

Introduction

A Singular Remedy

What commerce [...] for the people that are the sole proprietors of the most powerful remedy that medicine possesses to restore the health of mankind in the four corners of the Earth.

– Francisco José de Caldas, *Memoria sobre el estado de las quinas*, 1809.

By the late 1700s and early 1800s, cinchona bark was, to many, ‘the most important, and the most usual remedy that medicine possessed’.¹ Though of limited repertoire – cinchona trees prospered only on the precipitous eastern slopes of the Andes at the time, in the Spanish American Viceroyalties of Peru and New Granada – and comparatively recent acceptance into Old World materia medica, the bark had, by the turn of the eighteenth century, woven itself into the texture of everyday medical practice in a wide range of societies within, or tied to, the Atlantic World. It was everywhere attributed ‘wonderful’,² ‘singular’,³ even ‘divine’⁴ medicinal virtues, the knowledge of which, so it was said, had come to mankind from its simplest, and humblest, specimens, ‘wild Indians’⁵ close to nature and privy to its most coveted secrets. Bittersweet ‘febrifugal lemonades’ and bottled wines of the bark sat on the shelves of Lima apothecaries, the counters of Cantonese market

¹ Luis de Rieux, ‘Carta a Miguel Cayetano de Soler,’ *Archivo General de Indias*, Indiferente 1557, Aranjuez, 1800-05-14, 346 v.

² Antonio Caballero y Góngora, Archbishop and Viceroy of New Granada, referred to the bark’s ‘wonderful effects (*sus maravillosos efectos*)’ in a 1788 letter. Antonio Caballero y Góngora, ‘Copia de Carta Reservada,’ *Archivo del Palacio Real*, Papeles del Almacén de la Quina, Caja 22283 / Expediente 2, Turbaco, 1788-05-28.

³ Baltasar de Villalobos, *Método de curar tabardillos, y descripción de la fiebre epidémica, que por los años de 1796 y 97 afligió varias poblaciones del partido de Chancay* (Lima: Imprenta Real del Telégrafo Peruano, 1800), 117; Edward Rigby, *An Essay on the Use of the Red Peruvian Bark in the Cure of Intermittents* (London: J. Johnson, 1783), 6.

⁴ Simon André Tissot, *Aviso al pueblo acerca de su salud ó Tratado de las enfermedades mas frecuentes de las gentes del campo*, trans. Juan Galisteo y Xiorro (Madrid: Imprenta de Pedro Marin, 1790), 161.

⁵ William Cockburn, *The Present Uncertainty in the Knowledge of Medicines in a Letter to the Physicians in the Commission for Sick and Wounded Seamen* (London: Benj[amin] Barker, 1703), Preface I. A1.

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stands and in the medicine chests of Luanda hospital orderlies. They were routinely concocted, and administered at the bedside, by Moroccan court physicians, French housewives and slave healers alike and they accompanied, tucked into their pouches, Dutch sailors to febrile environs, Peruvian soldiers to the battlefield and North American settlers westward. Scottish physicians, creole botanists and French writers alike were unanimous not only in according the bark ‘singularity’,⁶ and ‘the first place among the most effective remedies’ (*die erste Stelle unter den wirksamsten Arzneimitteln*),⁷ but also in holding it to be ‘more generally useful to mankind than any in the materia medica’.⁸ It was commonly agreed upon that there was ‘no febrifuge of such well-known virtue in all of medicine’ (*por que no se halla en la Medicina febrifugo de virtud tan conocida*),⁹ and that not a single remedy ‘more estimable and precious [than the bark] had been discovered unto this day’.¹⁰

For decades now, historians of science, medicine and technology have insisted on the epistemological lesson that science and knowledge are the result of specific circumstances and close, local settings, situated and bound ‘ineluctably to the conditions of their production’ – historically contingent, idiosyncratic ‘form[s] of practice’, rooted in a particular time and place.¹¹ The field is at present said to be in the midst of a fundamental turn toward global approaches that straddle traditional spatial boundaries but, as some of its most prominent advocates have cautioned, practitioners have hardly begun to understand the consequences of that shift for the field’s most basic values and principles, especially its

⁶ Aylmer Bourke Lambert, *A description of the genus Cinchona, comprehending the various species of vegetables from which the Peruvian and other barks of a similar quality are taken* (London: B. and J. White, 1797), 1.

⁷ Samuel Auguste André Tissot, *Anleitung für das Landvolk in Absicht auf seine Gesundheit* (Zürich: Heidegger und Compagnie, 1763), 288–89.

⁸ Rigby, *An Essay on the Use of the Red Peruvian Bark*, 6.

⁹ Manuel Hernandez de Gregorio, ‘Dn. Manuel Hernandez de Gregorio, Boticario de Camara presenta una memoria compuesta de 37 artículos, queriendo persuadir las grandes conveniencias de la estancación general, y parcial de la Quina en beneficio de la salud publica, y del interés del Real Erario, detallando las reglas gubernativas para su administración,’ *Archivo General de Indias*, Indiferente 1556, Madrid, 1804.

¹⁰ Hipólito Ruiz López, *Quinología O Tratado del Arbol de la Quina o Cascarilla, con su descripción y la de otras especies de quinos nuevamente descubiertas en el Perú, del modo de beneficiarla, de su elección, comercio, virtudes, y extracto elaborado von cortezas recientes* (Madrid: La viuda é hijo de Marin, 1792), 38.

¹¹ For that diagnosis, see James A. Secord, ‘Knowledge in Transit,’ *Isis* 95, no. 4 (2004), 657. See also Lorraine Daston, ‘Science Studies and the History of Science,’ *Critical Inquiry* 35, no. 4 (2009). The term ‘situated knowledge’ is commonly associated with the work of Donna Haraway; see her ‘Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,’ *Feminist Studies* 14, no. 3 (1988).

emphasis on locality.¹² This book is an attempt at writing a history of how medical knowledge – in the shape of matter, words and practices – was shared between and across a wide range of geographically disperse and socially diverse societies within the Atlantic World and its Asian entrepôts between 1751 and 1820. Centred on the Peruvian bark, or cinchona, it exposes and examines how that medicine and the imaginaries, therapeutic practices and medical understandings attendant to its consumption, were ‘part of the taken-for-granted understanding’¹³ of people in many different social and cultural contexts: at Peruvian academies and in Scottish households, on Louisiana plantations and in Moroccan court pharmacies alike. Much of the book is concerned with the conditions, contingency and idiosyncrasy of the prevalence and movement of bark knowledge – through contingent ‘act[s] of communication’,¹⁴ ‘brokerage’¹⁵ and sociality,¹⁶ ‘between [...] settings’ tied together by Atlantic trade, proselytizing, and imperialism¹⁷ – as well as with the variability of the knowledge in motion. Indeed, the book suggests that cinchona’s wide spread owed less to its utter immutability and consistency than, as historians have argued for other tools and substances, to a measure of malleability, and multivalence: its ability to ‘subtly adapt’, be refashioned, or tinkered with.¹⁸ Scholarship on modern and early modern

¹² Kapil Raj, ‘Beyond Postcolonialism ... and Postpositivism. Circulation and the Global History of Science,’ *Isis* 104 (2013), 341; Secord, ‘Knowledge in Transit,’ 660. See also Fa-ti Fan, ‘The Global Turn in the History of Science,’ *East Asian Science, Technology and Society: An International Journal* 6 (2012).

¹³ Secord, ‘Knowledge in Transit,’ 655. ¹⁴ *Ibid.*, 661.

¹⁵ On the ‘historically situated work of mediation’, and brokerage, in the history of science, see Simon Schaffer et al., introduction to *The Brokered World. Go-Betweens and Global Intelligence, 1770–1820*, ed. Simon Schaffer et al. (Sagamore Beach: Watson Publishing International, 2009), xx.

¹⁶ Marcy Norton has stressed the role that sustained, and persistent, exposure to substances, especially through social relationships and practices, played for their spread. Marcy Norton, ‘Tasting Empire: Chocolate and the European Internalization of Mesoamerican Aesthetics,’ *The American Historical Review* 111, no. 3 (2006).

¹⁷ On debates about ‘Atlantic interdependence’ around 1800, see Richard J. Blakemore, ‘The Changing Fortunes of Atlantic History,’ *English Historical Review* CXXXI, no. 551 (2016), 855. See also D’Maris Coffman and Adrian Leonard, ‘The Atlantic World: Definition, Theory, and Boundaries,’ in *The Atlantic World: 1400–1850*, ed. D’Maris Coffman, Adrian Leonard and William O’Reilly, The Routledge Worlds (London: Routledge, 2015), 3. On knowledge not as ‘abstract doctrine but as communicative practice in a range of well-integrated and closely understood settings’, see Secord, ‘Knowledge in Transit,’ 671.

¹⁸ David Kaiser, *Drawing Theories Apart: The Dispersion of Feynman Diagrams in Postwar Physics* (Chicago: University of Chicago Press, 2005), 7. This alludes to the work of Bruno Latour, who argued that practices of ‘inscription’ produced ‘immutable mobiles’. The idea was originally formulated in Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge, Mass.: Harvard University Press, 1987).

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globalization, with its liquid language of elusive flows and unconstrained circulation, still tends to evoke an idea of movement as erosive and antithetical to place, and of ‘the very idea of locality [...] as a form of opposition or resistance to the [...] global’, a gesture towards the discrete, and authentic.¹⁹ It was in large measure the bark’s ability to tie itself to locales, however, to settle and become situated,²⁰ again and again, that accounted for its prevalence and mobility. Science and knowledge are not bound to one time and place, this book holds. They may be unmoored and moved – become well known and generally useful elsewhere – but they will invariably do so in ways that are just as contingent, situated and local as those traditionally associated with their production.

The Outlines of Cinchona

It may appear redundant for the historical account of a plant component to further define the outlines of its object of study. The seeming definitional sharpness of cinchona is deceptive, however.²¹ Because the bark was, by the late 1700s and early 1800s, spoken of, sought after and studied in countless tongues across the Atlantic World and beyond, there were considerable shifts in its epistemic, chemical and medical contours, its nomenclature and, not least, its therapeutic indications. This is not to say that cinchona was not a distinct, identifiable object by the late 1700s and early 1800s.²² Indeed, though its passage into the wider Galenic medical repertoire during the late 1600s had been attended by

¹⁹ For a critique of how mobility serves as an antithesis to ‘space’ in scholarship on globalization, see Stuart Alexander Rockefeller, ‘Flow,’ *Current Anthropology* 52, no. 4 (2011). On place and the ‘liquid’ language of global history, see Stefanie Gänger, ‘Circulation: Reflections on Circularity, Entity and Liquidity in the Language of Global history,’ *Journal of Global History* 12, no. 3 (2017), 316. On ‘the very idea of locality [...] as a form of opposition or resistance to the [...] global’, see Roland Robertson, ‘Glocalization: Time-Space and Homogeneity-Heterogeneity,’ in *Global Modernities*, ed. Mike Featherstone, Scott Lash and Roland Robertson (London: Sage, 1995), 30.

²⁰ This responds in part to Kapil Raj’s question of how to tackle to the ‘concomitant situatedness and movement of science’. Raj, ‘Beyond Postcolonialism ... and Postpositivism,’ 337–41.

²¹ On the often ‘labile’ and unstable qualities of substances in movement, see Guy Attewell, ‘Interweaving Substance Trajectories: *Tiryaq*, Circulation and Therapeutic Transformation in the Nineteenth Century,’ in *Crossing Colonial Historiographies: Histories of Colonial and Indigenous Medicines in Transnational Perspective*, ed. Anne Digby and Waltraud Ernst (Cambridge Scholars Publishing, 2010), 2; Carla Nappi, ‘Winter Worm, Summer Grass: *Cordyceps*, Colonial Chinese Medicine, and the Formation of Historical Objects,’ in *Crossing Colonial Historiographies: Histories of Colonial and Indigenous Medicines in Transnational Perspective*, ed. Anne Digby, Projit B. Mukharji and Waltraud Ernst (Newcastle upon Tyne: Cambridge Scholars, 2010).

²² Nappi, ‘Winter Worm, Summer Grass’.

controversy over its nature, virtues and properties,²³ by the late 1700s and early 1800s, medical practitioners, both lay and professional, across the Atlantic World generally agreed on the bark's utility as a remedy and its coherence as a category.²⁴ Rather, the very latitude and cosmopolitanism of the bark's pathways entailed acts of adaptation, customizing and calibration, and, with them, a measure of variability and volatility that compels us to handle both the subject and the term, cinchona, advisedly, and with a measure of care.²⁵ As much recent scholarship reminds us, objects exist both in space and in time. They have a diachronic quality; are possessed of lives and biographies;²⁶ and accrete new meanings, names and properties, as they are identified, translated or 'adjust [...] to context' in the process.²⁷ They ought thus to be understood as malleable to a point: as multiple yet coherent, as liminal yet recognizable.²⁸

²³ See in particular Saul Jarcho's 1993 study on the plant's 'discovery', its transmission to and within western Europe and its incipient establishment as a canonical part of medical practice through the lens of Francesco Torti's *Therapeutice specialis* (1712). Saul Jarcho, *Quinine's Predecessor. Francesco Torti and the Early History of Cinchona* (Baltimore: Johns Hopkins University Press, 1993). On the bark's gradual acceptance, see also Andreas-Holger Maehle, *Drugs on Trial: Experimental Pharmacology and Therapeutic Innovation in the Eighteenth Century* (Amsterdam: Editions Rodopi, 1999), 1. See also Harold J. Cook, 'Markets and Cultures. Medical Specifics and the Reconfiguration of the Body in Early Modern Europe,' *Transactions of the Royal Historical Society* 21 (2011), 208–09; Samir Boumediene, *La colonisation du savoir. Une histoire des plantes médicinales du 'Nouveau Monde' (1492–1750)* (Vaulx-en-Velin: Les Éditions des Mondes à Faire, 2016).

²⁴ Lorraine Daston has written about how phenomena 'amalgamate into a coherent category'. Lorraine Daston, 'Introduction. The Coming into Being of Scientific Objects,' in *Biographies of Scientific Objects*, ed. Lorraine Daston (Chicago: University of Chicago Press, 2000), 6.

²⁵ Guy Attewell, 'Interweaving Substance Trajectories', 2; Nappi, 'Winter Worm, Summer Grass'.

²⁶ This is an allusion to studies devoted to the 'lives' and 'biographies' of objects and things. See Igor Kopytoff, 'The Cultural Biography of Things: Commoditization as Process,' in *The Social Life of Things: Commodities in Cultural Perspective*, ed. Arjun Appadurai (Cambridge: Cambridge University Press, 1986).

²⁷ Lorraine Daston, 'Introduction. Speechless,' in *Things That Talk. Object Lessons from Art and Science* ed. Lorraine Daston (New York: Zone Books, 2004), 18. On substances in motion, see also Carla Nappi, 'Surface Tension. Objectifying Ginseng in Chinese Early Modernity,' in *Early Modern Things. Objects and Their Histories, 1500–1800*, ed. Paula Findlen (London: Routledge, 2012), 34; Barbara Orland and Kijan Espahangizi, 'Pseudo-Smaragde, Flussmittel und bewegte Stoffe. Überlegungen zu einer Wissensgeschichte der materiellen Welt,' in *Stoffe in Bewegung. Beiträge zu einer Wissensgeschichte der materiellen Welt*, ed. Barbara Orland and Kijan Espahangizi (Zürich: diaphanes, 2014).

²⁸ Historians have in recent years suggested replacing the 'notion of an object as always singular with that of an object as always multiple', and malleable. Nappi, 'Surface Tension,' 46. See also Orland and Espahangizi, 'Pseudo-Smaragde, Flussmittel und bewegte Stoffe.' On the difficulties of 'locating' substances, see also Erika Monahan, 'Locating Rhubarb. Early Modernity's Relevant Obscurity,' in *Early Modern Things. Objects and Their Histories, 1500–1800*, ed. Paula Findlen (London: Routledge, 2013), 239. See also Daston, 'Introduction. Speechless,' 18.

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As with other introduced exotic commodities – coffee, rhubarb or pineapple²⁹ – by the late 1700s and early 1800s appellations for the bark across languages varied, if seldom beyond recognition. *Cinchona* was the standard botanical name for the bark after Carl Linnaeus (1707–1778) first defined the genus in the second, 1742 edition of his *Genera Plantarum*, naming it after the Countess of Chinchón, Francisca Fernández de Ribera, for her legendary and, by all accounts, imaginary role in drawing attention to the bark's virtues sometime between 1632 and 1638.³⁰ The bark also continued to be referred to by the older name of *quinquina* – from *Quina-Quina*, a Quechua word that actually referred to the balsam tree, and had been misapplied to cinchona by the Genoese physician Sebastianus Badus (fl. 1643–1676) in his 1663 *Anastasis Corticis Peruviae*.³¹ *Quinquina* persisted in various guises, coterminous with and alongside cinchona, particularly in French³² and Italian,³³ into the early nineteenth century, while Spanish³⁴ and Portuguese³⁵ sources employed the shorter *quina*. German and Dutch texts, presumably onomatopoeically with the Iberian term, likewise referred in common parlance to *China*³⁶ – or *Chinarinde*³⁷ – and *kina*,³⁸ respectively, and to

²⁹ Monahan, 'Locating Rhubarb,' 232.

³⁰ Jaime Jaramillo-Arango, 'A Critical Review of the Basic Facts in the History of Cinchona,' *Journal of the Linnaean Society* 53 (1949); Alex Haggis, 'Fundamental Errors in the Early History of Cinchona,' *Bulletin for the History of Medicine* 10 (1941). Linnaeus relied on the description and drawing by Charles-Marie de La Condamine to classify *Cinchona officinalis*, which erroneously merged two distinct cinchona varieties. Spanish botanists would later seek to revise Linnaeus's misapprehension. Matthew Crawford, 'Empire's Experts: The Politics of Knowledge in Spain's Royal Monopoly of Quina (1751–1808)' (unpublished PhD dissertation, University of California, San Diego, 2009), 18–19.

³¹ Various historians have examined this early misapprehension: Jaramillo-Arango, 'A critical review'; Haggis, 'Fundamental Errors,' 421–29.

³² For French uses of the term 'quinquina', see, for instance, M. Mallet, *Sur le Quinquina de la Martinique, connu sous le nom de Quinquina-Piton* (Paris: 1779).

³³ Italian sources frequently referred to 'kinakina'. See, for instance, Enrico Tegut, *Le mirabili virtù della Kinakina, con la maniera di servirsene in qualunque sorte di Febbre, e compassione* (Venice: Presso Antonio Zatta, e Figli, 1785).

³⁴ See, for instance, Ruiz López, *Quinología*; Pedro Crespo Nolasco, 'Carta apologética de la quina o cascarilla,' *Mercurio Peruano (Lima)* 8 (1795 [1861]).

³⁵ See, for instance, Jose Mariano Velloso, *Quinografia Portuguesa ou Collecção de varias memorias sobre vinte e duas especies de quinas, tendentes ao seu descobrimento nos vastos dominios do Brasil, copiada de varios authores modernos, enriquecida com cinco estampas de Quinas verdadeiras, quatro de falsas, e cinco de Balsameiras* (Lisboa: Impressor da Santa Igreja Patriarcal, 1799).

³⁶ See, for instance, Heinrich von Bergen, *Versuch einer Monographie der China* (Hamburg: Hartwig & Müller, 1826); Tissot, *Anleitung für das Landvolk*, 288.

³⁷ See, for instance, E. G. Baldinger, 'Geschichte der Chinarinde und ihrer Wirkungen,' *Magazin vor Aerzte* 7 (1778).

³⁸ For references to 'kina' in Dutch sources, see, for instance, C. Terne, *Verhandelingen over de Vraage, in hoe verre zou men, by gebrek van de Apotheek, uit kelder en keuken de vereischte*

cinchona in jargon. Some European languages possessed other alternate terms for cinchona, revolving around its provenance, medicinal properties or materiality. In English, for instance, its popularity allowed it to be known simply as the ‘bark’ or, owing to its supposed provenance, as the ‘Peruvian bark’. On account of its close association with the Jesuit order, particularly in earlier sources, it was also referred to as the ‘Jesuit’s bark’ or, since it was often available in the pulverized form, the ‘Jesuit’s powder’.³⁹ Spanish sources, too, often spoke rather than of *quina* of *cascarilla*, a diminutive of the Spanish word for ‘tree bark’ (*casara*), while German sources occasionally referred to it as *Fieberrinde*, that is, ‘fever bark’.⁴⁰ Nomenclature maintained a measure of coherence and kinship even beyond these earlier consumer societies by virtue of linguistic relationships – translation equivalence, or onomatopoeia – references to geographical provenance, or therapeutic indications. Slavic, Turkic or Asian-language renderings in particular appear to have had onomatopoeic qualities. Eighteenth-century Chinese sources referred to ‘金鸡勒’ (‘chin-chi-lei’ in Wade-Giles, ‘jin ji lei’ in pinyin),⁴¹ for instance, Russian sources to ‘хина’ (khina), or ‘перуанская хина’ (peruanskaya khina),⁴² while in the Ottoman Empire the bark was referred to as ‘kına’ (kına), or ‘kûşûru’l-Peruviyane’, a literal translation of ‘Peruvian bark’.⁴³ Equations are, to be sure, fraught with difficulty, and these various terms were idiosyncratic and part of widely divergent epistemic systems. They were also, however, cognate appellations, fragments of discourse that reveal networks of production,⁴⁴ threaded together by men and women from

Geneesmiddelen, ook tegen de zwaarste ziekten en kwaalen, zo uit- als inwendig, kunnen bekomen, mits uitzondere de volgende middelen, Kina, Kwik, Opium, Staal, Delfzuuren, Rhabarber en Ipecacoana (Amsterdam: Petrus Conradi, 1788).

³⁹ See, for instance, John Gray, William Arrot and Phil Miller, ‘An Account of the Peruvian or Jesuits Bark,’ *Philosophical Transactions* 40 (1737/38).

⁴⁰ Georg Leonhart Huth, *Sammlung verschiedener die Fieberrinde betreffender Abhandlungen und Nachrichten* (Nürnberg: Seeligmann, 1760); Tissot, *Anleitung für das Landvolk*, 288; Alexander von Humboldt, *Ideen zu einer Geographie der Pflanzen: Nebst einem Naturgemälde der Tropenländer* (Tübingen / Paris: F. G. Cotta / F. Schoell, 1807), 63–67.

⁴¹ The term is mentioned in the *Pen-ts’ao kang mu shih-I*, compiled in 1765 by Chao Hsüeh-min (1719–1805). Cited in Paul Unschuld, *Medicine in China. A History of Pharmaceuticals* (Berkeley: University of California Press, 1986), 166.

⁴² See, for instance, John T. Alexander, *Bubonic Plague in Early Modern Russia: Public Health and Urban Disaster* (New York: Oxford University Press, 2003), 183.

⁴³ Feza Günergün and Şeref Etker, ‘From Quinaquina to “Quinine Law”’: A Bitter Chapter in the Westernization of Turkish Medicine,’ *Osmanlı Bilimi Araştırmaları* XIV, no. 2 (2013), 47; Salim Aydın and Esmâ Yıldırım, ‘Bursalı Ali Münşi ve Tuhfe-i Aliyye. Kına Kına Risâlesi Adlı Eserinin Çevirisi,’ *Yeni Tıp Tarihi Araştırmaları* 8 (2002), 93.

⁴⁴ On practices of equation in the history of medicine, see Nappi, ‘Winter Worm, Summer Grass,’ 29–30.

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various world regions who had evidently long engaged with and relied upon one another – not only in apprehending that substance’s ‘admirable effects’⁴⁵ but also in crafting a name for it.

Significant, and growing, world market demand for the bark in the late 1700s and early 1800s – from buyers in Portuguese Luanda, at the Ottoman Porte and in the Archduchy of Austria alike – rendered cinchona’s botanical classification and demarcation both imperative and difficult. As with other plant-based medicinal substances of the period,⁴⁶ there was considerable controversy not only over the boundary of cinchona via-à-vis other plants but also over the varieties cinchona was to encompass – the kinds and number of species that were to be contained in the genus *Cinchona*, to resort to the period’s botanical lexis.⁴⁷ It was in particular the repeated removal to novel bark-growing regions in the Spanish American Viceroyalties of New Granada and Peru – on account of the bark’s worldwide appeal, and resultant overexploitation – and with it, the encounter with divergent varieties of cinchona, that distressed consumers, medical practitioners and naturalists alike.⁴⁸ The Spanish, British and French commercial quest for substitutes also yielded several South Asian, Filipino, and Caribbean cinchonas – from St Lucia, Saint Domingue, Guadeloupe and Martinique – that were subject to clinical trials and chemical analyses, but eventually, for the most part, discarded.⁴⁹ In 1805, as the result of a two-decades-long quest, two tree species supposed to be cinchona varieties – *Cinchona macrocarpa* and

⁴⁵ Note dated as of February 12, 1773, in ‘Varios Papeles pertenecientes á la Quina del Péru,’ *Archivo del Palacio Real*, Papeles del Almacén de la Quina, Caja 22282 / Expediente Número 6, Madrid, 1773-02-12.

⁴⁶ On the difficulties of identifying species of rhubarb, and determining which varieties were the ‘true rhubarb’, see Monahan, ‘Locating Rhubarb,’ 229.

⁴⁷ In common parlance – the lexis of Spanish colonial officials, harvesters and Creole merchants – the term ‘species’ was also often applied to cinchona at large – ‘the said species cinchona (*la d[if]ic[il]ha especie de cascarilla*)’. See, for instance, ‘Sobre el acopio de la Quina de los Montes de Loxa Callysalla y otros que la produzcan de buena calidad, y su envío a España de cuenta de la Rl. Hazienda,’ *Archivo Nacional de la Historia*, Quito, Fondo General, Serie Cascarilla, Caja 3, Expediente 13, Cuenca, 1790-08-26, ff. 34–36; ‘Expediente sobre el corte de cascarilla en los Montes de Loxa,’ *Archivo Nacional de la Historia*, Quito, Fondo General, Serie Cascarilla, Caja 2, Expediente 5, Loja, 1779-08-19, f. 1.

⁴⁸ For a detailed account of the removal from one harvest area to another, see Chapter 5.

⁴⁹ On botanical descriptions of ‘supposed cinchonas’ in the late 1700s, see Luis Alfredo Baratas Díaz and Joaquín Fernández Pérez, ‘Conocimiento botánico de las especies de cinchona entre 1750 y 1850: Relevancia de la obra botánica española en América,’ *Estudios de historia de las técnicas, la arqueología industrial y las ciencias 2* (1998), 648–50. On the French quest, see James E. McClellan and François Regourd, *The Colonial Machine: French Science and Overseas Expansion in the Old Regime* (Turnhout: Brepols Publishers, 2012), 260–62. For an example, see ‘Séance du Mardi 30 Juin. La Société m’a chargé de porter sur ses plumitifs le résumé suivt. concernant les différentes especes

Cinchona pubescens – were discovered on Portuguese territory in Rio de Janeiro.⁵⁰ Other than to the general limitations of Linnaean taxonomy and the difficulty of examining live plant specimens,⁵¹ it was owing to the variation in properties⁵² (bark colour, taste and texture), presented by the proliferation of newly found cinchonas by the beginning of the nineteenth century, that caused contemporaries to continue to differ – in some measure, increasingly so – on how to delineate and group that plant. Opinions on the sheer quantity of extant cinchona species varied from author to author, from two to twenty-two.⁵³ While the inner and outer botanical outlines of cinchona remained elusive, fragile and tenuous in the eyes of botanists from Uppsala to Santa Fé de Bogotá into the

de quinquina qui ont été soumises à son examen,' *Bibliothèque de l'Académie de médecine, Procès-verbaux des séances de la Société Royale de la Médecine*, Ms 11/11, Paris, 1789-06-30. On the British quest for substitutes, see Maehle, *Drugs on Trial*, 277; Pratik Chakrabarti, 'Empire and Alternatives: Swietenia febrifuga and the Cinchona Substitutes,' *Medical History* 54, no. 1 (2010).

⁵⁰ Vera Regina Beltrão Marques, *Natureza em Boiões: medicinas e boticários no Brasil setecentista* (Campinas: Editora da Unicamp / Centro de Memória-Unicamp, 1999), 134.

⁵¹ Baratas Díaz and Fernández Pérez, 'Conocimiento botánico de las especies de cinchona,' 649.

⁵² On the 'perceptible dimension' of materials in eighteenth-century chemistry, see Ursula Klein and Wolfgang Lefèvre, *Materials in Eighteenth-Century Science. A Historical Ontology* (Cambridge, Mass.: MIT Press, 2007), 58–59.

⁵³ According to Padréll et Vidal, by 1802, there were between four and seven varieties; see Joseph Padréll et Vidal, 'Dissertation sur l'usage et l'abus du quinquina dans le traitement des fièvres intermittentes; présentée et soutenue à l'École de Médecine de Montpellier le 23 Prairial an 10 (de la République),' in *Collection des thèses soutenues à l'École de Médecine de Montpellier*, ed. L'École de Médecine de Montpellier (Montpellier: Imprimerie de G. Izar e A. Ricard, 1802), 7–14. José Celestino Mutis defined seven species, but found only four of them to be 'medicinal' – *Cinchona lancifolia*, *Cinchona oblongifolia*, *Cinchona cordifolia*, and *Cinchona ovalifolia*. José Celestino Mutis, *Instrucción formada por un facultativo existente por muchos años en el Perú, relativa de las especies y virtudes de la quina* (Cádiz: Don Manuel Ximenez Careño, 1792); Manuel Hernández de Gregorio, ed., *El arcano de la quina. Discurso que contiene la parte médica de las cuatro especies de quinas oficinales, sus virtudes eminentes y su legítima preparación. Obra póstuma del doctor D. José Celestino Mutis* (Madrid: Ibarra, Impresor de Cámara de S. M., 1828). Hipólito Ruiz López organized his findings into seven types of cinchona in 1792, and revised them in 1801 to include nine. Ruiz López, *Quinología*, vol. 2, 50–54; Hipólito Ruiz López and José Antonio Pavón Jiménez, *Suplemento a la quinología, en el qual se aumentan las Especies de Quina nuevamente descubiertas en el Perú por Don Juan Tafalla, y la Quina naranjada de Santa Fé con su estampa* (Madrid: Imprenta de la viuda e hijo de Marin, 1801). By 1797, Aylmer B. Lambert had written of eleven species of cinchona; by 1821 he had come to think there were as many as twenty-two kinds. Aylmer B. Lambert, *An illustration of the genus Cinchona: Comprising Descriptions of all the Official Peruvian Barks, incl. Several New Species* (London: Searle, 1821). For discussions of the debates about cinchona classification in the Iberian world around 1800, see Baratas Díaz and Fernández Pérez, 'Conocimiento botánico de las especies de cinchona'; Mauricio Nieto Olarte, *Remedios para el imperio. Historia natural y la apropiación del Nuevo Mundo* (Bogotá: Universidad de los Andes – FLACSO-CESO, 2006), 83, 173–95.

10 Introduction

early nineteenth century, however, constant debate about its varieties also reified the idea of cinchona as a single object. As historians have argued for other plants, the very discussion of its instantiations – in continuously referencing the category they instantiate – also contributed to stabilizing and objectifying the bark as a recognizable thing.⁵⁴

London physicians,⁵⁵ creole bark merchants in the Viceroyalty of New Granada,⁵⁶ and Chinese medical authors⁵⁷ alike commonly circumscribed the bark's identity in the late 1700s and early 1800s, like botanists, by virtue of its geographical provenance as well as its material properties – texture, taste, consistency and colour. Genuine cinchona was supposed to have the same shape as cinnamon; a rough, splintery and mealy texture; and to be of either white, pale-yellow, reddish or orange colour, according to species (FIGURE 0.1).⁵⁸ When chewed, it was to be of a bitter, aromatic and astringent taste.⁵⁹ In conjunction with the rise of clinical pharmacology, experimenters also began to define the bark chemically, through experiments and the testing of properties – its acidity, solubility in various solvents or reaction with other substances, particularly bodily fluids.⁶⁰ At a time when simple clinical observations, experiences and statistics to evaluate treatments were gradually being introduced, doctors, botanists and surgeons in Madrid, Cartagena de Indias, London, Saint Domingue, New York, Rio de Janeiro or Lyon also increasingly conducted clinical trials – ‘exact, and repeated observations’, ‘by means of a general, extensive administration’ of the bark – among the populations of hospitals, slave plantations, or the military to

⁵⁴ Nappi, ‘Surface Tension,’ 41.

⁵⁵ Robert John Thornton, *New Family Herbal: Or Popular Account of the Natures and Properties of the Various Plants Used in Medicine, Diet and the Arts* (London: Richard Phillips, 1810), 117.

⁵⁶ Matthew Crawford, *The Andean Wonder Drug. Cinchona Bark and Imperial Science in the Spanish Atlantic, 1630–1800* (Pittsburgh, Pa.: University of Pittsburgh Press, 2016), 103.

⁵⁷ Chao Hsüeh-min described cinchona as ‘consist[ing] of thin, hollow twigs’ that ‘resembled the drug *yüan-chih*, after one ha[d] removed from it the marrow’ and affirmed that ‘the taste [was] slightly acrid’. Cited in Unschuld, *Medicine in China*, 166.

⁵⁸ William Buchan advised his readership to learn to ‘distinguish’ ‘genuine’ barks from ‘false’ ones. William Buchan, *Domestic Medicine: Or, a treatise on the prevention and cure of diseases* (London: W. Strahan, 1774), 169.

⁵⁹ See, for instance, Johan Andreas Murray, *Johan Andreas Murray's Vorrath an einfachen, zubereiteten und gemischten Heilmitteln, zum Gebrauche praktischer Aerzte bearbeitet*, ed. Ludwig Christoph Althof, 2 vols., vol. 1 (Göttingen: Johann Christian Dieterich, 1793), 1118; Padréll et Vidal, ‘Dissertation sur l’usage et l’abus du quinquina,’ 7–14. Aydıız and Yildirim, ‘Bursalı Ali Münşi ve Tuhfe-i Aliyye,’ 94; Crawford, *The Andean Wonder Drug*, 101–02.

⁶⁰ Chakrabarti, ‘Empire and Alternatives,’ 89; Maehle, *Drugs on Trial*, 8, 27; Klein and Lefèvre, *Materials in Eighteenth-Century Science*.