity of local flora and fauna. However, as Richard A. Voeks has argued, the "disturbance pharmacopeias" created by African immigration and the attendant transfer of African food crops and botanicals appears to have counterbalanced this trend. Indeed, Voeks has cited recent ethnobotanical research indicating that regions of ecological and cultural disturbance in Brazil today harbor a *greater* number of local botanical remedies than "untouched" indigenous regions deep in the Amazon. See Voeks, "Disturbance Pharmacopeias."

[498] My claim here builds on—and pushes backwards in time—Richard Grove's argument in *Green Imperialism*.

long-dead King Sebastian *(Sebastianismo)*— to triumph via natural philosophical theories of long-distance drug and spice transplantation.

By the nineteenth century, it had become apparent that these early attempts to move valuable tropical crops from their native ecological zones to climactic similar areas in the tropics were highly prescient. In addition to Dutch, British and French transplantations of quina and cochineal, later decades of the nineteenth century witnessed the cultivation of Andean coca and Afghani opium in new regions, a development that would have significant consequences for the contemporary illicit drug trade. In the seventeenth and eighteenth centuries, however, the transplantation schemes envisioned by Sprat, Macedo, and Vieira were largely failures. Likewise, although the Portuguese continued to dominate a large segment of the slave trade, their *assiento* was later won by the French and English and their share of the trade declined during the eighteenth century. So were the developments detailed in this chapter nothing more than another failed attempt to restore the Portuguese empire to its old prominence? On the level of epistemology and knowledge, the distributed and improvisational nature of the Portuguese "empire" had unexpected results. The Lusophone tropics emerged as fertile ground for natural philosophical inquiry, but as we will see in chapter five, the network that linked natural philosophers in London to places like Angola, Amazonia and Goa was a shadowy one.

Chapter 5

Occult Virtues: Anglo-Iberian Pharmaceutical Exchanges, 1650-1755

> Druggists have a wood they call *Lignum Nephriticum,* because the inhabitants of the country where it grows, use the infusion of it, made in fair water, against the [kidney] stone... If, turning your back toward the window, you pour out some of [this infusion] towards the light, and towards your eye; it will seem, upon coming out of the glass, to be perfectly blue... These, and other phenomena, which I have observed in this delightful experiment, many of my friends have beheld with wonder… And I confess, the oddness of the phenomena made me very solicitous to find out the cause thereof.
>
> —Robert Boyle on Bioluminscent *tlapalezpatli* wood, 1663

5.1 Introduction: making trials of preternatural drugs

Not long after he arrived in Machilipatnam, Thomas Bowrey began to wonder what, precisely, was happening inside the minds of the Machilitipatnamese. The bustling port city on India's Coromandel Coast had immediately struck the young East India Company merchant as a place of marvels. During the first days of his visit in 1673, Thomas Bowrey observed novelties like "Venomous Serpents [which] danced" to the tune of "a Musicianer, or rather Magician," and "all Sortes of fine Callicoes...curiously flowred."[499] But of all the strange wares sold and all the oddities on view, Bowrey was most fascinated by the singular effects of an unfamiliar drug. The townsfolk were "averse [to]... any Stronge drinke," Bowrey wrote, yet "they find means to besott themselves Enough with *Bangha*." They consumed this "Soe admirable herbe" in many forms, "but not one of them that faileth to intoxicate them to admiration." It could be chewed, mixed

[499] Thomas Bowrey, Sir Richard Carnac Temple, ed. *A Geographical Account of the Countries round the Bay of Bengal* (Cambridge: Hakluyt Society, 1905 [originally published London, 1679]), 68.

with tobacco and smoked, or made into a tea. Whatever the route of administration, Bowrey observed with interest, it proved "a very speedy way to be besotted."

Recalling his Indian voyages in London years later, Bowrey likened the effects of *bangha* to alcohol, yet argued that they were more complex and variable, "Operat[ing] accordinge to the thoughts or fancy" of those who consumed it. Those who were "merry at that instant, shall Continue Soe with Exceedinge great laughter… laughinge heartilie at Every thinge they discerne." Yet on the other hand, "if it is taken in a fearefull or Melancholy posture," the consumer might "seem to be in great anguish of Spirit." The plant was not a vehicle of a straightforward form of intoxication like that of wine, but a kind of psychological mirror that publicly reflected—and, indeed, amplified—the inner states of those who consumed it. Small wonder, then, that when Bowrey resolved to try the drug himself, he did so hidden in a private home with the shutters closed to townsfolk who, the merchant feared, might "come in to behold any of our humours thereby to laugh at us."[500]

I argue here that the preternatural effects of many Indies drugs shaped early experimental philosophy, and that these investigations in turn influenced the larger development of the drug trade in the eighteenth century.[501] In particular, this chapter explores how natural philosophers in England attempted to gain knowledge of the "occult virtues" latent in tropical medicines like the oddly intoxicating *bangha* or the

[500] All quotes from Bowrey, *Geographical Account*, 80.

[501] On the preternatural in early modern science see Lorraine Daston, "The Nature of Nature in Early Modern Europe," *Configurations* 6 (1998), 149-172. Briefly, whereas the *supernatural* is (in the medieval conception, at least) the exclusive realm of God, the *preternatural* can be a product of demons, magic, or the unexplainable workings of nature itself.

phosphorescent Mexican kidneywood that so captivated Robert Boyle.[502] Existing scholarship of early experimental medicine and science, I argue, has failed to capture the impact of these exchanges because those directly involved in them had good reason to conceal their activities. By building on Catholic and Iberian knowledge and materials, Protestant natural philosophers exposed themselves to charges of credulity, impiety, and "Jesuitical" methods. Likewise—but on the other side of the equation—learned Jesuits, physicians, apothecaries, and merchants in the Iberian empires risked Inquisitorial and royal scrutiny if they publically avowed "Northern" scientific doctrines or disseminated secret natural knowledge. And for Iberians and Britons alike, scientific engagement with drugs was shaped by fears of physical and mental harm resulting both from the indigenous origins of many Indies remedies and the fraudulent practices of apothecaries. Like Bowrey and his shuttered windows in Machilipatnam, individuals interested in the natural philosophy of drugs in both the Iberian and British empires had good reason to conceal their "humours" from prying eyes. Yet this clandestine science of drugs proved to be profoundly influential: the exotic and unexplainable *drogas* of the colonial world had, by the dawn of the nineteenth century, emerged as the precursors for a new class of chemically purified and experimentally tested substances—alkaloids—that laid the groundwork for the modern pharmaceutical industry.

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[502] On the concept of "occult qualities" or "occult virtues" in early modern natural philosophy see Keith Hutchison, "What Happened to Occult Qualities in the Scientific Revolution?," *Isis*, Vol. 73, No. 2 (Jun., 1982), 233-253; Tristan Dagron, "La doctrine des qualités occultes dans le *De incantationibus* de Pomponazzi," *Revue de Métaphysique et de Morale*, No. 1 (January, 2006), 3-20; and Seth Lobis, "Sir Kenelm Digby and the Power of Sympathy," *Huntington Library Quarterly*, Vol. 74, No. 2 (June 2011), 243-260.

What did it mean to investigate or "make trial" of drugs in the seventeenth century—not only in metropolitan centers like London but in a place like Machilipatnam? Bowrey's account offers an unusually frank and detailed insight into how early modern Europeans approached an unfamiliar and potentially hazardous—yet also potentially lucrative—substance like *bangha*. After carefully observing the effects of the substance for days, Bowrey resolved to try it himself along with "eight or nine of my companions," presumably fellow employees of the East India Company. Pints of a *bangha* elixir were duly purchased in the marketplace by Bowrey's "Fackeere," or guide, for six pence each, and the merchant and his compatriots retired to their lodgings, making sure to close "all dores and Windows." Bowrey's account of the resulting effects is worth quoting at length:

> It Soon tooke its Operation Upon most of us, but merrily, Save upon two of our Number, who I suppose feared it might doe them harme not beinge accustomed thereto. One of them Sat himself downe Upon the floore, and wept bitterly all the Afternoone; the Other terrified with feare did runne his head into a great Mortavan Jarre, and continued in that posture 4 hours or more; 4 or 5 of the number lay upon the Carpets (that were Spread in the roome) highly Complementinge each Other in high terms, each man fancyinge himselfe noe lesse then an Emperour. One was quarralsome and fought with one of the wooden Pillars of the Porch, untill he had left himself little Skin upon the knuckles of his fingers.[503]

Historians and other scholars have tended to assume that pharmaceutical self-experimentation is a modern practice. Accounts like these disabuse one of the notion rather quickly: Bowrey and his merchant friends were plainly interested in *bangha* as a recreational intoxicant.

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[503] Thomas Bowrey, *Geographical Account*, 80-1.

Yet Bowrey, who would later in life author the first English dictionary of the Malay language, was also what Lorraine Daston has called a "philosophical traveler."[504] Bowrey's interest in the drug lay not only in its recreational value, but its "curiosity" as a preternatural substance—and, not unrelatedly, its potential value as a new commodity. Since at least the sixteenth century, Indies travel accounts had tended to feature sections explaining the drugs, spices, and other valuable natural products of each region they discussed. Late seventeenth-century travelers seem to have become increasingly interested in the "narcotic" or "intoxicating" effects of such drugs and the details of their use in local cultures. Indeed, when the young impostor George Psalmanazar set out circa 1702 to write his own (entirely false) account of the island of Taiwan, he not only concocted a detailed description of the island's botanical riches, but even began to publicly consume what he would later ruefully call a "vast excess" of opium in order to more convincingly embody his assumed persona as an East Asian nobleman.[505] Newly "discovered" drugs that, unlike opium, were presently unavailable in Europe were a source of particular interest. Joachim le Grand, annotating a now-lost travelogue by Jeronimo Lobo, described a drug in use by the "Cafres" of the coast of present-day Mozambique "call'd by

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[504] Lorraine Daston, "The Empire of Observation, 1600-1800," in *Histories of Scientiic Observation*, ed. Lorraine Daston and Elizabeth Lunbeck (Chicago, 2011), 90-1. In his later life, Bowrey became an ardent scholar of Asian languages, compiling the earliest Malay dictionary and even meeting with the famed "false Formosan" and Royal Society interlocutor George Psalmanazar to quiz him about the languages of Taiwan (see Breen, "No Man Is an Island," 402). Bowrey's commonplace book—which features everything from poems inspired by *King Lear* and a rather touching design for his wife's funeral monument to the ship logs of a later Indies voyage Bowrey captained—has recently been digitized by the Beineke Library and merits further study. Beineke Rare Book and Manuscript Library, MS Osborn fc177, accessible online at: brbl-dl.library.yale.edu/vufind/Record/3446903

[505] George Psalmanazar, *Memoirs of ****, Commonly known by the Name of George Psalmanazar, a Reputed Native of Formosa* (London, 1764), 48.

the Portuguese, *Dutro*, [and] by the Cafres, *Banguini,*" which "entirely deprives a Man of Reason, and continues for the space of twenty four hours in the same Temper, which he was in, when he took it." Like the *bangha* described by Bowrey, the drug's intoxicating effects are envisioned as magnifying existing mental states:

> He that swallow'd it in a gay Humour, is entertain'd with pleasing Images, and is continually bursting out into fits of Laughter, and flights of Merriment. But he, whom his ill fate tempts to Taste it in a melancholly Disposition, protracts the Gloomy moments, gives the woes of Life a longer Duration, nothing can he utter but Sighs and Complaints, or apprehend but Misery and Misfortune, till the force of the Drug is exhausted, and he awakens from his dream of Sadness.[506]

Bowrey's account was unusual, however, in that he offered not only second-hand observation, but a detailed description of his own subjective *experience* of the drug, as well as the differing experiences of his companion.

As Anna Winterbottom and Simon Schaffer have noted, the East India Company factors and pilots of Bowrey's generation worked closely with the members of London's new Royal Society.[507] Indies merchants and sailors emerged as essential informants for the philosophers of London, sending dispatches relating to tides, currents, astronomical observations, local customs and trades, animal husbandry and horticulture, and medicine and pharmacy. Yet given the textual emphasis of much existing work on the East India Company's intellectual networks, for instance in Miles Ogborn's influential *Indian Ink,* it

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[506] Samuel Johnson's translation of Jeronimo Lobo and Joachim le Grand (trans. and ed.) *A Voyage to Abyssinia* (London, 1728), 226.

[507] Anna Winterbottom, "Producing and using the Historical Relation of Ceylon: Robert Knox, the East India Company and the Royal Society," *The British Journal for the History of Science* 42:4 (2009): 515-538; Simon Schafer, "Newton on the Beach: the Information Order of *Principia Mathematica*," *History of Science* 47 (2009): 243-276.

is worth noting that this was not *exclusively* a textual enterprise.[508] The East India Company, after all, was in the business of moving materials across vast distances, and the emerging culture of experimental drug research was no exception. Following the itineraries of Bowrey's *bangha* thus provides a window into how an exotic drug travelled from its local environment to the salons and laboratories of natural philosophers.

Around 1673, another English East India Company merchant named Robert Knox fled from several years of captivity in the independent kingdom of Kandy in the interior of Sri Lanka by piloting a stolen sloop along the Dutch-controlled coast. Parched with thirst, Knox and a fellow escapee were forced to drink "[p]onds of rain water… so thick and muddy, that the very filth would hang in our Beards… by which means… we used to often to be Sick of violent Fevers and Agues." Remembering his brush with death, Knox reflected that his providential discovery of the medicinal virtues of a South Asian plant allowed him to survive:

> At length we learned an Antidote and Counter-Poyson against the filthy venemous water, which so operated by the blessing of God, that after the use thereof we had no more Sickness. It is only a dry leaf: they call it in *Portugueze Banga*… and this we eat Morning and Evening upon an empty Stomach. It intoxicates the Brain, and makes one giddy.[509]

Knox reached London safely in September of 1680. Evidently he retained a taste for this intoxicating "Counter-Poyson," because nine years later, on November 7, 1689, Robert Hooke met with Knox at a London coffee house to obtain a sample of what Hooke called

[508] Miles Ogborn, *Indian Ink: Script and Print in the Making of the English East India Company* (Chicago, 2007).

[509] Robert Knox, *An historical relation of the Island Ceylon, in the East Indies* (London: printed by Robert Chiswell, 1681), 154. See Anna Winterbottom, "Producing and using the Historical Relation of Ceylon" (op. cit.) for an analysis of this interesting work.

the "intoxicating leaf and seed, by the Moors called *Ganges*, in Portug[uese] *Banga*, in Chingales *Consa*." Hooke added in his diary: "'tis accounted wholesome, though for a time it takes away the memory and understanding."[510] The natural philosopher was no stranger to intoxicating drugs: Hooke's diaries and commonplace books reveal that he was a regular user of laudanum, at that time a rather novel opium-based tincture that he often purchased from his fellow Royal Society co-founder Sir Robert Moray.[511]

On December 18, 1689, Hooke delivered a lecture to the Royal Society describing his administration of the drug to an unnamed "patient" (perhaps Knox, or even Hooke himself). "The Dose of it is about as much as may fill a common Tobacco-Pipe," Hooke reported, although the route of administration he tested was to grind the leaves and seeds into a fine powder, then chew and swallow them. The result, "in a short Time," was to

> take away the Memory and Understanding; so that the Patient understands not, nor remembereth any Thing that he seeth, heareth or doth, in that Extasie but becomes, as it were, a mere Natural, being unable to speak a Word of Sense; yet is he very merry and laughs and sings and speaks… yet he is not giddy or drunk, but walks and dances and sheweth many odd Tricks.[512]

Despite his emphasis on how the drug produced a loss of "Understanding" and "Sense," Hooke's overall assessment was surprisingly positive—glowing, in fact.

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[510] Tuesday, November 5, 1689 and Thursday, November 7, 1689 entries in the diary of Robert Hooke, reproduced in R.T. Gunther, ed. *Early Science in Oxford, Vol. 10* (London, 1935), 163.

[511] For instance, an unpublished memorandum book written by Hooke in the spring of 1672 records his use of laudanum and opium as a sleep aid eight times over a two-month period, as well as Indies drugs like guiacum, aloes and terebinth. This MS is transcribed in Felicity Henderson, "Unpublished material from the memorandum book of Robert Hooke, Guildhall Library MS 1758," in *Notes and Records of the Royal Society*, 61: 2 (May, 2007).

[512] Robert Hooke, "An Account of the Plant, call'd Bangue, before the Royal Society, Dec 18. 1689," reprinted in W. Derham, ed. *Philosophical experiments and observations of the late eminent Dr. Robert Hooke* (London: Printed by W. and J. Innys, 1726), 209.

The drug, he explained, "is so well known and experimented by Thousands, and the Person that brought it [Robert Knox] has so often experimented with it himself," that "there is no Cause of Fear, 'tho possibly there may be of Laughter." Hooke concluded by noting that he was currently attempting to grow the seeds in London, and that "if it can be here produced" the plant could "prove as considerable a Medicine in Drugs, as any that is brought from the Indies." More precisely, Hooke speculated, it could "be of considerable Use for Lunaticks."[513]

Both Bowrey and Knox's knowledge of this strange plant (which we now know as *Cannabis indica*) was gleaned from Lusophone informants and from the long textual tradition of Portuguese medical writing about Indies drugs.[514] Garcia da Orta had offered up the earliest account of *bangha*'s psychoactive properties in any European language a century earlier.[515] As we saw in Ch. 1, the Portuguese physician was not a fan of drug, reporting that it produced "sadness and nausea" in a "jester" of his acquaintance and warning the readers of his *Coloquios* to proceed with caution. The Portuguese word for the drug, *bangha* or *bangue*, would predominate in early English accounts throughout seventeenth and eighteenth century, as would the basic outlines of da Orta's initial descriptions of its effects.[516]

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[513] Hooke, "Account of the Plant, call'd Bangue," in *Philosophical experiments*, 210.

[514] As explored below, both Knox and Bowrey used Portuguese to communicate with local experts in the Indian Ocean. Knox, *Relation,* 170; Bowrey, *Geographical Account*, 75.

[515] Da Orta, *Coloquios dos simples*, 26r.

[516] See for instance Robert James, *Pharmacopoeia Universalis* (London, 1747), 250; Charles Alston, *Lectures on the Materia Medica* (London, 1770), 335; William Lewis, *An Experimental History of Materia Medica* (London, 1784) 187. Robert Burton's mention of "*bange*… like in its effects to opium" in *Anatomy of Melancholy* (London, 1621), in what is apparently the earliest reference to the drug in an English medical

5.2 The British become bioprospectors

> How great Diligence hath been used of late, to ransack both the *Indies*, to pry into all the Corners of the World, both inhabited and uninhabited, to find out a new *Plant*, not before described?
>
> —EDWARD TYSON, *ORANG-OUTANG SIVE HOMO SYLVESTRIS* (LONDON, 1699), 22.

In a 1588 treatise on "certaine special medicines" that apothecaries could produce from "the three kindes of peppers in common use," Garcia da Orta's name appears in the very first paragraph, and translations from *Colóquios* (1563) reoccur seven more times throughout this short pamphlet.[517] Significantly, however, although the author acknowledges that da Orta's findings invalidate the claims of Greco-Roman authors ("we learne by the histories penned by the latter writers, that all of this is untrue"), the section of the pamphlet devoted to actual pharmaceutical preparations reverts to citations of classical and medieval authorities. In what would become a typical pattern, the author switched between epistemological modes, abandoning contemporary Portuguese informants in favor of traditional authorities like Galen when it came time to offer codified instructions about the preparation and action of peppers on the body, rather than report traveler's tales about their growing habits, price, and local uses in India.[518]

The practical and empirical knowledge that made the global drug trade possible—what a valuable drug looked and smelled like, where it might be found within an

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text, directly quotes "Garcius ab Horto" on the subject. Robert Burton, *Anatomy of Melancholy* (London, 1860 [1652]), 390.

[517] Walter Baley, *A short discourse of the three kindes of peppers in common use and certaine special medicines made of the same* (London: Eliot's Court Press, 1588).

[518] Baley, *Short Discourse*, 14.

ecological setting, what it was called in local languages, whether and in what way it was psychoactive—was readily adapted from Portuguese authorities into English vernacular knowledge about the *trade* in drugs. Yet, English-language medical authorities were more slow to abandon two millennia of Greek, Roman, and Arabic learning as to the *theory* of drugs in favor of the upstart Portuguese—a nation, after all, that one early seventeenth-century naval officer lambasted as "a people of less Renown and Fame, and less Ability and Valour than any other Christian Monarchy."[519] Portuguese knowledge of drugs circulated readily among merchants and apothecaries working in vernacular commercial contexts, but it was slower to filter into the more learned networks of physicians and natural philosophers.

During the 1620s and 1630s, the Portuguese continued to dominate the global trade in goods like brazilwood, cinnamon, nutmeg, musk, mace, camphor, opium, tobacco, black pepper, and chili peppers. It was becoming evident to observers in Holland, England, France and Spain, however, that Portugal's era of monopolistic dominance had come to an end. In 1621, Robert Burton (himself a close student of Garcia da Orta) extolled "our laborious discoveries" and the "true Merchants" of Britain, who "carry the bell away from all other nation, even the *Portingales*."[520] Two decades earlier, in his *Briefe Description of the Whole World* (1636), the Anglican bishop George Abbott was already reflecting on the changing nature of the drug trade. "In time past," he wrote, the

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[519] Sir William Monson, *Sir William Monson's Naval Tracts in Six Books* (London: A. and J. Churchill, 1703), 392.
[520] Burton, *Anatomy of Melancholy*, 52.

Venetians had dominated the trade in Indies drugs via the Red Sea and Alexandria, but by Abbott's time, "Spice, and Apothecaries drugs are found to be far worse than before time they were, by reason of the great moysture which they take on the water, by reason of the long Navigation of the *Portugales* by the back part of *Africa*."[521] The Portuguese might have engineered a novel new way of delivering *drogas de botica* (apothecary drugs) to European consumers—but, Abbot pointed out, this did not mean that they had perfected it.

A backwards-facing sensibility was beginning to emerge in these British writings on Portuguese maritime dominance: the Portuguese spice/drug monopoly and the maritime power that sustained it began to figure as part of the recent past rather than the future. Writing in the 1640s, the aged naval officer Sir William Monson wrote that "we must confess, the Portugueses, to their Honour, were the first Breakers of the Ice, to give passage to all other strange Countries." But Monson also hinted at the ambiguous implications of this honor: "as they were the first Discoverers, to their Immortal Honour, so all Attemps [sic] by other Nations, in other Countries, must be attributed to them, as a People that trod out the first Path for others to walk in."[522] A failed Northwest Passage discoverer named Thomas James (1633) was more blatantly disparaging, acknowledging the importance of Portuguese informants about "the golden Indies" and "the mysteries of their trades, and traffique," but also attacking Portuguese navigators—"the meere shaddowes of whose mistaken Relations have comme to us"—for intentionally distorting

[521] George Abbott, *Briefe Description of the Whole World* (London: T. Judson, 1599), 150.
[522] Monson, *Naval Tracts,* 393.

information about Indies commerce and navigation. "The vicious, and abusive wits of later *Portingals*," he concludes, are founded on "falsities" and empty boasts about maritime prowess. It is "as if they had been brought home in a dreame or engine" rather than a proper sailing ship, he teased.[523] English agents of empire of the 1630s and 1640s thus saw themselves as following a path blazed by the Portuguese—but they were increasingly starting to think that they could pass them on the road.

Yet if British sea power began to come out from the shadow of the Portuguese in this period, local knowledge of Indies drugs remained largely a Portuguese prerogative. This remained true even in territories that the Portuguese had lost to the Dutch in the middle decades of the century, like the Sri Lankan coast navigated by Knox. Lusophone informants occupy the background of many early English accounts of Indies drugs, serving as informants, guides, translators, and go-betweens. When Thomas Bowrey began scouting for new products in the markets of Machilipatnam, for instance, he established local contacts like "Petro Loveyro, an antient Portuguees," who Bowrey came to "[know] very well."[524] Robert Knox noted in Sri Lanka that although the Portuguese had lost control of the island's coasts to the Dutch two decades before he arrived, "many of the

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[523] Thomas James, *The strange and dangerous voyage of Captaine Thomas Iames* (London, 1633), 107.

[524] Thomas Bowrey, *Geographical Account*, 75. Petro de Loveyro numbered among what Bowrey elsewhere describes as the "Portingals" who "beare arms in the Honourable English East India Company's Service as private Centinels" (Bowrey, *Geographical Account*, 4). This "ancient Portuguees" appears to have adapted to the rising British presence in India quite early; already by 1663 he figured in a letter from an East India Company merchant at Balasor as the "experienced Pilott Pedro de Lavera" and he appears again as an agent in the East India Company's "private trade" in a 1678 letter, ferrying an illicit shipment of goods to the Maldives at the behest of an English factor. See Richard Carnac Temple's footnote in Bowrey, *Geographical Account*, 75, citing a letter from Shem Bridges to Captain Charles Wilde, October 13, 1663, and Vincent and Read to Edwards at Balasor, January 29, 1678.

Natives became Christians, and learned the Portugueze tongue... to this day… even the King [of Kandy] himself understands and speaks it excellently well."[525]

5.3 Searching for the occult virtues of drugs

By the second half of the seventeenth century, British philosophical travelers were beginning to establish ties with Lusophone merchants, physicians and apothecaries in the East and West Indies. At the same time, medical practitioners in the tropics were emulating the new trends of empiric and chemical medicine in Europe, creating compound drugs using chemical processes and proprietary mixtures of exotic simples.[526] One of the most famous of these was the *Lapis de Goa*, an "artificial" version of a bezoar stone invented by the Portuguese apothecary Gaspar Antonio in Goa in the middle decades of the seventeenth century. In 1691 the Jesuit brothers who ran the Royal Hospital in Goa (which employed Gaspar Antonio as a lay apothecary) attempted to restrict sale of these bezoar-like "cordial stones" and license them using certificates of authenticity. [527] Yet they appear to have exploded in popularity during the 1680s and 1690s, and were frequently counterfeited and sold in London.[528] In his *Treasury of Drugs*

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[525] Knox, *Relation*, 170.

[526] On empirical medicine in the early modern Iberian colonies see Antonio-Barrera Osorio, "Knowledge and Empiricism in the Sixteenth-Century Spanish Atlantic World," in *Science in the Spanish and Portuguese Empires* and Júnia Furtado, "Tropical Empiricism."

[527] A March, 1691 decree attempted to regulate the sale and production of the stones. See Charles Borges, *The Economics of the Goa Jesuits, 1542-1759* (Concept Publishing Company, New Delhi, India: 1994), 87 and Ana Maria Amaro, "A famosa pedra cordial de Goa ou de Gaspar Antonio," *Revista da Cultura* 19: 22 (1988-1989): 87-108.

[528] The East India Company surgeon John Fryer claimed that the Jesuit pharmacy in Goa made an annual income of 50,000 xerafins on the sale of the stones, although Dauril Alden points out that this is an unsubstantiated claim. John Fryer, *A New Account of East India and Persia* and Dauril Alden, *The Making of*

Unlock'd (1690), John Jacob Berlu wrote of "*Goa Stones* (by some not rightly called *Lapis Jasper Antonicus*)" composed of "seed-pearl, *Bezoar*, Gold, and other Ingredients.[529] Likewise the merchant John Ovington's report of his 1689 voyage to Surat included a substantial description of two different cordial stones produced by the Portuguese in India: the "Snake-stone," made of "Ashes of burnt Roots, mixt with a kind of Earth, which is found at Diu, belonging to the Portuguese" and the "deservedly fam'd Gasper Antoni, or Goa Stone." Ovington explained how to determine whether these stones are counterfeit and added that Europeans he met in India "carry always about them one of these Stones inclosed in a Heart of Gold… which hangs about their Necks."[530] These "Goa" or "cordial stones" soon moved from the realm of exotic travelers tales to the everyday practice of healing, entering the cheaply-printed recipe books and pamphlets of British household medicine.[531]

Drugs from the Portuguese world—both "simples" and compound remedies like the Lapis de Goa and the "Snake-stone"—appear to have become a special interest of Robert Boyle and his circle among the Royal Society in the years following the 1662 marriage alliance of Queen Catherine de Bragança (the sister of Afonso VI, Portugal's

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an Enterprise, 543.

[529] "They are a dark green colour," Berlu adds, "mixed with Gold Streaks, in shape almost of a large Olive, cutting very fine within, of a gray colour." John Jacob Berlu, *The Treasury of Drugs Unlock'd or a Full and True Description of all sorts of Drugs and Chymical Preparations, sold by Drugists, Whereby you may know the place of their growth, and from whence they come, etc.* (London: John Harris and Tho. Hawkins, 1690), 67.

[530] John Ovington, *A Voyage to Surat in the Year 1689, edited by H. G. Rawlinson* (Asian Educational Services, 1996; first printed 1689), 155-156.

[531] The anonymous pamphlet *Fair play for one's life* (London: printed for M. Wotton, 1708), attributed simply to "a gentleman of quality of North Britain," complained that the "Goa stone" was in high demand among groups ranging from physicians to "Sea Surgeons" and street hawkers of drugs "pedlar'd about from House to House" (5).

monarch) and Charles II. In his *Observations made upon the Brasillian root, called ipepocoanha, imported from the Indies* (London, 1682) the London physician Richard Griffith noted that his research arose out of his "being frequently importuned by Esq *Boyl* to make Experiments upon *Indian Simples*, and to give an Account of my Observation and Success to some London Physitians."[532] Hans Sloane also took a strong interest in ipecacuanha, whose introduction into European medicine he credited to "an anonymous Portuguese, who lived in Brasil, (supposed to be one Manoel Tristaeon) whose book falling into the hands of the English, is translated and published by Purchas, in the year 1625."[533]

In his work on hydrostatics, Boyle described a series of experiments on bezoar stones, nephritic stones, and "calculi humani" (concretions found inside human bodies) inspired once again by Garcia da Orta ("a famous physician, who practiced long in the East Indies, and who had better opportunity that any European had before him, to try the virtue of bezoar"). Boyle also described being approached by a London drug merchant to test the legitimacy of an artificial bezoar which may well have been a Goa stone: "I have seen a fair adulterate bezoar-stone so resembling the genuine, that a great price was set upon it," Boyle wrote. "But by being brought to me for my opinion, I made no doubt of it being counterfeit, from its appearing as heavy, as a mineral stone of the same bulk."[534]

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[532] Richard Griffith, *observations made upon the Brasillian root, called ipepocoanha, imported from the Indies* (London, 1682). The fact that Griffith, a member of the conservative Royal College of Physicians, endorsed the "wonderful Virtue" of the Brazilian root was a testament to the changes in attitudes toward Iberian-traded drugs in the preceding decade.

[533] Hans Sloane, "On the Use of Ipecacuanha, for Looseness," *Philosophical Transactions* (1698), no. 238, 69.

[534] Robert Boyle, *Hydrostatics applied to the materia medica* (1690) collected in *The Philosophical Works of the*

FIGURE 5.1 An ink wash painting of an "Occidental bezoar of unusual bigness" in one the Royal Society's record books (undated, 1670s). Archives of the Royal Society, Cl.P/15i/7.

Boyle was even tasked with testing the legitimacy of an Indies "snakestone" by Queen Catherine herself. In his notebooks, Boyle recorded that "the Queen also was pleas'd to honor me with a command to try ye goodness of a snakestone" which she had been given by the emissaries of the King of Siam during their 1684 visit to London. Boyle made a "trial" of the "virtues" of the stone by administering it to a dog that had been bitten by a viper, but found it "void of virtues." Boyle was pleased to note, however, that "[Queen Catherine] being not discourag'd at this disappointment was pleas'd to send me

Honourable Robert Boyle Esq. Volume 2 (London, 1725), 329.

another of these Antidotes that came from ye same parte of ye East Indys." This time, the antidote worked, and Boyle recorded his "great satisfaction" at being able to report to Catherine that her drug was the genuine article.[535] New knowledge about psychoactive drugs that flowed from the Portuguese world into English culture, from tea to *bangha*, helped supply a culture of drug-based empiricism in Restoration London. Boyle's private list of "desiderata" that he hoped natural philosophers might discover in the future is telling in this regard. The list included both "Potent Druggs to alter or Exalt Imagination, Waking, Memory, and other functions" and drugs that would allow "Freedom from Necessity of much Sleeping [as] exemplify'd by the Operations of Tea."[536]

Although some have argued that the early Royal Society was hostile to the supposedly "medieval" or "Aristotelian" notion of occult virtues, Keith Hutchison has pointed out that the meaning of "occult" actually shifted markedly in the seventeenth century.[537] "Occult qualities" were regarded, in the Christian Aristotelian framework that prevailed in medieval natural philosophy, as unknowable by mortal minds, and indeed "insensible," i.e. unobservable using the tools and senses of the sublunary realm.[538] The

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[535] RSA, Ms 189, f. 16 (Robert Boyle's notes for his hydrostatics research, undated [1684?]).

[536] Archives of the Royal Society, Boyle Papers, 8, fol. 20. On Boyle's desiderata see Vera Keller, "The "New World of Sciences": The Temporality of the Research Agenda and the Unending Ambitions of Science" in *Isis* 103, 4 (December 2012), 727-734 and Anna Marie Roos, "Perchance to Dream: Science and the Future" in *The Appendix*, Vol. 2, No. 3 (July 17, 2014).

[537] "With the acceptance of insensible agencies into the scope of natural philosophy," Hutchison argued, "the word 'occult' lost its connotation of 'insensible' and henceforth referred solely to unintelligibility." Hutchison, "What Happened to Occult Qualities?" (op. cit.), 233. For an example of a scholar constructing a binary opposition between the "rationalism" of the Royal Society and the concept of occult virtues, see Marie Boas Hall, "Boyle's Method of Work: Promoting His Corpuscular Philosophy," *Notes and Records of the Royal Society of London*, Vol. 41, No. 2 (Jun., 1987), 111-143.

[538] Though usually associated with Aristotle, this doctrine also owed a debt to Galen, who wrote about magical amulets and drugs that operated according to "unnameable properties" which were observable by

triumph of the microscope, the telescope, and of Newtonian optics opened up these previously "insensible" realms of natural knowledge.[539] So, too, did the rise of the global drug trade, which brought the preternatural substances of the Indies into the ambit of natural philosophical observation and experiment. Figures like Newton, Hooke and Boyle may well have been hostile to the older definition of occult as insensible, but they actually evinced a keen interest in a revised conception of occult virtues as forces hidden in nature that, though *currently unintelligible*, could be subjectively sensed and potentially transformed into matters of fact via experiment and instrumental observation.

This natural philosophical interest in the occult qualities or virtues found in drugs has failed to occupy the attentions of modern historians, but it appears frequently in the writings of the early Royal Society and the earlier "mechanical philosophers" that inspired them. The early chemical physician Daniel Sennert, for instance, cited purgative drugs (of which the most famous in the seventeenth century was Brazilian ipecauanha) and poisons as the prime examples of what he called "occult qualities." These, he wrote,

> are not immediately known to the Sences, but their force is perceived mediately by the Effect, but their power of acting is unknown... So we perceive with our senses the evacuation caused by purgative medicaments; but we do not perceive that quality by which the purging medicaments do work that effect. After the same manner, we perceive with our Senses the symptoms which Poysons do stir up in our Bodies; but the qualities whereby they cause the said symptoms we perceive not by the sense.[540]

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the senses but could not be explained. See Brian P. Copenhaver, "A Tale of Two Fishes: Magical Objects in Natural History from Antiquity Through the Scientific Revolution," *Journal of the History of Ideas*, 52/3 (July-Sep 1991), 380-1.

[539] On the role of the microscope and other optical instruments in this changing notion of the occult see Catherine Wilson, "Visual Surface and Visual Symbol: The Microscope and the Occult in Early Modern Science," Journal of the History of Ideas, Vol. 49, No. 1 (Jan. - Mar., 1988), 85-108

[540] Daniel Sennert, *Thirteen Books of Natural Philosophy*, (London, 1661), 431, a translation by N. Culpepper

Sennert also included opium, peony root, and "the Nephritick Stone" as substances possessing "occult qualities… known by experience to be really true."[541] An intoxicating and unexplainable—yet abundantly documented and subjectively "experienced"—drug like the *bangha* of Bowrey, Knox, and Hooke similarly became an object of natural philosophical interest precisely *because* it possessed occult virtues: its effect could be immediately perceived by the senses, but its "power of acting" remained a mystery to be solved. Boyle himself wrote a memoranda on "specific medicines" (drugs that cured specific ailments via a precise action on the body, regardless of the individual constitution of the patient) in which he explored this changing meaning of occult qualities or virtues: "I am apt to think," he wrote, "that the future industry and sagacity of men, will be able to discover intelligible causes of most of those qualities, that now pass for occult."[542] Yet Boyle also admitted that many of the "specific virtues ascribed to medicines" were of such "uncommon textures" and "irregular motions" that even the most sensitive instruments might be incapable of rendering these hidden virtues intelligible.[543] Boyle seems to have associated these "uncommon" qualities with Indies drugs, as a list of the specifics he

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and A. Cole of Sennert's 1632 *Epitome naturalis scientiae*.

[541] Sennert, *Thirteen Books*, 435, 439.

[542] An early eighteenth-century medical author directly related Boyle's research into the "hidden Property" latent in drugs to quina: "Specific Medicines, are such as have a peculiar Vertue against some Disease; as the QuinQuina, or Cortex Peruviana, hath to cure Intermitting Fever… [they] have a Virtue to cure, by some hidden Property, this or that particular Disease. That there are such Medicines as these, in the latter and most proper sense of the Word, Mr. Boyle makes very probable." John Harris, *Lexicon Technium* (London, 1725, 4th edition), n.p.

[543] Robert Boyle, "The Notion of Specific Remedies Prov'd agreeable to Mechanical Philosophy: with the advantages of simple Medicines consider'd; and their Use recommended," in *Philosophical Works* (op. cit.), Vol. 3: 546.

mentions by name following this passage makes plain: Virginia snakeroot for poisons, Peruvian bark for fevers, a curious "stone" (an artificial bezoar?) that cured hemorrhages, Javanese scorpions, the Mexican "blood-stone" described by "the experienced Monardes," a mysterious "mortal poison" dispatched by "a young Negro woman of quality" in Africa, and even "the tooth of a true hippopotamus, or river-horse" that a former housemate of Boyle's wore around his neck to relieve "violent cramps."[544] Unlike the other occult qualities that fascinated figures like Boyle and Newton—the invisible powers of the lodestone, the force of gravity, or even the sympathetic magic of Kennelm Digby's "weapon salve"—these exotic materia medca were not always easily obtainable, and their legitimacy was difficult to verify.[545] To probe the mysteries of exotic drugs, natural philosophers in London also had to tap into what was, to them, another variety of "occult" or concealed knowledge: the Catholic and indigenous pharmaceutical networks of the Iberian tropics.

5.4 Anglo-Portuguese pharmaceutical exchanges

By the early eighteenth century, Portuguese authorities on drugs had begun to adopt the methods, nomenclature and epistemologies advocated by Boyle and other English, French and Dutch natural philosophers. Explaining the changes in the revised

[544] Boyle, "Notion of Specific Remedies," 3: 548, 550-551, 575.

[545] Elizabeth Hedrick, "Romancing the Salve: Sir Kenelm Digby and the Powder of Sympathy," *British Journal for the History of Science,* 41: 149 (June, 2008), 161-85. In his *Suspicions about some hidden qualities of the air* (1674) Boyle noted in his preface that he considered using the phrase "Occult Qualities of air" in the title and speculated about the "peculiar Textures" that undergirded the workings of "what we call Sympathies and Antipathies." On Boyle's speculation about occult qualities see Mary Floyd-Wilson, *Occult Knowledge, Science, and Gender on the Shakespearean Stage* (Cambridge: Cambridge University Press, 2013), 135

second edition of his *Pharmacopea Lusitana* (1711), the Lisbon apothecary Caetano de San António acknowledged that

> since the Northern nations have introduced chemistry it is evident that this important art [of pharmacy] is now very different than it was in earlier times… [thus] I have resolved to revise my *Pharmacopea Lusitana*, increasing the number of *receitas*, and modern theories, that may not have reached your notice owing to an incomplete knowledge of the different languages that the foreigners write in.[546]

Caetano de San António may well have been trying to catch up with his rival, João Curvo Semedo, who had directly cited "Roberto Boyle" six times in the revised second edition of his popular *Polyanthea Medicinal* (1704), including direct quotations from Boyle's treatise on specific remedies in a section on "remedies which work by occult virtues or qualities."[547] By 1733, the Portuguese physician José Rodrigues Abreu was citing no less an authority than Francis Bacon to argue that coffee was a "stupefacient" drug, , while in 1728 the Lisbon physician Luis Caetano de Lima demonstrated his bona fides as a proponent of the new "chemical" learning by compiling an exhaustive, three volume "epitome" of the works of the controversial English physician and Royal Society founding member Thomas Willis.[548] Even earlier, as we saw in Ch. 4, Duarte Ribeiro de Macedo's "Discourse on Transplantation" (*Discurso sobre a transplantação*) had revealed both his keen interest in English natural philosophy and covert meetings that allowed Macedo to plot ambitious and philosophically-grounded drug transplantation schemes along with a son

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[546] Caetano de S. António, *Pharmacopea lusitana* (Lisbon, 1711), "Prologo," 1.

[547] Semedo, *PM* (2nd ed, 1704), 117, 255, 529, 611, 617-8, and "Dos remedios que obrão por virtudes, e qualdades occultas, e das sympathias, e antipathias que ha entre muitas cousas," 606-621.

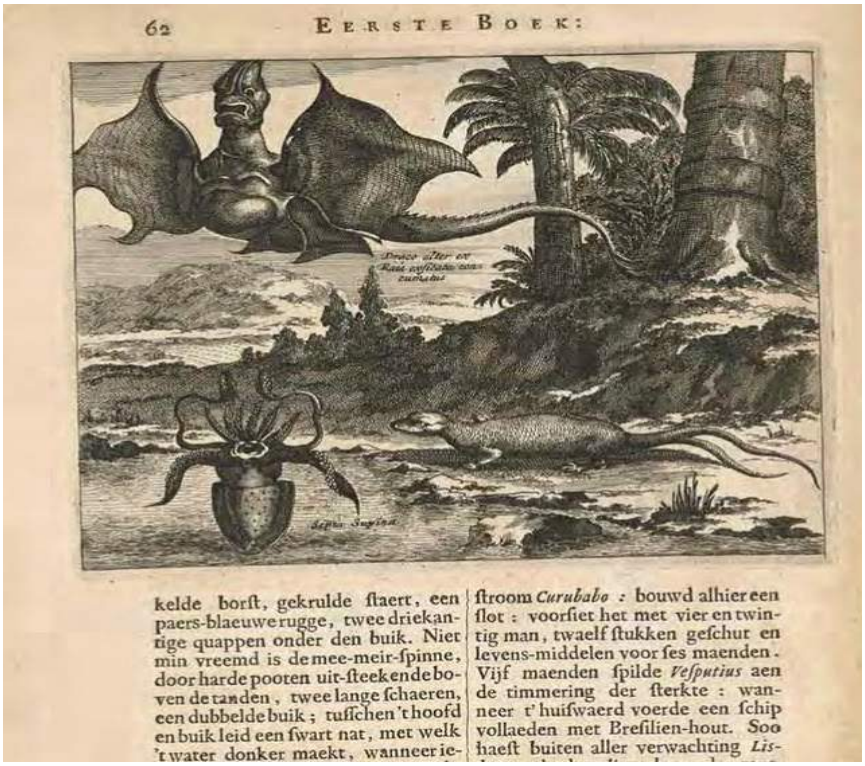
[548] José Rodrigues Abreu, *Historiologica Medica* (Lisbon, 1733), 422; Luis Caetano de Lima, "Epitome Willisiana," (1728), Biblioteca Nacional de Portugal, Manuscritos Reservados, Cod. 2050-2.

of Hugo Grotius and an English earl and patron of the Royal Society.

It would be a mistake, however, to take these episodes as proof of a unidirectional flow of knowledge. The decades following the Anglo-Portuguese alliance witnessed a renewed flowering of natural knowledge exchanges between Portuguese and British experts, although these exchanges usually occurred along personal and manuscript pathways rather than in print owing to pressure from the censors of the Inquisition. Even as English chemistry was influencing medical writers in Lisbon, knowledge and materials from the Portuguese tropical colonies were helping shape the development of natural philosophy within England. In August of 1671, for instance, Henry Oldenburg, the Secretary of the Royal Society of London, dispatched a set of "Inquiries for Brazil" to an informant in Bahia who remained anonymous in the official Royal Society account: most likely the Jesuit missionary and astronomer Valentin Stansel.[549] This long list of questions—which was probably composed collectively at a meeting of the Society—offers an interesting glimpse into the members' eclectic curiosity about the tropical New World as an ecological, climactic and epidemiological space. Was the dew of Brazil the Latin document asked, able "to wear away iron… yet being of such vigor that it marvelously strengthens both men and cattle?" Other questions inquired about poisonous jellyfish,

[549] Oldenburg to Thomas Hill, 30 Aug 1671, with enclosure for an unknown Jesuit in Brazil, in Hall and Hall, eds., *The Correspondence of Henry Oldenburg*, viii, 236, 244. For the original document see Archives of the Royal Society (henceforth *RL*) Cl.P/19/73, "Enquiries about Brazil recommended to Thomas Hill." See John Gascoigne, "The Royal Society, Natural History and the Peoples of the New World(s), 1660-1800," *BJHS* 42(4) Dec. 2009: 545 for a brief discussion of this letter. Thomas Hill was a Lisbon-based merchant of whom little is known, aside from the fact that he was a music-lover and friend of Samuel Pepys. He probably voyaged to Brazil on a trade mission, perhaps as a wine merchant. An earlier set of five questions for "Guiana and Brasil" had appeared in *Philosophical Transactions* II, No. 23, 422. March, 1666.

epidemic plagues, glow-worms, "fiery flying dragons (*dracones ignis volantes*)" and native Brazilians who, "moved by affection," were reputed to "seize the bodies of parents not killed by poison and, having dismembered them, bury them inside themselves." Questions repeatedly focused upon the entwined themes of exotic natural remedies and indigenous knowledge thereof: "Are the older Brazilians excellent botanists, able with ease to prepare every kind of medicine from materials gathered in all places," and to "seek after knowledge of diseases… according to some common intellectual principle?" Does the *murucuia-miri* plant "expel the afterbirth in a safe and pleasant manner?" Is it true that extract of *caapeba* cures the stone? What of *ipecacuanha*, already famous in England for "combating strongly every kind of poison"?


62 EERSTE BOEK:

kelde borſt, gekrulde ſtaert, een paers-blaeuwe rugge, twee driekantige quappen onder den buik. Niet min vreemd is de mee-meir-ſpinne, door harde pooten uit-ſteekende boven de tanden, twee lange ſchaeren, een dubbelde buik; tuſſchen 't hoofd en buik leid een ſwart nat, met welk 't water donker maekt, wanneer ie-

ſtroom *Curubabo*: bouwd alhier een ſlot: voorſiet het met vier en twintig man, twaelf ſtukken geſchut en levens-middelen voor ſes maenden. Vijf maenden ſpilde *Veſputius* aen de timmering der ſterkte: wanneer t' huiſwaerd voerde een ſchip vollaeden met Breſilien-hout. Soo haeſt buiten aller verwachting *Lis-*

FIGURE 5.2 A "draco" (dragon) floating above a South American landscape. Arnoldus Montanus *De Nieuwe en Onbekende Weereld* (*The New and Unknown World)* (Amsterdam, 1671), 62. Via the John Carter Brown Library.

The astonishing natural abundance of Portuguese America had already, by this time, been publicized via a series of widely-read treatises ranging from André Thevet's *Les singularitez de la France Antarctique* (1557) to Piso and Marcgrave's *Historiae Naturalis Brasiliae* (1648), and Arnoldus Montanus' 1671 *De Nieuwe en Onbekende Weereld* (*The New and Unknown World*). Indeed, the question about the "flying dragon" may refer to a passage mentioned in Piso, or to Montanus' illustration of a creature that an engraved caption labels as a *draco*. Many other questions contained in the 'Inquiries for Brazil' similarly sought to confirm or disprove the assertions made by these earlier Dutch and Portuguese accounts of the *curiosa* of tropical nature.[550]

By the 1660s, the Society was beginning to develop a global network of informants managed by Henry Oldenburg, the Society's irrepressibly energetic secretary and self-proclaimed "Intelligencer." Yet a lesser-known figure named Robert Southwell (like his close friend Robert Boyle, the scion of an affluent Anglo-Irish family) appears to have been more important than Oldenburg in articulating connections with the Catholic world. One of the most unusual Royal Society informants to emerge in this period was the now-septuagenarian Jesuit Jeronimo Lobo (previously encountered as a young missionary, nursing a fevered sailor off the coast of Africa in Ch. 3), who, during is retirement at the São Roque residence of the Society of Jesus in Lisbon, struck up an

[550] For an excellent case study of the reception of New World drugs in European elite and popular cultures, see Marcy Norton's *Sacred Gifts, Profane Pleasures: A History of Tobacco and Chocolate in the Atlantic World* (Cornell, NY: Cornell University Press, 2008). Quote Sarah Irving's work on the Royal Society and the 'empire of nature' at some point here as well. See esp. "An Empire Restored: America and the Royal Society of London in the Restoration"

unlikely friendship with the gregarious foreigner. Southwell, a diplomat and future president of the Royal Society (1690-95), seems indeed to have made a habit of locating learned figures in Catholic Europe, befriending them, and encouraging them to exchange what he called "secrets" with Boyle and Oldenburg.

FIGURE 5.3 A portrait of Southwell that still hangs in the Bristol manor house he purchased following his return from Lisbon. Attributed to Geoffrey Kneller (c. 1680?), Kings Weston House, Bristol, UK.

In the fall of 1660, for instance, Southwell paid a visit to "a meeting of the *virtuosi*" in Florence (the Accademia del Cimento) and forged an acquaintance with the Accademia's eminent patron, the Cardinal Leopoldo de Medici. He also befriended an unnamed Florentine mathematician who had been a student of Galileo ("the only one that is now living"). Southwell wrote to Boyle informing him of the Accademia's experiments and forwarding a letter from the learned Florentine, importuning Boyle "to embrace this occasion of correspondence with the prince [Medici]" which Southwell assured Boyle would "number among the felicities of my life, that I was but instrumental unto so great a good. I am sure there will pass communication of great secrets between you."[551] As a taste of these "great secrets," Southwell described a recent series of experiments attempting to extract and observe the "salts from all things" with the aid of a very early microscope ("by the help of glasses"). The Accademia had found, according to Southwell, "that [drugs] which afford the most sharp and edged salts, are of the fiercest operation in physic," a finding which may well have influenced Boyle's thoughts about the "uncommon textures" of certain specific drugs. Southwell also referred to a box of Italian curiosities that he had earlier sent to Boyle, noting that he happy to send along other specimen of bezoar-like "calcined" stones purchased from a curiosity cabinet owner in Bologna "which truly I forgot to put into the box."[552]

In a subsequent letter from Rome the following spring, Southwell happily

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[551] Robert Southwell to Robert Boyle, Florence, October 10, 1660, in *The Works of the Honourable Robert Boyle, Volume Six* (London, 1772), 297.

[552] Southwell to Boyle, October 10, 1660, 298.

reported that "Father [Athanasius] Kircher is my particular friend, and I visit him and his gallery frequently. Certainly he is a person of vast parts… He is likewise one of the most naked and good men that I have seen, and is very easy to communicate whatever he knows."[553] Although Southwell allowed that Kircher "is reputed very credulous, apt to put in print any strange, if plausible, story, that is brought unto him," Southwell deemed him to be "philosopher enough" and promised to give Boyle a "receipt" that Kircher had written up on how to produce "the flower growing from its ashes" upon their next meeting, as well as a more detailed report of Kircher's answers to "all the questions you bid me ask him." Southwell's friendship with the famously well-connected Kircher gave the Royal Society access to a highly global network of far-flung learned Jesuits that had been unavailable to Oldenburg. In late 1665, King Charles I sent Southwell to Portugal to negotiate a peace with Spain, and he resided in Lisbon for the following three years. During this time, Southwell apparently encouraged Lobo to write in greater depth about the natural curiosities of east Africa, and by 1667 Southwell had prepared a compete set of natural philosophical treatises written by Lobo and annotated by another Royal Society member and junior diplomat who worked alongside Southwell in Lisbon, Peter Wych.[554] These included:

1. A Relation of the River Nile, its source, current and inundation
2. An account of the real existence and the place of abode of the Unicorne

[553] Robert Southwell to Robert Boyle, Rome, March 30, 1661, in *Works of the Honourable Robert Boyle*, 299.

[554] RSA, Journal Book of the Royal Society, Vol 3, April 25, 1667, 70. C.R. Boxer, *Descriptive List of the State Papers Portugal 1661-1780 In the Public Record Office London*, (Lisbon, 1979), Vol. 1, pg. 68 describes a letter at the National Archives (S.P. 89/8 fol. 41) dated Feb 4 1667 from Sir Robert Southwell to Lord Arlington that commends Sir Peter Wych for his work as a special envoy, "whose behavior has given great and general satisfaction." Journal Book of the Royal Society Vol. 3, February 28, 1666.

3. Of the Abyssin Emperor, vulgarly called Prester John
4. Of the Red Sea and the cause of its inundation
5. A discourse of Palme trees, their variety, fruit, usefulness, proper soil, etc.

These five treatises were decontextualized fragments from Lobo's extensive travels that carefully avoided extensive descriptions of Lobo's missionary activities, instead emphasizing the impartial relation of natural phenomena.[555]

Wych and Southwell explicitly worked to nurture clandestine contacts with the Jesuit community in Lisbon. Wych, for instance, reported to Oldenburg he'd "engaged for a Correspondent in Philosophical Matters, the Professor of the Mathematicks at Lisbon, called Father John Marks, an English Jesuit." This Padre John Marks would appear to be the originator of Royal Society's ties with their anonymous Jesuit informant in Brazil (likely Valentin Stansel) to whom Oldenburg would later direct his "Inquiries for Brazil," because Wych noted that the Jesuit "had offered… to engage for the like Correspondence a Jesuit at Penambuco."[556] By March of 1668, Southwell had Lobo's manuscripts to Henry Oldenburg, along with two boxes of "divers curiosities" from Portugal, Brazil, and Angola which Oldenburg wrote of excitedly to Boyle.[557] These samples may well be those alluded

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[555] Lobo's longer narrative of his east African travels has a complex and interesting history. Lobo's original Portuguese has been lost, so the narrative survives in its French translation, published by Joachim le Grand as *Relation historique d'Abyssinie* (Paris, 1728). A young Samuel Johnson found the book interesting enough to translate into English which (as Boswell tells it) he performed while he "lay in bed with the book… and dictated." Johnson's "epitome" of the French text was published as *A Voyage to Abyssinia* (London, 1735). However, *another* version of Lobo's travels, seemingly written by Lobo himself in Portuguese and much longer than le Grand's translation, was discovered by Manuel Gonçalves da Costa in 1947, and was published as *Itinerario e Outros Escritos Inéditos* (Lisbon, 1971). Both Johnson and le Grand added extensive commentary to Lobo's original text, as Joel J. Gold has explored in "The voyages of Jerónimo Lobo, Joachim Le Grand, and Samuel Johnson," in *Prose Studies: History, Theory, Criticism* 5/1 (1982).

[556] RSA, Journal Book of the Royal Society Vol. 3: 1666-1668, February 28, 1666, fol. 67.

[557] Oldenburg to Boyle, London, April 14, 1668, in *The Works of the Honourable Robert Boyle*, 282. The boxes are also mentioned in Manuel Gonçalves da Costa, ed. *Itinerário e outros escritos inéditos* (Lisbon: Livraria

in an unusual addition to Nathaniel Grew's compendium of the belongings and curiosities of the Royal Society, the *Musaeum Regalis Societatis* (London, 1681).

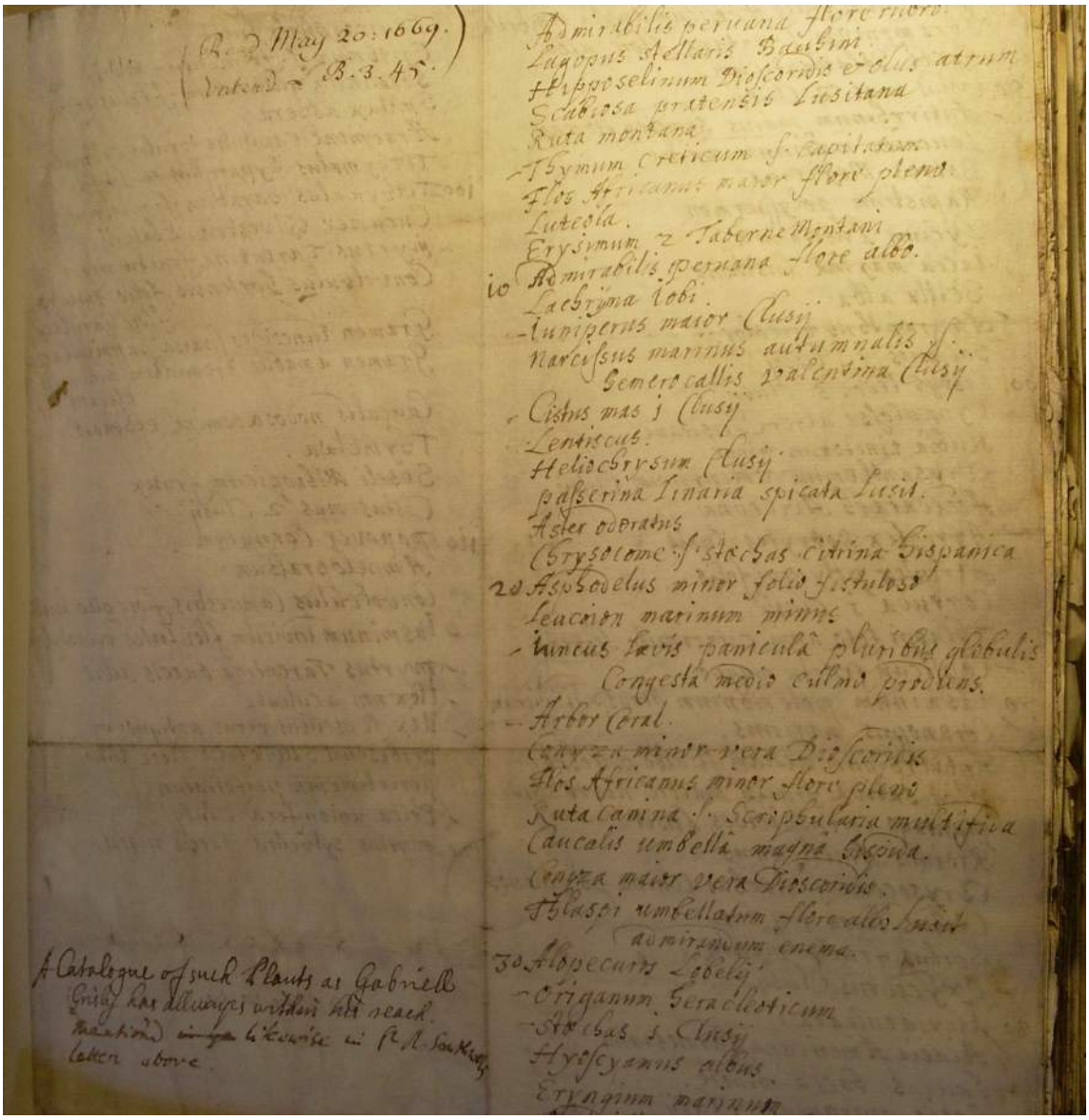

FIGURE 5.4 "A Catalogue of such Plants as Gabriell Grisly has always within his reach," forwarded to the Royal Society by Robert Southwell in 1669. Royal Society Archives, Cl. P. 10 doc. 11, May 20, 1669.

Civilização, 1971), 666. I hope to find out more about them and their contents during further research in the Royal Society archives.

Grew added an appendix to the main body of his text solely in order to describe a group of *materia medica* that had been donated by Southwell which were used by what Grew called "the Portugal Negros." These included "Sagu;" "the Mallaca gum;" Poco Sempie, "a Golden Moss... accounted a great Cordial;" and Rizagon, a "root brought from Bengala, of good use," this last a rare reference to a drug from the fever-ridden West Central African slave port of Benguela actually reaching Europe.[558] A year later, Southwell dispatched a letter from the German-Portuguese apothecary Gabriel Grisley proposing a plant exchange along with bottle of Amazonian *capaiba* balsam, a Portuguese manuscript entitled *Varias Receitas et Segredos da Medicina*, and an even larger set of medical and botanical curiosities from the Portuguese tropics. At the May 20, 1669 meeting of the Society, Southwell's finds were presented and enumerated (see Table 4). The source for the four materia medica marked as being from Angola may well have been a young João Curvo Semedo (or, perhaps, one of Semedo's suppliers in Lisbon's Chiado district or the Alcântara docklands), since Semedo appears to have been the sole seventeenth-century Iberian author to mention Southwell's rather mysterious "tooth of the beast emgala."[559] The physician called it *engala,* "an animal in Angola with the corpulence of a swine," whose teeth, when powdered, had "the greatest virtue in abating malignant fevers, even

[558] Nathaniel Grew, *Musaeum Regalis Societatis* (London, 1681), 385.

[559] Semedo, "Memorial de varios simplices," 11, a pamphlet bound with *Polyanthea Medicinal* (op. cit.). One of the only other contemporary references to this materia medica I have been able to find is in a Latin catalogue of Kircher's cabinet of curiosities, which calls it "a most valid remedy against venoms from the jungles of Angola… purchased from African hunters and in Italy and Portugal sold be merchants." Francisco Maria Ruspolo, *Musæum Kircherianum, sive musæum a P. Athanasio Kirchero in Collegio* (Rome: printed by Georgii Plachi, 1709), 277. Perhaps Kircher had shown his specimen to Southwell during their friendship in Rome a few years earlier, and he resolved to find his own when he reached Lisbon.

better than that of the true Bezoar stone," especially when mixed with poppy water).

TABLE 4. Robert Southwell's list of materia medica from the Portuguese tropics he donated to the Royal Society, 1669.

(These from Angola)
1. Some Taroco nuts
2. Two Angola onions
3. Some vipers-tongues
4. A tooth of the beast emgala

(*These from Brazil*)
5. Some black seeds, like beans of the tree sapucaya
6. Maracoya-seeds
7. Seeds of the sensitive plant
8. Quintessence of tobacco
9. Two coco-nuts
10. Some Brasil chesnuts
11. A root and stalk, which being masticated draws rheum

(These were sent by Dr. Gabriel Grisley, who also sent with them a written catalogue of such plants, as he had always in his reach.)

12. Arbor corall
13. Cistus mas 1 Clusii
14. Cistus mas 2 Clusii
15. Cistus ledon 1 Clusii
16. Cistus ledon 4 Clusii
17. Cistus ledon 5 Clusii
18. Stramonium sive Datura folio albo
19. Thymelea
20. Lentiscus
21. Laurus Americana
22. Jasminum Polemonium Monspeliense dictum
23. Zizyphus alba
24. Jasminum Indicum flore buteo odoratissimo
25. Cistus foemina
26. Alcea Japonensis flore pleno mutabili
27. Juniporus major Clusii 28. Melopepo melonia nocae 29. Acaju Britannicum
30. Maracaju Brasilianum
31. Admirabilis Peruana flore vario
32. Foeniculum dulce Azoricum
33. Hyacinthus tuberosus Indicus duas cebollas habens

More certain is Southwell's connection with the "Botanist and Chemist" (as he called himself) Gabriel Grisley, who was born in Germany but had been resident in Lisbon for decades. Grisley's written catalogue, which survives in the Royal Society archives, was an elaboration on exotica not contained in his *Desengano para a medicina ou botica para todo o pay de familias* (*Realization of Medicine, or, an Apothecary for All Fathers of Families,* first published 1656) and his *Viridiarum Lusitanum* (*Portuguese Plantation*, 1661)

both of which went into numerous editions throughout the seventeenth century.[560] In addition to examples of drugs mentioned in da Orta's *Coloquios* (the entries marked "Clusii") Grisley boasted of cultivating a number of rare New World botanicals such as passionfruit, "coral tree," Japanese alcea, and "varied admirable Peruvian flowers."

These dispatches from Southwell and his Lusophone informants Grisley and Lobo evidently drummed up an interest in the naturalia of the Portuguese empire in London, because later that year four apothecaries, including Hans Sloane's associate John Petiver and the Queen's botanist Leonard Plunket, gathered at the Temple Coffee House in London to plan a newly updated subscription edition of Grisley's *Viridiarum Lusitanum*.[561] In the earlier decades of the century, Lobo and Grisley had labored in the service of the Portuguese crown—Lobo in 1630s Ethiopia, and Grisley repeatedly petitioning King João IV to grant him funds to collect and grow "medicinal plants… for the good of the Kingdom."[562] Yet by the 1660s, both of these lifelong imperial servants found themselves working clandestinely with a charismatic Anglo-Irishman to send valuable natural knowledge to the philosophers of London.

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[560] For Grisley's list of plants, see Thomas Birch, *The History of the Royal Society*, *Vol. 2* (London, 1756) 372-3 and the original MS in the Royal Society Archives, Cl. P. 10 doc. 11, May 20, 1669. *Desengano para a medicina ou botica para todo o pay de familias, consiste na declaração das qualidades e virtudes de 260 hervas, com o uso dellas… por Gabriel Grisley, Medico Alemão* (Lisbon: Henrique Valente de Oliveira, 1656); Ibid, *Viridiarum Lusitanum in quo arborum fruticum et herbarum differentiae onomasti insertae* (Lisbon: Antonio Craesbeek, 1661).

[561] Margaret Riley, "The Club at the Temple Coffee House revisited," *Archives of Natural History* 33/1 (2006) 96.

[562] Grisley's petitions are from 1652 and 1657: ANTT, Registo Geral de Mercês, Mercês da Torre do Tombo, liv. 19, f. 402v-403, and AN/TT RGM, 325208.

5.5 Decontextualizations of the drug trade

The Anglo-Portuguese exchanges explored here were obscured by both confessional antagonism between Protestants and Catholics, as well as by emerging notions of racial difference. For instance, the manuscript copy of Lobo's treatises on Africa owned by the Royal Society identifies him by name and calls him a "learned Jesuit," and the members of the Society even decided to send the "good old Jesuit Heironymo Lobo" (as Southwell referred to him) a formal letter of thanks.[563] Yet when Lobo's work reached print in November of 1668 under the title *A Short Relation of the River Nile… and of Other Curiosities,* his name did not appear on the title page. Instead, the author was listed simply as "an eye-witness."[564] Although in his dedicatory epistle Wych did state that the manuscript was procured "by the curious Sir Robert Southwell from an inquisitive and observing Jesuit at Lisbon" who offered a "candid relation of Matter of Fact… and Naturall Curiosities," Lobo's identity had become anonymized, perhaps due to the Jesuit's fear of reprisals from either the Portuguese court or his own

[563] RSA, Journal Book of the Royal Society, Vol 3, August 10, 1668 and RSA, Classified Papers X (Botany), 1660-1740 Cl. P. 10, doc. 9, "Discurso das Palmeiras." Ines Zupanov and Ângela Barreto Xavier, in "The Quest for Permanence in the Tropics: Portuguese Bioprospecting in Asia (16th-18th Centuries)" *Journal of the Economic and Society History of the Orient* 57 (2014), 536 (which as far as I can tell is the only English-language scholarship on the topic) observe that a contemporary hand has added a note on this manuscript "to send [Lobo] some spectacles and perspective glasses." They interpret this as a sign that the Royal Society intended to gift Lobo with eyeglasses for degenerating eyesight, which is entirely plausible given his age, but considering the context and date I suspect this is in reference to a request of Lobo for materials for optical experiments, perhaps to construct a microscope. Hooke's *Micrographia*, after all, had come out just three years before and one suspects that Lobo would have been eager to take advantage of his new connections to the institution with which Hooke was affiliated.

[564] [Jeronimo Lobo], *A Short Relation of the River Nile… and of other curiosities written by an eye-witness, who lived many years in the chief Kingdoms of the Abyssine empire. Translated out of a Portuguese manuscript, at the desire of the Royal Society, by Sir Peter Wych* (London: printed for John Martin, 1669).

Order.[565] Even this carefully neutral packaging exposed the book to dismissal: an eighteenth-century British traveler to the same region of Ethiopia dismissed the author as "a lying Jesuit," Shepard Odell notes, "a phrase which in England in 1769 amounted to conclusive argument."[566]

Other Portuguese purveyors of natural knowledge came to be regarded as potentially suspect owing to anxieties about the purported propensity of the Portuguese to intermarry with local women. Though William Dampier relied on informants from the Portuguese world, he also cast doubt on their "purity" as Europeans. In the Philippines, for instance, he met a local informant, "entertained for the sake of his knowledge in the several Languages of these Countries," that Dampier apprehensively called "a kind of bastard Portuguese."[567] In the eastern Indian Ocean, likewise, Dampier mentioned a "mongrel *Portuguese*" who joined the crew. Captain Cowley wrote similarly in his own travel account that he encountered at the Ilha do Sal in the Cape Verde archipelago off the coast of Africa "five Men upon the Island, *viz.* 4 Officers and one Boy to wait on them: One being a Governor, who is a *Mullatoe*; two Captains and one Lietenant." To Cowley's eyes, "They were all black," but he noted that they "scorn to be counted any other than *Portuguese*; for if any Man call them *Negro's*, they will be very angry, saying, That they are white *Portuguese*."[568]

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[565] Lobo, *Short Relation*, ii.

[566] Sheperd Odell, *The Lore of the Unicorn* (Courier Corporation, 1930), 290. I note in passing that this is a delightful and remarkably erudite book that deserves to be better known.

[567] Dampier, *Voyages*, Vol 1, 407.

[568] See William Hacke's *A Collection of Original Voyages* (James Knapton: London, 1699), 43. John Fletcher's plays *The Sea Voyage* and *The Island Princess, or the Generous Portuguese* also contain interesting

In one of the most telling moments in Dampier's travels, a man on the same Ilha do Sal—which Dampier described as inhabited by "Portuguese *banditti*"— approached one of Dampier's crewmates with what he claimed was a lump of ambergris. As we saw in Chapter 1, early modern doctors attributed a number of compelling properties to this extraordinarily valuable substance, from an "alexipharmic" (anti-poison) power to the ability to intoxicate and cure melancholy. Dampier's crewmate was intrigued, and purchased the lump for "more than it was worth." "We had not a Man in the Ship that knew Ambergriese," Dampier confessed, "but I have since seen it in other places, and therefore am certain it was not right." True ambergris, as Dampier later learned, is "very hard," odorless, and "of a lighter color." Dampier realized that his friend had been tricked. The Portuguese *bandito* hadn't been selling ambergris at all. "Possibly 'twas some of their Goats Dung," the sea captain pondered.[569]

By the turn of the eighteenth century, some English authors were beginning to differentiate themselves more clearly from the Portuguese on not only a cultural but a racial level. Whereas in the 1630s British imperial theorists could see themselves as walking the same path to empire as the Portuguese, and in the 1660s British consumers adopted Portuguese tastes for tea and other Indies drugs, the anti-Catholic mania of late seventeenth century and early eighteenth-century England and its colonies had cast a pall

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references to Portuguese as intermediate figures between European and native. See also Anna Winterbottom: "Browne occasionally refers to local practioners borrowing from Portuguese customs, for example in their treatment of smallpox. Petiver and Browne, Vol. 6, specimen 234 (p. 1054), Tumba maraum or Carpa maraum Malab: 'I can't as yet learn that the Natives use this in Physick, except here and there one, who use it as an ingredient in the Cuddanee (which is Decotions for the Pox) which possibly they may have done in imitation of the Portuguese who do the same.'"

[569] Dampier, *Voyages*, 72.

on southern Europeans. The British-Virginian physician John Tennent's treatise on "Northern People" in "Southern Climates" equated the dangers of tropical nature and the dangers of southern European Jesuits. This segues into a discussion of one of Tennent's rivals, a "Quack" who "in *Paris* became posses'd of two *Arcana*, which he stiled his *Pill and Drop*." As Tennent put it suspiciously, "There are many Conjectures about his getting them, amongst which the most probable one is, that a *Jesuit* there communicated them to him."[570] The implication is that a Jesuit origin for the quack's "Arcana" would automatically invalidate them as proper medicines for "northern" bodies.

Gathering medical knowledge from the Portuguese world meant associating oneself with Catholics, mestizos, and indigenous groups: associations that threatened the scientific credibility of the Protestant natural philosopher. The solution to this problem was to tacitly maintain connections to the Iberian world (via merchant or missionary intermediaries) who could communicate firsthand knowledge and materials, but to allow the genealogies of this knowledge to drop out of the picture when it was presented to scientific/medical publics and to consumers – the stones made by Gaspar Antonio become merely "Antonios" or "stones" stripped of their specific pharmaceutical context but retaining an "Indies" origin that makes them fashionable in the changing medical marketplace of the time. [571] The Portuguese world was key to British natural knowledge, but it was also critical (from the perspective of British Natural philosophers) to obscure the origins of that knowledge.

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[570] Tennent *Physical Enquiries,* 29.

[571] On the role of credit and trust in the global drug trade see Harold Cook, *Matters of Exchange* (op. cit.)

A prime example of this process was the *Agua da Inglaterra* ("English water"), a proprietary remedy for tertian (i.e. malarial) fevers developed by Fernando or Fernão Mendes, a Portuguese-Jewish physician who travelled with Queen Catherine of Braganza to England as part of her courtly entourage.[572] The preparation was derived from Amazonian barks which (as we saw in Ch. 2) were ambiguously known as *quina* or *quinquinna* and held to be interchangeable with the Peruvian or "Jesuit's" bark (*Cinchona officinalis*). Although Peruvian bark commanded high prices, anyone who dared to sell so distinctly Jesuit-flavored a remedy in 1670s England exposed themselves to public scorn and suspicion. In his *Conclave of Physicians*, Gideon Harvey annotated Latin drug prescriptions with ribald commentary that compared the Indies drug-prescribing physicians of London to Jesuits, Cardinals, and Inquisitors. "Despair, despair, all is like to be lost. The Vessel is overloaden with Bark," Harvey wrote beneath one receipt that included quina, comparing the patient's body to an East India vessel. "The mischief is, there is no opening the hatches by a Purge, to let out the *Jesuit*."[573] The more charitably inclined John Evelyn speculated in his diary that the negative opinions surrounding quina arose "out of envy" among elite physicians because "it had been brought into vogue by Mr.

[572] Indeed, it is quite probable that it was Dr. Mendes who treated Catherine's "soar throat" upon her first arrival in England 1662, the illness that, according to one popular version of events, introduced the English court to tea. Mendes is a little-studied figure, appearing almost exclusively in the scholarship of the Portuguese historian of pharmacy Jose Pedro Sousa-Dias, especially his "A 'Água de Inglaterra' no Portugal das Luzes, contributo para o estudo do papel do Segredo na terapêutica no século XVIII," (Doctoral thesis, Faculty of Pharmacy, University of Lisbon, 1986).

[573] Gideon Harvey, *The Conclave of Physicians* (London, 1686), 106. On Harvey's decidedly unorthodox rhetorical strategy see Lynda Payne, *With Words and Knives: Leanring Dispassion in Early Modern England* (Ashgate, 2013), 30-32. Harvey, who had a wonderful way with words and a rather vivid imagination, continued: "Their immolations are celebrated chiefly in the Winter upon Dogs and Cats by the younger fry, and sometimes upon humane bodies performed by the Hangman, their subservient officer, which being conveyed to their Chauncel, the Cardinals in their turn hewing and slaying these Carcases like Cannibals."

Tabore, an apothecary."[574] Evelyn was referring to the treatment of King Charles II's 1685 "ague" (which led to his death) by an obscure young apothecary named Robert Talbor who employed the use of quina despite protestations by some physicians that it was a dangerous Catholic medicine.[575]

Although Mendes sent a now-lost set of *Reflexões sobre a virtude da água de Inglaterra* to the Portuguese crown in the early 1680s, the drug appears to have been popularized by João Curvo Semedo.[576] Curvo's most popular work, *Polyanthea Medicinal* (first printed in 1697) recommended the drug no less than seventeen times, and he included several case studies detailing the drug's success with patients in his later *Medical Observations of One Hundred Extremely Serious Cases*.[577] Semedo even reformulated the drug with a patriotic twist. Among the proprietary remedies that he dubbed the "Curvian secrets" (*secretos Curvianos*) and sold out of his house, Semedo included a remedy against "tertian" fevers that he called "Agua Lusitana," which he admitted elsewhere was a tweaked version of the formulation of Mendes.[578] Interestingly, although Mendes is almost entirely forgotten in English-language scholarship and didn't appear in any contemporary printed works by British physicians, Semedo seems to have regarded the

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[574] *Diary of John Evelyn*, Volume 2, pg. 334 Nov. 29, 1694. Although the apothecary was, he wrote, "reputed a Papist," Talbor was, in Evelyn's opinion, "in truth a very honest good Christian."

[575] Surprisingly little is known about Robert Talbor (or Talbot). See Rudolph E. Siegel and F. N. L. Poynter, "Robert Talbor, Charles II, and Cinchona: a Contemporary Document," *Medical History* 6/1 (January, 1962), 82-85 for a short overview with a transcription of a fascinating primary source.

[576] Pedro Sousa Diaz mentions this memoranda, of which I have been able to find no other archival traces.

[577] João Curvo Semedo, *Observaçoens Medicas Doutrinaes de cem Casos gravissimos* (Lisbon: Antonio Pedrozo Galram, 1708), 440, 513, 582.

[578] Semedo, *PM*, 587.

Jewish physician as something of a medical celebrity.[579] In a characteristically self-aggrandizing ten-page "Manifesto… directed at lovers of health" that apparently circulated as a pamphlet in Lisbon and was also often bound with Semedo's other medical works, Semedo defended his choice not to reveal the Curvian secrets because he was not yet as famous or rich as Fernão Mendes:

> To those who complain that I have not revealed the composition of my sixteen secrets, as certain other Physicians have revealed their own: I reply that while it is true that they have revealed them, they only did so after being rewarded with great honors and praise: for instance Fernão Mendes, for revealing his *agua das cezões* [a synonym for Agua de Inglaterra] the Kings Dom Pedro II of Portugal and Louis XIV of France gave him sixty thousand cruzados.[580]

Semedo, however, appears to have been mistaken. Although Mendes may have received a cash gift from Pedro II, it was the more famous Englishman Robert Talbor—and not Mendes—who the Sun King showered with riches and renown.[581] Today, Mendes is forgotten, whereas the colorful Talbor tends to have a prominent walk-on part in the numerous popular histories of malarial fevers, quinine, and tonic water.[582]

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[579] Mendes's children are actually better known in Anglophone scholarship than he is, because they became wealthy jewel merchants who played an important role in eighteenth-century London's Sephardic community. M. Woolf, "Foreign trade of London Jews in the seventeenth century," *Transactions of the Jewish Historical Society of England*, 24 (1970–73), 38–58, Moses Gaster, *History of the Ancient Synagogue of the Spanish and Portuguese Jews, the Cathedral Synagogue of the Jews of England, Situated in Bevis Marks* (London, 1901) 96-98.

[580] João Curvo Semedo, "Manifesto que o doutor Joam Curvo Semmedo, Medico, morador em Lisboa, faz aos amantes da saude," (Lisbon, 1708?) a pamphlet bound with João Curvo Semedo, *Observaçoens Medicas Doutrinaes dem cem Casos gravissimos* (Lisbon, 1708).

[581] The only confirmation of Pedro II's gift I have been able to find is a passing, uncited mention in a Portuguese medical lecture from the 1930s, so even this claim is somewhat suspect: Alvaro Guimarães de Caires, "Esbõço Histórico da Medicina dos Portugueses no Estrangeiro" in *Cursos e Conferências, Volume I, Boletim da Biblioteca da Universidade de Coimbra* (Coimbra, 1935), 57.

[582] See for instance Christopher Hamlin, *More Than Hot: A Short History of Fever* (Baltimore: John Hopkins University Press, 2014), Richard Barnett, *The Book of Gin: A Spirited World History from Alchemists' Stills and*

What exactly is going on here? In truth, neither Talbor or Mendes can be credited with any major innovation. Quina bark taken as a powder was already in wide use as a treatment for tertian fevers in Europe by the 1650s and 1660s. What made the Agua de Inglaterra and Talbor's "English remedy" different is that both preparations called for the bark to be infused in wine or spirits. Because quinine, like many alkaloids, is soluble in alcohol, this practice likely increased the bioavailibity of the drug and gave it a longer shelf life. But this was hardly a stroke of genius: infusing a plant-based remedy in spirits or wine was, after all, arguably the most common preparations used by early modern apothecaries. An anonymous flyleaf annotation by a French nobleman who claimed to have taken the cure direct from Talbor in Flanders described him as "a very poor man" who had simply administered a "powder steeped in a large glass of white wine." The annotator added: "It was very surprising to find out that it was nothing more than Quinaquina well disguised... One cannot imagine the confusion of the King's physicians, whom he had made great fun of, as was his way."[583]

Talbor's rhetorical flourishes were in fact more original than his cure: in his book *Pyretologia* (1672), the apothecary wrote mysteriously of his remedy containing "three Herculean Medicines," each "requring twelve... labors in their preparations" and shrewdly warned his readers away from "Jesuits Powder... for I have seen most dangerous effects

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Colonial Outposts to Gin Palaces (Grove Press, 2012), Walter Sneader, *Drug Discovery: a History* (London: Wiley and Sons, 2005), and Henry Hobhouse's truly abysmal chapter on cinchona in *Seeds of Change: Five Plants That Transformed Mankind* (London: Counterpoint, 1985).

[583] Contemporary flyleaf annotation in a copy of Leclerc's *Histoire de la Médecine* (Paris, 1702), transcribed in Siegel and Poynter "Robert Talbor," (op. cit.)

follow the taking of that Medicine."[584] As this move suggests, Talbor intentionally obscured the fact that his recipe actually depended on consuming very large quantities of "Jesuit's powder," and this fact only became widely known in the final year of his life, when his so-called *remède Anglois* was published—initially at the behest of Louis XIV and thereafter by a number of printers capitalizing on the cure's popularity—in a confusing profusion of editions attributed to at least four authors.[585] The historian of pharmacy José Pedro Sousa Dias argues that Mendes then adapted his recipe for Agua de Inglaterra from this printed source.[586] Yet Talbor was clearly drawing upon Iberian texts and materials when he formulated the cure, and Mendes' position as one of the royal physicians who were Talbor's publicly-declared enemies raises the possibility that the reverse was true. It is entirely possible that Talbor obtained knowledge of quina from Mendes or perhaps another émigré Iberian physician, then appropriated it as a secret preparation sold, not by a Catholic foreigner, but by a homegrown Anglican apothecary. It would not be the first, and certainly not the last, time that a controversial drug was

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[584] Robert Talbor, *Πυρετολογία, a Rational Account of the Cause and Cure of Agues; whereunto is added a Short Account of the Cause and Cure of Feavers*, (London, 1672).

[585] Nicolas Blegny, *La Découverte de l'admirable remède anglois pour la guérison des fièvres* (Paris: C. Blageart and L. d'Hourry, 1680) and François de Monginot, *De la guérison des fièvres par le quinquina* (Paris, 1680). The book history of the various treatises purporting to reveal Talbor's secret is maddening complex, and seemingly misrepresented in almost all existing scholarship: although it is (as far as I can tell) universally claimed that Talbor's remedy was published posthumously, the first editions of the two books cited here actually appeared a year *prior* to his death in 1681. This error may, perhaps, be caused by the fact that both books went into multiple editions in 1681 and these later printings are more commonly held by libraries.

[586] José Pedro Sousa Dias, "Jacob de Castro Sarmento (1691-1762) e a conversão à ciência moderna," in C. Pinto-Correia, *Primeiro Encontro de História das Ciências Naturais e da Saúde* (Lisbon: Shaker Verlag/Instituto Rocha Cabral, 2005), 55–80; José Pedro Sousa Dias, *A Água de Inglaterra: Paludismo e Terapêutica em Portugla no Século XVIII* (Caleidoscópio, 2012).

"rebranded" in this way.[587]

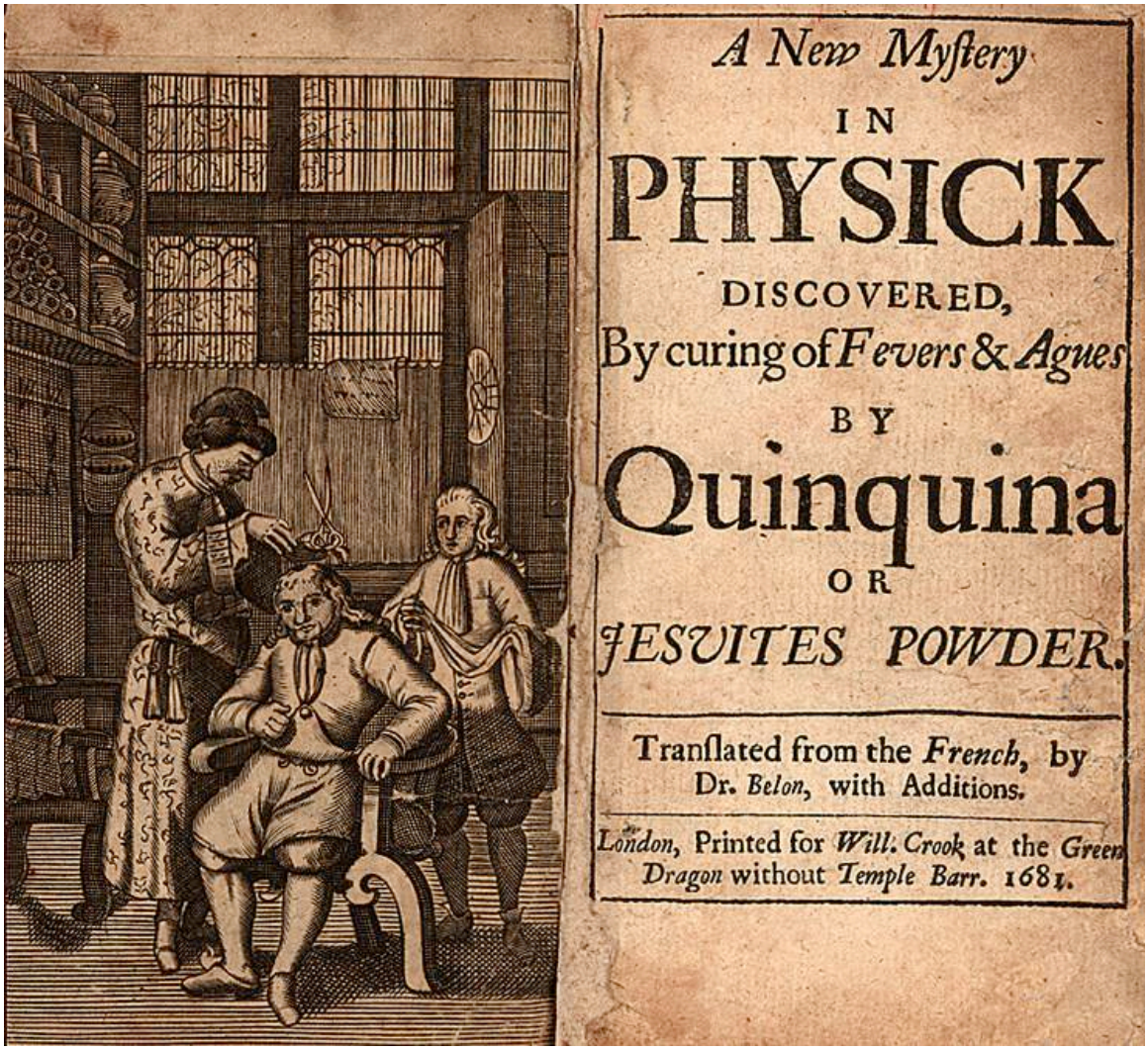

FIGURE 5.6 The baffling frontispiece engraving adorning the English translation of one of several quina-promoting books that Talbor's famous treatment of Louis XIV inspired in 1681, which seems to depict a barber in an East Indies or Chinese locale, despite the drug's South American origins. Courtesy of the John Carter Brown Library.

In Portugal, likewise, it was not Mendes but the more well-connected physicians João Curvo Semedo and, still later, the Royal Society member Jacob de Castro Sarmento

[587] As Patrick Wallis has noted, these sorts of late 17th century advertisements for proprietary drugs and medicines were actually among the first instances of "true" branding – in the sense that they advertised commercially sold products in mass market periodicals.

who would transform Agua de Inglaterra into the blockbuster patent remedy which it became in the eighteenth century.[588] The mingled character of the "English water"—which combined a tropical drug from the New World with the canny drug marketing of the empirics—stands as an excellent example of the confused character of the early modern drug trade. These remedies were made possible by the interpenetration of empiricists in London with the farflung exchange networks and access to tropical resources of the Iberian empires, but tracing these hidden origins was a task almost as difficult as discerning the "occult virtues" that gave them power.[589]

5.6 Conclusion: from apothecaries to pharmacies

Reflecting on a lifetime's study of drugs shortly before his death in 1760, a septuagenarian Scottish professor of botany and pharmacy named Charles Alston observed that a student of the materia medica could read treatises "on mercury, iron, antimony; on the balsamum, cortex, opium; on the vipera, bezoar, moschus, and hundreds of others," and never reach the end of them, "though he should read nothing else all his days."[590] Yet it seems to Alson that even as the texts related to drugs increased,

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[588] In 1936 a scholar named Augusto d'Esaguy noted that the Agua de Inglaterra "can be found in all Pharmacopoeiae published between the years 1681 and 1821" and speculated that the remedy was 'the most widely prescribed drug of its time.' "Agua de Inglaterra," *Bulletin of the Institute of the History of Medicine*, 4, 404-8, 1936. However, beyond the work of Jose Pedro Sousa Dias, the drug has attracted scant scholarly attention in more recent scholarship.

[589] See *Medicina Lusitana, soccorro delphico, a os clamores da naturesa humana* by Francisco da Fonseca Henriques, 1731 for over 20 mentions of quina quina and "Agoa da Inglaterra."

[590] Charles Alston, *Lectures on the Materia Medica: Containing the Natural History of Drugs, their Virtues and Doses*, 2 vols (London and Edinburgh: Printed for Edward and Charles Dilly and A. Kincaid and J. Bell, 1700), vol. 1: 1.

the *practice* of drugs remained mired in falsity and faddish pronouncements without real merit. "Although of late very great improvements have been made in every other part of medicine," he complained,

> Yet the Materia Medica, one of the most useful parts of it, has been too much neglected, and continues to be over-run with errors… antient prejudices and mistakes being adopted by the most modern writers, and not a little improved by pretended experiments, or real experiments misapplied… Hence we find poisons considered as antidotes; substances of no efficacy, as universal remedies; numberless specifics, catholicons, arcanums.[591]

Yet for Alston, the greatest ill was the "changeable" nature of the drug trade. "Have we not seen new pretended remedies blaze like comets for a few months, and then disappear," he asked? And even "a standard Pharmacopaeia, composed by one of the most learned bodies of physicians in Europe in 1619" suffered not simply from egregious errors of fact, but from this quack-like drive to repackage old drugs in new guises, to make ever bolder claims of efficacy. By Alston's count, at least seventy-four of the prescriptions in the original 1619 pharmacopea had been "changed for new ones without any necessity," despite being "of the same virtues with the old."

It is striking, in this regard, to compare Alston's lament to Semedo's over the top encomium to medical novelty a half century earlier. "The operations which we devise with modern Artifices," Semedo enthused, "are beauties that the Ancients could never reach." Conjuring a hypothetical crowd of carping critics (as he was prone to do), Semedo proceeds to demolish their objections:

> It would be a species of malevolence to deny the progress of Medicine,

[591] Alston, *Lectures on the Materia Medica*, I: 2.

> when with every day it advances yet further… let us consider the great difficulty that the most eminent Masters and Physicians of ancient times confessed to in curing *Hydropesias Timpaniticas*, or hysterical colics, or Rheumatisms. These days we know they these diseases can be most efficaciously cured with donkey milk. Let us consider too the fluxes of arterial blood that the Oracles of Medicine judged incurable: today they are cured easily by Cyprian green vitriol. Or let us turn to the excessive fluxes of blood that sometimes befall the lower parts during menstruation, or in dysentery, that anciently were so formidable, but which today we approach without fear, since there has been invented a secret, which I will give for free to the poor and sell to the rich.[592]

Semedo gives these examples, he adds, simply to prove that future physicians "on a curious quest can discover yet more new medicaments, which our ancestors the Medical Masters not only didn't discover, but couldn't even dream about."[593] One gets the impression that Semedo would have made a fantastic mountebank. But he wasn't exhorting spectators: this speech is buried on page 583 (treatise two, chapter 108) of a massively erudite tome written by the physician to a king. Semedo was not a quack: he was a proponent of the new learning, a chemical physician, a natural philosopher, a man of commerce. And he was proud of it.

Contrasting an Enlightenment Scottish professor's complaints about new fads and experiments with a rousing defense of modernity written by a licensed physician in Baroque Portugal is, one might say, historiographically jarring. This is not the narrative one finds in textbooks and survey courses, or indeed in the specialist literature. The connections studied here contest many assumptions held by historians of early modern science and medicine regarding the Northern European origin of Iberian medical and

[592] Semedo, *PM*, 583.
[593] Semedo, *PM*, 584.

scientific knowledge in this period. Portuguese historiography has tended toward an overly unidirectional model in which "enlightened" medical and scientific knowledge is seen to flow from *estrangeirados* (foreign-educated intellectuals) in France, Britain and the Netherlands to a moribund Portuguese periphery. Ana Simões, for instance, maintains that medicine and science in Portugal was "typical of peripheral countries" in that "the emphasis was not on the production of knowledge but rather on the reproduction and propagation of novelty." Simões regards "modern ideas" about science as emanating from urban centers of northern Europe such as London, Paris and Leiden.[594] Timothy Walker's book *Doctors, Folk Medicine and the Inquisition: The Repression of Magical Healing in Portugal during the Enlightenment* (2005), the most carefully-researched investigation of early modern Portuguese medical culture to date, breaks from this consensus by trying to provide "a revised view of Portugal's alleged scientific backwardness" that takes into account the international connections of Portuguese physicians and surgeons and the cosmopolitan nature of their scholarly inquiries.[595] Despite this, however, the book still portrays Portuguese doctors and medical practitioners as battling against a retrograde medieval Galenism centered around the Jesuit-led University of Coimbra in order to gain access to "the innovative ideas emanating from centers of learning in northern Europe."[596]

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[594] Simões et al, "Constructing Knowledge," 35.

[595] Walker 151. This point holds especially true for the New Christian physicians of the early eighteenth century, especially Jacob de Castro Sarmento Isaac de Saquera Samuda, with their close connections to London's Jewish community. See Mário Sérgio Farelo, "On Portuguese Medical Students and Masters Travelling Abroad: an Overview from the Early Modern Period to the Enlightenment" in *Centres of Medical Excellence?: Medical Travel and Education in Europe, 1500-1800*, Andrew Cunningham et al, eds. for a further discussion of medical travellers in early modern Portugal.

[596] Walker 97, 102. On page 119, similarly, medical "innovation" is described as "flowing into Portugal from

More recently, Zupanov and Xavier conclude a compelling recent article about Portuguese bioprospecting in Asia with the disappointingly simplistic assertion that "Portuguese intellectuals recognized the backwardness of Portuguese science and tried to imitate the institutions and practices existing abroad."

Scientific knowledge has, in short, been conceptualized by historians as pre-formed "packets" of information from Britain, France and the Low Countries that reached Portugal via translation, reproduction and propagation on the part of enlightened Portuguese travellers fleeing the backwardness of their native land.[597] The Royal Society, as the pre-eminent scientific institution of the era and the publisher of the influential *Philosophical Transactions*, emerges in existing scholarship as one of the most important conduits of empiricism for such Portuguese intellectuals.[598] It is true that by the mid-eighteenth century the Portuguese state (now under the control of the Anglophilic Marques de Pombal) made concerted attempts to reform Portuguese medicine along

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northern Europe."

[597] I write about the "packet" metaphor for thinking about flows of information in early modern networks in Breen, "No Man Is an Island," 391-417. I find it useful because it leads us to reflect on how contemporary understandings of networks (such as the "network packets" that comprise our contemporary telecommunications) implicitly shape our use of the word in an early modern context. I would argue that the current scholarly fascination with networks emerges directly out of the rise of the Internet in the last two decades, and that we run the risk of conflating early modern knowledge networks (which were fragmentary, improvisational, amorphous, disaggregated, dangerous, and hugely unpredictable) with their contemporary digital counterparts. By focusing on the flows of key texts and ideas—Cartesian corpuscularianism, say, or Newton's *Principia*—from one city or nation to another, we implicitly employ metaphors like the network packet or the "Delta airlines flight map" (as one member of Stanford's Mapping the Republic of Letters project described the sorts of simplified "two points and a line" maps employed by both that project and my own work).

[598] See Walker ch. 3, Ana Simões et al, "The Scientific Revolution in Eighteenth-Centur Portugal: the Role of the *Estrangeirados*," Rómulo de Carvalho, *Portugal nas Philosophical Transactions no séculos XVII e XVIII* (Coimbra: Tipografia Atlântida, 1956); Gonçalves Rodrigues, "A correspondência científica do Dr. Sachetti Barbosa com Emmanuel Mendes da Costa, Secretário do Sociedade Real de Londres," *Biblos*, XVI (Lisbon: 1938).

empiricist lines originally articulated by British, French and Dutch scientists and physicians. Yet a close attention to the medical and pharmacological aspects of this very empiricism, especially in the context of the early Royal Society, reveals a surprising twist: some of this "Northern" innovation was in fact a result of exposure to natural knowledge from the Portuguese tropics.

The examples cited here are fragmentary, but they demonstrate the entangled nature of pharmaceutical and medical knowledge between the empires that Charles and Catherine joined together. Robert Boyle eagerly collected, experimented upon and wrote about *drogas* from Brazil, Africa, and Goa; Henry Oldenburg solicited the botanical knowledge of a Jesuit in Brazil; philosophical travelers from Bowrey to Dampier relied at every turn on the local knowledge of Lusophone creoles and *mestiços*. British medical consumers eagerly sought out 'stones' that were the invention of a Jesuit apothecary in Goa, while a Portuguese Jewish physician's tinctures of South American quina emerged as a cure fit for kings.

This was an age of secret recipes, concealed guild knowledge, and rampant adulteration of medicines and samples.[599] Robert Boyle, with his passion for unexpected natural phenomena, attempted to defend apothecaries and drug merchants who adulterated their wares by suggesting that we might view these unknown quantities almost as inadvertent experiments: "Sometimes a seemingly improper addition may not

[599] Daniel Margócsy's *Commercial Visions: Science, Trade, and Culture in the Dutch Golden Age* (Chicago: University of Chicago Press, 2014) adds an interesting new dimension to this story by stressing the degree to which natural philosophical curiosities like *Wunderkammer* and rare botanical samples were commercialized, for instance by charging entrance fees or exchanging dedications for cash gifts.

only correct, but give new and unexpected virtues to a drug," Boyle pointed out.[600] An emphasis on the tropical and Iberian pathways of the drug trade rather than a traditional Republic of Letters framework shows that a vision of Boyle as a rational chemist seeking to abolish medieval or Aristotelian "occult virtues" and purify the debased practices of apothecaries and drug merchants is overly simplistic.[601] Like the hidden virtues in Boyle's drugs, the connections explored here were ever-shifting and difficult to quantify, but were productive of scientific knowledge as well as scientific confusion. Unstable and unreliable as they were, the exchanges between natural philosophers, apothecaries and drug merchants in the British and Portuguese worlds—operating both within and outside of the traditional Republic of Letters model—played an important role in turning drugs from curiosities and commodities into objects of scientific interest. By the middle decades of the nineteenth century, using methods not dissimilar from those of Boyle, chemists could perform mass extractions of quinine and repackage it as a pill or clear liquid (or, indeed, a cocktail) rather than a suspicious bark. The first step in this process was the Agua de Inglaterra: a reformulation of an Indies drug not only on the level of process (from powdered root to infusion in spirits) but, perhaps more importantly, a transformation of an indigenous botanical into a proprietary remedy with a memorable brand name. The ultimate result of this process, two hundred years down the line, was the

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[600] Robert Boyle, *The Advantages of the Use of the Simple Medicines*, in *Works*, 118.

[601] Marie Boas Hall wrote, for instance, of Boyle as attempting to "convert Aristotelians to the possibilities inherent in rational explanations for what were to them 'forms and qualities', occult because inexplicable." Although Boyle was certainly anti-Aristotelian in outlook, this does not necessarily mean that individuals like Boyle regarded the study of occult qualities or virtues in natural products as incompatible with rational explanations. Marie Boas Hall, "Boyle's Method of Work: Promoting His Corpuscular Philosophy," *Notes and Records of the Royal Society of London*, 41: 2 (Jun., 1987), 111-143.

formation of a truly massive industry, as well as a revolution in the epistemology that undergirded drug-taking. From a chaotic world of stuffed alligators and Venetian treacle, curiosity cabinet-like shops and enslaved plantation laborers, we now begin to approach the pristine sterility and mass-market promises of the pharmacy.

CONCLUSION

An Early Modern 'Invention of Drugs'?

> Suppose an Apothecaries shop were furnish't with exquisite drugges, yet if the boxes want names for direction, or there want a Physitian to prescribe the medicine; it is to be feared, that in such a confusion, poison should be taken for cordials.
>
> —GODFREY GOODMAN, 1616

> Chemistry has opened abundant treasures for the purpose of medicine. The Materia Medica has regularly received attention, and alteration, as that science has advanced; and has scarcely retained any thing but [Peruvian] Bark and Opium, which the vegetable kingdom can call its own. The utility of botany in physic, appears to correspond, in an inverse relation, with the labour that has been bestowed upon it.
>
> —BENJAMIN MOSELEY, 1789

> Who will ever relate the whole history of narcotica? It is almost the history of 'culture,' our so-called higher culture.
>
> –NIETZSCHE, *THE GAY SCIENCE*

6.1 Introduction: bodies of knowledge

Two well-dressed figures stand before a wall of shelves stocked with drug jars bearing labels like *Modestie*, *Raison*, and *Memoire*. One is pouring a potion marked *Sagesse* (wisdom) into the opened mouth of a seated figure who grips the pourer's arm uneasily. Below, court jesters wearing fool's caps tumble into a bedpan. To the right of these two—leaning in front of a distillation apparatus, a mortar and pestle, and a lengthy medical receipt pinned to the shelf—is a figure whose pose brings to mind a bread baker. But this is no *boulangier* sliding loaves of dough into a wood oven: it is an apothecary pushing a man on a long board into a distillation furnace. Above, the *phantasies* that had filled this foolish man's head emerge as the rarified quintessences of distillation: horses, backgammon boards, armor, pantaloons, women, swords, theater masks, flowers, hunting dogs, and, unaccountably, a monkey brandishing a walking stick. An accompanying bit of

doggerel takes the voice of a mountebank, inviting all who read it to cure their foolish humors with the same unorthodox methods:

Aprochez vous qu'avez la teste pleine	You, come here! Your head's constrain'd
de phantasie, qui vous met en grande peine	With fantasies, that make you pained:
assurez vous de ce Maistre sçavant,	Of this sage Master, one can't deny
quil voz humeurs seicherat tellemant,	That he will have your humours dry
dedans ce four, qu'aurez en peu de temps,	In no time flat, within his furnace—
grand allegeance de beaucoup de torments,	Great allegiance of many torments—
aussi serez purge per ses brevages	So too, he'll purge with healing potions
qu'incontinant deviendrez du tout sages.	That can make the foolish cogent.

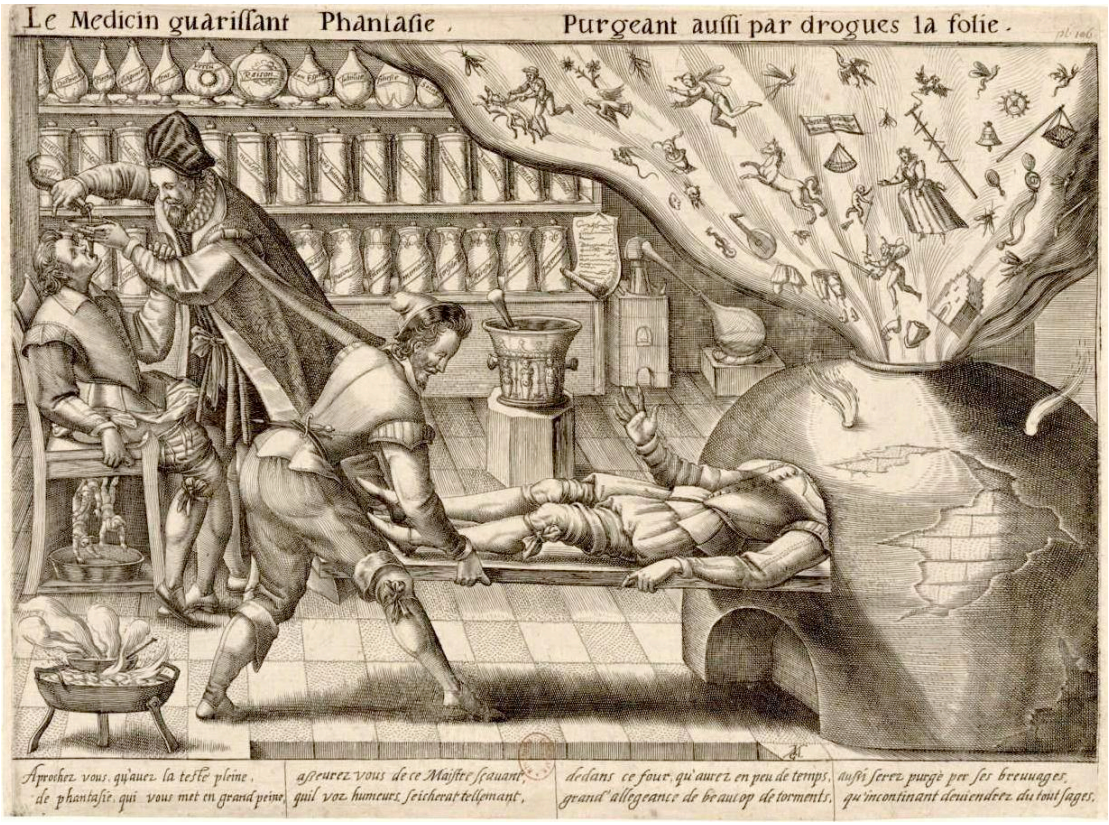

FIGURE 6.1 "The doctor cures fantasy, and also purges folly with drugs." Mattheus Greuter, (Paris?, 1620), via Gallica/Bibliothèque nationale de France.

It is a hallucinatory and potentially nightmarish scene, but a popular one: at least seven variations of this image appeared in the first half of the seventeenth century, in four

languages.[602]

One German version offered an expanded caption in the voice of one Doctor Wurmbrandt (Wormburner), who implores, "trust me to bring you back to your right mind" when you suffer from "wild imaginings as when… having become quite drunk… you are conscious of nothing, whether you are a man or woman."[603] The cure is effected not by phlebotomy (who Wurmbrandt professes to deplore) but by the new chemical arts: a still worn over the head produces a kind of cognitive vapor—bat, dagger, backgammon set, a woman, dueling pistols—that sublimates into the air and leaves the patient freed from psychological distress. It's a startlingly strange image, but also one that would have had an obvious metaphorical resonance for early modern Europeans versed in the notion of the human body as microcosm. If illnesses are indeed caused by fermentations of the blood, poisonsous corpuscles, or malignant humors, then why not move from distilling drugs to practicing medical chemistry directly on the human body itself?

One goal of these prints, of course, is simply to poke fun at the rising fortunes of apothecaries and chemical physicians, the sorts of *nouveau riche* and pedantic figures we encountered in chapter one. But they are also expressions of fascination with the rise of chemical medicine and of exotic drugs, which promised not only to cure existing diseases

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[602] Other versions include two English-language prints that add a gentleman and a woman holding a squirrel on a leash to the scene, an earlier German edition (c. 1600) also by Matthaus Greuter, and early two versions by Theodor de Bry, as well as another German-language version which identifies the healer as Doctor Wurmbrandt (worm-burner). See Antony Griffiths, *The Print in Stuart Britain* (London: Published for the Trustees of the British Museum, 1998), cat.91. The engraving also served as the model for a painted sign that survives in the Musée Rolin in Autun, France, which originally announced the wares of a 17th century apothecary shop at 20 Grand Rue Chauchien, Autun. See Jacqueline Vons, "Le médecin guarissant phantassie, purgeant aussi par druges la folie," in *Histoire des sciences médicales* 44: 2 (2010): 121-129

[603] Translation from Sander L. Gilman, *Seeing the Insane* (Lincoln: University of Nebraska Press, 1982), 42.

but, potentially, to augment the human mind and spirit. As we have seen, Robert Boyle's list of the *desiderata* he expected future natural philosophers to create included drugs to obviate the need for sleep and cure the mad, and Hooke was already speculating around the same time that *bangha* could "be of considerable Use for Lunaticks."[604] These images reflect the larger dichotomies surrounding drugs: between fear and fascination, the familiar and the exotic, the physical and the mental, the social and the internal.

They also, it seems to me, point to a dichotomy that has run throughout his work, which has tended to group together iatrochemical methods with the rise of what I have called "Indies drugs," or *materia medica* from the tropical world. Both were exotic new arrivals on the medical scene in the seventeenth century, and they were closely entangled as a result. But the dual acts of the two physicians in these images—the purge of toxins from the guts on the left, and the sublimation of the mind on the right—seem to suggest the beginnings of a divergence as well. In early seventeenth century, when these prints proliferated, the new chemical physicians were objects of ridicule and suspicion. Yet the natural philosophical basis for chemical medicine—its performance in an emerging Republic of Letters framework, its royal patronage and expanding prestige via publications like the *Philosophical Transactions*—ultimately gave it an aura of legitimacy that the commerce in tropical drugs like quina, bezoar, or guiacum lacked. It may be a harbinger of the divergence to come that whereas the purgative drug administered in

[604] See Chapter Five, refs. 15 and 81.

these images induces that most animalistic of all human functions, the distillation apparatus performs something sublime, surreal, almost miraculous.

These images lead us toward a key question arising from this dissertation: how did the early modern roles of drugs studied herein transform, in the nineteenth and early twentieth centuries, into the "modern" division of drugs into distinct legal and illegal categories? In the closing pages of "Tropical Transplantations," we will survey the role of drugs in Enlightenment thought, and in subsequent scholarship that builds on post-Enlightenment understandings of drugs as psychoactive and addictive. Finally, I will close with some thoughts on the big-picture significance of the scholarship presented here and suggestions for future research questions that might extend and contest it.

6.2 Theorizing drugs and the body politic

"A poet," wrote Arthur Rimbaud at the age of seventeen, "makes himself a visionary through a long, boundless, and systematized derangement of all the senses."[605] Rimbaud's generation were not strangers to psychoactive drugs, and the young poet surely had substances such as hashish, opium, and absinthe in mind when he penned his famous ode to a particularly tortured form of creative expression. But he also evoked the language of alchemy: the visionary "searches himself," Rimbaud wrote, "he consumes all the poisons in him, keeping only their quintessences." By the nineteenth century, the "passions" aroused by drugs had become celebrated in some quarters as part of a larger

[605] Arthur Rimbaud, Letter to Paul Demeny, Charleville, May 15, 1871, in Louise Varèse, trans. *Illuminations, and Other Prose Poems* (New York, 1946), xxx.

Romantic vogue for the exotic, the impassioned, the non-rational. Already by 1798, Kant was denouncing the mob-like and irrational "enthusiasm" of revolutionary crowds as resulting from a "derangement of the senses."[606] Significantly, however, the word *derangement* appears to have first appeared in late seventeenth-century French descriptions of chemical medicine, where it described "disorganized" particles like the corpuscles of blood in a sick patient or the skin of a rotting fruit.[607] The "derangement" of Kant's age evoked the madness of revolutionary mobs, or, perhaps, the opium-inspired visions of Shelley, Coleridge and Keats (who was in fact a licensed apothecary). But in the seventeenth century, *derangement* was the province of corpuscular theories of the body, like the distillers of fools' "phantasies" depicted in Figures 6.1 and 6.2—or, by metaphor, of indigenous spirituality. The French Jesuit Lafitau, for instance, wrote that the Algonquian peoples of New France "do prejudice to truth with their ignorance, superstition and corruption," which collectively cause a "derangement" in their minds that puts them in opposition to true religious faith.[608]

In *Matters of Exchange*, Harold Cook convincingly argues that many seventeenth-century Dutch leaders believed they "had become rich and powerful" by successfully organizing their "passions" into an objective and commercial framework:

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[606] Immanuel Kant, "Anthropology from a pragmatic point of view" (1798) in Robert B. Louden (trans.) *Anthropology, History, and Education* (Cambridge: Cambridge University Press, 2008).

[607] One of the earliest usages of the word I've found is in a review of a work of medical chemistry in *Le Journal des Sçavans* (15th book, Amsterdam, 1687) which describes an alchemical transformation as "un derangement des parties qui s'unissant avec les sels corrosifs" (65). As Furetière's *Dictionnaire universel* (1690) defined it, derangement was "a change that troubles the order and the disposition in which things had been arranged. The Opticians say of the change of color which comes to a rotten fruit, that it arises from the derangement of its particles" (n.p.).

[608] Joseph-François Lafitau, *Moeurs des Sauvages Amériquains* (Paris, 1724) 109-10.

> It was, then, not simply their passions but the placement of passions within a system of political relations that shifted history in certain directions, one sign of which was material betterment for many of those absorbed into the rapidly growing monetary economy. Another sign was the increase in knowledge about objects, the objectivity of natural matters of fact.[609]

Yet not all natural knowledge from the non-European world could be successfully converted into "matters of fact," and not all early modern drugs were amenable to a globalizing market economy or to the political economy of empire. Some, indeed, might produce *derangement* in the early modern sense of the word. If a drug was psychoactive, or addictive, or entangled with "heathen" practices, the disordered passions it aroused threatened both individual reason and the governance of the state.

The "distillation of fantasy" engravings that proliferated in the seventeenth century speak to the ambiguous role of novel drugs and chemical medicines as simultaneously contributing to the rise of global trade while also threatening to damage not only physical, but also mental and societal well-being. The Dutch engraver Theodor de Bry's 1597 depiction of a "Stultorum medicus" (physician of fools) appears to have been the ur-image that inspired the later French, Dutch and English versions of the engraving (Figure 6.2).[610]

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[609] Cook, *Matters of Exchange*, 408

[610] The first edition of the engraving appeared in 1597, in Thodor de Bry and Johann Israel, *Emblemata saecularia, mira et iucunda varietate saeculi huius mores ita exprimentia* (Frankfurt, 1596).

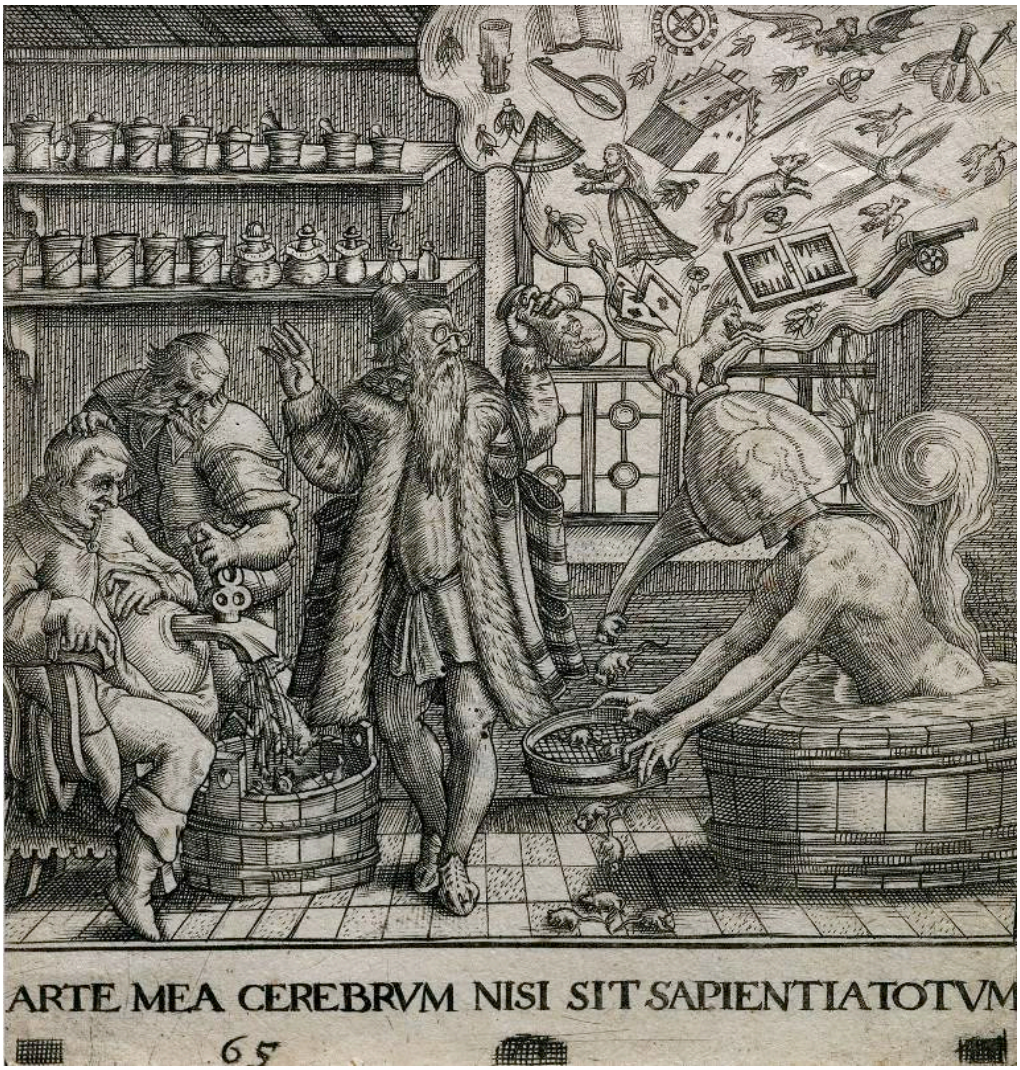

FIGURE 6.2 "My art could be all knowledge—besides wisdom." Thodor de Bry and Johann Israel, *Emblemata saecularia*, (Frankfurt, 1596).

The caption (freely translated) reads, "My art could be all knowledge, besides wisdom," while an accompanying Latin epigram pokes fun at the boasts of Paracelsan physicians, who achieve

Quod non Hippocrates,	What neither Hippocrates
no noverat ante Galenus,	nor Galen ever attained:
Arte mea cerebri	with my art I retrain
fatuos incido meatus	the paths of fools' brains.

In this rendition, the fool at left is being mechanically purged of the fermentations in his stomach by means of a faucet. Why?

As we have seen, a frequent charge lobbed against drug merchants and apothecaries was that they sold noxious substances that produced what one Jacobean wit called "civil wars and insurrections in the state of my stomach."[611] But the selling point of many Indies drugs, from powerful laxatives like ipecacuanha to "blood purifiers" like quina, was that they expelled toxic matter and balanced the fermentations within the body. As the Brazilian unlicensed physician João Cardoso de Miranda put it, "the Moderns" had demonstrated that all agues and fevers were caused by "fermentations and acidic juices that are transmitted to the blood and perturb the body's natural economy."[612] This could lead to a "souring in the brain" and "blockage of the nerve fluid" that gave rise not only to fevers and scurvies, but to madness, melancholy, and idiocy. Likewise, the Dutch-educated physician and writer John Mandeville linked an improper balance of "Stomachiack Ferment" to the reasoning faculties, since the brain consumed the "finer particles" involved in digestion.[613]

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[611] This is a quote from the anonymous play "The Family of Love" (attributed to Thomas Middleton) discussed in Chapter One (see ref. 113).

[612] Cardoso de Miranda, *Relação*, 111-2 He described these "Moderns" as the Paracelsans van Helmont and Ettmuler and "the Cartesians [Francisco] Sylvius, [Thomas] Willis, Martin Martines, and others."

[613] Hal Cook, *Matters of Exchange*, 400. Cook's contextualization of Mandeville's thought points to the multiple strands that converged toward the end of the seventeenth century to constitute this fermentation-based conception of health, from Paracelsianism and Van Helmont to Sylvius on acids and alkalis and Cartesian corpuscularianism to the teachings of Hermaan Boerhaave and the works of Dutch and Italian anatomists. Medical practitioners in the Portuguese tropics were attempting to participate in this larger, medical Republic of Letters framework: Cardoso de Miranda's citations of all of the figures mentioned here point to his integration of a pan-European discourse about tropical natural knowledge, exotic drugs, and the etiology of diseases into his clinical practice among African slaves in Bahia.

In short, the proper application of drugs and medical therapies influenced not only the physical health of patients, but the maintenance of their reason and, consequently, the overall well-being of the body politic. The English translator of a French treatise on Talbor's cure for malaria, for instance, expressed his sarcastic hope that Louis XIV would

> learn from the prudent Conduct of Englands King (if it be not too hard to be imitated) the Royal Secret of stopping the Ague-fits of the State, occasioned by the Fermentation of corrupt and seditious humors in some of the Noble parts, and in the lower regions of the body Politick, and curing the Distemper without much Purging and Blood-letting.[614]

As many medical authors pointed out, the heat of the tropical belt greatly increased this danger of the "fermentation" or "corruption" of the body's fluids. A 1711 Portuguese guidebook to medicine in the tropics, *A Light for Surgeons at Sea*, likened the bodies of sailors on voyages in the Torrid Zone to the casks of wine they carried for trade with Africa, which acidified and spoiled in the heat.[615]

Yet the drugs and vernacular knowledge of the tropics also offered the promise of novel cures. As we have seen, Talbor's miraculous "English remedy" was actually a thinly-veiled repackaging of Amazonian quina. Around the same time, no less an authority than Robert Boyle encouraged the adoption of "physick… [from] the *Indians* and other barbarous Nations" as well as from "Midwives, Barbers, [and] Old Women" because, he speculated, "where the Practitioners of Physick are altogether illiterate, there oftentimes

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[614] Nicolas de Blégny and John Wallis, *The English Remedy, or Talbor's Wonderful Secret for Cureing of Agues and Feavers* (London: John Wallis, 1682), "The Bookseller to the Reader," n.p. (iv).

[615] José Rodrigues Abreu, *Luz de Cirurgioens Embarcadissos, que trata das doencas epidemicas de que costumam enfermar* (Lisbon, 1711), 16-17.

Specifics, may be best met with."[616] Purging both individual bodies and minds and the body politic of foolishness and physical corruption thus involved casting a very broad net indeed—one that passed freely over national boundaries, epistemologies, religious divides, oceans, and ecological zones—even as it required caution about the physical and mental transformations induced by novel medicines.

In 1682, John Chamberlayne speculated in a treatise on four of the most popular Indies drugs (coffee, tea, tobacco, and chocolate) that widespread adoption of tropical remedies by Europeans would increase the safety of these ambiguous substances. Chamberlayne argued that consumers could effectively acculturate themselves to toxic drugs, "taming" them in the process.[617] Even opium and hellebore, two of the most feared narcotics of the age, became seemingly harmless if the consumer's body was able to "naturalize" them:

> We read of a French Ambassador, that being in England, was indispos'd, that he could never sleep; upon which he would often devour whole Ounces of Opium without being concern'd: and the Turks are often observ'd to swallow great Lumps of it, a tenth part of which would kill those that are not accustomed to Opiates. I know a Woman in this City, that being us'd to take both the Hellebores, will often swallow whole Scruples of them without the least motion, or operation, so that custom and conversation will make even the fiercest creatures familiar.[618]

It is no coincidence that the language Chamberlayne employed— "tame," "naturalize," "civil"—was identical to the rhetoric of European colonization. As Peter Sahlins has

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[616] Boyle, *Usefulnesse of Experimental Naturall Philosophy*, 2: 220-1.

[617] John Chamberlayne, *The Natural History of Coffee, Thee, Chocolate, Tobacco* (London: Christopher Wilkinson at the Black Boy, 1682), 22.

[618] Chamberlayne, *Natural History of Coffee,* 22-3.

shown, French government officials and colonial leaders in the late seventeenth century adopted a "language of the animal world" that prized notions of tameness, envisioning French *artes* as transforming a barbarous nature into a rational and well-ordered imperial garden.[619] A similar, albeit temporally later, process is at work in Richard Drayton's influential study of the Royal Botanic Garden at Kew, whose proprietors envisioned their work as nothing less than the "Improvement" of the world.[620] In the New World, Africa, and Asia, these concerns with domestication and improvement translated into the notion that indigenous societies, like wild animals, required "taming" to become full members of the civil society of the early modern European empires.[621]

Tropical drugs underwent a similar process of acculturation. As Chamberlayne wrote in reference to opium and tobacco, "Use and custom, will tame, and naturalize the most fierce and rugged Poyson, so that it will become civil and friendly to the body."[622] Yet as we have seen, an abiding fear among Europeans of the seventeenth and eighteenth centuries was that the process might also work in the opposite direction. If a tropical drug was sufficiently "fierce and rugged," it stood to reason that if used without proper guidance, precisely the opposite transformation could occur, transforming formerly "civil"

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[619] Peter Sahlins, "The Royal Menageries of Louis XIV and the Civilizing Process Revisited", *French Historical Studies*, Vol. 35, No. 2 (Spring 2012), 239. See also Sahlins' forthcoming *The Symbolic Lives of Animals and the Making of Early French Modernity* (forthcoming, 2015).

[620] Drayton, *Nature's Government*.

[621] Anderson, *Creatures of Empire* and Benjamin Breen, "'The Elks Are Our Horses': Animals and Domestication in the New France Borderlands," *The Journal of Early American History* 3 (December, 2013), 188-205.

[622] Chamberlayne, *Natural History of Coffee,* 22.

consumers into heathens, barbarians, and "slaves" to the drug.[623] The early modern drug trade was thus more than a commerce in exotic commodities or a system of colonial resource extraction. It was part of a novel attempt to regulate physical and mental states on both an individual and societal level: to tame the "passions" of barbaric materials into "civil" substances fit for a well-regulated state, and to organize the techniques and commercial exchanges of the drug trade into what Cook calls "a system of political relations that shifted history in certain directions."[624]

Whiggish narratives of medicine and pharmacy in the nineteenth and twentieth centuries regarded this process as a march of progress: figures like Boyle applied experimental methods and skepticism to refine the disgusting concoctions and demonic brews of the early modern era into safe and effective pharmaceuticals. Likewise, the professionalization of science in the early nineteenth century effectively rendered the suspect trade of the apothecary obsolete. In the place of the musty *botica* stuffed with potions and poisons came the gleaming laboratories of medical chemists, and the multinational might of pharmaceutical companies like Merck (founded as an apothecary shop in 1668, but transformed into a pharmaceutical concern by Emanuel Merck circa 1816), the Beecham Group (1859), a progenitor of GlaxoSmithKline, and Bayer (1863). Like the distillations performed on seventeenth-century fools, we might think of this

[623] Because addiction was not used in relation to drugs until the nineteenth century, early modern writers typically used the metaphor of enslavement to describe figures (like Chamberlayne's French ambassador) who pharmacologists today would describe as suffering from physical dependency. For instance, the reformed Formosan George Psalmanazar described himself as a "slave to youthful passions" during the time of his youthful imposture in London circa 1704-5, clarifying that he was, specifically "a perfect slave" to opium. (Psalmanazar, *Memoirs*, 49).

[624] Cook, *Matters of Exchange*, 408.

transformation as producing both an empyrean quintessence (scientifically-produced pharmaceuticals) and an earthly remainder (illicit drugs). As Kathleen Murphy has noted in the context of plantation medicine in colonial North America, this process of professionalization and specialization obscured the role of indigenous experts—as well as non-elite practitioners like the barbers and "Old Women" mentioned by Boyle.[625] Likewise, nineteenth-century transplantations of drug crops outside of their traditional ecological zones severed plants like quina from the local, vernacular expertise that had grown up around them. Yet whereas the professionalization of chemistry in this period turned alchemy from an act of artisanal commercial production into an antiquated curiosity, a global commerce in drugs untouched by scientific pharmacy or imperial transplantations persisted on a massive scale, ultimately emerging (by the early twentieth century) as a shadow trade in banned substances.[626] In the following section I engage with the larger scholarship on this post-Enlightenment role of drugs as illicit commodities, arguing that many thinkers and writers have failed to account for the *historical construction* of drugs as an invented—and ever-shifting—category of goods.

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[625] Kathleen S. Murphy, "Portals of Nature: Networks of Natural History in Eighteenth-Century British Plantation Societies," (PhD Dissertation, The John Hopkins University, 2007), 316-7.

[626] One is tempted to draw a comparison, as well, with the transformations in the social status of astrology and astronomy in the eighteenth century. Whereas astrology never went away, it became a kind of "black market science," pursued on the fringes of polite society whereas (in the time of a figure like John Dee, who was the court astrologer of Elizabeth I) it had occupied the center.

6.3 Drugs and enlightenment

Drugs have proven "good to think with" for cultural commentators and philosophers from the nineteenth-century onward, providing a useful shorthand for notions of slavish obsession, physical dependency, altered mental states, and the feedback loop of labor and consumption. The history and theory of drugs has figured particularly prominently in Marxist and post-structural interpretations of the rise of capitalist consumption. In many respects, indeed, this has been the primary theoretical lens by which the larger humanist academy has viewed drug history from the 1980s to the present. As Jayoung Min has recently put it, "the mystified value of a drug" as a "stigmatized commodity" makes it "the very essence of what Marx calls a magical commodity, or commodity fetish."[627] In their introduction to the 2003 volume *High Culture*, Anna Alexander and Mark S. Roberts write that drugs "conquered the earth and established... pathways between peoples of different worlds, from the tribal to the modern," and argue that the notion of addiction (which, following Derrida, they implicitly associate with drugs) metaphorically informs both modern literature and modernity in general.[628] For many scholars currently working in the fields of literature and anthropology, in short, the history of drugs has taken on an outsized role as a proxy for the rise of a globalized and "modern" consumer society which is "addicted" not only to

[627] Jayoung Min, "Novel Addiction: Consuming Popular Novels in Eighteenth-century Britain," (PhD Dissertation, Duke University, 2011), 15-16. In other words, a drug is simultaneously an embodiment of the specialized labor of workers and of a broad-based cultural fascination that gives it an arbitrary power and value.

[628] Anna Alexander and Mark S. Roberts, "Introduction," in Alexander and Roberts, eds., *High culture: reflections on addiction and modernity* (New York: SUNY Press, 2012), 1.

the types of substances studied here, but to literature, pornography, television, food, politics, and other "fetishes."[629]

Yet the absence in many of these works of a well-grounded understanding of the historical trajectories of drugs as both *concepts* and *commodities* has led to a confusing state of affairs. For cultural theorists, "drugs" tends to figure as inherently addicting substances, typically policed by legal regimes, and hence as apt metaphors for any number of contemporary societal addictions. For researchers in the natural sciences, by contrast, "drug" has a different but equally nebulous connotation, either as an addictive substance that activates the reward system of the brain via the release of neurotransmitters like dopamine or serotonin, or as any type of pharmaceutical or natural product that exerts an empirically-verifiable alteration in health.[630] Scholarship in the natural sciences and medical fields deal far less with the theory of drugs, but frequently invokes *histories* of drugs: recent scientific papers on everything from malaria to brain scans to pulmonary hypertension have offered potted histories of early modern drugs.[631] Although this

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[629] Pietz, "The Problem of the Fetish," Jayoung Min, "Novel Addiction"; Alexander and Roberts, *High Culture*; Kane Race, *Pleasure Consuming Medicine: The Queer Politics of Drugs* (Durham: Duke University Press, 2009); Brett Neilson and Mohammed Bamyeh, "Drugs in Motion: Toward a Materialist Tracking of Global Mobilities *Cultural Critique,* 71 (Winter, 2009), 1-12; Brett Ingram, "Critical Rhetoric in the Age of Neuroscience," (PhD Dissertation, University of Massachusetts, 2013); Peta Mitchell, *Contagious Metaphor* (London: Bloomsbury, 2013); ch. 4; Hermann Herlinghaus, *Narcoepics: A Global Aesthetics of Sobriety* (London: Bloomsbury, 2013).

[630] Christian P. Müller and Gunter Schumann, "Drugs as Instruments: A New Framework for Non-Addictive Psychoactive Drug Use," *Behavioral and Brain Sciences,* 34 (2011).

[631] White, Nicholas J., Gareth DH Turner, Nicholas PJ Day, and Arjen M. Dondorp, "Lethal malaria: Marchiafava and Bignami were right," *Journal of Infectious Diseases* 208: 2 (2013): 192-198; McGraw, Paul V., Ben S. Webb, and David R. Moore, "Sensory learning: from neural mechanisms to rehabilitation," *Philosophical Transactions of the Royal Society B: Biological Sciences* 364: 1515 (2009); Kosanovic, Djuro, Xia Tian, Oleg Pak, Ying-Ju Lai, Yi-Ling Hsieh, Michael Seimetz, Norbert Weissmann, Ralph Theo Schermuly, and Bhola Kumar Dahal, "Rhodiola: an ordinary plant or a promising future therapy for

scholarship rarely interacts with anthropological and literary studies of drug history, it shares with them an assumption that the globalization of drugs connects to the origins of "modernity," in this case of modern science and medicine.

It is striking, given this widespread assumption that drugs played a role in modernity, to observe the relative silence on the subject from early modern historians. Histories of early modern commodities have enjoyed remarkable success in recent years, as have the sub-fields of early modern environmental history and "colonial botany."[632] As the preceding chapters demonstrate, many of the individuals involved with early modern bioprospecting, botany, transplantation, and natural philosophy explicitly employed and debated the term "drug." Yet the present-day historians who study these figures tend to write instead of "plants," "remedies," "cures," or "*materia medica*."[633] An unintentional, cumulative result of these choices is that historians have largely ceded the history of drugs to literary theorists, cultural commentators, and scientists.

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pulmonary hypertension?" *Pulmonary circulation* 3: 3 (2013): 499.

[632] Commodity histories: Kris Lane, *Colour of Paradise*; Amy Butler Greenfield, *A Perfect Red: Empire, Espionage and the Quest for the Colour of Desire* (New York: Random House, 2006); Molly Warsh, *American Baroque: Pearls and the Nature of Empire, 1492-1700* (forthcoming, 2015). Colonial botany: Chris Parsons, "Plants and Peoples: French and Indigenous Botanical. Knowledges in Colonial North America, 1600 – 1760" (PhD Dissertation, University of Toronto, 2011); Kathleen Murphy, "Portals of Nature," Sam White, "From Globalized Pig Breeds to Capitalist Pigs: A Study in Animal Cultures and Evolutionary History," *Environmental History* 16 (2011): 94–120; Marcy Norton, *Sacred Gifts, Profane Pleasures;* Schiebinger, *Plants and Empire*.

[633] Two notable exceptions are Jordan Goodman's work on what he calls "*excitantia*" in the Enlightenment and David Lord Smail's chapter on drugs in *On Deep History and the Brain*: Jordan Goodman, "Excitantia: Or, How Enlightenment Europe Took to Soft Drugs," in Goodman, ed. *Consuming Habits: Drugs in History and Anthropology* (Routledge, 1995); Daniel Lord Smail, *On Deep History and the Brain* (Berkeley, 2008), ch. 6. Yet these are both fairly idiosyncratic works by senior scholars; more junior historians appear to have been slow to take up the theme of drugs in the early modern world. For instance, a search for "early modern drugs" in Proquest's dissertation archive yields only a single hit (Brian Cowan's 2000 Princeton PhD dissertation "The Social Life of Coffee").

One goal of this dissertation is to explore what happens when we apply the rich scholarship that has grown up around the Columbian exchange and early modern science and medicine to the task of historicizing drugs and their global circulation. The research presented here offers an alternative mode for understanding the entangled origins of drugs and modernity that, I believe, provides a middle way between the simplifications of both the Whiggish orientation of the sciences and the overly theoretical, Marxist approach of cultural theorists, literary scholars and anthropologists.[634]

For instance, Derrida's oft-cited assertion that "the Enlightenment... is in itself a declaration of war on drugs" rests on a simplification of the historical role of drugs—and, indeed of the Enlightenment.[635] (Precisely who was declaring war, one wants to ask, and on what?)[636] However, it is true that European writers over the course of the eighteenth century increasingly portrayed intoxication and recreational drug usage as hostile to both reason and "civility."[637] If the preceding chapters have hinged on the multivalent roles of drugs as emerging global products—the ability of substances like tobacco or quina to

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[634] Popular studies of drugs unfortunately tend to be the worst of both worlds in this regard, either borrowing the deterministic and triumphalist narratives of those in the sciences and medicine (the heroic quest to isolate quinine from quina, for example) or the obscurantist and ahistorical tendencies of some twentieth-century philosophical discussions of illicit drugs.

[635] Jacques Derrida, "The Rhetoric of Drugs," (1990) reprinted in Alexander and Roberts, *High Culture*, ch. 1.

[636] See Dan Edelstein, *The Enlightenment: a Genealogy* (Chicago: University of Chicago Press, 2010) and Charles W. J. Withers, *Placing the Enlightenment: Thinking Geographically About the Age of Reason* (Chicago: University of Chicago Press, 2007) for recent studies which reassess the origins of and participants in the Enlightenment.

[637] Phil Withington and Angela McShane, eds. "Cultures of Intoxication," *Past & Present Supplement* 9, (2014) offers the best overview of eighteenth-century reactions against intoxication. See also David Courtwright's *Forces of Habit* and Jordan Goodman, "Excitantia,." Of particular interest is Courtwright's much-needed corrective to the Whiggishness of many drug histories in Ch. 3 of *Forces*, which questions why drugs like khat and coca leaves failed to become global commodities in the same era as the rise of coffee, opium and chocolate.

move between different cultural contexts, social registers, and epistemologies—a temporal sequel to this work might center on the opposite process. By the nineteenth century, drugs were becoming discrete and knowable entities. What I would like to suggest is that this shift indeed contributed both to our modern conception of drugs as a social, commercial and legal category, and to modernity in general—but that the role of drugs in the post-Enlightenment world was more complex than either the ahistorical approach of Derrida and other social theorists or the Whiggish narratives of the natural sciences have allowed.

In one sense, the changing meanings and social functions of "drugs" in the late eighteenth and early nineteenth centuries simply reflected a larger remapping of the natural sciences. Chemists, newly able to isolate the alkaloids within substances that had previously been the domain of botanists and collectors, began to conceptualize drugs not as holistic natural products (a leaf or a piece of bark) but as molecular entities (an alkaloid with a precise—and precisely describable—chemical structure). This "fixing" of drugs was also an attempt to differentiate these chemically-described pharmaceuticals from those substances whose chemical makeup and physiological action could not be determined. Whereas the purity of an alkaloid like quinine or morphine could be experimentally verified, the provenance, legitimacy, and concealed "virtues" of drugs like *bangha* rested upon the reports of merchants, apothecaries, and cultivators. Likewise, chemically-derived alkaloids tended to present as white powders, offering visible and material proof of their supposed purity. By contrast, the compound medicines containing the "Indies

drugs" studied in the preceding chapters (like Sydenham's drops for opium or Agua de Inglaterra for quina) were complex and often repugnant on a sensory level, presenting not as pure white powders but as dark and noxious brews. The split between illicit drugs and licit pharmaceuticals thus rested not only on the scientific discovery of alkaloids and of methods of empirical verification of drug purity and contents, but on fears of adulterated and impure drugs, and larger cultural and even aesthetic anxieties about the non-European worlds from which they hailed. If, as Brian Cowan has argued, the "consumer orientalism" of the seventeenth century had turned a novel substance like coffee into a global sensation by circa 1700, a century later these exotic drugs emerged as the unsavory obverse of the pristine coins minted by European chemists a century later.[638]

Derrida, then, was not wrong when he hinted that the concept of drugs in the modern West was linked to Orientalism.[639] Yet he also fell prey to a common mistake of non-historians who write about the history of drugs: he approached drugs as if they were a fixed class of commodities whose histories could be inferred from their present-day use.[640] Take for instance Derrida's remark that "one can, of course, refer to alcohol or tobacco as 'drugs,' but this will necessarily imply a sort of irony, as if in so doing one only marked a sort of rhetorical displacement." For Derrida, a twentieth century Frenchman, it went without saying that calling a glass of *pastis* or a Gauloise a "drug" was an ironic

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[638] Cowan, *The Social Life of Coffee*, 116.

[639] Derrida, "Rhetoric of Drugs," 30.

[640] Derrida, "Rhetoric of Drugs," 22. Derrida's lack of historical background shows here: he jumps between references to the Greek *pharmakon* to drugs in the "modern" world, which is here basically analogous with twentieth-century France, with little attention to the centuries in between.

act, because, as he put it, "the simple consumption of these products, in and of itself, does not form the object of moral reprobation" or of disciplinary action. But as we've seen, consuming novel liquors and Amerindian tobacco *was* once a morally questionable act, and *was* the subject of intense disciplining from both emerging state bureaucracies and from institutional bodies like London's College of Physicians or the Iberian Inquisitions. These efforts, to be sure, were often unsuccessful. Yet although a Jahangir or a King James might have failed to *enforce* their strictures on tobacco smoking, this does not invalidate the social and epistemological significance of early modern fears of non-European drugs, or the importance of the early modern drug trade in shaping how emerging states and institutional bodies sought to police the consumption habits of their members. Rather than assuming that drugs and pharmaceuticals are *characteristic* of monolithic edifices like "the Enlightenment" or "mass consumption," then, I break with scholarly consensus by arguing that these distinctively early modern substances were, indeed, *constitutive of* specific manifestations of modernity (such as institutional policing of consumption, the rise of experimentalism, and the globalization of consumer demand).

One significant finding from this explicitly early modern framing of the history of drugs is the importance of tropical nature and tropical experts in the histories of both experimental science and globalization. We have seen how, as early as the late sixteenth century, Garcia da Orta cast moral judgement on those who consumed *bangha*, and da Orta and other early commenters on Indies medicines were beginning to speak of "narcotic" or "stupefying" drugs. Yet these claims were highly subjective and personalized:

da Orta framed *bangha* as a dangerous intoxicant, whereas Hooke argued that it was potentially useful in the treatment of madness. This difference of opinion does not mark any seismic shift in understandings of intoxicating drugs between the 1560s and the 1660s. Instead, it points to the eclecticism and divergent opinions of early modern beliefs about Indies drugs, which were based on anecdotal evidence and highly idiosyncratic forms of experimentalism that often took place *in situ* in tropical colonies rather than in the metropole. Witness, for instance, João Curvo Semedo's report of a "foreign surgeon" in Angola who performed an *experimenta* on the antivenom properties of two African drugs by testing them on poisoned hens, a practice that mirrored Robert Boyle's "trial" of a bezoar by administering it a poisoned dog in the same period.[641]

Although tropical drugs which could be "tamed" via experimentation and purification into alkaloids triumphed as objects of scientific study in the nineteenth century, this did not mean that global consumers stopped demanding their unprocessed, "raw" cousins: the non-alkaloidal forms of many drugs became lower-status, but continued to circulate as globalized commodities. The case of the most famous alkaloid of all, morphine, furnishes a representative example. Whereas (as we have seen) unprocessed opium had been one of the most prized medicinal simples of the early modern era, over the course of the nineteenth century it became associated with Chinese laborers, the newly-coined concept of addiction, and urban poverty. Meanwhile, morphine—the alkaloid derived from opium by a German chemist in 1804—won plaudits as a *treatment*

[641] Semedo, "Memorial de Varios Simples," 29; Robert Boyle, *Hydrostatics applied to the materia medica*, 329.

for opium addiction, as well as finding its way into expensive tonics that were considered appropriate even for pregnant women and nursing babies. Whereas, in 1664, Nicolas Lefebvre had defended opium from traditionalists who regarded it as a high-priced novelty espoused by "Chymical Philosophers," by the nineteenth century, opium had become associated with "traditional" societies and the working poor—but as the booming trade recorded in the ledgers of the East India Company reveals, this decline in status did not equate to a decline in popularity.

6.4 Future paths forward in the history of drugs

"Did we know the mechanical affections of the particles of rhubarb, hemlock, opium and a man, as a watchmaker does those of a watch," John Locke mused in 1690, "we should be able to tell beforehand that rhubarb will purge, hemlock kill, and opium make a man sleep."[642] The isolation of alkaloids like morphine and quinine during the Napoleonic era seemed to augur the realization of Locke's dream, offering a scientifically-verifiable and testable method of studying and consuming drugs.

If only writing the history of drugs were so simple. The arguments presented here are preliminary and need to be examined at far greater depth, and with more archival rigor. So, too, do the larger implications of this research, which I hope, despite all its failings, will prove to be productive of future work in this badly understudied field. The dreaded "why does it matter" question, when directed at a history of drugs, seems to me

[642] John Locke, *Essay Concerning Human Understanding* (London, 1690) 4: 25.

to be rather easily answered. The illegal drug trade is (and, I surmise, has for centuries been) one of the largest and most powerful industries on the planet, accounting for approximately 1% all global GDP. The pharmaceutical industry is even larger, perhaps twice as large in terms of percentage of world GDP. And this purview excludes substances that we now classify as foods, like coffee beans, which, remarkably, rank as the second-most widely traded global commodity after crude oil. To these economic figures we can point to the role of drug violence in narco-states like contemporary Mexico and Afghanistan, long-standing debates about the societal impacts of prescription amphetamine and opiate abuse and the legacies of the crack epidemic, the future promise of "nootropics" (smart drugs) and their implications for socioeconomic inequality, not to mention the massive demographic effects of the suppression of diseases like malaria and eradication of others like smallpox using the twentieth-century descendants of some of the early modern substances studied here.

Yet despite this obvious contemporary and historical significance, the history of drugs remains an understudied field. This lacunae is particularly telling given the recent vogue for work in the humanities which integrates findings from neuroscience and the environmental sciences: drugs can function as both ecological actors and neurochemical agents, and would therefore seem to offer an obvious path forward for research in this vein. At a basic epistemological level, I believe there is a conflict at work here between the outlooks of anthropologists, philosophers and historians of medicine—who tend to concentrate on the social and cultural construction of medicinal and recreational

substances rather than on their biological characteristics—and the assumptions of those in medicine and pharmacy about the objective biological efficacy of drugs.

My aim here has been to write a history of drugs that mediates between this push and pull and tries to bridge these disciplinary gaps. My emphasis throughout has been largely cultural, and indeed I argue (for instance in Chapter Two) that early modern drugs were culturally-constructed and the product of a complex negotiation that had more to do with the aims and biases of drug merchants, cultivators, and consumers than with the biological features of the drugs themselves. At the same time, I have become convinced that historians and anthropologists of medicine who disregard issues of biological action entirely are missing important pieces of the puzzle. It is impossible, in my view, to adequately understand the historical impact of quina without recognizing the widely-accepted scientific finding that *Cinchona officionalis* does in fact contain alkaloids which are effective in treating malaria. By the same token, it is directly relevant to the arguments made here that the opium *is* in fact psychologically and physically addictive. These are not cultural constructions: they are robust clinical findings which historians and other humanists need to creatively integrate into their analysis of the past rather than ignore.

Yet the ways of interpreting this underlying chemical reality are always different, and are indeed shaped by cultural values and concerns. When the impostor George Psalmanazar described himself as "a slave" to opium, he seemed to be hinting at the modern conception of addiction—but he was not participating in it, because it had not

yet been invented. And when the participants in the Eleusinian Mysteries consumed the *kykeon*, they were demonstrating the centrality of the *pharmakon* in Athenian intellectual and social life—but they were not consuming a drug, because they had no such concept. My aim here has been to navigate between a recognition of the inherent biological features of drugs and their cultural construction. If I am deemed successful, I believe this could represent a future path forward not just for historians of drugs but for historians of medicine in general—one that moves away from the both the Whiggish narratives of the march of modern medicine and from an overly reductive cultural understanding of healing that refuses to engage with evidence from the sciences. This type of middle way is already being pursued by environmental historians, and I believe it will profoundly expand our understanding of the historical trajectory of drugs and cross-cultural healing in the future.

This work is not merely about the history of drugs, however. It is also a case study in imperial entanglement and a proof of concept of how future studies of the Atlantic and early modern worlds might be approached. I have explicitly framed this research in a transimperial context, one which begins in the Portuguese world, ends in the British, and focuses on the intentionally ecological rather than political spatial framing of the tropical belt. It may be argued that the findings presented here may merely reinforce the other recent works on early modern science and empire, many of them traditional in temporal framing and methods. After all, historians have been calling attention to indigenous go-betweens, knowledge exchanges, the materiality of science and medicine, and the like for

several years now. Arguments along these lines are becoming a new orthodoxy, and it is no longer sufficient simply to demonstrate once again the role of slaves, indigenous peoples and what was once thought of as 'peripheral' regions in the accumulation and exchange of early modern natural knowledge.

Yet, as I hope to have shown, the history of drugs in the early modern world offers distinctive insights into facets of human experience that previous works on the Columbian Exchange and early modern science, medicine, and commerce have overlooked. Studying the subjective physical and mental effects produced by novel drugs, for instance, can clarify how science and medicine interacted with religious practices. Drugs from the tropical belt became a uniquely controversial class of objects owing to their multivalence in this regard: the same "occult virtues" in medicinal drugs that fascinated natural philosophers like Robert Boyle also made them valuable to *feiticeros*, or esoteric practitioners like Francisco de Buytrago who straddled the realms of spirituality and medicine. Ultimately, some tropical drugs failed to attain high status within European medical practice because they were too closely linked to indigenous knowledge or suspect medical practices.[643] Others like quina became integrated into scientific medicine, but their original indigenous contexts were stripped away. Still other drugs (like cannabis, coffee, tea and tobacco) won popular acceptance as consumables, but lost their perceived value as medicines and their role in scientific knowledge-making.

Interestingly, in recent years this dichotomy has begun to invert: it is now

[643] On the loss of medical knowledge from colonial contexts see Londa Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World* (Cambridge, 2004), chs. 3 and 4.

indigenous botanicals that are prized by global medical consumers, and lab-made pharmaceuticals are becoming suspect. Twenty-first century Western culture has nourished a cult of indigeneity that locates "authentic" or "natural" cures in "traditional" cultures of healing, especially those of so-called "Stone Age tribes" untouched by Western medicine. As phrases like "Stone Age" alone imply, many such beliefs are themselves a legacy of colonial-era beliefs and prejudices. At the same time, drugs made in labs have increasingly taken on an aura of unwholesomeness as research chemicals that occupy a "gray market" have appeared in a number of sensationalist news reports. The most infamous such coverage surrounded "bath salts," a term which typically refers to MPDV, an amphetamine-like cathinone alkaloid synthesized from the traditional drug *khat*, which has long been hugely popular as a recreational stimulant in Yemen.[644] As this hints, many of the more recent "drug scare" substances actually have unexpected links with premodern drugs. Today, for instance, the sassafras tree is grown in large quantities as a cash crop in Southeast Asia. An unknown but significant proportion of this crop makes its way into covert factories that convert compounds in sassafras known as safroles into the alkaloid MDMA (ecstasy), from whence it is shipped to international hubs of the drug trade like London and Amsterdam. This quasi-alchemical process of transforming a tropical tree bark into a powerful psychoactive drug occurs above all in Thailand, Malaysia, and Indonesia: the regions that East India Company ships once sailed to from

[644] M. Coppola, and R. Mondola, "3, 4-methylenedioxypyrovalerone (MDPV): chemistry, pharmacology and toxicology of a new designer drug of abuse marketed online," *Toxicology Letters* 208: 1 (2012): 12-15.

the same British and Dutch imperial capitols.[645]

Having completed a part of the circle, let us now return to the Miradouro do Adamastor in Lisbon, with its eternal pairing of Vasco de Gama and an African giant, and its Museum of Pharmacy beside an alleyway of drug dealers. The *farmacias* nearby announce their wares with glowing green signs depicting a snake entwined around a palm tree—the special blazon of the Portuguese Order of Apothecaries, symbolizing the union of nature and knowledge. They bring to mind the old soldier Francisco de Buytrago, with his tropical Tree of Life. Yet they also point to the historical erasure of the apothecaries and of the more eclectic and wide-ranging understanding of "drugs" which they represented. Despite its allegorical depth, the symbol is a nineteenth century invention, and even the most traditionalist Lisbon pharmacies—I spotted at least one that still stocked ceramic jars of moldering quina and opium—are just that: *farmacias* rather than early modern *boticas*. Today, the multiple registers and functions of the early modern drug trade have become disaggregated. There are the *farmacias* and the drug dealers around Adamastor, but also the *ervanária* (herbalist) down the road, who told me her family had been selling herbs in Lisbon for over five generations. Not to mention the "smart shop" up the hill in Bairro Alto, which Google Maps coyly classifies as an "herb shop" which but is in fact a supplier of gray-market stimulants and hallucinogens packaged in Amsterdam and produced in Southeast Asia and China.

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[645] AnthonieVerweij, "Clandestine manufacture of 3, 4-methylenedioxymethylamphetamine (MDMA) by low pressure reductive amination. A mass spectrometric study of some reaction mixtures," *Forensic Science International* 45: 1 (1990): 91-96; M. Schäffer, T. Gröger, M. Pütz, and R. Zimmermann. "Forensic profiling of sassafras oils based on comprehensive two-dimensional gas chromatography," *Forensic Science International* 229: 1 (2013): 108-115.

What will the future bring? One of the most indisputable findings of the present study is that the conceptual and legal definitions of "drugs" have long been—and continue to be—in a state of constant change. Understanding the shifting definitions of drugs and the imperial and indigenous origins of the drug trade has implications not only for history and other humanities disciplines, but for public policy. Portugal offered a model for the world to follow when it decriminalized all drugs in 2000: as is well attested, drug laws in other developed countries disproportionately punish youthful and non-white offenders and lead to unnecessary violence along borders, contributing to inequalities that have persisted since colonial times.[646] But I believe that advocates for drug *legalization* (as opposed to decriminalization) have failed to grapple with the deep historical entanglements of global commerce and drugs. Heroin, it is worth remembering, is a proprietary formula of the Bayer corporation (trademarked 1895), and re-opening the sale of highly addictive substances to multinational corporations may not have the beneficent social impacts that some hope for. Many calls for legalization, furthermore, rest upon a facile value distinction between "natural" plant-based medicines and "artificial" pharmaceuticals. As the early modern apothecaries studied here could have attested, the mere fact that opium or hemlock are natural products does not make them safe. Likewise, a recent vogue for participating in shamanistic ceremonies that involve the consumption of psychedelics with long histories of indigenous American use like ayahuasca and peyote

[646] A 2013 report from the German newspaper *Der Spiegel* offered a generally positive assessment of the policy's social impact: "'This Is Working': Portugal, 12 Years after Decriminalizing Drugs,'" *Der Spiegel*, March 27, 2013 [accessed online at http://www.spiegel.de/international/europe/evaluating-drug-decriminalization-in-portugal-12-years-later-a-891060-2.html].

seems (to me) to owe more to early modern fetishizations of exotic non-European spirituality and to the "disturbance pharmacopeias" of societies fractured by slavery and disease than to the unbroken continuation of ancient spiritual traditions. The contemporary world, in short, remains profoundly shaped by drugs as both socioeconomic and cultural forces. But the contemporary roles of drugs—no less than in early modern societies—are riven by misunderstanding, disinformation, and unequal relations of power. In failing to grapple with the *historical* origins of the drug trade, then, we may ultimately run the risk of failing the future as well.

Appendix A

Memorial de Varios Simplices (c. 1707?)

The Lisbon apothecary and physician João Curvo Semedo (1635-1719) numbered among the most influential practitioners in the Portuguese empire. He was also one of the most eclectic. Uniquely among his peers among the licensed physicians of seventeenth-century Lisbon, Semedo did not hesitate to prescribe African drugs and to laud the virtues of non-European and non-Christian healers. Reproduced below is my translation of a particularly significant list of drugs from Portuguese America, Africa, and the East Indies entitled *Memorial de Varios Simplices*. This 32-page text was seemingly written by Semedo at some point between 1697 and 1707. This date, at least, marks its first mention in print: in his *Observaçones medicas doutrinaes de cem casos gravissimos* (Lisbon: Antonio Pedrozo Galram, 1707), Semedo refers readers interested in the Indies drug "Agua de Cananor, chamada Agua de pedra Fria" ("Water of Cananor, called water of the cold stone") to read of the "other very great virtues of the said stone which can be seen in the Memorial de varios simplices."

By 1716, the list of drugs was being bound along with the third edition of Semedo's most famous work, *Polyanthea Medicinal*. Today it survives exclusively in this guise as an addendum to the *Polyanthea*. Yet given Semedo's earlier reference in 1707, it seems likely that the list appeared earlier as a standalone pamphlet which Semedo circulated to advertise the proprietary drug formulae that he sold out of his house in Lisbon. Because pamphlets distributed by early modern physicians tended not to survive, it would make sense that only the later editions bound alongside Semedo's much longer *Polyanthea* would exist in libraries today (I have personally consulted the copies bound with post-1707 editions of *Polyanthea* owned by the BNP and the New York Academy of Medicine, as well as digital facsimile of copies owned by the Computense University of Madrid and the British Library). Throughout, Semedo emphasizes the novelty of his cures and his special access to expert knowledge from Portuguese Africa and the Indies, reflecting his privileged social status as the physician to the King as well as his engagement with "modern" proponents of chemical medicine and non-traditional cures. As the map reproduced on the next page demonstrates, the vast majority of the "simples" (*simplices*) Semedo discusses originated in Portuguese Africa, Brazil, or South Asia, and animal derivatives outnumbered plants by a slim margin.

For reasons of space, this is an abridged translation. My best guess as to the region where each drug originates has been added in brackets.


"Simples" described
by João Curvo Semedo
Animal:
Mineral:
Plant:

Medicinal simples… from Oriental India, and America, and other parts of the world which come to our kingdom to remedy many diseases, along with the virtues of each one, and the way that they ought to be used.

From India and from other parts of Europe come to this Kingdom [of Portugal] many remedies of singular virtues, contained in various types of stones, roots, powders, seeds and fruits. Yet because there is no manual [*roteiro*] that explains either the uses of these remedies or the mode in which they are to be applied, it proceeds that a great many people have in their homes already the remedies which could easily cure their diseases, but from lack of information about these remedies, they are without utility, and the sick remain without health. This consideration and sentiment incited my curiosity and zeal for the common good, and so I have diligently researched not only among certain persons who have travelled in the Indies and other regions of the earth, but I have also discovered various manuscripts which have informed me of the virtues of the aforesaid stones, powders, roots and fruits. Thus I have written this Memorial as an aid to human nature, and if this service that I have done for the common good is not seen to merit thanks, it also does not deserve rebuke, although I understand full well that there are men so ungrateful, and of so depraved a spirit, that they do by malice what little children do out of innocence, suckling their mother's milk, and biting the very breast that has sustained them.

The remedies which come from the East Indies [India Oriental] and from other regions are stones, powders, bones, fruits, seeds, or roots; they can be milled or infused in common water; others are mixed into ricewater, which the natives [of the East Indies] call "Ambatacanja"; some are mixed with the juice of gallego limes, and these are given for fevers, to be drank upon their onset and departure.

The experience of the Moors and Gentiles [i.e Hindus] of Asia was the teacher which gave [us] knowledge of the use of such remedies. As well, the experiments of some curious men have demonstrated the great benefits that many times result from their operations, not encountering the general evacuations of Medicine, that the Pandits who assist [in medicine] in those lands, also use from the beginning of diseases, not altering their period of application. And in this way cure the most acute and malign diseases, regulating the speed of the blood, the purgings, and aiding in vomiting for the tempo of heart, in such a manner that a remedy is never applied along with another, before each has been allowed to have its effect freely.

Doctors, as well as layfolk, take the view that bezoars and remedies which come from India and other foreign lands do not work the same wonders in Portugal that they do in India and in the lands where they originate. Thus [they argue], owing to the difference of the climate when these remedies arrive in Portugal, they do not have the same vigor that they possessed in the lands where they were born. To this concern I respond that all of the simples conserve their virtues with which God has created them, so long as no corruption enters into the bodies of these drugs. We see, and have experimented, that these simples which come from the Conquests to the apothecaries of our Kingdom are made into many compound remedies [*remedios compostos*] and sent back to the same Colonies to serve the sick there, and still retain the same good effects which they had in Portugal, passing through diverse climates and being oftentimes the apothecary drugs [*simplices das boticas*] most subject to corruption, which the bezoarticos of India are not, having a much greater durability and longevity.

There was even a curious man, who, seeking to demonstrate these remedies which came from India more than thirty years ago have today the same effects when they have come to this Kingdom, found them to have the same good effects in Portugal which they had in India.

Supposing this to be truly experimented, we will now proceed to each of these simples with an individual relation of its virtues, beginning with the Bezoar stone (which is the most known and used, both in

Portugal and in the rest of the world.)

Simple Bezoar Stone [East and West Indies]
Description and virtues of the Pedra Bazar Simplez, or natural bezoar stone, which is born in the stomachs of some animals very similar to little goats.

First of all, it is necessary to examine with great care whether the Bezoar stone is true or false. Because if it is true, it produces excellent effects, with the condition that one needs to give it in a quantity of twenty or forty grains each time it is adminstrered, because giving only three or four grains (as is customary among the barber-surgeons [*barbeyros*] who are the Physicians of the ordinary folk), has no effect for it is given in too small a quantity. And it is for this reason that the remedy is infamous for the loss of lives of patients--and for money ill spent. And thus it will happen that, though the stone may be true, it is not given in the aforesaid quantity.

It is necessary that Physicians principally warn of two very important things. The first is that the stone ought to be mixed with five or six ounces of common water boiled with *Scorzonera hispanica* [*Escorcioneyra*] or with poppies, or with holy thistle [*cardo santo*] because these give to the said mixture of bezoar with distilled watters, a "clear target" [alvo em claro]. Those who are curious can learn the reasoning behind this in my *Polyanthea Medicinal*, third edition, treatise 2, chapter 130, folio 675, line 1.

The second thing which ought to be known about the said bezoar stone is that when mixing it give six ounces of water and with whatever one uses of the aforesaid things, those also miss the mark who use too small a quantity of water which will take the stone tot the distant places where it is meant to serve; but mixed with a great quantity of water, it has very good effects in pains of the heart, and lack of breath, and with all sorts of acute and malign fevers, giving it every hour as necessary, and along with bleedings.

In the suppression of urine, the bezoar--if it is genuine--has great virtue. For such a condition, before applying, give to the patient three as a vomitorio three ounces of the Agua Benedicta, or six grains of Tartaro emetico, or half an ounce of white copper sulfite, bleeding them on the other day four times from the arms, and on the next day three times, for when this case is very dangerous and pressing, it is necessary to give the remedies with the greatest promptness, since if he does not urinate by the seventh day, typically the patient will die.

Pardon me for having made this digression, for I am obliged by the lust for life of those who follow, and give this advise as important for both present and future physicians.

Artificial Codrial Stone [Goa]
Description and virtues of the Pedra Cordeal Composta.

These stones are not created by nature in the entrails of animals, but are artificially created from various ingredients, all of them chosen and known to have great cardiacal and bezoartical virtues; these proceed from the artifice with which these stones are created by a member of the Society of Jesus living in India, which are of a greater or lessor form which are of a greater or lessor form according to how he wishes to make them. These stones being made by the hands of this Jesuit [Gaspar Antonio] have singular virtues to cure the following infirmities.

In malign and strong fevers, when the patient is of a great age, give him 24 grains pulverized with six ounces of common water cooked with scorzionera or with poppies or with black cherries, because taking it in this quantity mitigates the warmth and dryness caused by the fever and prevents the malignity from reaching the heart, defending, conforting, and relieving the patient; and if the ill person be either very weak or very old is pleased to take wine, give them 24 grains of the said stone mixed in two spoonfulls of wine....

Any time that melancholy accompanies illness, or among those who are well, whether they have a fever or not, you can give them a quantity of the artificial bezoar, if they have no fever, in excellent wine, and if they have one, in water boiled with escorcioneira or borrage. Take the said stone cooked in water with an oitava of the root of contrayerva or Virginia snake root [serpentaria virginia], or if thse roots are not available, boiled with cardo santo: this is an effective remedy against all manner of venemous bite, whether drunk after the bite of a viper, scorpion, spider, or other venemous animal, or if applied directly to the wound….

I must confess that before I invented (by the mercy of good, and by the good fortune of the sick) my "Bezoartico" called "Curviano" against malign fevers and venemous diseases, I did not much use the pedra Bazar, because although I had a good opinion of it, assuming it was genuine, it seemed to offer me some doubts and reasons for not using it, because I saw that each year from India there came tons and tons of it, and it seemed to be impossible that such a quantity of true pedras could exist. So for this reason, I spoke with some trustworthy people, who had lived in India for many years, and said that of all the animals in which these stones are formed, when they have two within them, it is a miracle. And thus by this reasoning I did not use the stones [imported to Portugal], because it seemed to me impossible to verify if they were genuine.

…

Natural stone of the porcupine, and its virtues [India]

The true stone of the porcupine is one of the best antidotes which comes from India for remedying health, and just as it produces great effects, so to is it of great monetary value, such that any stone you take with a little oil will cost, at minimum, a thousand reis. Among the virtues of this stone, the principle is this: it is a great antidote for malign fevers, and no other remedy is stronger than it besides my own Curvian Bezoartico, nor does any other remedy have such utility as this stone… Surgeons, who cure in lands where there are no Doctors, and for people who are ignorant of Medicine, because they think of these things superficially, mix [quina] bark, which ought to be mixed only with pure water, with other bitters, and thus kill their patients, or they add to the fever, and for this reason distemper the body and take away the virtue. And now they know the reason why there are such prohibitions on the sweets and the oils [doces e os azedos] that are taken with quinaquina, or agua de Inglaterra: because as the virtue of quinaquina consists of its bitterness, which they take away or aate with a quantity of sweetness or oil, this virtue is lost... I direct the curious to my *Polyanthea*, tract. 2, chapter 103, fol. 550, line 22.

Stone of the porcupine [India]

Teeth of the porcupine [India]

Stone of Cananor [Cananor, India]

Ear of the Manatee [Amazonia]

Candar Stone [Tartaria]

Stone of the head of the cobra of Pate, commonly called the Mombaça Stone [Mombassa, East Africa]

Safira Stone ?

Stone of the Dio Cobra [Diu?]

Pauzari stone [Persia?]

Paraguay herb [Paraguay]

Crab of Aynão [Macao]

Teeth of the female virgin fish [Brazil?]

Rib of the female virgin fish [Brazil?]

Penis of the seahorse [Africa?]

Penis of the deer [Europe?]

Teeth of the seahorse [Africa?]

Teeth from the mouth of the elephant [Angola]

Hoof of the wildebeest [Angola]

Bones of the spine of the Cobra Zuchi [Angola]

Teeth of the Engala [Angola]

Manica root [Manica province, Mozambique]

Root of the mother of god [?]

Cypo root [Brazil]

Solor root [?]

Calumba root [Mozambique]

Virginia snake root [Virginia]

Sapuche root (*Randia laevigata*?) [Northern Mexico]

Root of João Lopes Pinheyro (*Toddalia aculeate*?) [India]

Butua root, or Parreyra brava [Kingdom of Butua, southwestern Zimbabwe]
This root takes the name from the Kingdom of Butua were it grows; they call it the same along the Rivers of Sena among the Gentiles; among the Portuguese it is called Parreyra Brava [wild pepper] or Butua root... The powder of the said root, mixed with vinegar in such a way as to make a paste, resolves abcesses when applied on them and relieves any such condition when applied for six to eight days in succession. This I observed many times, principally in the wife of Manoel de Aranjo, living near the Church of the Annunciation [Igreja de Annunciada]. The said woman had a leg swollen to such a state of deformity that all believed it impossible for her to escape death. And when I applied this root in the form of a paste, she was saved within six days without the need for any other remedy.

…
The root serves to cure hemmorhages of blood, when drunk in a powder mixed with the water of tachagem

(plantago major, a healing plant found in Europe)... Luis Serrão Pimentel, Cosmografo mor do Reyno, can testify to the truth of this, since he, being without hope of any human remedy, cured his hemmorhage with the powder of this root. I have seen the same admirable proof in a woman living in Boa Vista on the road called Poço das tabuas, the said woman having rampant hemmorhages which I suspected to have been caused by some *feitiço*, which were slowly killing her. And taking this root, in six or seven days she was cured, as if with a miracle.

…

It serves also to cure the "purgations of the mother," drinking it for thirty days with fasting, and at night six ounces of water infused with it, to which is joined twelve grains of fine powder of the Butua root. All of the house of the Senhor de Aguas Bellas can testify to the truth of this, because there was in this house a girl who at nine years of age suffered from this purgation, which no remedy could tame, excepted for the powder of this root." [n.b. The Senhor of Aguas-bellas when Semedo wrote this was Joseph Pereyra Sodré, the governor of Sao Tomé.]

…

The **Doctor Francisco Roballo Freyre**, **knight of the Order of Santiago and Fisico-mor in the Estado da India**, certifies that when given three days in succession to a woman, who has in the 'region of a mother' a *inchação fleumonosa* (phegmy swelling) that does not resolve after a long time, that only the boiled root of the Butua can resolve the swelling.

Divine Root, [Portugal]

Unguent of Bicuiva, [Rio de Janeiro and Pará]

Maçãa do Leão [Africa]

Macãa do Elefante [Africa]

Triaga Brasilica [Bahia]

Oil of Elephant [Africa]

Cobra de Cascavel [Brasil]

Apple of the cow [Portugal]

Root of João Pires [?]

Gallstones of a cow [Portugal]

Powder of Largis ["The Regions of Persia near to Turkey"]

Cobra powder [India]

Contrayerva [Spanish America]

Angelica Tree ["It grows in the *Certão*, or jungles in the lands of America," i.e. Amazonia]

Meriganga [?]

Artequim or Artequin [India]

Quiriato [?]

Monguz Root [India?]

Maldive Coconut [Maldives]

Coquinho of Melinde, or Macoma [Malindi, Kenya]

Milhomes Root ["Interior of the *Certão* of Brazil"]

Tambuape Root [Bahia]

Potatoes of Campo ["*Certao* of Brazil"]

Fava of Melinde [Milindi, Kenya]

Root of Queijo [?]

Root of Ginsão (Ginseng) [China]

Root of Moçuaquim [Mozambique]

Spiders of Peru [Peru]

Powder of Angariari [Angola]

Unicorn or Ave Inhuma [Brazil]

Jamvarandim, [Bahia and Pernambuco]

Tinta negra, [China]

Root of Maranga, [China]

Root of fevers, [South India]

Root of Apostemas [?]

Root of Ar [?]

Quiriato Tree [Brazil?]

Alambre Oil [Europe?]

Tranquil Oil [Europe?]

Ponta da Abbada, [Congo]

In the Kongo language, Abada refers to a mythical animal similar to a unicorn.

Minhaminha root, or quiminha, [Angola]
That this root has such a virtue against venom as to equal or exceed the pao Cobra, has been experimented by a foreign Surgeon named Monsieur Estruque. He gave it to two chickens who had poison in their stomachs, enough to kill them, and giving one of them Minhaminha mixed with water and giving to the other the Pao Cobra with a mind to test which of these roots had more virtue against poison, he observed that both chickens escaped death.

Another Flemish surgeon, called Alexandre, wished to examine the virtues of Minhaminha and to this end he gave a little bit of "folimão" to a dog, and after the dog had fallen he made it drink a water in which he had dissolved Minhaminha and he roused, as if he had never taken a poison. This tree grows in parts of Embaça, and is a small tree, which has no trunk; but it creates many skinny shoots? which rise up from the root.... the leaves are small and make many points. This root has a quality so rare, which is that when mixed with other roots, they lose their strenth, having no virtues, because the Minhaminha has sucked them all up, and for this reason they call it Minhaminha, because in the language of Angola "Minhaminha," means "swallows" because it swallows up the virtues of the other medicines. And for this reason it swallows up poisons which are in the stomach. (29)

Mutututu root [Angola]

Trees which seem very similar to our Medronheyro, alike in both the leaves and the fruits.

Bucho da Ema [Maranhão]

Powder of Mubamgo [Embassa and Casange in Angola]

Appendix B

Geographic origin of drugs in a sample of seventeenth-century household medical texts

I include the following list not as a finished research project (far from it!) but as a potential source for other historians of medicine interested in tabulating the geographic and socio-economic distribution of seventeenth-century drugs. I have made educated guesses at geographic origin that range from virtually certain (such as nutmeg from the East Indies) to extremely nebulous (are "crab eyes" from the East or West Indies or somewhere else entirely?). If nothing else, these lists serve to highlight the astonishing diversity and eclecticism of the early modern drug trade, and to remind us that famous substances like tobacco, opium, coffee, and chocolate were consumed alongside literally thousands of other exotic goods which are virtually forgotten today.

Origin of drugs prescribed by Adrian von Mynsicht (Germany, written in Latin, 1638):[647]

Local (Holy Roman Empire)	*Europe, Mediterranean*	*Asia, East Indies*	*Americas*	*Africa*
Acacia, Agarick, Alder, Allum, Angelica, "Anklebone of a Hare," Antimony, "Ashes of young magpies and swallows," Ash seeds, Ashes of Hearts-ease, Assarabacca, Balm, Bay-berries, Betony, Bindweed, Blackberries, Black cherries, "Blood of an Ass," "Bone of a Stags heart," Borage, Borax, Broom, Bryony, Bugloss, Burnet, Camomile, Celandine, Chervil, Chicory Water, Cinquefoil, Coltsfoot, Comfrey, Crocus Metallaroum, Dill, Dodder, Dragonwort, Earthworms, Dwarf Elder, Elateris[?], Elder, Elecampane, Elks hoof, Eryngo, Eyebright, Fennil, Flower-de-luce, Fluelin, Garden rue, Goats horn shavings, Gold, Gooseberries, Ground Ivy, Hazlewood, Heartsease, Hedge-Hysop, Hellebore, Henbane, Horehound, Hyacinth, Juniper berries, Liquorish, Lungwort, Maidenhair, Mallows, Mandrake, Mans scull, Marigold, Marjoram, Mastich, Mercury, Millefoile,	Alexandrian musk, Amber, Aniseeds, Bitter almonds, Cantharides, Castor, Citrons, Coloquintida [Bitter cucumber], Coriander, Cyprus wood, English tin, Hermodactyls, Hungarian gold, Gallia moschata[?], Lemons, Mithridate, Orange, Pomegranate, Quinces, Raisons, Red coral, Saffron, Sarcocol, Scammony, Spanish wine, Spirit of Turpentine, Sweet almonds, Troches Alandal, Turbith, Wild poppy[?], Venice treacle	Ambergriese, Assa foetida, Benjamin [Benzoin gum], Bol ammoniac, Camphire, Cardamom, Cassia lignea, China, Cloves, Cinnamon, Cubebs, Cummin, Flowers of Arabick, Galbanum, Galangal, Ginger, Gum Arabick, Gumm Lacca, Indian spike, Lignum Aloes, Long pepper, Mace, Mother of Pearl, Musk, Myrabolans Indian and yellow, Myrrh, Nutmeg, Opium, Oriental Bezoar, Oriental Pearls, Oriental saffron, Rhubarb, Sena, Styrax calamitis [Storax], Squinanth, Tragacanth,	Balsom of Peru, Crabs eyes,* Guaiacum, Gum of Peru, Jalap, Mechoacan, Nephritick wood [*Eysenhardtia polystachya*, i.e. palo azul?],[648] Sarsa parilla, Sassafras, Sugar candy, Tobacco	Dragons Blood, Grains of Paradise,

647 Adrian von Mynsicht, *Thesaurus et armamentarium medico-chymicum* (Schernwebel & Schamlherz, Lubeck, 1638), translated into English by John Partridge, *Thesaurus & Armamentarum Medico-Chymicum, or a Treasury of Physick* (J.M. at the Black Swan, 1682). Medicines listed here are gathered from the English translation, but have been checked against the Latin original.

648 Two unrelated but similar species appear to have been known to early modern apothecaries as "Ligum Nephriticum" or kidney wood: the palo azul of Mexico (*Eysenhardtia polystachya*) and *Pterocarpus indicus*, native to Southeast Asia and Australasia. Robert Boyle cites Athanasius Kircher on the wood's origin in Mexico and records his chemical experiments with it in "The Experimental History of Colours," (1663) collected in the *Works of the Honourable Robert Boyle* (London, 1772), I: 731-2.

Millipedes, Misleto, Mountain Osier, Mullein, Native vitriol, Olibanum, Origanum, Parsley, Peach pit, Pennyroyal, Pepper of the Mount [*Daphne mezereum?],* Pikes eyes, Pionys, Pimpernel, Polypody of the Oak, Primrose, "Protuberances on Mares legs," Red archangel, Rhenish wine, Rhodia, Rocket, Rosemary, Roses, Sagapen[?], Sal Armoniack, Sal Nitre, Sage, Salt of wormwood, Scabious, Scordium, Scorzonera, Scurvygrass, Silver, Steel, Smallage, Sorrel, Sowbread, Spicknard, Spirit of Honey, Spirit of Wine, Spirit of Vitriol, Staveacre, St. Johns wort, Stoechas [?], Sulpher, Swallow-wort, Tartar, Teil-tree, Tormentile, Walnut, Water-flag, Water-mints, White sanders, Wild pellitory, Wild Time, Wormwood, Valerian, Vinegar of Clove-Gilly flowers, Vervain, Vipers, Zedoary				
Total: 133	**Total: 31**	**Total: 37**	**Total: 11**	**Total: 2**

Origin of drugs prescribed by author of "Delights for Ladyes" (Elite ladies' recipe book, England, 1655-c.1680s?):[649]

Local (British Isles)	*Europe, Mediterranean*	*Asia, East Indies*	*New World*	*Africa*
Agrimony, Ale, , Barberry, Beares foot, Bugloss, Borrage, Calamus, Clary flowers, Cowslip, Cypruss roots, Earth-worms, Elks horn (powdered), Fennel seeds, Flag, Filipendula, Elderleaves, Elicumpany [Elicampane], Horse reddish, Hysop, Lavinder, Licoras, Maidenhearts, Marjoram, Marigold, Milk, Mint, Mugwort, Orgats, Parsley root, Pellitory of the wall, Pempernell, Plantin water, Rosemary, Red cock (entrails), Roses, Rosin, Rue, Sage, Saxafrage, Snailes, St. Johns wort, Strawberyes, Time, Tormentill, Tornops, Walnuts, Wood-sorrell	Angelica, Annaseeds, Brandy, Caraway, Coriander, Corrans [currants], Hartshorn, Lemons, Muskadine [wine], Oranges, Poppy, Saffron, Sack [wine], Sallamoneck [Salamoniac], Turpentine, White wine	Ambergreese, Benjamin [genus *Styrax*], Camphor, Cinamon, Cloves, Fennygreek, Galingale, Ginger, Indian balsom, Long-pepper, Musk, Myrrhe, Nutmeg, Powder of Rubarb, Storox[?], Turmerick	Rum, Sarsasparilla, Sugar,	Canary [wine], Gum dragon[?]
Total: 47	**Total: 16**	**Total: 15**	**Total: 3**	**Total: 2**

Origin of drugs in BNL Codex 1627 (Apothecary's notebook, Portuguese, 1660):[650]

Local (Iberia)	*Europe, Mediterranean*	*Asia, East Indies*	*New World*	*Africa*

649 Penn Van Pelt, MS Codex 627, 1655.
650 BNL, Cod. 1627, author unknown, *Tractatris de Facultatibus, e usu omnium medicamentorum, tam simplicium, quam compositorum, Quae in officcinis Reperiuntur* (Lisbon?, 1660), from a section labeled "Quantitates omnium medicamentorum huius Pharmacae" ["Quantities of all the medicines of this Pharmacy,"] fol. 289r-291r.

Aromaticum rosatum [Roses], Benedicta, Conserva violas [violets], Elebor [white and black], Mel rosatum, Miletum, Polypodium, Prunis, Prunis laxativa, Sitrion, Turbith,	Agaricum, Ambra, Catholicon, Coloquintides, Hermodatili?, Mana?, Margariton?, Metridatum, Phenicon?, Philonum romanum, Scamoneum	Aloes, Antodotum magogum [Antidote of Magog]?, Conserva rosas persicas, Cassia fistula, Lac, Mirabolan, Pil de Lapis Lazuli, Pil. Indiae, Rhabarbum, Sena, Tamarindi, Thiriaca smaragdor, Tragantum, Trium sandalor?,	Mechoacam	Dragonsblood,
Total: 12	**Total: 11**	**Total: 13**	**Total: 1**	**Total: 1**

Origin of drugs in José Coelho, *Pharmaca* (Apothecary's notebook, Portuguese, 1668):[651]

Local (Iberia)	*Europe, Mediterranean*	*Asia, East Indies*	*New World*	*Africa*
Absintio, Centaurea, Fumo Terre, Isopo, Polipodio, Rosis, Turbit, Violis	Agarico, Coloquintida, Corallo, Mana?, Scamonea	Amomo, Casia fistula, Cinamon, Mirabolanis, Musco, Noz moscada [nutmet], Reubarbaro, Saphiris, Sene, Tamarindos	Jalap, Mechoacam	N/A
Total: 8	**Total: 5**	**Total: 10**	**Total: 2**	

Origin of drugs in Hopestill Brett's notebook ("Middling sort" recipe book? England, 1678):[652]

Local (British Isles)	*Europe, Mediterranean*	*Asia, East Indies*	*New World*	*Africa*
Ader spear[?], Beeswayxe, Betony, Bolsfoot, Burnit, Butter, Camamile, Comfree, Cosset, Dears fatt, Earth wormes, Figgs, Gumfary[?] rootes, Honey, Led (red), Likres [licorice], Liverwort, Lungwort, New milk, Pine tree [tops], Rosemary, Roses, Rosin, Sage, Sanacle[?], Snails, Sweet wort,Vinegar [?]	Brandy, Dates, Malmsey [wine], Poppy, Resons of ye Son, Roach alum, Sack [wine], Turbitt radix [*Athamanta turbithum*], White Wine	China, Ginger, Hormodatillo, Long pepper, Nutmeg, 'Sinniment' [Cinammon],	Jalap, Sugar,	N/A
Total: 28	**Total: 9**	**Total: 6**	**Total: 2**	**Total: 0**

Origin of drugs prescribed for the use of "Gentlewomen" by John Shirley (England, 1687):[653]

Local (British Isles)	*Europe, Mediterranean*	*Asia, East Indies*	*New World*	*Africa*
Ale (hot), Agrimony, "A Mans Scull that has not been above a year buried," Asses milk, Balaustius, Barberries, Bark of an	Allum, Amber (white), Annis-seed,* Angelica, Aristolocia, Bole-	Alloes, Bezoar-stone (Oriental and unspecified), Camphire, Cinamon,	Eyes of Crab, Seed Pearls, Sugar (white,	Canary [wine], Dragons blood, Grains

651 BNL, Cod. 2259. José [Jozeph] Coelho, *Pharmaca, de Jozeph Coelho que fes sendo boticario no anno de mil e seis sentos e sesenta outo na botica da rua larga* (Em Coimbra, [1668]), from the section "De Simplicibus" and passim.

652 Penn Van Pelt MS Codex 626, 1678. "Hopestill Brett Her Booke 1678" on title page.

653 From John Shirley, *The Accomplished Ladies Rich Closet of Rarities* (London, 2nd ed, 1687), Items marked with a * indicate a drug potentially imported from both the Mediterranean basin and 'the Indies;' # denotes drugs that could have originated in England or in the Europe/Mediterranean region.

elder tree, Barrows-grease, Baum, Bay, Bettony, "blood of a dog dried," Broom-buds, Burdock-leaves, Calamus, Cardus, Castle-sope, Celendine, Centory, Cammomile, Cobwebs, Colophony, Diagredium, Eggs, English tobacco, English saffron, Elicampane roots, Eufrace, Eye-bright, Fennel, Fern-root, Flowerdelize, Groundsill, Harts-horn, Hearts of sheep, Henbane, Hellebore (white and black), Hog-Fennel, Honey, Hounds-tongue, Hysop, Lead, Lilly-roots, Onion, Oppoponax, Orobus (meal), Oyl of Brimstone, Lavender, Marjorum, Marshmallows, Mint, Mugwort, Nettles, Nightshade, Parsley, Petasitis root, Plantane, Pimpernel, Powder of Licoris, Quick-lime, red-Housleek, Ribwort, Roses, Rosemary, Rosin#, Rue, Rye-meal, Sage, Salgem, Salt, Scordium, Setwell, Ship-Pitch, Smallage, Snap-dragons, Spikenard, Sorrel, Stags-suet, St. Johns-wort, Swinesflesh, Thyme, Tormentillo?, Verdigrease, Vervein, Violet-flowers, Vinegar, Virgins-wax?, Walnuts (green), Water-cresses, Woodbine leaves, Wood-sorrel, Wormwood	Armonick, Castorum,* Citron, Claret, Corral (white),* Copperas?,* Curran[t]s, Cyprus-nuts, Juniper-berries, Lemon, Lime-juice, Malaga-wine, Mastick, Mithridate, Muscadel, Olive-oyl, Pomegranet-seed, Red wine, Rhenish-wine, Turbith [*Athamanta turbith*, southern Europe], Turpentine, Tuttiae [Tutty stone or *lapis tuttiae*], White Wine, Venice-treacle	Cloves, , Cubebs [*Piper cubeba*], Frakincense, Galbanum [*Ferula gummosa* resin, Iran], Gallengale [Galengal root], Ginger, Gum-dragant, Laudanum, Mace, Myrrh, Nutmeg, Olibanum [*Styrax benjamin?*], Saffron, Senna,	brown, and candy)	of Paradise
TOTAL: 97	**TOTAL: 29**	**TOTAL: 18**	**TOTAL: 3**	**TOTAL: 3**

Origin of drugs prescribed by the authors of Codex 388 (England, 1699-1703)[654]

Local (British Isles)	*Europe, Mediterranean*	*Asia, East Indies,*	*New World*	*Africa*
Babberys[?], Bearth-worte, Beere, Brooke-lime, Broom blossoms, Camamile, Chicken-weed, Crabb shells, Dead mans scull, Elderberrys, Green hopps, Head of a hedg-hog, Hunny, Ground-silly, Jacobs ladder, Lickerish, Maiden-hare, Mugwort roots, Mullet, Ossop, Parsley, pelitary of the wall [*Parietaria officinalis*], Polypodium roots, Planton, Pyany [peony] roots, Raven sculls, Red cows-milk, Red comfrey, Red-rose leaves, Red lead, Rosemary, Rue, Sage, Scurvygrass, Salt of vitriell [vitriol], Snaills, Sweet marjoram, Surrop of violets, Thunder-boult stone [evidently 'ceraunia,' an EME name for Paleolithic stone tools!], Water-cressis, White lead, Worm-seed	Annaseeds, Bol ammonack [Armenian and Levant bole], French Brandy, Gension [Gentian?], Harts-horn, Olive Oyl, Sallamoneck [Salamoniac], White wine	Camphor, Cenna, China, Long Pepper, Manna, Merr, Nutmeg, Powder of Rubarb,	Gum goacum [Guiacum?], Rum, Sassafras, Sarsasparilla, Sugar candy	Ivery
Total: 42 (69%)	**Total: 8 (9%)**	**Total: 8**	**Total: 5**	**Total: 1**

654 Penn Van Pelt, MS Codex 388, Account book and recipe book, 1699-1703, no page numbers. This was clearly a family miscellaneous notebook: the early pages are multiplication and addition tables evidently used by a school-child, also some calligraphy practice, then follow culinary recipes, recipes for 'physick,' notes on debts owed, and other miscellaneous business notes, all in a range of hands.

Origin of drugs prescribed by Mary Kittilby (England) in 1714:[655]

Local (British Isles)	*Europe, Mediterranean*	*Asia, East Indies*	*New World*	*Africa*
Adders-spear, Agrimony, Allum, Balm [?], Bay-Tree, Betony, Brook-lime, Bugle, Burrage, Bugloss, Burdock-Rinds, Carduus, Camomil, Charity, Cinqfoile, Colts-foot, Comfrey, Cowslip, Daisies and Daisy-roots, Dandelion, Deer-suet, Elecampane powder, Eringo-root (*Eringium maratimum*), Figs, Fir-tree-tops, Garden-Tansy, Garden Scurvy-grass, Germander, Golden-rod, Ground-pine, Hauthorn-buds, Herb-Robert, Honey, Horseradish-seed, Hyssop, Lavender, Lillies of the Valley Meadow-Saxifrage, Millipedes, Mint Mugwort, Mustard-Seed, New Ale, Osman-Royal [royal fern], Oyl of Brimstone, Oyl of Juniper, Oyl of Worms, Pimpernel, Plantain, Rape, Red-Sage, Ribwort, Rosemary, Rue, Sage, Sanicle, Scabious, Selandine, Shell-snails, Southernwood, St. Johns-wort, Solaman-seal, Speedwel, Syrup of Black-cherries, Syrop of Marsh-mallows, Syrop of Peach-blossoms, Tansy, Tormentil, Wake-Robin, Wall-nuts, Water-cresses, Wild Honey-suckle, Whitethorn flowers, Worm-seed, Wood-sorrel, Wormwood, Verum	Amber, Angelica, Annis-seed*, Broom, Burgundy-Pitch, Brandy, Bole-armoniac*, Citron-peel, Claret [wine], Coral,* Cork, Currants, Cyprus-Turpentine, Dates, Damask-Roses, Gentian, Harts-horn shavings, Lemon-peel, Neat-Oyl [?], Oranges-leaves, "Oyl-Olive", Poppies,* Raisons of the Sun, Rhenish [wine], Sage of Jerusalem, Saffron, Sevil-Orange-seeds, Sherry-Sack [wine], White-wine	Ambergris, Balm of Gilead, Cardamom, Cassia [*Cinnamomum aromaticum*?], Cinamom, China, Cloves, Frankincense, Ginger, Jujubes, Lignum aloes, Mace, Musk, Nutmegs, Rhubarb, Saffron, Sena, Smaragd [Persian emerald], Spic'd Diatragacanth [Tragacanth], Tamarinds, Termerick, Yellow Sanders [Sandalwood]	Balsom of Peru, Crabs-eyes, "Prepared Pearls"?, Sassafras, Sarsaparilla, Sugar-candy*, Virginia Snakeweed,	Dragon [Blood]
TOTAL: 79 (60%)	**TOTAL: 28 (17%)**	**TOTAL: 22**	**TOTAL: 7**	**TOTAL: 1**

Origin of drugs in "Miscelaneum Pharmaceuticum" (Traditional Galenic, Italy) c. 1700:[656]

Local (Italian peninsula)	*Europe, Mediterranean*	*Asia, East Indies*	*New World*	*Africa*
Acoro [*Acorus calamus*], Acqua di Latte [buttermilk], Adianto "chiamato Capil Venere" [Maidenhair fern, *Adiantum capillus-veneris*], Agarico, Alum, Ammoniaco [Sal ammoniac], Aristolochia, Assaro, Bedeguar "nasce in Toscana" [*Diplolepis rosae*], Berberi or "spina acuta" [hawthorn], Bittume "chiamato Asphalto," Brionio, Cartamo domestico, Centaurea, Ciclamino o Pan Porcino [Hogwort?], Euforbio [genus *Euphorbia*?], Eupatorio	Absinthio Romano [Roman or Pontic Wormwood], Ambra [Amber], Ammi "di Candia" [*Ammi visnaga*], Balsamo, di Macadeonia, e di Cipro," Brodo de Galli, Hermodatilo, Riccino [*Ricinus communis*], Sarcocolla [genus *Sarcocolla*]	Aloe, Amomo [genus *Amomum*, cardamom], Assa fetida [Asafoetida], Bdellio, "Been, sive Ghianda Unguentaria" [*Moringa olefeira* or "Ben tree"?], "Been "d'Armenia," Bengivi "d'un Arbore delle Indie," Blante Bisantie "dalli Arabi," Bollo Armeno [Armenian bole], Borace	Balsamo occidental [?]	N/A

655 From Mary Kittilby, *A collection of above three hundred receipts* (London, 1714), "A Collection of Receipts in Physick and Surgery," 129-218. Items marked with a * indicate a drug potentially imported from both the Mediterranean basin and 'the Indies.' N.B., ownership by a woman is indicated by "Kathy Brooke Book 1718" written on the title page. For more on the role of women in medical alchemy see Jayne Elizabeth Archer, "Women and alchemy in early modern England" (Unpublished Ph.D. dissertation, Cambridge, 2000).

656 Van Pelt Library MS, Codex 527, anonymous, "Miscelaneum Pharmaceuticum," c. 1700. This MS appears to be a modified transcription of the *Ricettario Fiorentino* [Florentine Pharmacopeia] of 1573.

[genus *Eupatorium*?], Fumaria, Ginestra, Hyssopo, Iride, Nitro [saltpeter], Opopoanace [*Opopanax chironium*], Polipodio [genus *Polypodium*], Prune, Psillio, Rose, Serapino, Sale [salt, various kinds listed], Stecados [*Lavandula stoechas*, Spanish lavender?], Thimo, Timelea [*Daphne mezereum?*], Turbith, Viole

"d'Armenia, Cassia Fistola, Lapis Armeno, Lapis Lazuli, Manna, Mirabolani cheboli [*Terminalia chebula*], Mirabolani citrini [Terminalia citrina], Mirabolani delli Indii, Rhabarbaro [Rhubarb], Scammonea "d'Antiochia" Senna, Tamarindi,

Origin of drugs in Penn Codex 785 (English, 1711-1726):[657]

Local (British Isles)	*Europe, Mediterranean*	*Asia, East Indies*	*New World*	*Africa*
Ale, Agrimony, Balsam of Sulphur, Bayberries, Bay Salt, Brimstone, Brooklime, Bugloss, Camomile, Celandine, Elder blossoms, Isop[hyssop], Lavender, Garlick, Hops, Lillyroots, Lime [mineral], Marshmallows, Pimpernel, Rosemary, Sage, Sheeps foot, Spirits of scull, St. Johns wort, Treacle?, Wild Thyme, Pennyroyal, Pellitory of the wall, marjoram, Mint, Balm, Cowslips, Marygolds, Wood Sut[?], Wormwood, Violets	Angelica, Anniseeds, Bitter almond, Brandy, Citrons, Currants, Lemons, Limes, Malmsey [wine], Oil of turpentine, Oranges, Raisins of the Sun, Roach allom, Spirit of hartshorn, White wine, Roman wormwood	Aloes, Bole ammoniac, Camphor, Cloves, Cinnamon, Frankinscense, Galangall, Ginger, Gum Benjamin, Long pepper, Myrhh, Nutmeg, Parma Cetty [spermaceti], Poppies, Storax	Balsom of Peru	Dragonsblood,

Origin of drugs Manuel Ferreira de Casto shipped to Rio (Apothecary, Portuguese, 1738):[658]

Local (Portugal)	*Europe, Mediterranean*	*Asia, East Indies*	*New World*	*Africa*
Agrimonia, Alcassies, , Almeirão, Amendoas doces, Ameiocas, Aristolachia, Aypo, Azebre?, Baga de Louro?, Bardana, Bertonica, Bisnaya?, Borrages, Cardo santo, Centauria, Cevada?, Chicoria, Cinabrio Nativo, Coentro, Coralina, Dronideiras?, Escabrioza, Esquinanto, Espargo, Flizopia?, Flora terestre, Fragarias, Fumaria, Lingoa de Vasa?, Lorna, Luparas, Marmelos, Massans [apples], Neveda, Pinpinelas, Rozas, Sabugo, Scordioneira, Tucilago, Violas, Visco quercino?,	Agarico, Alcatira Branca?, Assafrão?, Cascas de romans azedas, Genciana, Gilbarbeira, Jujubas, Linhaca Galega, Macela galega, Orinodatilos, Raspas de viado, Rozas de Toledo,	Alcanphor, Almeciga da India, China, Laudano Opiado, Mirabolanos, Mirrha, Mumia, Nos Moscada, Ruibarbo, Salsa da Orta, Tamarindos	Amargosos?, Asucar, Balsamo Peruviano, Cascas de pao santo, Jalapa, Salça parilla, Quinaquina	Sangue do Drago,

657 Van Pelt Library MS, Codex 785, "Recipe book."

658 AN/TT Livros dos Feitos Findos no. 85 - Livro de Carregações de Productos de Botica de Manuel Ferreira de Castro, (1738-1750s, Lisbon), "Carregação que Manda ir Antonio de Lima Gomes, surgião… para o rio de Jan[eiro]," ["Cargo sent to Rio de Janeiro on behalf of of Antonio de Lima Gomes, surgeon"], fol. 3r-5r. Ferreira de Castro's self-assigned category of "Xaropes" [syrups or compound drugs] have not been listed because I've been unable to trace the constituent ingredients in most of them. The same holds true of "Unguentos" [Unguents] and "Impostos" [Plasters].

Appendix C

List of drugs shipped to Bahia by the Lisbon apothecary Manuel Ferrera de Castro, 1738

The following transcription is from a commonplace book held by the Arquivo Nacional da Torre do Tombo in Lisbon [PT/TT/LFF/0085: Livro de Carregações de Productos de Botica de Manuel Ferreira de Castro]. It is a large, leatherbound notebook written in several hands over the course of two decades, seemingly the account ledger kept behind the counter in a Lisbon apothecary shop maintained by one Manuel Ferrera de Castro. It records debts owed and paid, memoranda, arithmetical jottings, and, most significantly, several lists of drugs shipped to the colonies on different years, along with their weights and prices.

These lists present the tantalizing possibility of obtaining a set of price series for the different drugs vended by Lisbon's *boticarios*. Something similar has been achieved by Patrick Wallis at the LSE, who studied rate books recording tarrifs on drugs imported into London. Nothing similar is possible in Lisbon owing to the destruction wrought by the 1755 earthquake and tsunami, which leveled the warehouses, import offices and mercantile concerns of the port area and destroyed almost all attendant documents. Castro's commonplace book thus offers an exceptionally rare glimpse into the economics of the drug trade in the Portuguese empire. It merits much further study in a standalone article, but for now I have included a transcription of one entry in the book, which recorded a shipment of drugs Castro sent to an apothecary named Luiz Forte de Bairos in the Brazilian capitol of Bahia in 1738. I have retained Castro's own organizational structure (splitting the goods into different categories of drug, like "simples" and "unguents") as well as his notation style, which records first the drug name, then the weight shipped, then the price in *reis*. Where I have been able to determine the English name of a drug, I've included it in brackets.

Simples

Salcaparilha 8 lb - 3840 [Sarsaparilla]
Senn. da Lapata do Milhor 8 lb 5600
Nan. com de Sezilia? 8 lb 10400
Aludiade em pedra 32 lb 1920
Incenso de Lagrima 9 lb 960 ["Incense of tears"]
Pedra hume Cruda 8 lb 640
Verdeta 2 lb 1200
Alcatira 1 lb 600
Ponta de Viado 1 lb and 1 dramme 400 [Elks horn]
Sangue de Drago 1 lb 1 dr. 900 [Dragonsblood]
Coral Vermilho 1 lb 800
Cremor de tartaro 4 lb 600 [Cream of tartar]
Raspas de viado 1 lb 400 [Powdered stag's horn.]
Tromentina Fino de Veneza 16 lb 3840
Olivio 4 lb 280 [Olives]
olhos de carang. 1 lb 1 dr. 600 ["eyes of crab"]
Hermodatilos 1 lb 480 ["Hermodactyl" root]
tutian em rama 3 lb 600
Cristal Montano 1 ounce 60 ["Mountain crystal"]
Pedra Medicamentoza 1 ounce 100
Panacea Mercurial 1/2[?] ounce 480 [Mercury]
Spermacetti 2 ounce 240 [Sperm whale]
Cranio humano 1/2[?] ounce 200 [Human skull]
Bezoartico do Curvo 4 oz 4800 [the false bezoar stone of João Curvo Semedo]

Trociscos de Fiorovanto 4 oz - 2000
Mehoacuo? 1/2lb 300
Ameixas 37 lb 1200 [dried plums]
Seuda? 2 Algueres 480 [suet?]
Trociscos de Alandal 1/2 oz 200 [Extract of bitter cucumber].

AGOAS [WATERS]

de Seorsioneira 2 frascos 720 [scorcion]
Papoulas 2 fr. 300 [poppy]
cardo santo 2 fr 600 [holy thistle]
"Flor de Sabugo" 2 fr 720 [elderberry water]
erva cidrinha 2 fr 480
sereigas negras 2 fr 900
borrages 2 fr 300 [borrage water]
de almeixão 2 fr 300 [lettuce water?]
Agoa canela seleta 1 lb 960 [cinnamon water]
Spirito de Vinho2 lb 800 [brandy]
Spirito de Sal armoniac 1 oz 160 [sal ammoniac]

XAROPES [SYRUPS]

Rozado simples 5 lb 1500 [rose syrup]
espicamento de Mel Rozado 5 lb 1600 [rose honey]
avreo 5 lb 2400
perdico 5 lb 3000
Murtinhos 5 lb 1200
chicoria de niculao 3 lb 1500 [chicory]
arrobe de sabugo 3 lb 900 [elderberry]
sumo de marmelos 3 lb 720 [marmalade]

OLEOS [OILS]

Rozado 5 lb 1200 [rose oil]
de Violas 5 lb 1500 [violet oil]
Amendoas doces 3 lbs 960 [sweet almond oil]
Tromentina destilado 1 lb 1200
de Castorio 1 oz 80 [castor oil]
de Noz Moscada expreso 1 dramme 600 [nutmeg oil]

UNGU[EN]TOS [UNGUENTS]

deropelativo de Cumos[?] 1 lb 0$360
Avreo 1 lb 0$240

EMP[O]STOS [PLASTERS]

de Rans[?] com Mercurio 2 lb 1$000
Olios[?] Zacarias 2 lb 0$200
Consortativo 2 lb 0$800
di Aquilão Menor 2 lb 0$720
Di Apalma 2 lb 0$720
De Galbano 1/2 lb 1$600 [galbanum gum]
Di Aquilão gomado 1 lb 0$600
Di Aquilão Major 1 lb 0$480

SALSAS

Triaga Alagna 4 ounces 0$400
Triaga de esmeraldas 2 ounces 0$240 [emerald treacle]
Philonio Rumano 1 ounce 0$160
Philonio Perdico 1 oz. 0$160
Asucar dorado de Comer 12 lb 1$800
Conserva de Violas 1 lb 0$600 [conserved violets]
Pirolas Cochias[?] 1 oz 0$240
Pirolas Agregativas 1 oz 0$240
Angelicas 1 oz 0$240 [angelica root]
Pirolas Lucidas 1 oz 0$300
Raizes Brazias Alarina 1 lb 0$960
Scorsioneira 3 lb 0$360 [scorcion]
Almirão 1 lb 0$120
Lingoa de Vaca 1 lb 0$150 [cow's tongue (a plant)]
De Borrages 1 lb 0$200 [borrage]

ERVAS [HERBS]

Maluas molhos no.: 24 0$120
Violas molhos no: 40 0$300 [ground violets]
Olacula galega molhos numero 40 0$240
Salva molhos no: 20 0$160
Bertonica molhos no: 20 0$160 [ground bertonica]
Alfarima 3 lb 0$640
Alecrim 2 lb 0$200 [rosemary]

FLORES [FLOWERS]

Cordeais 1/2 lb 0$400
Papoulas 1 lb 0$480 [poppy]
Cascas de Romans 1/2 lb 0$080

RAIS [ROOTS]

de lonna[?] 1 oz 0$200
Sentaurias 1 oz 0$150 [centaury]
de Tramago[r]a? 1 oz 0$150

SEMENTES [SEEDS]

erva doce 1 lb 0$180
cominhos 1/2 lb 0$200
Mirabolanos Citrinos 1/2 lb 0$240 [mirabolans]

[MISC: BOOKS, TOOLS AND EXPENSES]

Um livro de Medicina de Mirandela 3$000 [a book of medicine by Mirandela]
Dais Livrinhos spirituaes Corte leseste 0$200 [Spiritual books]
Custarao 27 trascos[?] que vão 2$700
Custarao 3 garafas e 7 vidras pequenas 0$360 [containers and glasses]
Custarao 11 folhas entre peguem e gr[an]des? 1$100 [paper]
custarao 2 bocetas
custou sinco sacos que vao, e pano para o Livro 0$450
custou o cuchou[?] efectio delle 1$420
custou levalo a bordo da agoa 0$300
custou a fragata levalo ao Navio 0$400
custou deles pachos do Consoldado o mais p.[?] 1$920

Total: 105$100

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