

Introduction

Side Effects of Empire

Malaria remains one of the indelible hallmarks of the postcolonial world. It is also a trope through which various communities identify themselves. Today, malaria continues to dominate agendas of the World Health Organization, multinational philanthropy, research in tropical medicine, electoral politics, medical journalism and governance. In recent decades, novelists have appropriated malaria as a central problematic of anti-realist fiction¹ or have mentioned the presence of anti-malarial drugs in the traveller's kit as an indicator of persisting western psychoses about erstwhile British colonies.² Malaria is also considered to be a signifier of the limits of postcolonial modernity, development and democracy. This is most evident in contemporary India, where reports have described malaria as an endemic agent, shaping the encounters between Maoist insurgents and state-endorsed paramilitary forces in the interiors.³

In recent years, malaria has been acknowledged to be a globally relevant disease, which shaped the patterns of a variety of world historical processes: human settlements in Ancient Rome, the European colonisation of the 'New World', the demography of agrarian England, nationalist reconstructions and ethnic conflicts in the twentieth century, and the Cold War. Many historians have engaged with contemporary medical science to explain malarial outbreaks in the wider non-European world in the nineteenth and twentieth centuries in terms of social inequalities, racial degenerations, poverty, hunger, water stagnation and ill-conceived

¹ A. Ghosh, *The Calcutta Chromosome: A Novel of Fevers, Delirium and Discovery* (New Delhi: Ravi Dayal Publishers, 1996).

² A. Roy, *The God of Small Things* (London: Flamingo, 1997), 266.

³ Special Correspondent, 'Maoist Link to Malaria', *The Telegraph* (Thursday, October 29, 2009), www.telegraphindia.com/1091029/jsp/frontpage/story_11672759.jsp [retrieved on 24 March 2014]; S. Ravi, 'Indian Police fighting Maoists "dying of malaria"', BBC (Tuesday, 23 February 2010), http://news.bbc.co.uk/1/hi/world/south_asia/8529615.stm [retrieved on 24 March 2014].

and carelessly implemented government projects.⁴ Twentieth-century (or even more recent) scientific understandings of malaria have been invoked to diagnose mortalities and to analyse events in earlier centuries.⁵ Other kinds of scholarship have situated efforts to eradicate malaria within the social histories of newly consolidated nation-states, as well as global geopolitics.⁶

Rather than taking scientific medicine as an explanatory frame, this book aims to explain the processes through which scientific medical knowledge about malaria itself was put together. It extends the premise that medical or scientific knowledge has been a product of contingent historical processes.⁷ To understand the widespread significance of malaria in the contemporary world, many recent books have examined the history of malaria in the twentieth century.⁸ Instead, I focus on the long nineteenth century, and explore the intellectual, cultural and political histories of the ways in which the category was reconsolidated and sustained as an object of natural knowledge and social control. The nineteenth century deserves more scholarly attention, in its own right, as a

⁴ See, for example, A. Samanta, *Malarial Fever in Colonial Bengal, 1820–1939: Social History of an Epidemic* (Kolkata: Firma KLM, 2002); M. Humphreys, *Malaria: Poverty, Race and Public Health in the United States* (Baltimore: Johns Hopkins University Press, 2001), 3, 8, 68; R. M. Packard, *The Making of a Tropical Disease: A Short History of Malaria* (Baltimore: Johns Hopkins University Press, 2007), 13, 19–35, 249–250; K. Yip (ed), *Disease, Colonialism and the State: Malaria in Modern East Asian History* (Hong Kong: Hong Kong University Press, 2009).

⁵ R. Sallares, *Malaria and Rome: A History of Malaria in Ancient Italy* (Oxford: Oxford University Press, 2002); Packard, *The Making of a Tropical Disease*, 17–35; J. L. A. Webb Jr, *Humanity's Burden: A Global History of Malaria* (Cambridge: Cambridge University Press, 2008), 32–49; J. R. McNeill, *Mosquito Empires: Ecology and War in the Greater Caribbean* (Cambridge: Cambridge University Press, 2010).

⁶ F. M. Snowden, *The Conquest of Malaria, Italy 1900–1962* (New Haven: Yale University Press, 2006); M. Cueto, *Cold War, Deadly Fevers: Malaria Eradication in Mexico, 1955–1975* (Baltimore: Johns Hopkins University Press, 2007).

⁷ I particularly draw upon research which has hinted at how historical insights about malaria since the early twentieth century were shaped by colonial discourses about race and civilisation, questions of nationalism and ethnicity, and the liaisons between warfare and industry. See for example, S. M. Sufian, *Healing the Land and the Nation: Malaria and the Zionist Project in Palestine, 1920–1947*, (Chicago and London: University of Chicago Press, 2007); L. B. Slater, *War and Disease: Biomedical Research on Malaria on the Twentieth Century* (New Brunswick: Rutgers University Press, 2009); W. Anderson, *Colonial Pathologies: American Tropical Medicine, Race and Hygiene in the Philippines*, (Durham: Duke University Press, 2006), 207–225; D. Arnold, “‘An ancient race outworn’: Malaria and Race in Colonial India, 1860–1930”, in W. Ernst and B. Harris (eds), *Race, Science, Medicine, 1700–1960* (London and New York: Routledge, 1999), 122–143; M. Harrison, “‘Hot beds of disease’: Malaria and Civilisation in Nineteenth-Century British India”, *Parassitologia*, 40 (1998), 11–18.

⁸ For example, Snowden, *The Conquest of Malaria*; Sufian, *Healing the Land and the Nation*; Slater, *War and Disease*; Cueto, *Cold War, Deadly Fevers*; J. L. A. Webb Jr, *The Long Struggle Against Malaria in Tropical Africa* (Cambridge: Cambridge University Press, 2014).

significant phase in the history of malaria, rather than being treated as a period characterised by flawed archaic understandings about the disease, which would be rectified eventually in course of the next century.⁹ Embarking on this project, I soon realised that malaria was perceived as amongst the most active and commodious disease-causing entities during much of the century. It was associated with a variety of debilities far beyond fevers, ranging from idiocy to impotence. Malaria was not a self-contained category. Rather, malaria was co-constituted with political discourses and practices relating to a network of plants, events, places, drugs and insects. Nor were narratives about malaria confined within nationally bounded geographies or the territorial units reified by area studies. British India, the focus of this book, was an integral part of an interconnected world in which malaria, cinchona plants, the drug quinine (extracted from cinchona barks) and subsequently mosquitoes were co-constituted.

In exploring the makings and persistence of malaria as an enduring diagnostic category, I have drawn upon particular strands within constructivist histories of science and medicine, and historical epistemology, more generally.¹⁰ Invoking the vocabulary common to these overlapping genres of scholarship, this book analyses how malaria, cinchonas, quinine and mosquitoes were co-produced, maintained and repaired as prepackaged, self-evident, ready-made and black-boxed categories in British India.¹¹ But such an analysis needs to be combined with a

⁹ Existing books on the history of malaria in the nineteenth century include the 1940s classic E. H. Ackerknecht, *Malaria in the Upper Mississippi Valley, 1760–1900* (Baltimore: The Johns Hopkins Press, 1945). Paul Winther's *Anglo-European Science and the Rhetoric of Empire: Malaria, Opium and British Rule in India, 1756–1895* (Oxford: Lexington Books, 2005) provides a close reading of the various findings of the Royal Commission on Opium of 1894 on the status of opium as an anti-malarial. Chapter 3 of this book adopts an alternative approach while building on Arabinda Samanta's important work *Malarial Fever in Colonial Bengal*.

¹⁰ These different approaches have in common their shared critique of scientific determinism. For an engaging commentary on constructivism see J. Golinsky, *Making Natural Knowledge: Constructivism and the History of Science* (Chicago and London: University of Chicago Press, 2005). For historical epistemology see L. Daston, 'Historical Epistemology', in J. Chandler, A. I. Davidson and H. Harootunian (eds.), *Questions of Evidence: Proof, Practice and Persuasion Across the Disciplines*, (Chicago and London: University of Chicago Press, 1994), 282–289.

¹¹ For knowledge as an object of maintenance and repair see B. Latour, 'Whose Cosmos, Which Cosmopolitics? Comments on the Peace Terms of Ulrich Beck', *Common Knowledge* 10, 3 (2004), 459; for 'prepackaged' see, L. Daston, 'Science Studies and the History of Science', *Critical Inquiry* 35, 4 (Summer 2009), 807, 811; for a critique of the 'self-evident method' in the histories of science, see S. Shapin and S. Schaffer, *Leviathan and Air Pump: Hobbes, Boyle and the Experimental Life* (New Jersey: Princeton University Press, 1985), 4–13. For a broader conceptualisation on self-evidence see S. Schaffer, 'Self Evidence', in Chandler, Davidson and Harootunian (eds.), *Questions*

historiography that has exposed the overlapping trajectories of modernity and empire.¹² Indeed, the entrenchment of integrated regimes of modernity and empire since the late eighteenth century necessitated the proliferation of categories of rule and knowledge. Such categories have over time appeared legitimate, commonsense, credible, foundational and even universal across the expanses of the colonial world and beyond. The stories explaining the making and naturalisation of these categories, it has been suggested, might reveal ‘the ambivalences, the contradictions, the use of force, and the tragedies and the ironies’ that have attended the histories of modern empires.¹³ An eclectic range of such categories, from the economic¹⁴ to the primitives,¹⁵ or indeed population,¹⁶ were historically produced or remade in a variety of conjunctures engendered by modern empires and their legacies both within Europe and its colonies. Like many of these categories and processes, the circulation of words like malaria, quinine and cinchona was augmented in post-Enlightenment Europe and Victorian and Edwardian England. In the course of the nineteenth century, these were reconfigured as natural, inevitable and relevant in distant corners of the British Empire. The predicaments of the wider colonial world in turn reshaped and sustained them, while also redefining the ways in which these were understood in Europe itself.

Malaria established itself as a recurrent category amongst government officials in British India and other parts of the colonial world by the third quarter of the century. Its status as a valid and credible category was seldom in doubt within the bureaucracy even as its meanings and physical characteristics were upheld as imprecise, fluid and contentious. Various commentators considered malaria simultaneously as familiar and

of Evidence, 56–91. For ‘black box’ and ‘readymade science’ see B. Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, Mass.: Harvard University Press, 1987), 2–4.

¹² For an elaboration of the overlaps between modernity and empire, see for example S. Dube, ‘Terms that Bind: Colony, Nation, Modernity’, in S. Dube (ed), *Postcolonial Passages: Contemporary History-writing on India* (New Delhi: Oxford University Press, 2004), 1–37. See also, P. Chatterjee, *Black Hole of Empire: History of a Global Practice of Power* (New Jersey: Princeton University Press, 2012), xi–xii.

¹³ D. Chakrabarty, ‘Postcoloniality and the Artifice of History: Who Speaks for “Indian” Pasts?’, in Ranajit Guha (ed), *A Subaltern Studies Reader: 1986–1995* (New Delhi: Oxford University Press, 1997), 288.

¹⁴ T. Mitchell, *Rule of Experts: Egypt, Techno-politics, Modernity* (Los Angeles: University of California Press, 2002), 4; see also M. Goswami, *Producing India: From Colonial Economy to National Space* (Chicago and London: University of Chicago Press, 2004).

¹⁵ P. Banerjee, *The Politics of Time: ‘Primitives’ and History Writing in a Colonial Society* (New Delhi: Oxford University Press, 2006).

¹⁶ A. Bashford, *Global Population: History, Geopolitics, and Life on Earth* (New York: Columbia University Press, 2014); S. Hodges, ‘Governmentality, Population and the Reproductive Family in Modern India’, *Economic and Political Weekly*, 39, 11 (March 13–19, 2004), 1157–1163.

enchancing, hackneyed and enigmatic, quotidian and dreadful.¹⁷ Despite or perhaps because of this, malaria continued to be imagined as the most flexible, elusive and yet ubiquitous disease-causing entity through much of the century. The effects of malaria were reported to have been encountered in diverse and disparate geographical terrains across the colonial world and beyond: from inhospitable military trenches to long-distance sea voyages, from monotonous plains to eventful frontiers, from sun-baked deserts to impenetrable ravines and jungles. Both as a material and a metaphor, it was invoked consistently in narratives about travels and settlements. Malaria found itself entangled with the diagnoses of an exhaustive range of everyday and spectacular illnesses; the management of individual and collective bodies; the prejudices of smell, colour and class; efforts to make sense of lands, landscapes and objects; and debates about agricultural improvement, land revenue as well as urban and sanitary governance. A few decades later in 1923 when Rabindranath Tagore, by then a Nobel laureate and later apotheosised as the national poet of India, called for a ‘war with malaria’, the category had already acquired newer connotations, often in consonance with shifting patterns in late-imperial politics.¹⁸ At the same time, it continued to occupy the centre stage in vernacular imagination as a crucial node of anti-colonial resistance and nationalist reconstruction, percolating into the arena of provincial print cultures.

In situating the different understandings and practices relating to malaria within various layers of imperial history, this book provides an occasion for extending the conversations between the histories of science and medicine on the one hand and scholarship on empire and postcolonial studies on the other. It speaks to the concerns opened up by an interrelated field of scholarship, which over the past two decades has been described variously as histories of colonial medicine, histories of science and empire, global and postcolonial histories of science.¹⁹

¹⁷ See for instance, R. Deb Roy, ‘Mal-areas of Health: Dispersed Histories of a Diagnostic Category’, *Economic and Political Weekly*, 42, 2 (January 13–19, 2007), 123. See also, M. Worboys, ‘From Miasmas to Germs: Malaria 1850–1879’, *Parassitologia*, 36 (1994), 61–68.

¹⁸ R. Thakur, ‘Samavaye Malaria Nibaran’ (‘Malaria Eradication Through Cooperatives: Text of lecture delivered on 29th August 1923’), in *Rabindra Rachanabali*, Volume 13 (Calcutta: West Bengal Government, November 1990), 795–798.

¹⁹ These have emerged to be extremely rich fields of scholarship. For an overview on the field of colonial medicine, see P. Chakrabarti, *Medicine and Empire, 1600–1960* (Basingstoke: Palgrave Macmillan, 2014). See also R. Deb Roy, ‘Science, Medicine and New Imperial Histories’, *British Journal for the History of Science*, 45, 3 (September 2012): 443–450. Critical commentaries on the historiography of imperial, global and postcolonial science include R. Macleod (ed), *Nature and Empire: Science and the Colonial Enterprise, Osiris*, 15 (Chicago: University of Chicago Press, 2000);

These multi-sited histories have revised in many ways the received imperial and nationalist geographies of scientific and medical knowledge formation.²⁰ Apart from exposing patterns of connections and correspondence between colonies held by various European imperial states, these histories have discarded narcissistic and Eurocentric narratives of triumphalism, progress and unilateral diffusion of scientific knowledge from Europe to the rest of the world. The increasing emphasis on a variety of non-European actors and sources have not only added multiple accents to the histories of early-modern and modern sciences but have also diversified our insights into their textures, vocabularies and dictions.²¹ Themes such as translation, exchange, circulation, racism and violence have now emerged as crucial in understanding the making of modern science and medicine.

Despite methodological admonishments implicit in these works, various existing histories have continued to focus exclusively on colonial administrative policies, and have often tended to reify at face value the official categories of scientific and medical governance. Similarly, single-minded emphases on vernacular processes of translation and cultural difference have not done enough to question the façade of an originally unbiased domain of colonial-state-endorsed metropolitan scientific knowledge. There has been a growing awareness of the need then to go beyond scholarly models that either internalise the epistemological foundations of the colonial state or continue to romanticise an autonomous, exotic and incommensurable indigenous sphere.²² The case of malaria

S. Sivasundaram, 'Sciences and the Global: On Methods, Questions and Theory', *Isis*, 101, (2010), 146–158; S. Hodges, "The Global Menace", *Social History of Medicine*, 25, 3 (2012), 719–728; W. Anderson, 'From Subjugated Knowledge to Conjugated Subjects: Science and Globalisation, or Postcolonial Studies of Science', *Postcolonial Studies*, 12, 4 (2009), 389–400; E. Kowal, J. Radin and J. Reardon, 'Indigenous Body Parts, Mutating Temporalities, and the Half-lives of Postcolonial Technoscience', *Social Studies of Science*, 43, 4 (2013), 465–483.

²⁰ For the expression 'multi-sited histories', see W. Anderson, 'Postcolonial Histories of Medicine', in F. Huisman and J. H. Warner (eds), *Locating Medical History: The Stories and Their Meanings* (Baltimore and London: Johns Hopkins University Press, 2004), 287.

²¹ For example P. B. Mukharji, *Nationalizing the Body: The Medical Market, Print and Dak-tari Medicine* (London and New York: Anthem Press, 2009); K. Sivaramakrishnan, *Old Potions, New Bottles: Recasting Indigenous Medicine in Colonial Punjab* (New Delhi: Orient Longman, 2006); R. Berger, *Making Ayurveda Modern: Political Histories of Indigenous Medicine in North India, 1900–1955* (Basingstoke: Palgrave Macmillan, 2013); G. Attewell, *Refiguring Yunani Tibb: Plural Healing in Late Colonial India* (Hyderabad: Orient Blackswan, 2007); S. Alavi, *Islam and Healing: Loss and Recovery of an Indo-Muslim Medical Tradition, 1600–1900* (Basingstoke: Palgrave Macmillan, 2008).

²² A recent wave in the histories of medicine in South Asia has succinctly critiqued the category 'indigenous'. These include Attewell, *Refiguring*; Alavi, *Islam and Healing*; Sivaramakrishnan, *Old Potions*; Berger, *Making Ayurveda Modern*; Mukharji, *Nationalizing the*

inspires historians to contest long-held distinctions between an objective as well as sacrosanct world where knowledge is produced and a messy outside world where knowledge is consumed, resisted and displaced.²³ Thus here I return to the mainstream category of public health and to factories, laboratories, plantations and government files to interrogate the surviving myths of stability and autonomy prevalent about some of the most celebrated and apparently insulated sites of modern science and medicine.

Rather than focusing only on official policy makers, I propose to locate (wherever feasible) the European, colonial and vernacular sources in a single analytic field²⁴ to examine not only predictable differences, but also revealing overlaps between them. As the story of how the histories of cinchonas, malaria, quinine and eventually mosquitoes and the intimacies between them were shaped unfolds, in the following chapters, it will be clear that the concerns of a range of institutions, groups and individuals were enmeshed. I explore the interplay between a variety of sources: bureaucratic records relating to the medical and sanitary departments of the colonial state; correspondence involving the office of the Secretary of State for India; private papers of London-based drug-manufacturing families; annual reports of dispersed cinchona plantations and quinine factories; widely circulating medical journals and military manuals; Bengali vernacular literature and advertisements; and reports and memoirs written by peripatetic physicians, phyto-chemists, geographical explorers, entomologists, botanists, geologists and chemical examiners within British India and beyond. Bengal, from where most of my non-English examples are drawn, was home to one of the earliest cinchona plantations and quinine factories to have been established in the colonial world, even as it continued being recounted in various sources as amongst the more intensely malarial provinces of the British Empire. Witness to one of the most enduring encounters with colonial rule in modern history,

Body. For a critical overview of this literature, see P. B. Mukharji, 'Symptoms of Disease: New Trends in Histories of "Indigenous" South Asian Medicines', *History Compass*, 9, 12 (2011), 887–99.

²³ Even Michel de Certeau frames the 'devious . . . dispersed', 'innumerable and infinitesimal' 'tactics of consumption' in opposition to 'the centralised and spectacular . . . dominant cultural economy' of production. See, M. de Certeau, *The Practice of Everyday Life* (Los Angeles and London: University of California Press, 1984), xi–xxi. For the overlaps between the worlds of science and its public, institutional research and spectacular performance, see for instance S. Qureshi, *Peoples on Parade: Exhibitions, Empire and Anthropology in Nineteenth-Century Britain* (Chicago and London: University of Chicago Press, 2011).

²⁴ A. Stoler and F. Cooper, 'Between Metropole and Colony: Rethinking a Research Agenda', in A. Stoler and F. Cooper (eds), *Tensions of Empire: Colonial Cultures in a Bourgeois World* (London and Los Angeles: University of California Press, 1997), 4, 15.

Bengal provides various examples not only of how practices and knowledge relating to malaria were circulated, translated, appropriated and contested across linguistic contexts, but also of the ways in which colonial modernity, medical conceptions about the body and provincial print markets interacted to shape vernacular public culture.

Malarial Subjects covers the period 1820 to 1909: from the discovery of quinine in Paris to the organisation of the Imperial Malaria Conference in the British Indian summer capital at Simla. As I have hinted already, this period witnessed gradual shifts in the ways malaria was perceived: from being an elusive and generic cause of many diseases to its reconfiguration as the name of a mosquito-borne parasitic fever disease; from being an essential theme in asserting colonial difference and governance to emerging as an agenda in nationalist reconstruction and development. Over this period, various plants including eucalyptus, sunflower and opium²⁵ were attributed with properties to cure diseases associated with malaria. However, despite changes in the epistemological and political meanings of malaria, quinine (extracted from cinchona barks) continued to figure throughout the period, as its most enduring and quintessential remedy. These two categories were projected as invariably connected.

The structure of this book reflects how, during the period of around ninety years covered here, the figure of quinine informed understandings about the disease/disease-causing entity it was supposed to remedy. Taken together, Chapters 1 and 2 show that the establishment of cinchona plantations in colonial Dutch Java, French Algeria and British India in the 1850s coincided with considerable redefinition of malaria as a colonial disease. Besides, while the word malaria was certainly not absent in sources available in English in the eighteenth century, an unprecedented circulation of the category across the British Empire followed the discovery of quinine in 1820. John MacCulloch's treatise published in 1827, seven years after quinine was discovered, was widely recognised as the first book-length English work on malaria. Moreover, while examining the making of Burdwan fever, an epidemic attributed to malaria in the Bengal presidency in British India in the 1860s and 1870s, Chapter 3 indicates that quinine often functioned as a quick-fix diagnostic agent to determine the malarial identity of enigmatic maladies. A patient could be retrospectively diagnosed as malarial if s/he had recuperated after consuming quinine. Chapter 4 argues that quinine itself was not a homogenous, stable or inflexible entity. But rather, as hinted in the final chapter, quinine was adaptive instead to the shifts within

²⁵ For example, see Winther, *Anglo-European Science*.

imperial rule and to the changing meanings of malaria. The Imperial Malaria Conference of 1909, an important event towards the end of the period covered by the book, was organised in Simla in the wider context in which the therapeutic properties attributed to quinine were questioned, and reasserted in the wake of significant readjustments in the aetiology of malaria.

Malarial Subjects therefore questions the predictable teleological sequences of scientific knowledge production, which various histories of colonial science and medicine often take for granted. In such a schema, problems inevitably precede the solutions they tend to necessitate; an answer is possible only after a question has been posed; cures are responses to well-defined maladies, which have already revealed themselves. This book, in contrast, presents an overlapping history of quinine and malaria to expose various ways in which cures and their diseases, solutions and their problems could sustain and shape one another.²⁶

At the same time, each chapter focuses on individual scientific and medical categories to examine how British imperial rule in India re-consolidated or engendered them: a plant (cinchona), a diagnostic category (malaria), an epidemic (Burdwan fever) and a drug (quinine). The final chapter reveals the imperial networks through which the histories of a group of insects (mosquitoes) and malaria were entangled in the 1900s, and how these entanglements in turn affected the social and political meanings of quinine. This book joins existing efforts to critique colonial rule by exposing how certain aspects of the 'taken for granted intellectual framework' of British colonialism were consolidated.²⁷ Such an exercise also enables me to extend the prevailing insights into the links between Empire and the production of natural knowledge.²⁸ Indeed, the production of social and scientific perceptions about the constellation of *natural artifacts* explored here, as well as the establishment of

²⁶ While commenting on Ludwick Fleck's work on syphilis, David Bloor hints at a closely similar idea in *Wittgenstein: A Social Theory of Knowledge* (New York: Columbia University Press, 1983), 34–36.

²⁷ Shapin and Schaffer, *Leviathan and Air Pump*, 6.

²⁸ For example, R. Drayton, *Nature's Government: Science, Imperial Britain and the 'Improvement' of the World* (New Haven: Yale University Press, 2000); S. Sivasundaram, *Nature and the Godly Empire: Science and the Evangelical Mission in the Pacific* (Cambridge and New York: Cambridge University Press, 2005); Macleod, *Nature and Empire*; D. Arnold, *The Tropics and the Travelling Gaze: India, Landscape and Science, 1800–1856* (Seattle: University of Washington Press, 2006); P. Anker, *Imperial Ecology: Environmental Order in the British Empire, 1895–1945* (Cambridge, Mass.: Harvard University Press, 2001); R. H. Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600–1860* (Cambridge: Cambridge University Press, 1996).

interrelationships between them were enabled considerably by various kinds of connections held together by the British Empire. This history reconfirms how Empire occasioned not only the imbrications of the apparently unconnected worlds of colonial governance, vernacular cultures, medical knowledge and pharmaceutical commerce, but also structured the ways in which British India was linked to events, sites and processes in South America, Dutch Java, Ceylon, Burma, Mauritius, German and British Africa, and Trinidad.

The arrival of cinchonas to be planted in British India in the late 1850s coincided with the end of the Sepoy mutiny, and the transfer of the political authority to govern significant parts of the subcontinent from the East India Company to the British Crown. This book ends around 1909; the year when the first Imperial Malaria Conference was organised as well as the Morley Minto Reforms were enacted, a few years before the onset of the World War I. The decades in between witnessed a particular phase of imperial rule, which was marked by an unprecedented convergence of regimes of knowledge, biopolitics and political economy in British India.²⁹ This was reflected in the interconnected network of conversations about agricultural improvement, class, colours, credibility, diseases, distance, drugs, expertise, factories, field-works, governance, insects, labour recruitments, laboratories, legitimacies, markets, places, plants, plantations, purities and races about to be explored in this book. This phase, which Stoler and Cooper have described as the ‘embourgeoisement of imperialism’, was also characterised by the emergence of a newer commitment to govern the moralities, productivities and individual conducts of imperial subjects on either side of the colonial divide.³⁰ Unsurprisingly, these concerns fed into ensuing conceptions about colonial bodies, health, diseases and their cures. During these decades,

²⁹ A. Appadurai, ‘Number in the Colonial Imagination’, in C. Breckenridge and P. Van der Veer, (eds), *Orientalism and the Postcolonial Predicament: Perspectives from South Asia* (Philadelphia: University of Pennsylvania Press, 1993), 314–39; D. Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-Century India* (Los Angeles and London: University of California Press, 1993); M. Harrison, *Climates and Constitutions: Health, Race, Environment and British Imperialism in India, 1600–1850* (New Delhi: Oxford University Press, 1999); K. Raj, *Relocating Modern Science: Circulation and the Construction of Scientific Knowledge in South Asia and Europe, 1650–1900* (Palgrave Macmillan: Houndmills and New York, 2007), 181–222; P. Chatterjee, ‘The Disciplines in Colonial Bengal’, in P. Chatterjee (ed), *Texts of Power: Emerging Disciplines in Colonial Bengal* (Minneapolis and London: University of Minnesota Press, 1995), 1–29. Incidentally, this phase also reveals the overlapping foundations of imperial and nationalist discourses in British India. See particularly, P. Chatterjee, ‘The Constitution of Indian Nationalist Discourse’, in P. Chatterjee, *Empire and Nation: Selected Essays* (New York: Columbia University Press, 2010/1987), 37–58; M. Goswami, ‘From Swadeshi to Swaraj: Nation, Economy, Territory in Colonial South Asia’, *Comparative Studies in Society and History*, 40, 4 (October, 1998), 609–636.

³⁰ Stoler and Cooper, 31.

exigencies and apparatuses of Empire reshaped not only the meanings and contours of individual categories, such as cinchonas, quinine, malaria and mosquitoes, but also engendered the terms of intimate interactions between them.

However, imperial constructs such as cinchonas, quinine, malarial objects or mosquitoes were enabling artifacts rather than passive, inert or vacuous (non)entities. The predominant anthropocentrism in conventional political histories of empire has begun to be contested by historians who have commented variously on the multiple careers of animals, materials and plants in British imperial history.³¹ I build upon and extend further the possibilities inherent in these works to argue that Empire itself was reconsolidated while shaping the histories of nonhumans such as cinchona plants, objects considered as malarial, the drug quinine, mosquitoes and even parasites. Therefore, the word nonhumans used in this book does not refer to animals alone. But rather, it explores the symbiotic dynamics between the British Empire, on the one hand, and a spectrum of other-than-humans (including materials and organisms), on the other.

The British Empire was clearly not a monolithic, unchanging, omnipotent agent or a 'totalising efficacy'.³² Rather than homogenizing it as a coherent point of origin or a preordained institutional framework, or a distant overarching entity, Empire can be interpreted more incisively as a constellation of processes, which was coming into being along with the script that it was putting together.³³ There has been an increasing awareness of the ways in which the dominant themes in

³¹ For cultural histories of animals in colonial India, see for example J. E. Hughes, *Animal Kingdoms: Hunting, the Environment and Power in the Indian Princely States* (Cambridge, Mass.: Harvard University Press: 2013). For plants, see for instance Drayton, *Nature's Government*; for veterinary turn in the histories of medicine see S. Mishra, 'Beasts, Murders and the British Raj: Reassessing Colonial Medicine in India from the Veterinary Perspective, 1860–1900', *Bulletin of the History of Medicine*, 85, 2 (2011), 587–619. For materials and science in the wider imperial world, see, P. Chakrabarti, *Materials and Medicine: Trade, Conquest and Therapeutics in the Eighteenth Century* (Manchester and New York: Manchester University Press, 2010); H. J. Cook, *Matters of Exchange: Commerce, Medicine and Science in the Dutch Golden Age* (New Haven: Yale University Press, 2007).

³² Kowal, Radin and Reardon, 'Indigenous Body Parts', 470.

³³ Here I draw upon reassessments about modern states in general and colonial and post-colonial states in particular. See, T. Mitchell, 'Society, Economy and the State Effect', in G. Steinmetz (ed), *State/Culture: State Formation After the Cultural Turn* (Ithaca: Cornell University Press, 1999), 76–97. Mitchell argues elsewhere that 'the issue of power and agency' should be seen as a 'question instead of an answer known in advance'. See T. Mitchell, 'Can the Mosquito Speak?', in *Rule of Experts: Egypt, Techno-politics, Modernity* (Berkeley and Los Angeles: University of California Press, 2002), 53. For the ways in which the state is experienced and reconfigured in the everyday, see for example, J. Saha, 'A Mockery of Justice: Colonial Law, the Everyday State and Village Politics in the Burma Delta, c. 1890–1910', *Past and Present*, 217, 1 (2012), 187–212;

mainstream political and cultural history – capital, democracy, enlightenment, the everyday, modernity, romanticism – did not only engender but were in turn permeated and delimited by nonhumans such as animals, oil, automata, technology, metals, machines and alike.³⁴ Similarly, I uncover how imperial artifacts such as cinchonas, malarial objects, quinine and mosquitoes, in turn, deepened the structural, ideological, prejudicial, biopolitical, as well as physical foundations of Empire itself. Nonhuman objects and organisms (like cinchonas, quinine, mosquitoes, malarial objects), medical knowledge about them and Empire were not only entangled, but to quote Donna Haraway, were also ‘becoming with’ one another.³⁵ The history of malaria therefore provides an occasion to probe the constitutive intersections amongst the nineteenth-century worlds of medicine, nonhumans and empire.

Recent histories on a diverse range of topics have shown renewed interest in undertaking the bold challenge to narrate the materiality of nonhuman objects and organisms by transgressing the conventional confines of discourse analysis and the history of ideas.³⁶ In the process, significant histories of medicine and the environment have

J. Wilson, *The Domination of Strangers: Modern Governance in Eastern India, 1780–1835* (Basingstoke: Palgrave Macmillan, 2008), 4, 9–18, 183–185.

³⁴ N. Shukin, *Animal Capital: Rendering Life in Biopolitical Times* (Minneapolis and London: University of Minnesota Press, 2009); T. Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London and New York: Verso, 2011); S. Schaffer, ‘Enlightened Automata’, in W. Clark, J. Golinski and S. Schaffer (eds), *The Sciences in Enlightened Europe* (Chicago and London: University of Chicago Press, 1999), 126–165; D. Arnold, *Everyday Technology: Machines and the Making of India’s Modernity* (Chicago and London: University of Chicago Press, 2013); N. Wickramasinghe, *Metallic Modern: Everyday Machines in Colonial Sri Lanka* (New York and Oxford: Berghahn Press, 2014); J. Tresch, *The Romantic Machine: Utopian Science and Technology after Napoleon* (Chicago and London: University of Chicago Press, 2012).

³⁵ D. Haraway, *When Species Meet* (Minneapolis and London: University of Minnesota Press, 2008), 2, 23–27. Other theoretical formulations, which indicate co-constitution of authors, objects and knowledge, include D. E. Pearse, ‘Author’, in F. Lentricchia and T. McLaughlin (eds), *Critical Terms for Literary Study* (Chicago and London: University of Chicago Press, 1990), 113. See also, F. Trentmann, ‘Materiality in the Future of History: Things, Practices and Politics’, *The Journal of British Studies*, 48, 2 (April 2009), 297, 300; S. Kirsch and D. Mitchell, ‘The Nature of Things: Dead Labor, Nonhuman Actors, and the Persistence of Marxism’, *Antipode*, 36 (2004), 688.

³⁶ For a critical engagement with conventional social constructivism and on the methodological challenges of talking about materials and objects, see Golinsky, *Making Natural Knowledge*, 1–45. See also, P. Joyce, ‘What is the Social in Social History?’, *Past and Present*, 205 (November, 2009), 175–210; B. Braun and S. J. Whatmore (eds), *Political Matter: Technoscience, Democracy and Public Life* (Minneapolis and London: University of Minnesota Press, 2010); T. Bennett and P. Joyce (eds), *Material Powers: Cultural Studies, History and the Material Turn* (London and New York: Routledge, 2010); J. Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham and London: Duke University Press, 2010); R. Drayton, ‘Maritime Networks and the Making of Knowledge’, in

drawn upon the sciences almost immediately.³⁷ There is a need to go beyond descriptions of straightforward materiality or uncontaminated nonhuman agency often revealed in scientifically informed histories. Therefore I am inspired by Timothy Mitchell's pioneering first chapter in *Rule of Experts*, which evokes the figure of mosquitoes in mid-twentieth-century Egyptian history, to interrogate straightforward notions of agency prevalent in social theory. Yet, Mitchell does not open up for analysis the contingent histories of medical entomology through which mosquitoes were labeled as vectors of malaria earlier in the century.³⁸ In this book I explore ways to trace the inscriptions of materials and objects while examining the links between the production of scientific knowledge and Empire.³⁹ Therefore I examine the empowering properties acquired by cinchona plants, malarial objects, mosquitoes and different forms of quinine, while social perceptions and scientific knowledge about them was being produced by imperial assemblages and associations.⁴⁰ These categories and entities under construction were not passive, impotent, inflexible, unresponsive or insignificant. I analyse the

D. Cannadine (ed), *Empire, the Sea and Global History* (Basingstoke: Palgrave Macmillan, 2007), 74–78; P. Chatterjee, T. Guha-Thakurta, B. Kar, 'Introduction', in P. Chatterjee, T. Guha-Thakurta and B. Kar (eds), *New Cultural Histories of India: Materiality and Practices* (New Delhi: Oxford University Press, 2014), 12–17.

³⁷ Gregg Mitman points out in a stimulating article how 'environmental history appropriates scientific knowledge to grant agency to nature', citing the works of William McNeill, Alfred Crosby and Jared Diamond. G. Mitman, 'In Search of Health: Landscape and Disease in American Environmental History', *Environmental History*, 10, 2 (April 2005), 192. Other scholars have drawn upon medical entomology to recognise mosquitoes as historical agents. For example, McNeill, *Mosquito Empires*; Webb, *Humanity's Burden*, 32–49.

³⁸ Mitchell, 'Can the mosquito speak?' 19–53.

³⁹ A similar plea to combine narratives of 'historical contingency with the matter-of-fact hard materialism of science studies' has been evident in P. B. Mukharji, 'The "Cholera Cloud" in the Nineteenth-Century "British World": History of an Object-without-essence', *Bulletin of the History of Medicine*, 86 (Fall, 2012), 303–332. See also, R. Deb Roy, 'Quinine, Mosquitoes and Empire: Reassembling Malaria in British India, 1890–1910', *South Asian History and Culture*, 4,1 (January 2013), 65–86.

⁴⁰ Works that have been particularly instructive for me include Mitchell, 'Can the mosquito speak?', 38–40, 50; L. White, 'Tsetse Visions: Narratives of Blood and Bugs in Colonial Northern Rhodesia, 1931–39', *Journal of African History*, 36 (1995), 219–245; S. Jansen, 'An American Insect in Imperial Germany: Visibility and Control in the Making of the Phylloxera in Germany, 1870–1914', *Science in Context*, 13, 1 (2000), 31–70. For historical sociologies of commodification see for example, A. Appadurai, 'Introduction: Commodities and the Politics of Value', in A. Appadurai (ed), *The Social Life of Things: Commodities in Cultural Perspective* (Cambridge: Cambridge University Press, 1986), 3–60; W. van Binsbergen, 'Commodification: Things, Agency, and Identities', in W. van Binsbergen and P. Geschiere (eds), *Commodification: Things, Agency and Identities: The Social Life of things Revisited* (Berlin/Muenster/Vienna/London: LIT, December 2005), 9–51. For the ways in which objects impacted variously while being commoditised and culturally constituted in the colonial world see S. Mintz, *Sweetness and Power: The Place of Sugar in Modern History* (New York: Penguin Group, 1985);

extent to which these, whether as categories undergoing constitution or as deployed metaphors, or as objects of knowledge, governance and production were, as Bruno Latour suggests, ‘modifying a state of affairs by making a difference’.⁴¹ Quinine, mosquitoes, cinchonas and other non-humans could make variously their presence felt while being constituted by discourses and practices enabled by Empire. Thus it might be simplistic to conceive of them as willful, full-fledged, autonomous, preordained and straightforward actors wholly independent of the political circumstances they found themselves in.

Therefore, this book reasserts the need for political histories of British Empire to be more attentive to the lessons of science studies, an interdisciplinary field that takes the agency and existence of nonhuman objects and creatures as a central point of inquiry.⁴² Science studies scholars have suggested that the imbrication of nonhumans in various actions can be shown to be both simultaneously constructed and real.⁴³ They have undertaken the challenge to narrate the capabilities of nonhuman objects and organisms while resisting the temptations of scientific reductionism and biological determinism. In their theoretically more ambitious moments, science studies scholars have contested essentialist and straightforward notions of agency itself. They have argued that agency (and even existence) should be considered the exclusive monopoly of neither autonomous humans nor nonhumans. Instead, they point out that these are properties of collectives or assemblages of humans and nonhumans, subjects and objects.⁴⁴

T. Burke, *Lifebuoy Men, Lux Women: Commodification, Consumption and Cleanliness in Modern Zimbabwe* (Durham: Duke University Press, 1996).

⁴¹ B. Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford: Oxford University Press, 2005), 72 and 52.

⁴² Golinsky, *Making Natural Knowledge*, 1–45; Daston, ‘Science Studies and the History of Science’.

⁴³ See Latour, *Reassembling the Social*, 88–93, 44–73; B. Latour, ‘The Promises of Constructivism’ in D. Ihde and E. Selinger (eds), *Chasing Technoscience: Matrix of Materiality* (Bloomington: Indiana University Press, 2003), 27–46. I. Hacking, *Social Construction of What?*, (Cambridge, Mass. and London: Harvard University Press, 1999), 1–34; D. Haraway, ‘Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective’, in M. Biagioli (ed), *Science Studies Reader* (New Delhi and London: Routledge, 1999), 175–76, 183–85; S. Sismondo, ‘Some Social Constructions,’ *Social Studies of Science*, 23, 3 (August 1993), 516, 519–22; and Kirsch and Mitchell, ‘The Nature of Things,’ 697–702. Also see Nicole Shukin on ‘rendering’ in *Animal Capital*, 20–27.

⁴⁴ Latour, ‘A Collective of Humans and Nonhumans,’ in *Pandora’s Hope: Essays in the Reality of Science Studies* (Cambridge, Mass.: Harvard University Press, 1999), 174–193; Haraway, ‘Situated Knowledges’, 179, 185; B. Latour, *We Have Never Been Modern* (Cambridge Mass.: Harvard University Press, 1993), 136–138; Latour, *Reassembling the Social*, 72; B. Latour, ‘On the Partial Existence of Existing and Nonexisting Objects,’ in

While drawing upon some of these insights, this book also hopes to demonstrate how scholarship about empire might, in turn, situate these lessons of science studies within enduring historical contexts, by revealing the ways in which nonhumans (or indeed collectives of humans and nonhumans) were implicated within histories of violence, expansion and intercultural exchange. Attention to the history of British Empire in South Asia will uncover not just how cinchonas, malarial objects, quinine and mosquitoes were reshaped in the long nineteenth century. Focus on colonial South Asia will further show that these plants, materials and insects did not constitute a self-sufficient and autonomous world of nonhumans. But rather, specific socio-material assemblages that proliferated in the British imperial context sustained them. I also suggest that imperial biopolitics in British India were founded on the simultaneous processes of anthropomorphism, animalisation and dehumanisation, which, on occasions, blurred the distinctions between humans and nonhumans/subjects and objects.⁴⁵ Attribution of lifelike properties (if not human characteristics) to cinchonas, quinine, malarial objects and mosquitoes converged with and stoked exclusionary narratives about race, place, colour, purity, primitives, class and labour.

The title of this book *Malarial Subjects* simultaneously draws on different uses of the word subjects. In a public lecture delivered in London in March 1882, the British Indian bureaucrat Joseph Fayrer deployed the expression ‘malarial subjects’ to refer to patients suffering from ‘various symptoms of the malarial poison’ ranging from remittent fever to ‘a variety of indefinite complaints’.⁴⁶ Going beyond the overt medical connotation of the original expression, the title of this book signals at the imperial context in which the lecture was delivered. Malaria had emerged by then as an extensively deployed trope to describe colonial

L. Daston (ed), *Biographies of Scientific Objects*, (Chicago: University of Chicago Press, 1999), 253, 256, 258.

⁴⁵ On dehumanisation, see the historiography on ‘primitives’, for example, K. Ghosh, ‘A Market for Aboriginality: Primitivism and Race Classification in the Indentured Labour Market of Colonial India’, in G. Bhadra, G. Prakash and S. Tharu (eds), *Subaltern Studies X: Writings on South Asian History and Society* (New Delhi: Oxford University Press, 1999), 8–48; J. Fabian, *Time and the Other: How Anthropology Makes its Object* (New York: Columbia University Press, 1983); Banerjee, *Politics of Time*. See also S. Muthu, *Enlightenment Against Empire* (New Jersey: Princeton University Press, 2003), 11–71. On anthropomorphism see L. Daston and G. Mitman, *Thinking with Animals: New Perspectives on Anthropomorphism* (New York: Columbia University Press, 2005). This point about the dual move of anthropomorphizing and dehumanizing in relation to enlightenment Europe has been made most eloquently by Simon Schaffer in ‘Enlightened Automata’. Also see H. Raffles, ‘Jews, Lice and History.’ *Public Culture*, 19, 3 (Fall, 2007), 521–566; Jansen, ‘An American Insect in Imperial Germany’.

⁴⁶ J. Fayrer, ‘First Troonian Lecture on Climate and the Fevers of India’, *Lancet*, 119, 3055 (March 18, 1882), 423–426; 467–470.

lands, landscapes and people. Besides, Fayrer's status as an authority on malaria was connected to his long career as a bureaucrat in British India. His examples of native people, who figured in his narrative as either vulnerable to or immune from malaria, were drawn from various parts of the colonial world including Algeria, Burma, India, Guinea or the West Indies.⁴⁷ *Malarial Subjects* therefore indicates that various medical and colonial identities were bound by nineteenth-century histories of the category malaria. The title of the book also acknowledges that malaria attracted the attention of a variety of intellectual persuasions. The medical history of malaria was shaped by contributions from geologists, geographers, meteorologists, chemists, economic-botanists, engineers, natural historians and entomologists. In a more methodological sense malaria provides opportunity for deeper conversation between the apparently disparate historiographies of empire, medicine and non-humans. Finally, the history of malaria can also provide the occasion to complicate the received distinctions between the subject and the object. In history writing, the word subject is variously understood to mean the subjugated, or an acting agent, or a product of relationships of power. I ask in this book if these different conceptualisations of the subject can be extended to incorporate the nonhuman. In the process, I also urge that the binary of human and nonhuman itself needs to be historicised.

⁴⁷ Ibid.