

2 The Demands of Humanity

The cinchona, placed in the dominions of his Majesty, [...] is, on account of its virtue, a specific of the first necessity. Its extraction ought to attract tribute to Spain from all the nations (*debe atraer a España el tributo de todas las Naciones*): but it must be handled abiding by constant rules that preserve it in the abundance, goodness, and at the moderate price that humanity demands.

– Antonio Caballero y Góngora to José Gálvez, October 19, 1786.

On May 14, 1800, Luis François de Rieux (1768–1840), chief physician at the Royal Hospital in Cartagena de Indias, wrote to Miguel Cayetano Soler y Rabassa (1746–1808), then Minister of Finance of the Spanish Empire, to advise him about the importance of extensive, structured and equitable world trade in cinchona bark. Cinchona being, he wrote,

the most important, and the most usual remedy that medicine possesses (*siendo la quina el Medicamento más importante, y el mas usual que posee la Medicina*); humanity demands, and justly so, that this medicament of first necessity reach our hands without the fraud it has so often suffered hitherto, and at the most equitable price, in order that not even the poor, the most numerous in all the countries and the worthiest of a monarch's piety, whose resources are scarce, be deprived of a remedy on the administration and faithfulness (*fidelidad*) of which the lives of men depend so many times.¹

Luis François de Rieux, 'full of ideas [...] about the rights of man [...] acquired in France, where he had his cradle', was by no means the only contemporary to aver that his efforts on behalf of cinchona originated in his concern for humanity.² On the contrary, the presumption to speak and act not only in the name, but for the betterment, of a universal humanity is one we find recurrently, in the treatises and decrees of Spanish colonial officials, British physicians and French naturalists

¹ Rieux, 'Carta a Miguel Cayetano de Soler,' 346 v.

² For biographical references to Luis de Rieux, see Manuel Salvador Vázquez, 'Las quininas del norte de Nueva Granada,' in *Enfermedad y muerte en América y Andalucía (siglos XVI–XX)*, ed. José Jesús Hernández Palomo (Sevilla: CSIC, 2004), 421.

alike – writers accounting for their endeavours in regulating or intensifying cinchona commerce, like Rieux, and also in investigating its therapeutic properties or locating inexpensive substitutes outside the Spanish American harvest areas.³ Part of a wider Enlightenment discourse, which consistently claimed both to address and represent the ideal collectivity of humanity,⁴ the equitable distribution of faithful, and inexpensive cinchona was, though by no means the only project of enlightened medicine,⁵ one that to many physicians, naturalists and colonial officials ‘merited the utmost attention’.⁶

Probing the enlightened discourse that cinchona was in the service of humanity, this chapter endeavours to situate, measure and define the ideal collectivity of beneficiaries invoked by cinchona’s advocates during the late 1700s and early 1800s. It exposes and examines how cinchona and knowledge of it travelled across and between societies within, or tied to, the Atlantic World by setting out the structure, volume and reach of trade in cinchona. Though scholarship on the general volume of Spanish bark trade,⁷ as well as the Crown’s inability to generate significant profits

³ On September 24, 1786, Antonio Caballero y Góngora wrote about the relevance cinchona had for ‘humanity’. Antonio Caballero y Góngora, ‘El arzobispo Virrey da cuenta,’ *Archivo General de Indias*, Indiferente 1554, Santa Fé, 1786-09-24. Hipólito Ruiz López likewise stressed the importance of a better understanding of the various cinchona species for the sake of ‘all of humankind’ (*todo el género humano*). Ruiz López, *Quinología*, 2. The physician Richard Dancer likewise referred to ‘humanity’ (*hominum generi*) in his Edinburgh doctoral dissertation on cinchona. Richard Dancer, *Dissertatio Medica Inauguralis de Cinchona* (Edinburgh: C. Stewart, 1809), 2. For an example from the French colonial context, see Joseph Gauché’s appeal to the Royal Society of Medicine (La Société Royale de Médecine) to study ‘that bark’s efficacy’ ‘for the good of humanity’: Gauché, ‘Description d’un Quinquina indigène à St. Domingue.’ The French quest for substitutes was often justified by means of its benefits for ‘humanity’. Mallet, *Sur le Quinquina de la Martinique, connu sous le nom de Quinquina-Piton*, 1–2. Accusations of ‘adulteration’ of the bark were also often phrased around the writers’ concern for ‘humanity’. Padréll et Vidal, ‘Dissertation sur l’usage et l’abus du quinquina,’ 4–5.

⁴ On the discourse of ‘humanity’ in the Enlightenment, Daniel Brewer, *The Enlightenment Past. Reconstructing Eighteenth-Century French Thought* (Cambridge: Cambridge University Press, 2008), 21.

⁵ On the discourse of ‘humanity’ in relation to medicine, especially smallpox inoculation, see Martha Few, *For All of Humanity. Mesoamerican and Colonial Medicine in Enlightenment Guatemala* (Tucson: University of Arizona Press, 2015), 4.

⁶ José Celestino Mutis, ‘Carta testimonial de Mutis al dr. Francisco Martínez Sobral,’ in *José Celestino Mutis*, ed. Federico Gredilla (Bogotá: Academia Colombiana de Historia, 1982 (1789)), 119.

⁷ The most important works on the subject are those by Antonio García-Baquero González and Miguel Jaramillo Baanante. Antonio García-Baquero González, *Cádiz y el Atlántico (1717–1778)*, 2 vols., vol. 1 (Cádiz: Diputación Provincial de Cádiz, 1988); Miguel Jaramillo Baanante, ‘El comercio de la cascarilla en el norte peruano-sur ecuatoriano: evolución de impacto regional de una economía de exportación, 1750–1796,’ in *El Norte en la Historia Regional. Siglos XVIII–XIX*, ed. Scarlett O’Phelan Godoy and Yves Saint-Geours (Lima: IFEA-CiPCA, 1998).

from it,⁸ is quite extensive, the geography of that commerce beyond Spain and within the various consumer societies around 1800 has hitherto received little comprehensive attention.⁹ Drawing on regional accounts of bark consumption as well as on trade statistics, medical treatises and the extensive Spanish administrative record on the subject, this chapter charts the bark's material availability by means of commerce and contraband as well as concomitant, non-commercial forms of distribution – charitable giving, medical relief programmes and diplomatic gift exchange – between 1751 and 1820. Preparing the ground for subsequent chapters concerned with the movement of consumption practices and expertise in indications, the chapter outlines, in the first part, the catchment and volume of Atlantic trade in the bark. In the second part, the chapter sketches the trade's routes and its reach, from the Spanish and Portuguese American possessions to North America and the Caribbean, Europe, northern and coastal Africa and the eastern Mediterranean, as well as the eastern reaches of the Spanish, Portuguese and Dutch empires in South and East Asia. The third part of the chapter is concerned with the trade's social reach within these societies – with the inner contours of the 'ailing mankind'¹⁰ that benefitted from that remedy. As various historians have argued, though medicine trade across the Atlantic basin was lively and extensive around 1800, a set of substances – rhubarb,¹¹ opium¹² and cowpox lymph¹³ – stood out for their exceptional importance, that is, their higher consumption and their

⁸ Matthew J. Crawford's *The Andean Wonder Drug* highlights Spain's inability to generate significant profits from the bark trade and to defend its 'natural' monopoly from Dutch, Portuguese, British and French trade and, especially, contraband.

⁹ Even the most recent contributions in the field do 'little to explore [the bark's] medical utility outside Spain' or 'to trace the smuggling routes' and other unofficial conduits that distributed 'the Peruvian bark', as one of the book's reviewers put it. David Sowell, review of *The Andean Wonder Drug: Cinchona Bark and Imperial Science in the Spanish Atlantic, 1630–1800*, by Matthew James Crawford, *American Historical Review* 122, no. 3 (2017). Some world areas are particular 'blind spots'. As Saul Jarcho put it in 1993, 'the spread of Peruvian bark into [...] the Orient and the Americas, has failed to attract, even incidentally, the attention of [...] historians. Jarcho, *Quinine's Predecessor*, 94.

¹⁰ Baumes, *Traité des fièvres rémittentes et des indications qu'elles fournissent pour l'usage de quinquina*, 2, 3.

¹¹ On rhubarb, see Clifford M. Foust, *Rhubarb. The Wondrous Drug* (Princeton, N.J.: Princeton University Press, 1992).

¹² On opium in the eighteenth century, see, for instance, Maehle, *Drugs on Trial*, chapter 3.

¹³ Benjamin A. Elman, *A Cultural History of Modern Science in China* (Cambridge, Mass.: Harvard University Press, 2006), 109. On smallpox inoculation in Spanish America, see, Few, *For All of Humanity*. On East Asia, see Ann Jannetta, *The Vaccinators: Smallpox, Medical Knowledge, and the 'Opening' of Japan* (Stanford, Calif.: Stanford University Press, 2007).

wider reach.¹⁴ The Peruvian bark was commonly the most valued and used of them from the Americas.¹⁵ It was thus, the chapter holds, though perhaps not quite the single ‘most important, and usual remedy that medicine possesse[d]’, yet one of the best-known and most peripatetic medicinal substances to run through the warp and weft of Atlantic trade in pharmaceuticals during the late 1700s and early 1800s. Its journeys offer, as such, an important and rare window into the reach and workings of plant trade, epistemic brokerage and therapeutic exchange in that period.

World Bark Trade

According to the trade series compiled by Antonio García-Baquero González in his classical *Cádiz y el Atlántico* (Cádiz and the Atlantic), Spain imported a total of more than 223,932 *arrobas* – equalling 2,575 tons, on average 83 tons per annum – of cinchona from all of its Spanish American ports between 1747 and 1778, alongside various other medicines: 64 tons of various purges, 5 tons of copal, 3.9 tons of balsams, 7 kilograms of contrayerba and 4 tons of sarsaparilla.¹⁶ At the time, most of the bark came to Cádiz – Spain’s key port for the monopoly trade with the Americas from 1717 to 1778 – from the Viceroyalty of Peru, from whence it would have sailed the route around Cape Horn.¹⁷ The exploitation of America’s natural resources by the Spanish Crown had reached unprecedented heights by the second half of the eighteenth century, principally under the rule of Charles III (1716–1788, r. 1759–1788),¹⁸ and the Crown’s efforts to increase cinchona imports had by then already borne fruit. According to García-Baquero, between 1717 and 1738 Spain had only imported a total of some 24,293 *arrobas* – 279 tons, some 13 per annum – of cinchona.¹⁹ In recent years, various historians,

¹⁴ Much of the rapidly expanding literature on early modern global and Atlantic drugs trade has emphasized the prevalence of a small number of – five to ten – medicinal substances that dominated the market, with cinchona invariably being numbered as one of them. See, for instance, Walker, ‘The Medicines Trade in the Portuguese Atlantic World,’ 5; Benjamin Breen, ‘Empires on Drugs: Materia Medica and the Anglo-Portuguese Alliance,’ in *Entangled Empires: The Anglo-Iberian Atlantic, 1500–1830*, ed. Jorge Cañizares-Esguerra (Philadelphia: University of Pennsylvania Press, 2018), 602; Wallis, ‘Exotic Drugs and English Medicine,’ 31–33; Bleichmar, *Visible Empire*, 145–46.

¹⁵ García-Baquero González, *Cádiz y el Atlántico*, 1, 340; Wallis, ‘Exotic Drugs and English Medicine,’ 31–33; Stefanie Gänger, ‘World Trade in Medicinal Plants from Spanish America, 1717–1815,’ *Medical History* 59, no. 1 (2015), 47.

¹⁶ García-Baquero González, *Cádiz y el Atlántico*, 1, 340–41. ¹⁷ *Ibid.*, 275.

¹⁸ On Charles III and his pursuit of natural science, for the benefit of the empire, see Paula De Vos, ‘Natural History and the Pursuit of Empire in Eighteenth-Century Spain,’ *Eighteenth-Century Studies* 40, no. 2 (2007), 217.

¹⁹ García-Baquero González, *Cádiz y el Atlántico*, 1, 336–51.

adducing additional documentary evidence, have adjusted García-Baquero's figures upwards, suggesting that Cádiz imports may have been, at least for some periods of time, significantly higher than the amounts established to date. Studies have suggested that 314 tons reached Cádiz in 1755,²⁰ a year for which García-Baquero had counted 291 tons, 23.4 tons in 1769,²¹ a year for which García-Baquero had calculated 5.4 tons, and more than 259 tons per annum between 1761 and 1775,²² a 14-year period for which García-Baquero had assumed an average of 63.5 tons per annum. These figures may be precipitate, but they suggest that García-Baquero's are, at the very least, conservative figures. In the era of free trade between 1778 and 1796, when other peninsular ports were allowed to trade with Spanish America, cinchona commerce flourished along with an overall growth in imports from Spanish America.²³ Spanish merchants, according to recent historical studies, handled an average of more than 321 tons of cinchona per annum between 1775 and 1779, some 137 tons in the 5 years between 1780 and 1784, an average of 451 tons per annum in the years 1785 to 1789, and 224 tons per annum between 1790 and 1794.²⁴ Warfare would have caused serious temporary disruptions in the flow of trade, as the historian Miguel Jaramillo Baanante has argued, and may well account both for the decline in imports over the 5-year period between 1780 and 1784 – Spain entered the Anglo-French War (1778–1783) in 1779 – and their steep rise between 1785 to 1789, owing to stocks that would have accumulated during the war.²⁵ As Jaramillo Baanante has suggested, the normal volume would have oscillated around the 224 tons of the subsequent 5-year period (FIGURE 2.1).²⁶ Peninsular ports received the largest share of Spain's bark imports. Other lesser, official

²⁰ Luz del Alba Moya, *Auge y Crisis de la Cascarilla en la Audiencia de Quito, Siglo XVIII* (Quito: Facultad Latinoamericana de Ciencias Sociales, Sede Ecuador, 1994), 41.

²¹ Juan Riera Palmero, 'Quina y malaria en la España del siglo XVIII,' *Medicina & Historia. Revista de estudios históricos de las ciencias médicas* 52 (1994), 21.

²² According to Dora León Borja, between 1761 and 1775, as much as 259 tons of cinchona left the port of Callao for Cádiz annually, at a time when further exports would have reached Spain from the ports of Veracruz and Cartagena. Leon Borja, 'Algunos datos,' 101–02.

²³ John Fisher, *Commercial Relations between Spain and Spanish America in the Era of Free Trade* (Liverpool: Centre for Latin American Studies, University of Liverpool, 1985), 60–64.

²⁴ Jaramillo Baanante, 'El comercio de la cascarilla,' 661. Other historians' calculations roughly confirm these figures. According to Juan Riera Palmero, more than 20,000 *arobas* – some 230 tons – were handled by Spanish merchants in 1788, some 438,026 *libras* or 201 tons in 1789, some 15,000 *arobas* or 172.5 tons in 1791 and 250,000 *libras* or 115 tons in 1794. Riera Palmero, 'Quina y malaria en la España del siglo XVIII,' 21.

²⁵ Jaramillo Baanante, 'El comercio de la cascarilla,' 66. ²⁶ *Ibid.*

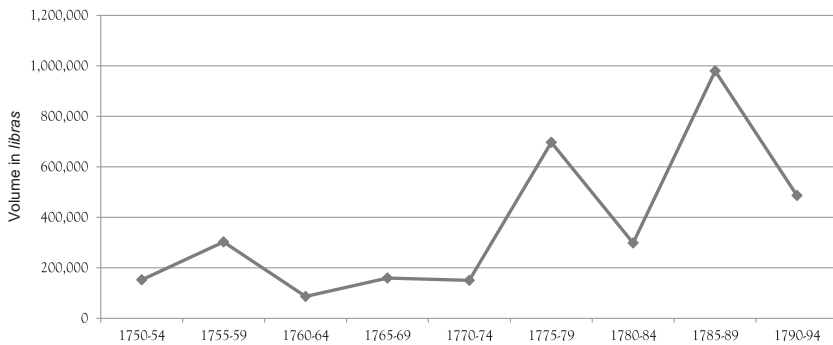


Figure 2.1 Volume of official cinchona exportations to peninsular ports, with 5-year averages.

Adapted from Miguel Jaramillo Baanante, 'El comercio de la cascarilla en el norte peruano-sur ecuatoriano: evolución de impacto regional de una economía de exportación, 1750-1796,' in *El Norte en la Historia Regional. Siglos XVIII-XIX*, ed. Scarlett O'Phelan Godoy and Yves Saint-Geours (Lima: IFEA-CiPCA, 1998), graphic 1.

transportation routes, however – along the continent's shores to ports in the Viceroyalties of New Spain, to the Spanish Philippines, or the United States²⁷ – would have added to the roughly 220 to 230 tons of cinchona traded legally and formally every year during the late 1700s.

There is agreement among historians that the amounts of cinchona handled by Spanish merchants were but a fraction of the overall volume of bark trade. Though the exact routes and the volume of illegal trade in cinchona elude us – the difficulty of following cinchona onto a contrabandist's vessel or through the bustle of a marketplace renders any mapping or quantification necessarily fragmentary – the paper trail in Spain's archives leaves little doubt that foreign merchants handled a significant volume of contraband and that Spain faced 'much difficulty' in closing the trade's many 'gateways and entries'.²⁸ Portuguese, British,

²⁷ By the first decade of the nineteenth century, the United States directly imported from the port of La Guaira in Venezuela bags of cinchona bark. Jacques A. Barbier and Allan J. Kuethe, *The North American Role in the Spanish Imperial Economy: 1760–1819* (Manchester: Manchester University Press, 1984), 167. According to Alexander von Humboldt, 1030 *libras* of cinchona reached the port of Veracruz, in the Viceroyalty of New Spain, in 1802. Alexander von Humboldt, *Ensayo político sobre el reino de la Nueva España*, trans. Vicente Gonzalez Arnao, vol. 4 (Paris: Rosa, 1822), 74.

²⁸ As José García de Leon y Pizarro, the president-regent of the Kingdom of Quito, remarked in 1782, 'many were the gateways and entries of this commerce [in cinchona] today; and to close them one faces much difficulty and one requires an infinite number of guards'. 'Expediente y cartas de José García de Leon y Pizarro.' *Archivo General de Indias*, Indiferente 1554, Quito, 1782-08-18. On the importance, and elusiveness, of contraband, see also Jaramillo Baanante, 'El comercio de la cascarilla.'

Dutch and French contrabandists, overcoming the Spanish government's efforts to restrict trade with its colonies, frequently acquired cinchona directly from the harvesters in the Viceroyalties of New Granada and Peru. The inhabitants of the Dutch colonies of Surinam, Berbice and Essequibo in Guyana, for instance, were often accused of entering the Orinoco River 'under the pretext of fishing', and of trafficking cinchona in exchange for clothes with the harvesters.²⁹ For the latter, the attraction of selling their yield to smugglers and other unauthorized buyers presumably lay both in their more liberal pay and lesser concern with quality. As the governor (*corregidor*) of Loja, Pedro Xavier de Valdivieso y Torre (d. 1786, r. 1773–1784), put it, Loja bark cutters could always be sure to sell their yield to contrabandists who, 'unconcerned with [the bark's] quality (*sin reparar en calidad*)', paid 'three, and four *pesos* for an *arroba*',³⁰ where Crown officials would confiscate barks on account of their supposed worthlessness, and 'pretend to burn them'.³¹ Several of the foremost cinchona merchants in Cuenca and Loja were also repeatedly accused of engaging in contraband with foreigners.³² The Archbishop and Viceroy of New Granada, Antonio Caballero y Góngora (1723–1796, r. 1782–1789), was convinced that ample contraband in cinchona passed through the territories occupied by the Guajiros – one of many areas in the Americas the Spanish Crown controlled but nominally – along the River Hacha.³³ The Guajiros, 'the most troublesome tribe in the viceroyalty of New Granada' in the eyes of contemporary observers, were 'numerous and bold', and as 'a commercial tribe' were known to have 'considerable intercourse with the British and Dutch, who provide them with goods, slaves, and fire-arms'.³⁴ Another gateway for cinchona smugglers that Spanish officials found it difficult to

²⁹ 'Testimonio de los Autos, sobre que se establezcan el estanco de la Quina, o Cascarilla, en virtud de la real orden de S. M.,' *Archivo General de Indias*, Indiferente 1554, Cuenca, 1776-07-29 / Villa Orellana, 1776-08-18, 937.

³⁰ Pedro Xavier de Valdivieso y Torre, in a report to José García de León y Pizarro, dated as of February 21, 1782. 'Sobre la conservacion de Montes de Cascarilla de la Prov.a de Loxa y proveymiento de este Genero para la Real Botica,' *Archivo Nacional de la Historia*, Quito, Fondo General, Serie Cascarilla, Caja 2, Expediente 11, Loja, 1782-02-21 / 1783-04-27, 2–3.

³¹ José García de León y Pizarro, 'El Conde de Casavalencia informa difusamente sobre la representación del corregidor de Loxa y del Botanico encargados del acopio de Quina,' *Archivo General de Indias*, Indiferente 1556, Madrid, 1795-11-14, 178.

³² Moya, *Auge y Crisis de la Cascarilla*, 179.

³³ Antonio Caballero y Góngora, 'El Arzobispo Virrey de Santa Fé Informa à V.E. el testimonio indirecto que ha tenido de las clandestinas extracciones de Quina que hacen los extranjeros en las costas septentrionales del Reyno,' *Archivo General de Indias*, Indiferente 1554, Carta 315, Santa Fé, 1782–1789.

³⁴ John Pinkerton, *Modern Geography. A Description of the Empires, Kingdoms, States, and Colonies; with the Oceans, Seas, and Isles; in all the Parts of the World: Including the most*

close was the border with the Portuguese Viceroyalty of Brazil. Officials frequently reported that Portuguese contrabandists shipped cinchona out of the Andes via the Marañon River in quantities sufficient to 'fill the entirety of Europe with it'.³⁵ With its source in the Andes, the Marañon runs northwest along the eastern base of the Andes before it turns eastward to meet the Ucayali River, together forming the Amazon River, which flows into Portuguese territory. Other instances of contraband apparently happened outside the harvest areas, at the stopovers along cinchona's shipping routes. Theft of legal exports was common, with the bark's lightness and low volume – it was usually shipped in the shape of fine, dried chippings – making it an easy target for small-scale smuggling. Spanish pharmacists often complained that boxes of cinchona reached them half empty, with evident traces of having been opened elsewhere – their nails removed or their leather straps cut – and with the cinchonas in them 'replaced with other rotten, dirty' barks.³⁶ In the late 1700s, Spanish officials persistently sought to avoid the exportation of cinchona through the empire's Caribbean ports. The Caribbean, with its many isolated beaches and coves, and with the major European colonial powers controlling multiple non-contiguous territories, was at the time the ultimate place for merchants to transgress the policies and statutes that impeded their ability to transact exchanges with one another.³⁷ The exportation of cinchona via Ocaña, on the Magdalena River northwards to the Caribbean port of Santa Marta, for instance, though it was comparatively inexpensive, was usually discouraged because it had the disadvantage of attracting contraband from 'foreign islands'.³⁸ So was the bark's extraction through the ports of Portobello or Cartagena.³⁹ The British colony on the island of Grenada in the south-eastern Caribbean – ceded to Britain by the treaty of Paris in 1763 – was generally thought to

Recent Discoveries and Political Alterations, 2 vols., vol. 2 (London: T. Cadell and W. Davies, Strand, 1817), 662.

³⁵ 'Expediente y cartas de José García de Leon y Pizarro.' Saul Jarcho also found evidence for early smuggling via the Marañon River. Jarcho, *Quinine's Predecessor*, 196–98.

³⁶ Joseph Diguja, 'El Excelentísimo Señor Bailio Frey Don Julian de Arriaga, con fecha de siete de Mayo de este presente año, y de R. Orden, me previno,' *Archivo General de Indias*, Indiferente 1554, Quito, 1773–12–20. On replacement of cinchonas with false, or putrid, barks, see also Crawford, *Empire's Experts*, 127.

³⁷ Alan L. Karras, 'Transgressive Exchange. Circumventing Eighteenth-Century Atlantic Commercial Restrictions, or the Discount of Monte Christi,' in *Seascapes. Maritime Histories, Littoral Cultures, and Transoceanic Exchanges*, ed. Jerry H. Bentley, Renate Bridenthal and Kären Wigen (Honolulu: University of Hawai'i Press, 2007), 122.

³⁸ Caballero y Góngora, 'Copia de Carta Reservada.'

³⁹ Moya, *Auge y Crisis de la Cascarilla*, 33; Jaramillo Baanante, 'El comercio de la cascarilla,' 58; 62.

serve as a key entrepôt for contraband trade with cinchona,⁴⁰ as was Curacao, the most important Dutch transshipment port for illicit trade.⁴¹ In other cases, shipments of cinchona coming from Spanish America were taken by British galleons. A Spanish shipment was taken just outside Cádiz in 1804,⁴² and the same occurred with a shipment destined for Bordeaux in 1793, the contents of which went to public auction in Liverpool.⁴³

Though the magnitude of illegal smuggling and theft of legal imports is, by nature, elusive, there is evidence to suggest that it by far surpassed the volume of Spain's official trade. 'From the newspapers' and trade bulletins that were published in 'London, Amsterdam, and elsewhere', from the 'observations of foreign commerce confirmed by men very versed in it', and from the 'large amounts of the most select cinchona that were extracted furtively' and traded 'by the British, the Dutch, the French, and the Danish', Spanish officials estimated that from the total volume of trade with 'a plant that grows only in the dominions of His Majesty', Spanish merchants handled, by the late 1700s, possibly half, possibly one-third, or as little as one-sixth.⁴⁴ Contemporary estimates of the overall harvest yields in some measure support these proportions. José Ignacio de Pombo (1761–1815), a spokesman of Cartagena's merchant guild, estimated that by the year 1800 the overall quantity of cinchona harvested in the Viceroyalties of New Granada and Peru amounted to some 2.5 million *libras* – that is, 1,150 tons –⁴⁵ five times the 220 to 230 tons handled legally, and officially, by Spanish merchants in the late 1700s and early 1800s. Contemporary observers' estimates

⁴⁰ 'Testimonio de los Autos.'

⁴¹ In 1758, for instance, the ship *Curaçao Visser* shipped a cargo of 354 seroons of cinchona bark – some 35 tons – to Amsterdam. For this and other cinchona shipments, see Rutten, *Dutch Transatlantic Medicine Trade*, 29; 59.

⁴² Bergen, *Versuch einer Monographie der China*, 310.

⁴³ 'Op Woensdag den 19 Juny 1793, 's morgens ten 11 uren precies, zal men, te Liverpool, publyk veilen en verkoopen: de GANTSCHE LADING, van het Schip Le Federatif, van St. Domingo komende en naar Bourdeaux gedestineert geweest zynde,' *Rotterdamsche Courant* N^o 70, 1793-06-11.

⁴⁴ 'Informe de la Contaduría de 9 de Julio de 1774 y respuesta del Sor Fiscal de 30 de Agosto del mismo año,' *Archivo General de Indias*, Indiferente 1554, Madrid, 1774-07-09 / 1774-08-30, 835–36. Other contemporary observers contended that 'for one pound that entered Spain the foreigners took two or three'. Miguel de Jijon y León, 'Recomendaciones para la explotación y comercialización real de la cascarilla,' *Revista del Archivo Nacional de Historia*, Sección del Azuay 6 (1986 (1776)). Also cited in Moya, *Auge y Crisis de la Cascarilla*, 41.

⁴⁵ José Ignacio de Pombo, 'Carta de José Ignacio de Pombo a José Celestino Mutis explicando su informe sobre las quinas,' *Archivo del Real Jardín Botánico*, Real Expedición Botánica del Nuevo Reino de Granada (1783–1816), José Celestino Mutis, Correspondencia, RJB03/0001/0001/0288, Cartagena (Colombia), 1805-10-30.

may have been a long guess, but other figures corroborate their sense that the volume of illicit trade in cinchona was a multiple of the legal volume. In 1776, a year in which, according to García-Baquero, 395 tons of bark reached Cádiz, just the 38 most important Cuenca merchants, forced to declare their possessions by royal decree, were found to be holding 618 tons of bark harvested in the Cuenca area – a significant portion, but surely not equal to the overall amounts extracted from the two Vice-royalties.⁴⁶ Calculating even with the by all accounts moderate estimate of foreign, illicit trade surpassing Spanish trade by a one-to-two ratio, the total bark trade volume would have oscillated around 450 tons per annum in the late 1700s and early 1800s. That estimate matches the calculations of Manuel Hernandez de Gregorio, the King's Apothecary, who wrote in 1804 that free trade in the bark then amounted to between 800,000 and 1 million *libras* – that is, some 368 to 460 tons – and that it appeared to him 'to increase further proportionate with an upsurge in [the bark's] uses'.⁴⁷ Calculating with less moderate estimates, the overall bark trade volume may well have amounted to, or surpassed, de Pombo's 1,150 tons. At any rate, as with other export sectors on the Atlantic seaboard of the New World – tea, cotton or tobacco – with cinchona, 'contraband dwarfed legal exchange'.⁴⁸

Towards the early 1800s, the Spanish American territories were threatened with losing even their natural monopoly on the bark. While the Caribbean cinchonas that resulted from the British and French commercial quest for substitutes were for the most part quickly discarded,⁴⁹ the cinchona species discovered on Brazilian territory in 1805 as the result of a two-decades-long quest were more auspicious. During the 1790s in particular, the Portuguese Crown had not only naturalists but also colonial bureaucrats, clergymen and militia sergeants search Brazil's 'hinterlands' (*sertões*) and make inquiries among the 'persons of greater discernment' about trees resembling cinchona in appearance – prints of cinchona trees were issued for that

⁴⁶ Moya, *Auge y Crisis de la Cascarilla*, 40–41.

⁴⁷ Hernandez de Gregorio, 'Memoria,' 1034.

⁴⁸ Wim Klooster, 'Inter-Imperial Smuggling in the Americas, 1600–1800,' in *Soundings in Atlantic History. Latent Structures and Intellectual Currents, 1500–1830*, ed. Bernard Bailyn and Patricia L. Denault (Cambridge, Mass.: Harvard University Press, 2009), 179. By 1745, legal tea imports represented about a quarter of English consumption. Carole Shammas, 'Changes in English and Anglo-American Consumption from 1550 to 1800,' in *Consumption and the World of Goods*, ed. Roy Porter and John Brewer (London: Routledge, 1993), 184.

⁴⁹ On the French quest, see McClellan and Regourd, *The Colonial Machine*, 260–62. On Britain, see Maehle, *Drugs on Trial*, 277.

purpose – in taste, or in terms of usage, that is, plants that were employed as febrifuges.⁵⁰ By decree of the prince regent, Dom João VI (1767–1826, r. 1799–1826), tree bark taken for cinchona was dispensed in ‘the hospitals, even the military ones, of these realms’ in 1804 to gain ‘a proper understanding of its virtues’ (*o devido conceito das virtudes*), by having doctors and surgeons conduct ‘exact, and repeated observations’ by means of a general, extensive administration, to decide ‘the use, and consumption’ of the ‘bitter Brazilian barks’.⁵¹ Even though tree bark taken for cinchona from the captaincies of Pernambuco, Oeiras do Piauí, Maranhão and Bahia was gathered and shipped to the metropolis, the Portuguese court and the empire’s military and naval hospitals from the 1780s onwards, both historians and contemporaries have tended to assume that none of the plants discovered before 1805 was a cinchona variety.⁵² According to the historian Vera Regina Beltrão Marques, it was only in 1805 that two cinchona varieties – *Cinchona macrocarpa* and *Cinchona pubescens* – were found in Rio de Janeiro. They were classified in 1806 and reconfirmed in 1811 by a commission consisting of, among others, Bernardino António Gomes (1768–1823).⁵³ It appears that, at least temporarily, these Brazilian and, in some measure, also some Caribbean barks, albeit in small amounts and with a low profile, entered commerce – as

⁵⁰ See, for instance, D. José Luis de Castro, ‘OFÍCIO do (vice-rei do Estado do Brasil), conde de Resende, (D. José Luis de Castro), ao (secretário de estado da Marinha e Ultramar), D. Rodrigo de Sousa Coutinho,’ *Arquivo Histórico Ultramarino*, 017 – RIO DE JANEIRO – CATÁLOGO DE DOCUMENTOS MANUSCRITOS AVULSOS / Cx. 165, D. 12275, Rio de Janeiro, 1798-05-04; Vicente Gomes da Silva, ‘OFÍCIOS (14) de oficiais da marinha e comandantes de embarcações, ao (secretário de Estado dos Negócios da Marinha e Ultramar), visconde de Anadia, (D. João Rodrigues de Sá e Melo Meneses e Souto Maior),’ *Arquivo Histórico Ultramarino*, 076 – REINO RESGATE 20121023 / Cx. 302-A, Pasta 5, Rio de Janeiro, 1806-02-04; Caetano Pinto de Miranda Montenegro, ‘OFÍCIO do governador e capitão-general da capitania de Mato Grosso Caetano Pinto de Miranda Montenegro ao (secretário de estado da Marinha e Ultramar) Rodrigo de Sousa Coutinho,’ *Arquivo Histórico Ultramarino*, 010 – MATO GROSSO – CATÁLOGO DE DOCUMENTOS MANUSCRITOS AVULSOS / Cx. 34, D. 1791, Vila Bela, 1798-06-14. For more examples, see Beltrão Marques, *Natureza em Boiões*, 132.

⁵¹ ‘Decretos do príncipe regente.’

⁵² Jose Mariano Velloso’s ‘Portuguese Quinography’ partly served the purpose of assisting the search for Brazilian cinchona varieties by enlightening its readership about the properties of ‘false cinchonas’. Beltrão Marques, *Natureza em Boiões*, 132–33.

⁵³ *Ibid.*, 134. See also Bernardino António Gomes, ‘OFÍCIO de Bernardino António Gomes ao (secretário de estado da Marinha e Ultramar), visconde de Anadia (João Rodrigues de Sá e Melo Meneses e Souto Maior),’ *Arquivo Histórico Ultramarino*, 017 – RIO DE JANEIRO – CATÁLOGO DE DOCUMENTOS MANUSCRITOS AVULSOS / Cx. 243, D. 16604, Lisboa, 1807-03-20.

cinchonas, or as creditable substitutes – and added further to the between 450 and 1,150 tons of cinchona in circulation.⁵⁴

For these trade volume figures to become meaningful, and to ascertain how many people contemporaries' 'humanity' comprised, it is critical to understand how much cinchona was generally administered to a sufferer. While vernacular manuals, domestic recipe collections and medical treatises almost invariably offered precise counsel on the individual doses of bark required and their rate of application, sources rarely fixed an overall requisite quantity of cinchona to be administered. Rather, recipe collectors, physicians and apothecaries in different parts of the world were in agreement that the quantity of bark necessary for a cure was 'very different in different cases'.⁵⁵ Several writers advised, in case the suggested dose did not cure the sufferer, to 'repeat the same procedure',⁵⁶ administer a second or third dose,⁵⁷ or simply continue the administration of the medicine at regular intervals for as long as necessary. As Lady Eleanor Dundas (d. 1837) of Carron Hall put it in her recipe book, one was to 'repeat the medicine' 'untill [the Patient] misses the fit', or as the authors of the *Edinburgh new dispensatory* phrased it, 'till the paroxisms cease[d]' and the sufferer's 'appetite, strength, and complexion return[ed]'.⁵⁸ The authors' method of adjusting dosage to the sufferer's condition not only responded to differences in the 'obstinacy' (*Harnäckigkeit*), or rebelliousness of fevers, and other ailments. It also complied with the period's general emphasis upon the variability of

⁵⁴ Timothy Walker refers to Brazilian cinchona exports. Walker, 'The Medicines Trade in the Portuguese Atlantic World,' 27.

⁵⁵ Lewis and Rotheram, *The Edinburgh new dispensatory*, 143.

⁵⁶ A cinchona-based recipe for an acute remedy pasted into Miss Myddleton's collection recommended 'repeat[ing] the dozes again' 'if the fit return'. 'Receipts copied from Miss Myddleton's Book.' The Portuguese recipe collection compiled by João de Jesus Maria likewise recommended repeating the 'same procedure' if the remedy did not cure the sufferer. João de Jesus Maria, 'Colleção medica de receitas p[ar]a quasi todos os achaques a q[ue] está sugeita a natureza humana, e muitas uezes experimentadas com bom sucesso pellos melhores medicos, cirurgiões, e quimicos deste reino, e estrangeiros: e muitas dellas tidas por segredos quasi infalíveis de cazas illustrissimas, e medicos grandes deste reino em muitos annos,' *Biblioteca Nacional de Portugal*, Manuscritos Reservados, COD. 5077, Lisboa, 1760, 43. A French recipe collection likewise counselled sufferers to 'repeat the same remedy if the fever returned'. 'Collection of medical receipts, with a few household and veterinary receipts: in French,' *Wellcome Library*, Archives and manuscripts, Closed stores WMS 4, MS.4087, n.p., n.d., 35.

⁵⁷ Luís Gomes Ferreira, 'Erário mineral,' in *Erário mineral*, ed. Júnia Ferreira Furtado (Rio de Janeiro: Editora FIOCRUZ, 2002 (1735)), 516.

⁵⁸ Lady Eleanor Dundas, 'Collections of medical and cookery receipts in English, by several hands,' *Wellcome Library*, Archives and manuscripts, MS.2242, Falkirk / London, c. 1785, 22. The authors of *The Edinburgh new dispensary* advised their readership to continue the administration until the sufferer's 'appetite, strength, and complexion return[ed]'. Lewis and Rotheram, *The Edinburgh new dispensatory*, 143.

individual constitutions and the resultant necessity of tailoring dosage to the patient's individual needs.⁵⁹ To ascertain standard dosage, at least approximately, one can only rely on the authors' references to the maximum quantities administered, the average doses dispensed or the doses found most beneficial in the clinical observations and experiences conducted at the time to evaluate treatments. Most Spanish American medical treatises, advice literature and recipe collections, for instance, advised doses ranging from half a drachm – less than 2 grams – to 1 ounce – some 29 grams – that is, less than 16 grams on average.⁶⁰ In Europe, with bark of low quality or in particularly violent illnesses, physicians occasionally saw themselves forced to administer by their own standards extravagant doses to effect a cure.⁶¹ Experienced medical practitioners implicated in putting different or newly discovered varieties of cinchona on trial to gain 'a proper understanding of their virtues',⁶² however – at the Lyon Grand Hôtel-Dieu hospital, the Spanish Court or

⁵⁹ For references to the necessity of adapting dosage to constitution, see Murray, *Vorrath von einfachen, zubereiteten und gemischten Heilmitteln*, 1, 1131. See also Buchan, *Domestic Medicine*, 176. See also 'Pareceres de los médicos sobre los efectos de la Quina de Santa Fé,' *Archivo del Palacio Real*, Papeles del Almacén de la Quina, Caja 22283 / Expediente 1, Madrid, 1784-12-19 / 1784-12-18. On New Spain, see Juan de Esteyneffer, *Florielegio medicinal de todas las enfermedades, sacado de varios, y clasicos autores, para bien de los pobres, y de los que tienen falta de Medicos, en particular para las Provincias remotas, en donde administran los RR. PP. Misioneros de la Compañía de Jesus* (Mexico: Herederos de Juan Joseph Guillena Carrascoto, 1712), 296. For secondary sources on the variability of dosage, depending on the sufferer's constitution, see, for instance, Roy Porter, 'The Eighteenth Century,' in *The Western Medical Tradition*, ed. Lawrence I. Conrad, et al. (Cambridge: Cambridge University Press, 1995), 87; Emma Spary, 'Health and Medicine in the Enlightenment,' in *The Oxford Handbook of the History of Medicine*, ed. Mark Jackson (Oxford: Oxford University Press, 2011).

⁶⁰ According to Hipólito Ruiz López, it was common to administer from 'half a drachm to two or more drachms', that is, between 1.94 and 7.76 grams, on average some 4.85 grams. Ruiz López, *Quinología*, 40. A Mexican recipe collection advised 'six drams', some 23.28 grams. See recipe number 223 – 'For Tertian Fevers' (*Para Fiebres tertianas*) – in 'Secretos medicos, y chirurgicos,' *Wellcome Library*, Archives and manuscripts, Closed stores WMS / Amer. 22, Mexico, n.d. The author of a Lima recipe collection advised one-eighth of an ounce, some 3.6 grams. Anon., 'El Medico verdadero. Prontuario singular de varios selectisimos remedios, para los diversos males à que està expuesto el Cuerpo humano desde el instante que nace. Compuesto por un curioso, para el alivio de todos los que se quieran curar con èl,' in *La medicina popular peruana*, ed. Hermilio Valdizán and Angel Maldonado (Lima: Imprenta Torres Aguirre, 1922 (1777)), 446. The highest dose advised in the sources under consideration was 'one ounce' of powdered cinchona, that is, some 30 grams. Villalobos, *Método de curar tabardillos*, 100–01; William Buchan, *Medicina doméstica* (Madrid: Imprenta Real, 1785), 54.

⁶¹ See, for instance, Johann Claudius Renard, *Die inländischen Surrogate der Chinarinde in besonderer Hinsicht auf das Kontinent von Europa* (Mainz: F. Kupferberg, 1809), 9. See also Lochbrunner, *Der Chinارينdenversuch*, 36.

⁶² 'Decretos do príncipe regente.'

London's Royal College of Physicians – generally recommended, like their Spanish American counterparts, doses ranging from half a drachm to one or two ounces.⁶³ So did medical practitioners in societies within or adjoining Europe's colonial, evangelizing and commercial entrepôts in North America, the eastern Mediterranean or western Africa. From surgeons in Portuguese Angola who prescribed an ounce and a half of the bark⁶⁴ to Ottoman doctors in Bursa who administered doses ranging from 8 to 16 drachms, that is, 25 to 50 grams,⁶⁵ to physicians in the West Indies who generally administered 2 ounces of the bark,⁶⁶ medical practitioners the Atlantic World over would have agreed that more than 2 ounces of bark was an unduly large dose and that less than half a drachm was too low a prescription. Assuming that doses fluctuated around an average of 30 grams in societies rimming the Atlantic basin, the around 450 to 1,150 tons of bark traded per annum could have been administered in 15 to 38 million sickness episodes every year in the decades around 1800. At a time when Europe had a population of some 80 to 90 million – England, the Netherlands, the Habsburg territories, France, the Italian peninsula and Spain had 71.7 million inhabitants in 1750 and 121.7 million in 1850 – and the world a population of between 771 and 954 million inhabitants,⁶⁷ the bark might, potentially at least, have reached a rather substantial portion of humanity.

⁶³ A circular letter published by the Royal College of Physicians, dated November 15, 1799, recommended a dose of 'half a drachm in substance' of 'the red Bark'. See the article, pasted into 'Miss Myddleton's Book': 'Receipts copied from Miss Myddleton's Book.' In their clinical trials with Santa Fé bark on a thirteen-year-old girl, the inmate of a poorhouse in Jaen, Spanish doctors found that less than 2 ounces sufficed to cure her from quartan fevers, while an eighteen-year-old fieldworker, suffering from 'tertian fevers', convalesced after three-quarters of an ounce. 'Pareceres de los médicos sobre los efectos de la Quina de Santa Fé.' Doctor Michael O'Ryan at the Lyons hospital held that 'one or two ounces' of yellow bark were equal to curing a fever, while he required twice its amount of red bark. The Lyons hospital kept 'the most complete pharmaceutical collection in Europe', and its doctors had the necessary experience with a range of barks and sufferers to correlate a bark's efficacy with its colour. Michael O'Ryan, *A Letter on the Yellow Peruvian Bark, Containing an Historical Account of the first Introduction of that Medicine into France, and a Circumstantial Detail of Its Efficacy in Diseases, Addressed to Dr. Relph, Physician to Guy's Hospital* (London: J. Nunn, 1794), 20. Portuguese physicians usually found doses of between 11 and 60 grams adequate for their needs. Velloso, *Quinografia Portuguesa*, 93–94.

⁶⁴ Pinto de Azeredo, *Ensaio sobre algumas enfermidades d'Angola*, 64.

⁶⁵ Günergün and Etker, 'From Quinaquina to "Quinine Law,"' 45; Aydıöz and Yildirim, 'Bursalı Ali Münşi ve Tuhfe-i Aliyye.'

⁶⁶ James Clark, a physician on the island of Dominica, tended to begin with 'an ounce of bark in substance'; the same quantity given in the second remission would generally prevent a third 'fit'. Clark, *A Treatise on the Yellow Fever*, 82.

⁶⁷ The world had 771 million inhabitants in 1750 and some 954 million inhabitants in 1800. Massimo Livi-Bacci, *A Concise History of World Population* (Oxford: Blackwell, 1992), 26; 69.

Geographies of Consumption

There is overwhelming evidence that the bulk of these hundreds of tons and millions of doses of cinchona would have gone into the broader European markets, with a shifting tangle of Amsterdam,⁶⁸ Marseille,⁶⁹ Hamburg,⁷⁰ London⁷¹ and Genoese merchant houses – the latter supplied ‘not only all of Liguria’ with cinchona from Cádiz, but also the remainder of the Italian Peninsula, the Swiss Confederacy and part of the Levant⁷² – redistributing the bark from its ports of entry across Europe. By the late 1700s and early 1800s, cinchona was part of the standard medical repertoire across Europe, from the electorate of Hannover⁷³ to the Kingdom of Portugal,⁷⁴ from the Dutch

⁶⁸ According to Saul Jarcho, Amsterdam was a ‘world center of the cinchona trade’ between the late seventeenth and the late eighteenth century. Jarcho, *Quinine’s Predecessor*, 207.

⁶⁹ Patrick Boulanger, ‘Droguistes marseillais à la fin du XVIII^e siècle,’ in *Herbes, Drogues et Epices en Méditerranée*, ed. George J. Aillaud (Paris: Editions du Centre National de la Recherche Scientifique 1988), 49. Spanish officials saw Marseille, next to Rouen, as the key port for the French bark trade. Jijon y León, ‘Recomendaciones,’ 144.

⁷⁰ Frigates returning from Callao, Cartagena and Guayaquil between 1801 and 1808 carried large cargoes of cinchona to Hamburg: the frigate *Juliana*, returning from Callao in 1801, carried 98,237 pounds (*Pfund*) of cinchona; the frigate *Wilhelm und Albert*, returning from Cartagena, carried 298 *quintales* or 24 pounds (*Pfund*); the frigate *Wilhelmsburg*, which left Callao in 1807, carried 300,136.5 pounds (*Pfund*) of bark. The *Juan Paris* carried 90 tons (198,068 *Pfund*) of cinchona; the frigate *Cesar Peter* carried 193,572.5 pounds (*Pfund*), some 87 tons, in 1808. Hans Pohl, *Die Beziehungen Hamburgs zu Spanien und dem Spanischen Amerika in der Zeit von 1740 bis 1806* (Wiesbaden: Franz Steiner Verlag GmbH, 1963), 271; 77; 79–80.

⁷¹ On London, and England, as an international entrepôt for drugs and other commodities, see Wallis, ‘Exotic Drugs and English Medicine.’

⁷² According to the Spanish ambassador in Genoa, by 1785, 900 boxes with cinchona lay in the port of Genoa ready to be shipped. Juan Cornejo, ‘Informe de Don Juan Cornejo Ministro de V.M. en Genova,’ *Archivo General de Simancas*, Legajo 961/2, Genoa, 1785. Genoese merchants played a particularly important role in re-distributing American produce from Cádiz to the Mediterranean and northern European ports. Catia Brillì, ‘Mercaderes genoveses en el Cádiz del siglo XVIII. Crisis y reajuste de una simbiosis secular,’ in *Comunidades transnacionales: colonias de mercaderes extranjeros en el mundo atlántico* (1500–1830), ed. Ana Crespo Solana (Aranjuez: Ediciones Doce Calles, 2006).

⁷³ Gabriele Beisswanger, *Arzneimittelversorgung im 18. Jahrhundert. Die Stadt Braunschweig und die ländlichen Distrikte im Herzogtum Braunschweig-Wolfenbüttel* (Braunschweig: Deutscher Apotheker-Verlag, 1995), 260–64.

⁷⁴ On the availability of cinchona in Portuguese pharmacies, see the report by Manoel José de Souza, signed in Lisbon, April 17, 1799: ‘Neste Secretaria da Junta do Proto-Medicato da Repartição de Medicina se achaõ enformes que deram os Medicos d’esta Corte, e Provincias, relativamente a os Queitos a que se lhes mandou responder por Ordem da mesma Junta dos quaes o seu theor he o Seguinte,’ *Arquivo Nacional da Torre do Tombo*, Ministério do Reino / Negócios diversos do Físico-Mor, Maço 469/ Caixa 585, 4, Lisboa, 1799-04-17 / Tavira, 1799-05-06. Portugal imported some cinchona bark from neighbouring Spain. Eugenio D. Larruga, *Memorias políticas y económicas sobre*

Republic⁷⁵ to Habsburg Transylvania.⁷⁶ It was available not only in trading hubs and capitals, but also in more provincial towns and cities such as Portuguese Évora,⁷⁷ Bender, in the Ottoman principality of Moldavia⁷⁸ and Brunswick, in the Hannover Electorate.⁷⁹ The bark held pride of place among medicinal imports from the Americas in many areas. It made up 40 per cent of all direct American drug imports into England after 1720, for instance,⁸⁰ and was among the most common and renowned of all foreign remedies – arriving, other than from the Americas, from the Levant or the territories bounding the Indian Ocean – in European pharmacies and dispensaries like the *Hôtel-Dieu de Carpentras*⁸¹ or the *Hospital Escolar da Universidade de Coimbra*.⁸² Indeed, the value and weight of cinchona imports into important transshipment ports like Cádiz,⁸³ Hamburg⁸⁴ and London⁸⁵ were often greater than

los frutos, comercio, fábricas y minas de España, vol. XXXV (Madrid: Por don Antonio Espinosa, 1795), 55.

⁷⁵ See, for instance, Terne, *Verhandelingen*.

⁷⁶ On the administration of cinchona in Habsburg Transylvania, see Lochbrunner, *Der Chinarindenversuch*, 35–36.

⁷⁷ On Évora, see the report written by Manoel Francisco de Carvalho on April 28, 1799, ‘Enformes que deram os Medicos d’esta Corte.’

⁷⁸ The traveller Balthasar von Campenhausen found the Bender pharmacy, run by a Jewish apothecary, to have 1 pound of ‘fever bark (*Fiebrerrinde*)’ in store. Balthasar von Campenhausen, *Bemerkungen über Rußland, besonders einige Provinzen dieses Reiches und ihre Naturgeschichte betreffend* (Leipzig: Friedrich Christian Dürr, 1807), 148.

⁷⁹ On cinchona in Brunswick, see Beisswanger, *Arzneimittelversorgung im 18. Jahrhundert*, 260–70.

⁸⁰ Wallis, ‘Exotic Drugs and English Medicine,’ 32–33.

⁸¹ A 1763 inventory of the plant-based remedies kept at the Hôtel-Dieu de Carpentras in southern France documents that around half of its remedies were ‘home-grown’ Mediterranean plants, while the other half came from abroad: 28 per cent from the contiguous Levant, 11 per cent from the territories bounding the Indian Ocean and 11 per cent from the ‘New World’, with cinchona being principal among those. Colette Dubois, ‘Le quotidien d’une pharmacie hospitalière: la boutique de l’Hôtel-Dieu de Carpentras,’ in *Herbes, Drogues et Epices en Méditerranée*, ed. George J. Aillaud (Paris: Editions du Centre National de la Recherche Scientifique 1988), 90.

⁸² Cinchona was the ‘most extensively consumed drug’ (*a droga mais consumida*) in the Coimbra Teaching Hospital in the late eighteenth century. João Rui Pita and Ana Leonor Pereira, ‘A arte farmacêutica no século XVIII, a farmácia conventual e o inventário da Botica do Convento de Nossa Senhora do Carmo (Aveiro),’ *Agora. Estudos Clássicos em Debate* 14, no. 1 (2012), 231–32.

⁸³ García-Baquero González, *Cádiz y el Atlántico*, 1, 340. See also Gänger, ‘World Trade in Medicinal Plants,’ 47.

⁸⁴ Ulrich Pfister and Christine Fertig, ‘Coffee, Mind and Body: Global Material Culture and the Eighteenth-Century Hamburg Import Trade,’ in *The Global Lives of Things. The Material Culture of Connections in the Early Modern World*, ed. Anne Gerritsen and Giorgio Riello (London: Routledge, 2016), 229.

⁸⁵ Cinchona ‘stands out for its exceptional importance’ among all North and South American and Mesoamerican drugs imported into England in the second half of the eighteenth century and was the second most important drug in value imported into

those of any other – or most, in the latter case – medicinal substances, and invariably larger than those of any other American medicine, be that ipecacuanha, ‘Virginian snake-root’ or guaiacum. In some parts of Europe ‘not a single’ foreign plant remedy was employed ‘as often and in such large quantities’ (*so oft und dabei in so grosser Menge*) as cinchona, as the Mainz doctor Johann Claudius Renard put it in 1809,⁸⁶ or, as the Milan author Luigi Castiglioni (1757–1832) phrased it, ‘could compare to cinchona (*kina-kina*), [...] for the extensive use made of it to this day’.⁸⁷ Levels of cinchona consumption were high, even ‘absurd’ (*ungeheuer*) in some parts in the eyes of contemporaries.⁸⁸ In peninsular Spain, with a population of 10.4 million in the late 1700s,⁸⁹ domestic consumption amounted to at least 20 tons per annum by 1792,⁹⁰ enough for 1.3 million doses. The amounts of cinchona imported into England during the 1750s, in turn, provided between 300,000 and 1,186,000 doses, and between 112,000 and 449,000 doses during the 1770s,⁹¹ at a time when England had but around 6 million inhabitants.⁹²

Cinchona was widely available across the Spanish and Portuguese American possessions, too. It could be obtained from any well-stocked pharmacy in the Viceroyalties of New Granada,⁹³ New Spain⁹⁴ and

England from 1752 to 1754, and the seventh most important in value between 1772 and 1774. Wallis, ‘Exotic Drugs and English Medicine,’ 31–33.

⁸⁶ Renard, *Die inländischen Surrogate der Chinarinde*, 3.

⁸⁷ Castiglioni, *Storia delle piante forastiere le piu importanti*, 45.

⁸⁸ Renard, *Die inländischen Surrogate der Chinarinde*, 3.

⁸⁹ There were 10.4 million persons counted in the Kingdom of Spain in the summer of 1787. Livi-Bacci, *A Concise History of World Population*, chapter 1.

⁹⁰ According to contemporaries, in the year 1792, Spain imported 716,734 *libras* – 330 tons – of which 674,102 *libras* – 298 tons – were re-exported, and 42,633 *libras* – 20 tons – consumed domestically. Hernández de Gregorio, *El arcano de la quina*, v. Other contemporaries estimated that in the five years following 1771, one-tenth of the cinchona imports that reached Cádiz remained within peninsular Spain to cover the country’s needs. Miguel de San Martín Cueto, ‘Razon de las libras de cascarilla que se han extrahido para fuera del reyno,’ *Archivo General de Indias*, Indiferente 1554, Cádiz, 1776–10–25. Cinchona consumption in eighteenth-century Spain has been researched comparatively in depth. Juan Riera Palmero, ‘La Medicina en la España del siglo XVIII,’ in *Medicina y Quina en la España del siglo XVIII*, ed. Juan Riera Palmero (Valladolid: Universidad de Valladolid, 1997); María Luisa de Andrés Turrión, ‘Quina de la Real Hacienda para el ejército español en el siglo XVIII,’ in *Guerra y milicia en la España del X Conde de Aranda. Actas del IV Congreso de Historia Militar*, ed. José A. Armillas Vicente (Zaragoza: Gobierno de Aragón, Departamento de Cultura y Turismo, 1998); Riera Palmero, ‘Quina y malaria en la España del siglo XVIII.’

⁹¹ Wallis, ‘Exotic Drugs and English Medicine,’ 34.

⁹² Edward Anthony Wrigley and Roger S. Schofield, *The Population History of England: 1541–1871: A Reconstruction* (Cambridge: Cambridge University Press, 1989), 210.

⁹³ On the consumption of local cinchona varieties in Santa Fé, see also Salvador Vázquez, ‘Las quinas del norte de Nueva Granada,’ 55.

⁹⁴ Esteyneffer, *Florilegio medicinal*, 279.

Peru – in Lima, but also in provincial towns like Trujillo, Pisco, Ica, Huancavelica, Moquegua and Cuzco⁹⁵ – as well as in Brazil, where cinchona and cinchona-based compound medicines were sold from Rio de Janeiro to Bahia and from Pernambuco to Maranhão.⁹⁶ Contemporary estimates suggest an annual consumption of some 12,000 *libras*,⁹⁷ around 344,000 doses, for the entirety of Spanish America, at a time when these dominions had about 13.5 million inhabitants.⁹⁸ Internal consumption in the Viceroyalty of Peru would appear to have been comparatively low, too, amounting to between 0.4 and 1.4 tons of cinchona – between 25,000 and 86,000 doses per annum – that is, less than 1 per cent of the overall exports.⁹⁹ Actual consumption may have been higher than official figures suggest, however. Given that colonial officials often complained that the bark was sold on the streets and ‘on Fridays in the marketplace’ in cities like Santa Fé, and in the ‘villages adjacent to the hills’ where it was harvested,¹⁰⁰ we may venture to presume that cinchona was distributed through a variety of formal and informal channels in Spanish and Portuguese America by the late 1700s and early 1800s. It was likely employed in far more than the – 25,000,

⁹⁵ Pablo Macera, *Precios del Perú XVI–XIX. Fuentes* (Lima: Fondo Editorial / Banco Central de la Reserva, 1992), 131.

⁹⁶ Danielle Sanches de Almeida, ‘Entre lojas e boticas: O comércio de remédios entre o Rio de Janeiro e Minas Gerais (1750–1808)’ (Universidade de São Paulo, 2008), 84. See also *Documentos régios que authorizão a verdadeira Agoa de Inglaterra, da composição do doutor Jacob de Castro Sarmiento, manipulada presentemente por José Joaquim de Castro, na sua Real Fabrica, por decreto de sua Alteza Real o Príncipe Regente nosso Senhor. Com huma relação dos professores de medicina, e cirurgia deste reino de Portugal e seus Domínios, que tem attestado a excellencia da dita Agoa de Inglaterra* (Lisboa: Impressão Régia, 1809).

⁹⁷ Ruiz López, *Quinología*, 14.

⁹⁸ Nicolás Sánchez-Albornoz, ‘The Population of Colonial Spanish America,’ in *The Cambridge History of Latin America*, ed. Leslie Bethell (Cambridge: Cambridge University Press, 1984), 34.

⁹⁹ According to Cosme Bueno’s estimates, the entirety of the Viceroyalty of Peru consumed some ‘eight to nine quintales’ – 414 kilograms – in 1785. Cosme Bueno, ‘Carta al S. Visitador y Superior Intendente General,’ *Biblioteca Nacional del Perú*, Expediente sobre el Estanco de la Cascarilla, Sección Manuscritos – C388, Lima, 1785-09-19. The consulate that same year estimated that consumption amounted to 2,400 *libras* – that is, 1,104 kilograms – while Sebastian Mena, then in charge of inspecting Lima’s pharmacies, arrived at an annual consumption of 3,000 *libras* – 1,380 kilograms – for the Viceroyalty. For a discussion of these sources, see Jaramillo Baanante, ‘El comercio de la cascarilla,’ 52.

¹⁰⁰ Sebastián José López Ruiz, ‘Representación.’ *Archivo General de Indias*, Indiferente 1554, n.p., 1779-11-22, fs. 117–18; Sebastián José López Ruiz, ‘Para los efectos que convengan remite copia de una representación que ha dirigido al Virrey en que refiere los abusos y desordenes que se cometen en la colectación beneficio y comercio de las quinas de aquel reyno,’ *Archivo General de Indias*, Indiferente 1557, Santa Fé, 1804-08-13, 639.

86,000 or 344,000 – sickness episodes per annum that official trade figures would have allowed for.

A substantial share of British, Portuguese, French, Dutch and Spanish cinchona imports was re-exported to these Atlantic realms' imperial, commercial and evangelizing entrepôts – primarily in the Caribbean and North America, along the African coast and in South and East Asia.¹⁰¹ The British, Dutch and French West Indies were important consumer markets for the bark.¹⁰² So were the British and French North American colonies – or, after 1776, the United States – with New England pharmacies, Louisiana hospitals' provisions and plantation medicine chests in the antebellum South encompassing cinchona as a staple.¹⁰³ Portuguese merchants shipped bulk quantities of cinchona and cinchona-based medicines to its Lusophone enclaves along the African coast – to Mozambique, Benguela and Luanda, western Africa's largest slaving port – and to Timor, Goa and Macao, leased from China in 1557.¹⁰⁴ So did the Dutch West and East India companies (*Vereenigde Oost-Indische Compagnie*, or VOC; *Geoctroyeerde Westindische Compagnie* or WIC), which transported cargoes of cinchona to the Dutch Antilles, the Guyana colonies, the forts and lodges on the Gold Coast of West Africa and the Dutch East Indies.¹⁰⁵ British trade companies, according to contemporary statistics, re-exported in the five years from 1789 to 1793 some 123,779 pounds of cinchona – between

¹⁰¹ In the years 1772 to 1774, for instance, London's drug re-exports – into other European markets and British colonies – amounted to 53 per cent of the value of imports. Wallis, 'Exotic Drugs and English Medicine,' 28.

¹⁰² See Chapter 4.

¹⁰³ On New England, see Norman Gevitz, "'Pray Let the Medicine be Good': The New England Apothecary in the Seventeenth and Early Eighteenth Centuries," in *Apothecaries and the Drug Trade. Essays in Celebration of the Work of David L. Cowen*, ed. Gregory J. Higby and Elaine C. Stroud (Madison, Wis.: American Institute of the History of Pharmacy, 2001), 15. On cinchona consumption in Louisiana under Spanish rule, see 'Colonie de la Louisiane,' *Archivo del Palacio Real, Suministros de Medicinas y Papeles de la Real Botica 1671–1781*, Caja 22284, Madrid, n.d. On plantation medicine chests in the South, see Sharla M. Fett, *Working Cures. Healing, Health, and Power on Southern Slave Plantations* (Chapel Hill: University of North Carolina Press, 2002), 68–69.

¹⁰⁴ On the availability of cinchona in Timor and Mozambique, see Walker, 'The Medicines Trade in the Portuguese Atlantic World,' 27. On cinchona consumption in Luanda, see Pinto de Azeredo, *Ensaio sobre algumas enfermidades d'Angola*, 64. On shipments of cinchona-based patent medicines to São Filipe de Benguela, see 'Doutor Juiz de Fora Presidente, Vereadores e Procurador da Camera abaixo asignados da Cidade de São Filipe de Benguela, e Sua Capitania por Sua Alteza Real o PRÍNCIPE REGENTE Nosso Senhor, que Deus Guarde,' *Arquivo Nacional da Torre do Tombo*, Ministério do Reino / Negócios diversos do Físico-Mor / Maço 469, Caixa 585, 22, São Filipe de Benguela, 1800-09-02.

¹⁰⁵ Rutten, *Dutch Transatlantic Medicine Trade*, 12–13.

3.7 and 1.9 million doses – to Britain’s ‘colonial possessions in the East and West Indies’.¹⁰⁶ Spanish American exports of cinchona ointments, powders and extracts and of unprocessed red, white and orange bark from Acapulco via the Manila galleon,¹⁰⁷ in turn, though by all accounts small in comparison to Cádiz-bound freights, were presumably both destined for the Spanish settler population on the Philippines and resold to China via Cantonese merchants, whose intermediation allowed traders from Spain and Spanish America to participate in Asian commercial networks.¹⁰⁸

Indeed, cinchona was widely consumed not only in Europe’s colonial, evangelizing and commercial entrepôts in the Atlantic World but also far beyond. Its use was popular and prevalent wherever Iberian and English, Dutch or French imperialism, proselytizing and trade intersected with, or submitted to the rules of, other – Levantine, Mediterranean and Cantonese – trade networks. The bark came to the knowledge of Chinese physicians from the cosmopolitan, populous maritime entrepôt of Canton and from the ‘barbarians at Macao’¹⁰⁹ – a term that presumably encompassed both Portuguese settlers and members of the Jesuit order who, before their expulsion from all Portuguese territory after 1759, had popularized cinchona from their pharmacy at St Paul’s College

¹⁰⁶ According to the statistics compiled by John Relph in 1794, between 1789 and 1793 Britain imported a total of 634,783 pounds of ground cinchona, of which 123,779 were exported and 511,004 pounds stayed in the country. John Relph, *An Inquiry into the Medical Efficacy of a new Species of Peruvian Bark, Lately Imported into this Country under the Name of Yellow Bark: Including Practical Observations Respecting the Choice of Bark in General* (London: James Phillips, 1794), 2.

¹⁰⁷ Archival sources studied by Mexican historians reveal that, between 1772 and 1809, seven Manila galleons left the port of Acapulco with cinchona or cinchona-based medicines. Shipments sailed in 1772, 1775, 1799; two shipments in 1801; one in 1807; and another one in 1809. Reyna María Pacheco Olivera, ‘Análisis del intercambio de plantas entre México y Asia de los siglos XVI al XIX’ (unpublished master’s thesis, Universidad Nacional Autónoma de México, 2006), 126. On the Manila galleon trade in cinchona, see also Leon Borja, ‘Algunos datos,’ 96.

¹⁰⁸ Katherine Bjork, ‘The Link That Kept the Philippines Spanish: Mexican Merchant Interests and the Manila Trade, 1571–1815,’ *Journal of World History* 9, no. 1 (1998). Bjork’s argument is consistent with the position taken by Flynn and Giráldez, who argue that Europeans participated in existing Asian commercial networks. Dennis O. Flynn and Arturo Giráldez, ‘Born with a “Silver Spoon”: The Origin of World Trade in 1571,’ *Journal of World History* 6, no. 2 (1995). On the history of the galleon trade see Dennis O. Flynn, Arturo Giráldez and James Sobredo, eds, *European Entry into the Pacific. Spain and the Acapulco-Manila Galleons* (Ashgate: Variorum, 2001). In 1757, the Qing court changed its policy towards Western trade, consigning it to a single port, Canton. Fa-ti Fan, *British Naturalists in Qing China. Science, Empire, and Cultural Encounter* (Cambridge, Mass.: Harvard University Press, 2004), 6.

¹⁰⁹ That quote is taken from Chao Hsüeh-min’s (1719–1805) ‘Addenda and corrigianda to the Pen-ts’ao kang-mu (Pen-ts’ao kang mu shih-i)’ , cited in Unschuld, *Medicine in China*, 166.

(*Colégio de São Paulo*) in Macao.¹¹⁰ Other than through the veins of Portuguese medicine trade,¹¹¹ Chinese sufferers would also have procured the bark through Spain's Asian commerce in the bark, a sector that Spanish officials were eager to expand in the late 1700s.¹¹² Cinchona was also among the few goods imported into Nagasaki, Japan's only governmentally sanctioned point of entry for foreign merchants, by the Dutch East India Company. Following the expulsion of the Portuguese in 1638, only Chinese merchants and representatives of the Dutch East India Company were allowed to enter Japan to engage in trade, and the commodities brought were dictated by the – usually rather explicit – requests and regulations of the shogunate.¹¹³ In the Maghreb, cinchona had long been a valued remedy, which its inhabitants obtained through the region's long-standing participation in Mediterranean trade and contraband with Genoa, Catalonia, Marseille and Venice – and later, Britain, Denmark and France – and also from the Spanish pharmacies in Melilla and the Peñón de Alhucemas, just off the Moroccan coast. Madrid's Royal Pharmacy often supplied Spanish apothecaries directly with the necessary medicaments – among them, at times, several hundred kilograms of cinchona.¹¹⁴ Other 'oriental nations', according to

¹¹⁰ Recipes retrieved from the 1766 'Collection of various recipes and particular secrets from the principal pharmacies of our order in Portugal, India, Macao, and Brazil' (*Collecção de varias receitas e segredos particulares das principaes boticas da nossa Companhia de Portugal, da Índia, de Macáo e do Brasil*), a 633-page manuscript compilation, document that Jesuit pharmacies in Macao had long relied on cinchona for several of their recipes and manufactured numerous cinchona-based compound remedies. For transcriptions and excerpts from that collection, see Sabine Anagnostou, *Missionspharmazie. Konzepte, Praxis, Organisation und wissenschaftliche Ausstrahlung* (Stuttgart: Franz Steiner Verlag, 2011), 292; Ana Maria Amaro, *Introdução da medicina ocidental em Macau e as receitas de segredo da Botica do Colégio de São Paulo* (Macao: Instituto Cultural de Macau, 1992).

¹¹¹ Walker, 'The Medicines Trade in the Portuguese Atlantic World,' 19.

¹¹² Viceroy Antonio Caballero y Góngora repeatedly mentioned plans to increase Asian cinchona consumption 'through Acapulco and the Philippines' for the benefits of the Royal Treasury. Antonio Caballero y Góngora, 'Carta,' *Archivo General de Indias*, Indiferente 1555, Santa Fé, 1786-10-19; Antonio Caballero y Góngora, 'Carta al Marqués de Sonora,' *Archivo General de Indias*, Indiferente 1554, Santa Fé, 1786-10-19.

¹¹³ The list of imports was drawn from a review of inventories from the second half of the eighteenth century, found in *Het archief van de Nederlandse factorij in Japan*, 'Dejima Dagregisters' (*Algemeen Rijksarchief*, The Hague), three sample inventories of which are reproduced in Martha Chaiklin, *Cultural Commerce and Dutch Commercial Culture. The Influence of European Material Culture on Japan, 1700–1850* (Leiden: CNWS, 2003), 78–191. See also Robert Liss, 'Frontier Tales: Tokugawa Japan in Translation,' in *The Brokered World. Go-Betweens and Global Intelligence, 1770–1820*, ed. Simon Schaffer et al. (Sagamore Beach: Watson Publishing International, 2009), 9.

¹¹⁴ 150 *libras* of cinchona reached the Spanish pharmacies in 1784, 204 *libras* in 1785, 877 *libras* in 1786 and 200 *libras* in 1787, a total of 1,431 *libras*, or 658 kilograms. Andrés Turrión, 'Quina de la Real Hacienda para el ejército español en el siglo XVIII,' 422.

Spanish cinchona merchants' complaints, procured 'this excellent febrifuge' through English and other European exporters at the Smyrna market, in the Ottoman Empire.¹¹⁵ According to Ottoman physicians, the bark had at first been known only in Constantinople,¹¹⁶ but by the early 1700s, 'sailors and other travellers had popularized it far beyond [...], in other towns and lands'.¹¹⁷ The city of Smyrna on the Aegean coast was not only, according to contemporary observers, itself an important consumer market for the bark, but also a cosmopolitan entrepôt whence cinchona was 'distributed (*se derrama*) throughout the Asian portion of Turkey (*la Turquía Asiática*), in very large quantities (*en muy gruesas cantidades*)'.¹¹⁸ Smyrna had long attracted factors from Amsterdam, London, Marseille and Venice as well as Ottoman Armenian and Jewish merchants. It remained, by the late 1700s and early 1800s, an important entrepôt provisioning Anatolia and the Syrian and Persian markets with produce from western Europe.¹¹⁹ The population of the sprawling Ottoman Empire – extending, at the time, from Bosnia in the west to the Mesopotamian provinces of Basra, Baghdad and Mosul in the east – also procured supplies of the bark through the port of Cairo. Hundreds of kilograms reached the Ottoman palace from that Mediterranean entrepôt every year in the early 1800s.¹²⁰ The volume of Chinese, Moroccan, Japanese and Ottoman cinchona commerce, in part because it largely consisted of contraband, is elusive, but there can be little doubt that consumption and demand, 'in the countries in Africa and Asia (*los países de África y Asia*)' where cinchona was known, and which European merchants frequented, was significant.¹²¹ As Miguel de Jijon y León (1717–1794) put it in 1776, the bark was 'of the greatest necessity and, use, all over the world' (*de tan precisa necesidad y uso en todo el Mundo*), but 'particularly among the Asians' (*especialmente entre los Asiáticos*)¹²² – a term

¹¹⁵ 'Testimonio de los Autos,' 972. See also Jijon y León, 'Recomendaciones,' 131.

¹¹⁶ Edhem Eldem, *French Trade in Istanbul in the Eighteenth Century* (Leiden: Brill, 1999), 86. On cinchona consumption in the Ottoman Empire, see also Günergun and Etker, 'From Quinaquina to "Quinine Law,"' 50.

¹¹⁷ Aydüz and Yildirim, 'Bursalı Ali Münşi ve Tuhfe-i Aliyye,' 92.

¹¹⁸ Jijon y León, 'Recomendaciones,' 131.

¹¹⁹ Elena Frangakis-Syrett, *The Commerce of Smyrna in the Eighteenth Century* (1700–1820) (Athens: Centre of Asia Minor Studies, 1992), 35. On the history of Izmir and its merchant community, see Daniel Goffman, 'Izmir: From Village to Colonial Port City,' in *The Ottoman City between East and West. Aleppo, Izmir, and Istanbul*, ed. Edhem Eldem, Daniel Goffman and Bruce Masters (Cambridge: Cambridge University Press, 2001).

¹²⁰ Campenhausen refers to some 300 okas, or 384 kilograms, per annum. Campenhausen, *Bemerkungen über Rußland*, 192–93.

¹²¹ Pombo, 'Carta de José Ignacio de Pombo a José Celestino Mutis.'

¹²² Jijon y León, 'Recomendaciones,' 144.

that encompassed, by the late 1700s, not only the inhabitants of the Chinese and Mughal empires and Tokugawa Japan but also men and women of Arabic, Turkish or Persian extraction (FIGURE 2.2).¹²³

Limits to Distribution

Cinchona not only reached geographically disperse societies. The social depth of its consumption was just as varied and wide. Among the world's ruling elites, cinchona was widely known by the late 1700s and early 1800s. The shogunate in Japan,¹²⁴ the Tsar and his kin in Russia¹²⁵ and the Kangxi Emperor in China¹²⁶ valued and kept supplies of the bark for their own use. So did some ruling families in British and Mughal India: Muhammed Ali Khan, the Nawab of Arcot (1717–1795, r. 1749–1795), for instance, had the British physician Paul Jodrell (1746–1803) administer the bark – to good effect – in the treatment of his youngest son.¹²⁷ The Moroccan 'Alawi court likewise prized cinchona. Gift exchange was assiduous between Charles III and the Sultan of Morocco, Mohammed Ben 'Abd Allāh al-Khatib (1710–1790, r. 1757–1790), with Spain and Morocco alternately making and breaking diplomatic arrangements between 1767 and the Aranjuez Convention in 1780.¹²⁸ When the sultan chose his gifts from Spain in 1771, his list encompassed books about astronomy and globes, sweet cinnamon pepper and nutmeg bark, and also a number of plant-based remedies from Spanish America that the Sultan – who relied on Spanish medicine for his family's health – apparently was accustomed to using: jalap root, various balsams and ointments 'to reduce fleshiness' and to close wounds, and cinchona.¹²⁹

¹²³ On eighteenth-century European definitions of 'Asia' and 'Asians', see Jürgen Osterhammel, *Unfabling the East. The Enlightenment's Encounter with Asia* (Princeton, N.J.: Princeton University Press, 2019), 22.

¹²⁴ Liss, 'Frontier Tales: Tokugawa Japan in Translation,' 9.

¹²⁵ Jarcho, *Quinine's Predecessor*, 91; Bruce-Chwatt and Zulueta, *Rise and Fall*, 82. On substantial and consistent demand for four American drugs – cinchona, sassafras, sarsaparilla and guaiacum – at the Russian court in the late seventeenth century, see Griffin, 'Russia and the Medical Drug Trade in the Seventeenth Century', 17.

¹²⁶ Two French Jesuits, Jean de Fontaney and Claude de Visdelou, treated the emperor successfully with cinchona introduced from the French colony of Pondicherry in a much-evoked anecdote. See, for instance, Linda L. Barnes, *Needles, Herbs, Gods, and Ghosts. China, Healing, and the West to 1848* (Cambridge, Mass.: Harvard University Press, 2007), 108–09; Bruce-Chwatt and Zulueta, *Rise and Fall*, 102.

¹²⁷ Mark Harrison, *Medicine in an Age of Commerce and Empire. Britain and Its Tropical Colonies, 1660–1830* (Oxford: Oxford University Press, 2010), 133.

¹²⁸ Juan Bautista Vilar and Ramón Lourido Díaz, *Relaciones entre España y el Magreb: siglos XVII y XVIII* (Madrid: MAPFRE, 1994), 319–26.

¹²⁹ Duque de Losada, 'Nota de varios encargos que hace el Rey de Marruecos,' *Archivo del Palacio Real*, Real Botica, Reinados Carlos III / Legajo 197, 3, Aranjuez, 1771-04-20.



Figure 2.2 Some of the world's principal commercial entrepôts and urban consumer markets for cinchona in the late 1700s and early 1800s.

Following the time-honoured practice of sumptuary gift-exchange in Eurasian diplomatic etiquette, under Charles III the Spanish court gave away hundreds of kilograms of select cinchona, usually together with tobacco, vanilla and chocolate, from the Royal Pharmacy every year as gifts to foreign ministers, allied courts and the monarch's relations.¹³⁰

On the Italian Peninsula, the king's finest cinchona reached the courts of Naples and Sicily, Tuscany and Venice,¹³¹ the Duchy of Parma and Piacenza in northern Italy¹³² – with their dependent territories under Spanish Bourbon rule from 1732 to 1808 – and the Pope and the Spanish ambassador at the Holy See, 'out of filial affection'.¹³³ Charles III also regularly bestowed cinchona upon Holy Roman Empress Maria Theresa (1717–1780, r. 1740–1780) in Vienna, who could not thank him enough

¹³⁰ In 1777, the treasurer counted 1,444 *libras* of select cinchona– 664 kilograms – for the king's gifts. Miguel de Muzquiz, 'En 31 de Diciembre del año próximo anterior me pasaron el Gefe de la Real Botica, y el primer ayuda de dicho Real Oficio la cuenta adjunta del consumo que en todo el año de 1777 hubo de quina,' *Archivo del Palacio Real*, Copias de Ordenes comunicadas por el Ministro de Hacienda al Señor Sumiller de Corps. Real Botica, Reinados Carlos III / Legajo 197, 3, n.p., 1778-09-12.

¹³¹ 'Notas de las Corchas de Cacao soconusco, Botes de Tabaco de Tabaco Havano, de media arroba cada uno; de Sevilla y negrilla de a seis libras; y Quina que su majestad envía de regalo a la Corte de Napoles en este año de 1773,' *Archivo General de Simancas*, Legajo 907, n.p., 1773-07-20; 'Quina y Tabaco para los Regalos acostumbrados de las Cortes de Napoles y Toscana, y para Venecia,' *Archivo General de Indias*, Legajo 907, n.p., 1777-05-24; 'Quina y Tabacos para los Regalos que S.M. regala en este año a Napoles, Toscana y Venecia,' *Archivo General de Simancas*, Legajo 907, n.p., 1783-07-19; 'Relacion puntual de los Regalos de cacao soconusco, tabaco habano de Sevilla y Quina, que S.M. envía por la via de Alicante, y Genova, a sus Magestades Sicilianas, y demás particulares de la Corte de Napoles en el presente año de 1786, como se hizo en el 1785,' *Archivo General de Simancas*, Legajo 907, n.p., 1786.

¹³² The bark was usually addressed to the Duque of Parma, Fernando de Borbón-Parma, and his wife, Maria Amalia of Austria, Duchess of Parma. Occasionally, it was also destined for the Duque's vassals. 'Instancia solicitando quina para los vasallos de la encomienda del Infante Duque de Parma,' *Archivo General de Simancas*, Legajo 907, n.p., 1775-07-13; 'Tacabo y Quina para la Señora Infanta Duquesa de Parma,' *Archivo General de Simancas*, Legajo 907, n.p., 1783; 'Tabaco, y Quina para la Señora Infanta Duquesa de Parma,' *Archivo General de Simancas*, Legajo 907, n.p., 1786-01-22; Miguel de Muzquiz, 'El Rey ha resuelto que se embie al Señor Infante Duque de Parma un cajón de Quina,' *Archivo del Palacio Real*, Copias de Ordenes comunicadas por el Ministro de Hacienda al Señor Sumiller de Corps. Real Botica, Reinados Carlos III / Legajo 197, 3, San Lorenzo, 1772-12-22; Miguel de Muzquiz, 'El Rey quiere que se remitan a la Señora Infanta Duquesa de Parma dos arrobas de quina selecta,' *Archivo del Palacio Real*, Copias de Ordenes comunicadas por el Ministro de Hacienda al Señor Sumiller de Corps. Real Botica, Reinados Carlos III / Legajo 197, 3, El Pardo, 1783-03-30.

¹³³ Marques de Grimaldi, 'Carta a Miguel de Muzquiz,' *Archivo General de Simancas*, Legajo 907, Rome, 1779-10-21; Miguel de Muzquiz, 'Entre otras cosas que el Rey envía al Papa quiere S.M. remitirle una arroba de quina,' *Archivo del Palacio Real*, Copias de Ordenes comunicadas por el Ministro de Hacienda al Señor Sumiller de Corps. Real Botica, Reinados Carlos III / Legajo 197, 3, San Ildefonso, 1771-07-27; 'Regalo al Papa,' *Archivo General de Simancas*, Legajo 907, n.p., 1774-08-30.

for a 'gift of such a precious medicine, so rare when one wants it of excellent quality'.¹³⁴ Maria Anna Sophia of Saxony (1728–1797), widow of the Bavarian Elector Maximilian III (1727–1777, r. 1745–1777), often reminded Charles III of his duties as her brother-in-law, if his regular remittances of cinchona and Spanish tobacco, both so 'vital for her health', were ever overdue.¹³⁵ Already under the Spanish monarch Ferdinand VI (1713–1759, r. 1746–1759), gifts of cinchona had reached the courts of the Netherlands¹³⁶ and Denmark.¹³⁷ French, Habsburg and Portuguese ambassadors at the completion of their tour of duty at the Spanish court usually received cinchona among their presents,¹³⁸ and when the Ottoman ambassador Ahmet Vâsif Efendi (c. 1730–1806) left the Spanish Court in 1788 to return to Constantinople, Charles III bestowed upon him diamonds, vicuña cloth, a golden chest adorned with diamonds on green enamel, fine crimson cloth and 'two arrobas of cinchona in four small boxes'.¹³⁹ In 1784, on the occasion of a Treaty of Neutrality signed with the Ottoman Empire, Charles III sent a small Spanish fleet to Sultan Abdülhamid I's (1725–1789, r. 1774–1789) court in Constantinople with a series of precious gifts.¹⁴⁰ 'Amongst other things for the Sultan', the gifts included gold tableware, silver artefacts, embroidered satin and velvet cloth, and chocolate, vanilla, tobacco and cinchona laid out in 'curious boxes'.¹⁴¹ Charles III had long sought

¹³⁴ Simon de las Casas, 'Carta a Miguel de Muzquiz,' *Archivo General de Simancas*, Legajo 907, Vienna, 1772-10-03.

¹³⁵ Miguel de Muzquiz, 'Queriendo el Rey regalar a Su Hermana la Señora Electriz Viuda de Baviera veinte y cinco libras de quina de la mas selecta, lo participo a V.E. de orden de S.M.,' *Archivo del Palacio Real*, Copias de Ordenes comunicadas por el Ministro de Hacienda al Señor Sumiller de Corps. Real Botica, Reinados Carlos III / Legajo 197, 3, El Pardo, 1780-02-18.

¹³⁶ The King remitted some two *quintales* – about 92 kilograms, an amount sufficient for some 450 cases – of cinchona through Pedro Gil de Olondriz, his treasurer in The Hague, home to the Dutch States General, the government and the royal family. 'Nota del cacao de Soconurco, Polbillo de Oaxaca, Vaynillas Tavaco y Quina que se ha distribuido a los sujetos y parages que irán mencionados,' *Archivo General de Indias*, Indiferente 1552, Cádiz, 1753-10-09.

¹³⁷ Ferdinand VI remitted 'six pounds of the best cinchona' (*de la mejor que huviese*) together with 'other things from the Indies' – cacao, tobacco, vanilla – to the Marquis de Puente Fuerte, the Spanish ambassador in Copenhagen. Julián de Arriaga, 'Carta,' *Archivo General de Indias*, Indiferente 1552, Madrid, 1753-01-23.

¹³⁸ Riera Palmero, 'Quina y malaria en la España del siglo XVIII,' 22.

¹³⁹ José (Conde de Floridablanca) Moñino y Redondo, 'Regalo de Alhajas y Joyas hecho por S.M. y A.A. al embiado de la Puerta Otomana Ahmet Vasif Effendi,' *Archivo General de Simancas*, Secretaría de Hacienda / Legajo 906, El Pardo, 1788-02-29.

¹⁴⁰ On the negotiations between Spain and the Ottoman Empire in the late eighteenth century, see Hüseyin Serdar Tabakoğlu, 'The Impact of the French Revolution on the Ottoman-Spanish Relations,' *Turkish Studies* 3, no. 1 (2008).

¹⁴¹ 'Regalos hechos a la Corte de Constantinopla con motivo de la Paz, concluida en este año,' *Archivo General de Simancas*, Secretaría de Hacienda / Legajo 906, n.p., 1785.

good relations with the Ottoman Empire to institute direct trade links with the Levant, avoiding British and French intermediaries, and he and his ministers may well have taken advantage of the occasion to showcase cinchona as a Spanish product. At the same time, however, they would have taken a great deal of care in selecting the gifts for the Ottoman sultan to avoid any blunder in a long-awaited diplomatic alliance. They must have been materially certain the sultan would be familiar enough with the bark to recognize it instantly as a precious medicinal substance and that it would delight him as much as the gold, chocolate or velvet they bestowed along with it. By the late 1700s and early 1800s, cinchona bark was a medicinal substance sufficiently renowned to be valued, and prized, by the upper strata of Ottoman, Habsburg and Mughal societies alike, but also one that, so it would seem, was not so abundantly available of excellent quality as to render a gift in them unnecessary or unwelcome.

Cinchona's close association with gold, satin and velvet was not imaginary or purely symbolic. Though Spain did not capitalize significantly on the bark – even between 1782 and 1796, cinchona amounted only to 1.4 per cent of all of Spain's imports in value¹⁴² – the bark cost practitioners and sufferers a high price. Cádiz merchants sold the bark at 8 *reales per libra* between 1747 and 1762, at a time when stimulants like coffee cost 1.6 *reales per libra* in Cádiz and when chocolate sold for 2.5 *reales per libra*. Bark prices rose further over the later decades of the eighteenth century. Cinchona sold at 16 *reales per libra* in 1778, at 23 *reales per libra* in 1793, and at 28 *reales per libra* by 1794.¹⁴³ Prices soared on occasion, owing to temporary dislocations in supply and demand¹⁴⁴ or the sudden rise in popularity of particular bark varieties. In 1786, 'coloured cinchona bark' (*quinás coloradas*), harvested in the provinces of Cuenca, Riobamba, Guaranda, Alausí and Guayaquil, became so popular that English merchants paid up to 60 *reales per libra* for it in Cádiz.¹⁴⁵ Cádiz prices were a multiple of the amounts paid in the harvest areas, in

¹⁴² Shipments with a total value of 152,472,717 *reales de vellón* entered Cádiz in the period, while cinchona worth 6,000 *reales de vellón* reached Barcelona. Fisher, *Commercial Relations between Spain and Spanish America in the Era of Free Trade*, 70.

¹⁴³ According to García-Baquero, between 1747 and 1762, Cádiz merchants sold the bark at 25 silver *pesos per arroba*, while coffee cost 5 *pesos per arroba* – 1.6 *reales per libra* – and chocolate sold for 8 *pesos per arroba* – that is, 2.5 *reales per libra*. García-Baquero González, *Cádiz y el Atlántico*, 1; 164–65. For the Cádiz prices from 1778, 1793 and 1794, see Jaramillo Baanante, 'El comercio de la cascarilla,' 68.

¹⁴⁴ See, for instance, Jaramillo Baanante, 'El comercio de la cascarilla,' 70.

¹⁴⁵ José García de León y Pizarro, 'Informe,' *Archivo General de Indias*, Indiferente 1556, Madrid, 1706-01-07.

transfer sites like Piura and Paita and in Lima,¹⁴⁶ and merchants, apothecaries and itinerant barber-surgeons added further markups to the cost of cinchona bark when reselling it to medical practitioners and end consumers. Apothecaries in cities like Rome or Lisbon, according to contemporary observers, ‘made double or triple profits’ (*hacen una ganancia del doble, à del triple*), from reselling cinchona, or cinchona-based medicines.¹⁴⁷ Bark prices were affordable, and appeared ‘very reasonable’,¹⁴⁸ to the upper and middle echelons of various consumer societies at the time – the gentry, clergymen or civil servants, and also many craftsmen, merchants, physicians, lawyers and freehold farmers – but surely not to the poor – the men and women whose resources were scarce, as de Rieux had phrased it. In late eighteenth-century England, at a time when a shilling a day was a fair wage for a worker, customers paid from 18 pence to 9 shillings for a pound of cinchona – a ‘variation founded upon a supposed comparative difference in their respective goodness’.¹⁴⁹ Similarly, in Portugal, the price of what physicians considered a curative dose of the best cinchona oscillated between 400 and 600 *réis*,¹⁵⁰ when skilled workers – carpenters, masons and painters – made 300 to 400 *réis* a day and labourers and farmhands between 120 and 200 *réis*.¹⁵¹ In the electorate of Mainz, red cinchona bark, then the most esteemed by local physicians, cost 55 *Gulden* a pound, while bark of lesser quality still cost between 9 and 25 *Gulden*.¹⁵² A worker’s, even an artisan’s, annual income then amounted to some 80 to 100

¹⁴⁶ By 1786, for instance, in the harvest areas, merchants paid less than 48 *reales* per *arroba*, at a time when 1 *arroba* equalled 25 *libras*. Jaramillo Baanante, ‘El comercio de la cascarilla.’

¹⁴⁷ According to Nicolas de Azara, Spanish ambassador in Rome, by 1785 ‘apothecaries sold common cinchona for two paolos per ounce, and the one they pretended was select cinchona [...] for three, making a double or triple profit (*hacen una ganancia del doble, à del triple*)’. Nicolás de Azara, ‘Carta a Pedro de Lorena,’ *Archivo General de Simancas*, Legajo 961/2, Rome, 1789-10-09. In Portugal, ‘monopolists’ acquired a bottle of Castro’s cinchona-based English Water for 1,600 *réis*, and resold it to the public at up to 4,000 to 4,800 *réis*. *Documentos régios*.

¹⁴⁸ Buchan, *Domestic Medicine*, 169.

¹⁴⁹ Relph, *An Inquiry into the Medical Efficacy of a new Species of Peruvian Bark*, 4.

¹⁵⁰ See the report written by the Évora physician Manoel Francisco de Carvalho on April 28, 1799: ‘Enformes que deram os Medicos d’esta Corte,’ 56. According to the Minas Gerais-born physician Francisco Melo Franco (1757–1823), ‘an ounce of cinchona commonly costs 480 *réis*’. Cited in José Pedro Sousa Dias, *A água de Inglaterra: paludismo e terapêutica em Portugal no século XVIII* (Lisbon: Caleidoscópio, 2012), 62.

¹⁵¹ See the data files on Lisbon wages compiled by a research team based at the Instituto de Ciências Sociais da Universidade de Lisboa. Jaime Reis and Conceição Andrade Martins, ‘Prices, Wages and Rents in Portugal 1300–1910’ (2009), http://pwr-portugal.ics.ul.pt/?page_id=56.

¹⁵² Renard, *Die inländischen Surrogate der Chinarinde*, 18.

Gulden at most¹⁵³ and ‘only the wealthy’, according to the Mainz doctor Johann Renard, could at all afford red cinchona. ‘Families without fortune, artisans, manufacturers, people with a small income or families with many children’ could generally not, says Renard, afford any bark.¹⁵⁴ The authors of popular medical advice manuals and charitable pamphlets – John Haartman (1725–1788), whose ‘Clear Advice’ (*Tydelig Underrettelse*) addressed poor Finnish parishioners, or the Swiss Samuel Auguste André Tissot’s (1728 – 1797) 1761 ‘Advice to the country folk, with regard to their health’ (*Anleitung für das Landvolk in Absicht auf seine Gesundheit*) – unanimously recommended cinchona as the only secure remedy in fevers, but were well aware that the ‘common people’ (*das gemeine Volk*) would, for pecuniary reasons, often be unable or ‘reluctant to undergo a treatment’ (*wird sich nicht so leicht dieser Cur unterwerfen*) that resorted to the bark.¹⁵⁵

In and beyond Europe’s colonial, evangelizing and commercial entrepôts in North America and the Caribbean, coastal Africa, the eastern Mediterranean and South and East Asia, prices would commonly have been even higher than in the metropolis. High taxes and markups, as well as warfare and the low value placed on the New England currency, made medicines shipped to the British North American colonies far costlier than they were in London.¹⁵⁶ Surgeons of the Royal Navy could not afford to purchase the Peruvian bark in the West Indies – it sometimes cost ‘two guineas a pound’, around 42 shillings, four times the price paid back home in England – and petitioned for an ‘allowance of bark from government, while upon that station’.¹⁵⁷ Portuguese traders in Angola complained they could not make enough money to pay for the medicines of which they were ‘in daily need’.¹⁵⁸ Indeed, the price of bottled ‘English Water’ (*Água de Inglaterra*), a cinchona-based patent medicine

¹⁵³ Karl Härter, *Policey und Straffjustiz in Kurmainz. Gesetzgebung, Normdurchsetzung und Sozialkontrolle im frühneuzeitlichen Territorialstaat* (Frankfurt a. M.: Vittorio Klostermann, 2005), 600–01.

¹⁵⁴ Renard, *Die inländischen Surrogate der Chinarinde*, 8.

¹⁵⁵ Tissot, *Anleitung für das Landvolk*, 294. Haartman’s *Tydelig Underrättelse om de mäst gängbara Sjukdomars kännande och Botande genom Lätta och Enfaldiga Hus-medel* (Clear advice about recognizing and curing the most common diseases with plain and simple medication), first published in 1759, advised the use of the Peruvian bark, but suggested substitutes, since Haartman knew that many of his patients could not procure or afford the bark. Huldén, ‘The First Finnish Malariologist,’ 5.

¹⁵⁶ Gevitz, “‘Pray Let the Medicine be Good,’” 93; 97.

¹⁵⁷ John Hunter, *Observations on the Diseases of the Army in Jamaica: And on the Best Means of Preserving the Health of Europeans, in that Climate* (London: Printed for G. Nicol, Pall-Mall, Bookseller to His Majesty, 1788), 138.

¹⁵⁸ Cited in Joseph C. Miller, *Ways of Death. Merchant Capitalism and the Angolan Slave Trade, 1730–1830* (London: James Currey, 1988), 286.

popular throughout the Kingdom of Portugal and its overseas dominions, was higher in West African captaincies than back home in Portugal or in Brazil. While the English Water was available at 1,000 *réis* per bottle in Portugal from around 1772,¹⁵⁹ it was resold to the public in Portugal's American overseas dominions at up to 4,000 to 4,800 *réis*, and at up to 6,400 *réis* in Angola and Benguala (FIGURE 2.3).¹⁶⁰ As a consequence, in 1809 the Portuguese government sought to regulate the price at 1,600 *réis* for every big bottle and 900 *réis* for every small bottle for 'private commissioners in the captaincies of Rio de Janeiro, Bahia, Pernambuco, Pará, and Maranhão etc.', and at 2,400 *réis* for every big bottle and 1,300 *réis* for every small bottle in the captaincies of Angola and Benguala.¹⁶¹ The English Water was presumably more expensive in the West African captaincies since very few ships sailed there from Portugal directly. The inhabitants of Angola and Benguala would have received most of their supplies of English Water via Brazil.¹⁶² Prices were comparable or even more moderate than in the metropolis only in the southern Spanish American Viceroyalties. Cinchona was costly in pharmacies – in Lima, by the late 1700s, sufferers paid one *real* for a dose of powdered bark,¹⁶³ at a time when even higher earners like chaplains and physicians made but some 3,000 *reales* per annum¹⁶⁴ – but it was likely more affordable from other suppliers. Given that cinchona was administered in the potions of slave healers in Tucumán, in the Viceroyalty of Rio de la Plata,¹⁶⁵ and used in all kinds of fevers by Indian healers in the Quito *Audiencia*,¹⁶⁶ it was presumably available at a more favourable price from

¹⁵⁹ André Lopes de Castro (1734/35–1803) first started manufacturing the English Water, which had hitherto been imported from England, in Portugal between 1772 and 1774. José Pedro Sousa Dias, *A água de Inglaterra: paludismo e terapêutica em Portugal no século XVIII* (Lisboa: Caleidoscópio, 2012), 56; 62; 74.

¹⁶⁰ *Documentos régios*. ¹⁶¹ *Ibid*.

¹⁶² Most of the imports for the town of Luanda were Brazilian-produced goods, since the slave trade from Angola was primarily a two-way trade, between Angola and Brazil. In 1795, for example, of the 337 Portuguese vessels which left the harbour of Lisbon, only 14 went to Africa, as opposed to 51 that sailed for Brazil. Herbert S. Klein, 'The Portuguese Slave Trade from Angola in the Eighteenth Century,' *The Journal of Economic History* 32, no. 4 (1972).

¹⁶³ Anon., 'El Medico verdadero,' 446.

¹⁶⁴ By the year 1770, a hospital orderly made 2,400 *reales*, a porter 192 *reales*, a lawyer 800 *reales*, and a chaplain, physician or apothecary more than 3,000 *reales* per annum. Macera, *Precios del Perú XVI–XIX*, xxiv.

¹⁶⁵ Carlos Alberto Garcés, 'Místicos, curanderos y hechiceros: Historias de afroamericanos en la sociedad del Tucumán colonial,' *Contra Relatos desde el Sur. Apuntes sobre Africa y Medio Oriente* V, no. 7 (2010), 23.

¹⁶⁶ Eduardo Estrella, 'Ciencia ilustrada y saber popular en el conocimiento de la quina en el siglo XVIII,' in *Saberes Andinos. Ciencia y tecnología en Bolivia, Ecuador y Perú*, ed. Marcos Cueto (Lima: Instituto de Estudios Peruanos, 1995), 56–57.

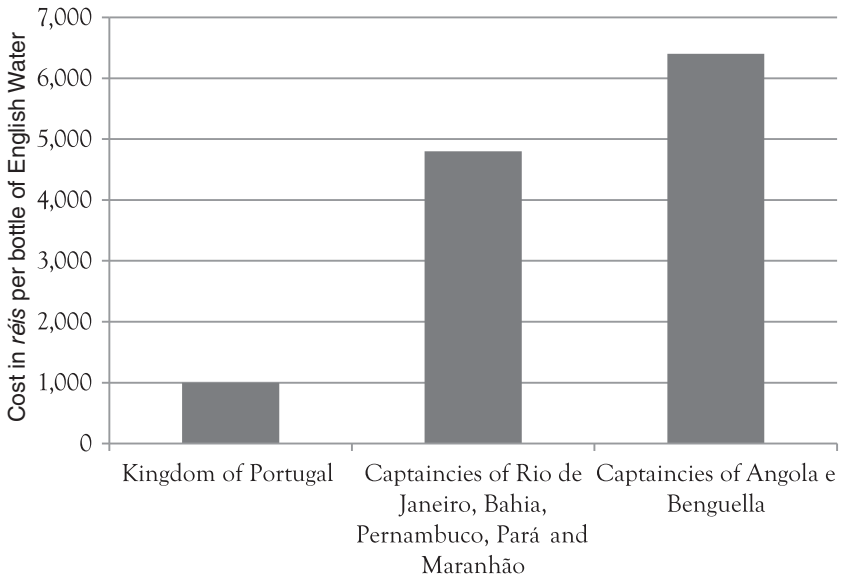


Figure 2.3 Approximate market prices in réis for bottles of ‘English Water’ (*Água de Inglaterra*) between 1772 and 1809, at a time when that medicine was fabricated in Portugal and exported to the West African captaincies of Angola and Benguella via Brazil.

Data from Sousa Dias, *A água de Inglaterra*, 45; *Documentos régios; Enformes que deram os Medicos d’esta Corte*, 56.

peddlers or herbalists, on the streets and in marketplaces, with ties to the harvest areas.

Even though those whose resources were scarce in places like New England, Finland and Angola could generally have ill afforded cinchona, those within the reach of religious orders, private charity and increasingly systematic medical relief programmes would still have had access to the bark. The Spanish Crown, in conjunction with a wider reform in the state’s understanding of its responsibilities towards the population, developed a comprehensive system of free-of-charge medical attention during the late 1700s that encompassed the distribution of medicines from the Royal Pharmacy among religious convents, localities afflicted by epidemics on the Iberian peninsula, in its American empire and beyond,¹⁶⁷ and hospitals – at a time when hospitals were still fundamentally charitable

¹⁶⁷ On the Crown’s eighteenth-century distribution of medicines among the army, convents and the court, see Andrés Turrión, ‘Quina de la Real Hacienda para el ejército español en el siglo XVIII,’ 419–21. See also María Esther Alegre Pérez, ‘La asistencia social en la Real Botica durante el último cuarto del siglo XVIII,’ *Boletín de la*

institutions, places of shelter for those who were poor and ill or near death.¹⁶⁸ Cinchona remittances regularly reached the Discalced Franciscans of Cienpuzuelos, whose vows of poverty prevented them from purchasing cinchona for their confreres,¹⁶⁹ ‘sick paupers’ (*enfermos pobres*) in Santa Fé’s San Juan de Dios Hospital,¹⁷⁰ and Jerusalem’s Franciscan monasteries, to cure tertian fevers among the ‘ailing friars that live in the convents of these holy sites’.¹⁷¹ The Spanish Crown was not the only government to dispense free cinchona to sick paupers. The Portuguese Crown was likewise frequently called upon, and granted, cinchona or cinchona-based medicines to sickly localities, from Estremadura¹⁷² to Angola.¹⁷³ Cinchona preparations were also distributed by the monarchs of Islamic societies, in which medical aid was likewise a recognized act of benevolence and charity.¹⁷⁴ When an epidemic was raging in the sultanate of Morocco in 1799 and 1800 – in Marrakesh,

Sociedad Española de Historia de la Farmacia 35, no. 139 (1984). On health care and poor relief under Bourbon rule more broadly, see also Pedro Carasa, ‘Welfare Provision in Castile and Madrid,’ in *Health Care and Poor Relief in 18th and 19th Century Southern Europe*, ed. Ole Peter Grell, Andrew Cunningham and Bernd Roeck (Aldershot: Ashgate, 2005), 100. On the earlier history of hospital and welfare work in Habsburg Spain, see Teresa Huguet-Termes, ‘Madrid Hospitals and Welfare in the Context of the Habsburg Empire,’ in *Health and Medicine in Hapsburg Spain: Agents, Practices, Representations*, ed. Teresa Huguet-Termes, Jon Arrizabalaga and Harold J. Cook (London: The Wellcome Trust Centre for the History of Medicine at UCL, 2009).

¹⁶⁸ Morris J. Vogel, *The Invention of the Modern Hospital. Boston 1870–1930* (Chicago: University of Chicago Press, 1980). On Spanish American hospitals, see Gabriela Ramos, ‘Indian Hospitals and Government in the Colonial Andes,’ *Medical History* 57, no. 2 (2013).

¹⁶⁹ Manuel de Laganas, ‘El Guardián y Comunidad de este Convento de San Francisco de Descalzos de la V. de Cienpuzuelos,’ *Archivo del Palacio Real*, Copias de Ordenes comunicadas por el Ministro de Hacienda al Señor Sumiller de Corps. Real Botica, Reinados Carlos III / Legajo 197, 3, Cienpuzuelos, 1775-07-06.

¹⁷⁰ Juan José Villaluenga, ‘Copia del oficio de Juan José Villaluenga del 18 de julio de 1786 al arzobispo virrey Antonio Caballero y Góngora comentando una donación anual de quina a fray Juan Antonio Gago, prior del Hospital de San Juan de Dios, de Cassa Plaza, para su administración a enfermos pobres,’ *Archivo del Real Jardín Botánico*, Real Expedición Botánica del Nuevo Reino de Granada (1783–1816). José Celestino Mutis. Documentación oficial. Oficios varios, RJB03/0002/0003/0097, Quito/Turbaco, 1786-10-08.

¹⁷¹ Fray Josef Fernandez Alexo, ‘Fray Josef Fernandez Alexo Religioso observante de San Francisco y Comisario de los Santos Lugares de Jerusalem expone,’ *Archivo General de Simancas*, Legajo 960, Jerusalem, 1781.

¹⁷² ‘OFÍCIO (3) ao (secretário de Estado dos Negócios da Marinha e Ultramar) Martinho de Melo e Castro,’ *Arquivo Histórico Ultramarino*, 076 – REINO RESGATE 20121023 / Cx. 30-A, Pasta 5, Faro (Lisboa), Caldas da Rainha, 1784-08-24 / 1787-05-08.

¹⁷³ Patrick Figueiredo, ‘A “Água de Inglaterra” em Portugal,’ in *A Circulação do Conhecimento: Medicina, Redes e Impérios*, ed. Cristiana Bastos and Renilda Barreto (Lisboa: Imprensa do Instituto de Ciências Sociais, 2011), 123–24.

¹⁷⁴ Miri Shefer-Mossensohn, *Ottoman Medicine. Healing and Medical Institutions 1500–1700* (Albany: State University of New York Press, 2009), 110.

Tangier, Meknes and Tétouan, in particular – Sultan Mawlay Sulayman (1766–1822, r. 1792–1822) had it combated by means of cinchona-based preparations, courtesy of the Spanish monarch Charles IV (1748–1819, r. 1788–1808).¹⁷⁵ Religious hospitals also frequently expended large quantities of the bark: the charitable *Hôtel-Dieu de Carpentras* in southern France,¹⁷⁶ for instance, and Rome’s ‘Hospital of the Holy Spirit’ (*Ospedale di Santo Spirito*), which used some 6 tons of cinchona bark between 1778 and 1785.¹⁷⁷ Religious orders were important pharmaceutical suppliers of the bark in the late 1700s and early 1800s, too, and several of them would have dispensed the bark charitably: pharmacies pertaining to Capuchin monasteries in Solothurn, in the Basel diocese,¹⁷⁸ to the Cistercian order in Eger, in the Habsburg-ruled Kingdom of Hungary,¹⁷⁹ and to the Jesuit order, the networks of which stretched from Büren to Macao, from Lima to Rome and from Milan to Goa.¹⁸⁰ Medical poor relief programmes in northern Europe, where, from the Reformation onwards, provision of health care and poor relief came to be seen as the responsibility of the community as a whole,¹⁸¹ commonly avoided the more expensive foreign plant remedies and replaced them with cheaper,

¹⁷⁵ Braulio Justel Calabozo, ‘El doctor Masdevall. Protomédico del sultán Marroquí Muley Solimán,’ *Al-Andalus – Magreb II* (1994), 180; 221–22.

¹⁷⁶ Dubois, ‘Le quotidien d’une pharmacie hospitalière,’ 94.

¹⁷⁷ According to the Spanish ambassador, the hospital used 18,099 *libras romanas*, that is, 6 tons. Azara, ‘Carta a Pedro de Lorena.’

¹⁷⁸ See the cinchona-based remedy against a ‘cold fever’ contained in a recipe collection attributed to the Solothurn Capuchin monastery’s pharmacy. ‘Kräuterrezepte und Hausmittel,’ *Archiv für Medizingeschichte*, Universität Zürich, Rezeptbücher, MS J 29, Solothurn (?), c. 1767.

¹⁷⁹ See, for instance, the report on a 1786 inspection of the pharmacy (*Bericht von der den 27. [...] ber 786 geschehenen Visitation der Apotheke deren P.P. Cisterciten in Erlau*) from the Hungarian National Archives (*Archivum. Magyar Nemzeti Levéltár*). I would like to thank Katalin Pataki for sharing this document, and her research, with me. Katalin Pataki has extensively studied monasteries and medical provisions in Hungary. Katalin Pataki, ‘Healers, Quacks, Professionals: Monastery Pharmacies in the Rural Medicinal Marketplace’, *Society and Politics* 12, no. 1 (2018), 32–49; Katalin Pataki, ‘Medical Provision in the Convents of Poor Clares in Late Eighteenth Century Hungary’, *Cornova* 6, no. 2 (2016), 33–58.

¹⁸⁰ On the Jesuit networks taking cinchona across the world, see Anagnostou, *Missionspharmazie*, 298; 321; 27. See also Sabine Anagnostou, ‘The International Transfer of Medicinal Drugs by the Society of Jesus (Sixteenth to Eighteenth Centuries) and Connections with the Work of Carolus Clusius,’ in *Royal Netherlands Academy of Arts and Sciences*, ed. Florike Egmond, Paul Hoftijzer and Robert P. W. Visser (Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, 2007). The Jesuit pharmacy of San Pablo College in Lima was a particularly important distribution centre for American plant-based remedies. Luis Martin, *The Intellectual Conquest of Peru. The Jesuit College of San Pablo, 1568–1767* (New York: Fordham University Press, 1968).

¹⁸¹ Andrew Cunningham, ‘Some Closing and Opening Remarks,’ in *Health Care and Poor Relief in 18th and 19th Century Southern Europe*, ed. Ole Peter Grell, Andrew Cunningham and Bernd Roeck (Aldershot: Ashgate, 2005), 11.

home-grown substitutes. Physicians were, however, frequently allowed and encouraged to administer cinchona and some other select remedies out of the public's purse to sick paupers. Hamburg's *Paupers' Pharmacopoeia*, for instance, a paragon of pharmaceutical knowledge for the German territories at the time, encompassed expensive foreign drugs if they were considered indispensable or significantly more effectual than local substitutes. Quassia wood, Peruvian balsam, copaiba balsams and cinchona were thus administered to the poor on a regular basis.¹⁸² Since the lives of patients often depended upon it, as one contemporary physician phrased it, it was imperative that cinchona also be accessible to the poor.¹⁸³ In 1806, the charitable hospital in Mainz spent more than 1,000 *Gulden*, a small fortune at the time, for cinchona and cinchona-based remedies.¹⁸⁴ The world over, the distribution of free cinchona frequently also extended to men and women on whose utility or productivity masters and governments relied. Slaves in Ottoman households¹⁸⁵ and on plantations in the West Indies,¹⁸⁶ workers in Spanish mines¹⁸⁷ and servants on the Arabian Peninsula¹⁸⁸ were administered doses of the bark to restore their health and ability to work. From Marrakesh to Rome, from Jerusalem to Carpentras, in the late eighteenth and early nineteenth centuries, charity or economic expediency often entailed access to the bark even for those whose resources were too scarce to purchase it.

Rather than poverty or scarcity of resources as such, it was distance from the veins of cinchona's passage – from colonial entrepôts, urban centres or charitable hospitals – that excluded men, women and children

¹⁸² Almuth Weidmann, *Die Arzneiversorgung der Armen zu Beginn der Industrialisierung im deutschen Sprachgebiet, besonders in Hamburg* (Stuttgart: Deutscher Apotheker-Verlag, 1982), 144; Robert Jütte, 'Hanseatic Towns: Hamburg, Bremen and Lübeck,' in *Health Care and Poor Relief in 18th and 19th Century Southern Europe*, ed. Ole Peter Grell, Andrew Cunningham and Bernd Roeck (Aldershot: Ashgate, 2005).

¹⁸³ Cited in Weidmann, *Die Arzneiversorgung der Armen*, 144.

¹⁸⁴ Renard, *Die inländischen Surrogate der Chinarinde*, 9.

¹⁸⁵ Aydüz and Yildirim, 'Bursalı Ali Münşi ve Tuhfe-i Aliyye,' 96.

¹⁸⁶ James Thomson, *A treatise on the diseases of negroes, as they occur in the island of Jamaica: with observations on the country remedies* (Jamaica: Alex. Aikman, jun., 1820), 14; 19; 27.

¹⁸⁷ The Royal Pharmacy in Madrid, for instance, supplied the miners in Almaden with cinchona almost yearly during the mid-1750s. Miguel de Muzquiz, 'En los años de 1752, 54 y 56 se sirvió el Rey mandar entregar varias porciones de Quina selecta para la curación de los terzados y enfermos del Real Hospital de las Minas de Almaden,' *Archivo del Palacio Real*, Copias de Ordenes comunicadas por el Ministro de Hacienda al Señor Sumiller de Corps. Real Botica, Reinados Carlos III / Legajo 197, 3, San Ildefonso, 1776-09-12.

¹⁸⁸ James Bruce (1730–1794), for instance, on his journey across the Arabian Peninsula, administered the bark to his 'rais', ill with a fever, to set him up again. James Bruce, *Travels to discover the source of the Nile, in the years 1768, 1769, 1770, 1771, 1772, and 1773*, vol. 5 (Edinburgh / London: J. Ruthven / J. Robinson, 1790), 300.

from the remedy's consumption. Urban populations generally had better access to remedies on account of a higher concentration of wealth¹⁸⁹ as well as a greater density of suppliers – the number of fixed shops specializing in the distribution of drugs grew even faster than the medical profession between 1780 and 1900¹⁹⁰ – and particularly so to foreign plant remedies like cinchona. Outside the colonial urban centres in the Viceroyalty of New Spain – that is, Mexico City, Puebla, Guadalajara, Veracruz, Valladolid and Oaxaca –¹⁹¹ for instance, cinchona bark was barely available. Similarly, in Muscovy, though 'generally employed' for the cure of intermittent fevers in the capital, Moscow,¹⁹² along the Caspian Sea, on the Caucasian plains and in the Crimea, where apothecaries were scarce, 'the poor and even many of the rich [were] unable to procure the bark',¹⁹³ as they were in the commercially more isolated regions of north-western Europe. Finnish sufferers' only source of supply for cinchona was Stockholm. Though severe 'intermittent fevers' (*växelfeber*) reigned in the south-western archipelago around Turku in the late 1700s – some 1,800 men, women and children died of these fevers between 1751 and 1773¹⁹⁴ – the district physicians who urged the administration of cinchona were well aware that most sufferers would be unable to procure the bark.¹⁹⁵ Even in states like Britain and in the Holy Roman Empire, in outlying rural areas where apothecaries were

¹⁸⁹ Mark S. R. Jenner and Patrick Wallis, 'The Medical Marketplace,' in *Medicine and the Market in England and Its Colonies, c. 1450–1850*, ed. Mark S. R. Jenner and Patrick Wallis (Basingstoke: Palgrave Macmillan, 2007), 11.

¹⁹⁰ Louise Hill Curth, 'Introduction: Perspectives on the Evolution of the Retailing of Pharmaceuticals,' in *From Physick to Pharmacology: Five Hundred Years of British Drug Retailing*, ed. Louise Hill Curth (Aldershot: Ashgate, 2006), 5.

¹⁹¹ Cinchona was available 'in all of [New Spain's] pharmacies' (*en todas las Boticas curiosas*). Esteyneffer, *Florilegio medicinal*, 296. Licensed apothecaries in colonial New Spain were concentrated, however, in the colonial urban centres of Mexico City, Puebla, Guadalajara, Veracruz, Valladolid and Oaxaca. Paula De Vos, 'From Herbs to Alchemy: The Introduction of Chemical Medicine to Mexican Pharmacies in the Seventeenth and Eighteenth Centuries,' *Journal of Spanish Cultural Studies* 8, no. 2 (2007), 140.

¹⁹² Robert Lyall, *The Character of the Russians, and a Detailed History of Moscow* (London: T. Cadell, in the Strand, and W. Blackwood, 1823), cvii.

¹⁹³ Edward Daniel Clarke, *Travels in Various Countries of Europe, Asia and Africa. Part the First: Russia, Tahtary and Turkey*, 4 ed., 2 vols., vol. 2 (London: T. Cadell and W. Davies, 1817), 206.

¹⁹⁴ This estimate is taken from F. J. Rabbe, who published *Några anteckningar om frossan i Finland samt botemedlen deremot* – which translates as 'Some Notes about the Ague in Finland and Remedies against it' – in the volume *Finska Läkaresällskapets handlingar* in 1856. Cited in Lena Huldén, Larry Huldén and Kari Heliövaara, 'Endemic Malaria: An "Indoor" Disease in Northern Europe. Historical data Analysed,' *Malaria Journal* 4, no. 19 (2005), 4.

¹⁹⁵ A Finnish cinchona-grinding mill was only established in Turku in 1813. Huldén, 'The First Finnish Malariologist,' 5.

scarce, supply was more restricted and vulnerable, and particularly foreign drugs were not always to be had when wanted, by both patients and professionals.¹⁹⁶ In the rural areas near Mainz, as Renard put it, even those who could afford it, if they fell ill on their landed estates, could not rely on finding cinchona in ‘small village pharmacies nor in the pharmacies of the minor neighbouring towns’, nor in the medical supplies of country doctors.¹⁹⁷ By the late 1700s and early 1800s, many of the world’s royal courts, bazaars and port cities were part of a vibrant medical market that redistributed remedies like cinchona to ‘the four corners of the Earth’ (*las cuatro partes del mundo*).¹⁹⁸ More so even than a person’s social stratum, religious creed, or political belonging, it was his or her relative nearness to, or distance from, the boundaries and confines of that market that determined ‘what he or she could reasonably expect to have available as medical provision’.¹⁹⁹

Officials, physicians and naturalists concerned with the bark’s equitable distribution around 1800 were not the last to presume to speak and act in the name and for the betterment of a universal humanity. The British quest to smuggle and transplant cinchona seedlings during the 1850s, which put an end to the South American monopoly, was commonly portrayed as an act to rescue the tree from certain extinction at the hands of its ‘ignorant’, and ‘barbarous’ Andean keepers for the good of nature and mankind.²⁰⁰ Like these later schemes, which were, as historians have argued, about the good of British imperial troops and administrative personnel rather than humanity, governmental, commercial and scholarly efforts around 1800 were likewise in the service of a particular sort and sector of humanity. The boundaries of the universal humanity propagated in the treatises and decrees of Spanish officials, British physicians and French naturalists in late 1700s and early 1800s were, however, unlike later ones, neither national and imperial nor strictly social,

¹⁹⁶ Steven King, ‘Accessing Drugs in the Eighteenth-Century Regions,’ in *From Physick to Pharmacology: Five Hundred Years of British Drug Retailing*, ed. Louise Hill Curth (Aldershot: Ashgate Publishing, 2006), 58.

¹⁹⁷ Renard, *Die inländischen Surrogate der Chinarinde*, 9. ¹⁹⁸ Caldas, *Memoria*, 13.

¹⁹⁹ Charles W. J. Withers, *Placing the Enlightenment. Thinking Geographically about the Age of Reason* (Chicago: University of Chicago Press, 2007), 54. Along a similar vein, historians have argued that men and women living in colonial territories had the advantage of better and more direct access to medical innovations like smallpox vaccines around 1800. Jürgen Osterhammel, *Die Verwandlung der Welt. Eine Geschichte des 19. Jahrhunderts* (München: C.H. Beck, 2011), 274–75.

²⁰⁰ Philip, ‘Imperial Science Rescues a Tree: Global Botanic Networks, Local Knowledge and the Transcontinental Transplantation of Cinchona,’ 190–91.

religious or geographical. Millions of men and women around the Atlantic World and beyond, be they Ottoman courtiers, Hamburg paupers or Andean villagers, had by the late 1700s and early 1800s come to have access, and to assign a medical purpose, to dried shreds of cinchona tree bark. Rather, the contours of the bark's availability were constricted and bound by physical and cultural distance from the veins of its passage: from the commercial, imperial and diplomatic ties and relationships that entwined its English, creole, Levantine and Portuguese distributors and that formed the trade's volume, vigour and, above all, reach. The humanity propagated in the treatises and decrees of Spanish officials, British physicians and French naturalists encompassed a wide range of men, women and children, so long as they lived or moved in places tied to the wider world: in convents or at court, in hospitals or near seaports, beside marketplaces or in town. Cinchona reached societies from the North Sea Basin to the Gulf of Mexico and from the Gulf of Guinea to the Caribbean Sea, but it was commonly in the service of a rather particular sort, and sector, of humanity.