6 Epilogue
Empire, Medicine and Nonhumans

The British geographer, botanist and ethnographer Clements Robert Markham's memoir detailing the transportation of cinchona seeds and plants from South America to South India, one might recall, was published in 1862. A few years after the Sepoy Mutiny, which marked the transition from East India Company rule to the British Raj, Markham argued that trees planted by rulers were the most enduring legacies of imperial regimes, comparing the recently imported cinchona plants in British India with the melon trees planted by Emperor Babur, the founder of the Mughal dynasty. He envisioned that these cinchona plants, much like Babur's melons, would outlast not only spectacular political events and engineering marvels, but also withstand the rise and fall of empires themselves. These plants, he thought, should be considered an everlasting gift to Her Majesty's Indian subjects from their imperial rulers.[1]

Cinchona plants and their most valuable extract, quinine, continued to remain significant in commerce, public health and global politics in the interwar period[2]. Across South Asia, as the last chapter has shown, the interrelationships amongst cinchona plants, the drug quinine, the tropical disease malaria and anopheles mosquitoes were already widely recognised by the start of World War I. However, the first two decades of the twentieth century also witnessed the beginnings of widespread disillusionment with imperial cinchona plantations and government quinine factories in British India. Insofar as cinchona plantations were concerned, the superiority of Dutch Java was almost entirely established

[1] See Chapter 1.

[2] The entanglement of quinine and cinchona with war and commerce continued. See, for example, F. R. Fosberg, 'Cinchona Plantation in the New World', *Economic Botany*, 1, 3 (July–September, 1947), 330–333; W. H. Hodge, 'Wartime Procurement in Latin America', *Economic Botany*, 2, 3 (July–September, 1948), 229–257; W. Popenoe, 'Cinchona Cultivation in Guatemala: A Brief Historical Review up to 1943', *Economic Botany*, 3, 2 (April–June, 1949), 150–157.

by then.[3] Private planters in northeastern India and Ceylon, as I have indicated, began replacing cinchonas from their plantations with other commercial crops. Books published from other parts of the Empire in the 1910s ironically claimed that cinchonas were not only frequently vulnerable to different diseases, but they were also sources of occupational skin diseases amongst those who handled these plants while 'making pharmaceutical preparations'.[4] The effectiveness of quinine itself was questioned amidst allegations of extensive adulteration in the medical markets, poisonous side effects, the emergence of cheaper pharmaceutical alternatives and the suggestion that eradicating mosquitoes was a more efficient way of resisting malaria than quinine prophylaxis.[5] Many of these limitations of quinine were highlighted in debates between colonial medical officials regarding the most effective ways of controlling malaria in the 1900s and 1910s. These debates were conducted in a range of imperial political contexts including colonial public health campaigns, everyday municipal governance, or in spectacular military frontiers during the World War I.[6] The recognition of quinine as an anti-malarial

[3] R. Drayton, *Nature's Government: Science, Imperial Britain and the 'Improvement' of the World* (New Haven and London: Yale University Press, 2000), 210, 230–231; A. Goss, 'Building the World's Supply of Quinine: Dutch Colonialism and the Origins of a Global Pharmaceutical Industry', *Endeavour*, 31, 1 (March 2014), 8–18. See also A. R. Hoogte and T. Pieters, 'Science, Industry and the Colonial State: A Shift from the German- to a Dutch-Controlled Cinchona and Quinine Cartel (1880–1920)', *History and Technology*, 31, 1 (2 January, 2015), 2–36; A. R. Hoogte and T. Pieters, 'Science in the Service of Colonial Agro-Industralism: The Case of Cinchona Cultivation in the Dutch and British East Indies, 1852–1900', *Studies in the History and Philosophy of Biological and Biomedical Sciences*, 47, PA (September 2014), 12–22.

[4] M. T. Cook, *The Diseases of Tropical Plants* (London: Macmillan, 1913), 175, 192, 244; R. Prosser White, *Occupational Affections of the Skin; A Brief Account of the Trade Processes and Agents Which Give Rise to Them* (London: H. K. Lewis, 1915) 49.

[5] P. Barton, "Powders, Potions and Tablets: The 'Quinine Fraud' in British India, 1890–1939" in J. H. Mills and P. Barton (eds.), *Drugs and Empire: Essays in Modern Imperialism and Intoxication, c. 1500–1930* (Basingstoke: Palgrave Macmillan, 2007), 144–161; Anonymous, 'Quinine and World War', *BMJ*, 1, 4230 (31 January 1942), 152–153; Anonymous, 'The Quinine Problem', *BMJ*, 1, 3777 (27 May 1933), 923–924; Anonymous, 'Wanted: A Cheap Antimalarial Drug in India', *BMJ*, 1, 4228 (17 January 1942), 78; Anonymous, 'Acute Quinine Poisoning', *BMJ*, 1, 3882 (1 June 1935), 1130; M. Harrison, *Disease and the Dilemmas of Development: A Malaria Strategy for Bombay Presidency, 1902–1942* (*Eighth Hasi Majumdar Oration on History and Philosophy of Medicine and Science*) (Calcutta: Estate and Trust Officer, University of Calcutta, 2011); M. Harrison, *The Medical War: British Military Medicine in the First World War* (Oxford: Oxford University Press, 2010), 229–238; M. Harrison, *Public Health in British India: Anglo-Indian Preventive Medicine, 1859–1914* (Cambridge: Cambridge University Press, 1994) 159–161.

[6] P. S. Lelean, *Quinine as a Malarial Prophylactic: A Criticism* (London: John Bale Sons and Danielsson, Ltd., undated) reprinted from *Journal of Royal Army Medical Corps*, November 1911. [Archives and Manuscripts, RAMC/565/10/10. WL]; R. Ross and D. Thomson, *A Case of Malarial Fever, Showing a True Parasitic Relapse, During Vigorous and*

survived these debates, and yet the effectiveness of the drug was subjected to unprecedented scrutiny during these years.

In concluding this book, I want to offer three distinctive analytical perspectives. The first draws together the threads of the argument in the preceding chapters, demonstrating that British imperial agency not only shaped the histories of quinine and malaria, but also occasioned the interactions between these categories. The second section of the epilogue reasserts the significance of non-European vernacular public culture in the history of British imperial medicine. I explore Bengali writings on malaria, quinine and mosquitoes in some detail to suggest ways to go beyond the twin tropes of imposition and resistance in the history of British imperial medicine. The final section will focus on nonhuman objects and organisms to critique anthropocentrism in standard historiography of British Empire. Taken together these two sections extend existing conceptions of British imperial agency by focusing on interactive relationships between the British Empire and different components within imperial history. I will argue that the focus on imperial agency in this book does not imply the methodological marginalisation of either vernacular public cultures or nonhumans. Instead, I conclude by suggesting that various vernacular public cultures and nonhumans were not only co-constituted with British imperial history, but also were integral to it.

A Cure and Its Disease

Although I began this book with an analysis of the discovery of the alkaloid quinine in 1820, I have focused especially on the period between Markham's programmatic statements in the early 1860s (marking the establishment of cinchona plantations in British India) and the beginning of systematic doubts about the effectiveness of quinine in the late 1900s and early 1910s. In these intervening decades, British India was one of most significant parts of the colonial world where quinine was established as the quintessential cure for diseases associated with malaria.

Continuous Quinine Treatment (Liverpool: Liverpool School of Tropical Medicine, 1912) reprinted from the *Annals of Tropical Medicine and Parasitology*, 5, 4 (February 1912), 539–543 [Shelfmark: WC750 1912R82c. WL]; W. F. Bynum, '"Reasons for Contentment": Malaria in India, 1900–1920', *Parassitologia*, 40 (1998), 25–26; W. F., Bynum, 'An Experiment that Failed: Malaria Control at Mian Mir', *Parassitologia*, 36 (1994), 112, 115–116; Harrison, *Disease and the Dilemmas of Development*, 13, 17, 18; Harrison, *The Medical War*, 229–238. See also L. Monnais, 'Rails, Roads and Mosquito Foes: The State Quinine Service in French Indochina', in R. Peckham and D. M. Pomfret (eds.), *Imperial Contagions: Medicine, Hygiene and Cultures of Planning in Asia* (Hong Kong: Hong Kong University Press, 2013), 198, 199, 203, 208–212.

Rather than proposing a self-contained history of malaria or quinine, I have explored the ways in which the historical trajectories of a disease, a cure, a group of plants and (subsequently) insects intersected. While examining the interconnected histories of quinine and malaria during this period, I have questioned the conventional chronologies of medical knowledge production. Such established chronologies have often assumed a definite pattern according to which: problems inevitably precede a solution, an answer takes shape only after a coherent question has been posed, and preexisting understandings about a disease necessitate knowledge about a cure. Instead, this book has argued that knowledge about a cure and a disease-causing entity, to a considerable extent, shaped one another. In fact, it is not entirely implausible to think about situations in which knowledge about cinchona and quinine preceded, and effected crucial shifts in the history of malaria. Chapters 1 and 2 indicate that the establishment of colonial cinchona plantations in Dutch Java, French Algeria and British India in the mid-nineteenth century converged with the redefinition of malaria from a predominantly European to an almost exclusively colonial concern. While the word malaria certainly had a presence in English language sources in the previous centuries, the discovery of quinine in 1820 was followed by unprecedented circulation of malaria as a diagnostic category and as a matter of governmental preoccupation. Chapter 3 has shown, while commenting on the making of Burdwan fever, that quinine could be invoked to establish the malarial identity of a malady. In many instances during the epidemic, confirmed diagnoses did not lead to the prescription of cure. On the contrary, quinine was employed as a pharmacological agent in quick-fix diagnostic tests. Thus the malarial identity of a malady was ascertained by the response of the ailing body to quinine.

At the same time, the incorruptibility and inflexibility of the pharmaceutical category quinine itself was not necessarily taken for granted by contemporary officials. Therefore, British colonial bureaucrats, who assumed that the Burdwan fever assured the supply of bodies affected with malaria, used the 'opportunity of the epidemic', in turn, to verify the 'purity' of certain drugs circulating extensively as quinine in the medical market. Focusing on attempts to manufacture pure quinine in government factories in British India, Chapter 4 has further explored the irony that despite being employed to establish whether an ailing body was suffering from malaria, quinine itself remained an unstable, malleable as well as elusive entity over many decades. Quinine continued being described as a quintessential remedy in the early 1900s, as has been shown in the previous chapter, even when the corresponding diagnostic category malaria itself was redefined substantially: from an elusive cause of many diseases to the name of a mosquito-borne fever disease. In

this decade, prevailing insights about how quinine cured an ailing body were altered to adapt to the newer meanings associated with the category malaria.

I have contributed to attempts within the wider historiography of science to demystify expressions such as experiments, discovery and invention. While narrating the history of quinine manufacture in British India, for example, I have urged that these expressions should not only be read as indicators of the teleological development of pharmaceutical technology, but also as politically contingent, historically produced labels. Similarly, I have indicated that the chemical separation of two newer alkaloids from extracts of cinchona barks was not termed as an exceptional discovery in the world of phytochemistry in 1820 itself. The accomplishment of Pelletier and Caventou was retrospectively glorified as a momentous event in the history of pharmaceutical chemistry because of the recognition quinine eventually received from the market in subsequent decades. Likewise, the mosquito brigades organised in the 1900s were not applications to the 'field' of an already established discovery achieved within the walls of enclosed laboratories. Instead, such elaborate 'expeditions' emerged as occasions for reconfirming tentative laboratory findings, and reasserting them before a global audience. This book, therefore, reinforces persisting efforts to recast the histories of scientific milestones, while at the same time questioning the established chronologies in the relationships between a disease and its cure. In the process, it contradicts the suggestion that modern medicine necessarily represents an objective, teleological and progressive uncovering of scientific reason.

The mutual co-constitution of the drug quinine and the disease malaria was shaped, to a great extent, by the histories of British Empire in the long nineteenth century. In concluding in the late 1900s and early 1910s, I have situated the crystallisation of interrelationships amongst malaria, quinine and mosquitoes within wider trends of the links between natural knowledge and modern imperial rule. As in the case of malaria, other scholars have shown, various developments in the early twentieth century in the fields of natural knowledge and practice, particularly in bacteriology, anthropology and ecology were culminations of processes that had their roots in the imperial history of the nineteenth century.[7] Indeed, the consolidation of natural knowledge about

[7] See for example P. Chakrabarti, *Bacteriology in British India: Laboratory Medicine and the Tropics* (Rochester: University of Rochester Press, 2012); G. W. Stocking Jr., 'The Ethnographer's Magic: Fieldwork in British Anthropology from Tylor to Malinowski', in G. W. Stocking Jr. (ed.), *Observers Observed: Essays on Ethnographic Fieldwork* (Madison: University of Wisconsin Press, 1983), 70–120; S. Qureshi, *Peoples on Parade: Exhibitions, Empire and Anthropology in Nineteenth-Century Britain*, (London and Chicago: University of Chicago Press, 2011); P. Anker, *Imperial Ecology: Environmental Order in the British*

cinchonas, malaria, quinine, and mosquitoes, and the establishment of interrelationships between them were not inevitable or accidental, but rather the exigencies and apparatuses of imperial rule shaped them. The British Empire occasioned not only the imbrications of the worlds of medical knowledge, pharmaceutical commerce, colonial governance and (as I will elaborate further in the next section) vernacular public cultures, but also bound South Asian history with events unfolding in distant parts of the world, particularly in South America, the West Indies, German, French and British Africa, and Dutch Java. While analysing the persistence of malaria as a diagnostic category, I have focused on the nineteenth century in its own right. I have refused to treat it as a period characterised by flawed archaic understandings about the disease which would be rectified eventually in course of the next century.

Malaria, of course, continued to remain a significant concern in world history and politics in the interwar period. Many recent books on the history of malaria have focused predominantly on the twentieth century.[8] This book has provided a historical backdrop to the period covered by these existing scholarly works by identifying the ways in which malaria was reconfigured as a major concern for global governance in the imperial context of the long nineteenth century. This context also shaped the interactions between the scholarly disciplines of tropical medicine, parasitology and entomology, and these interactions in turn, resulted in the preponderance of narratives about blood, parasites and mosquitoes in the literature concerning malaria in the early twentieth century.

By focusing on this period, this book reveals how certain nineteenth-century trends in the history of malaria persisted into the next century. Events in the early decades of the twentieth century, particularly the redefinition of malaria as a mosquito-borne, parasite-caused fever disease and the discrediting of quinine did not immediately constitute an incommensurable epistemological break in the history of malaria and its cures. Indeed, as I have indicated in Chapter 5, in various quarters, practices such as the therapeutic prescription of quinine, the use

Empire, 1895–1945 (Cambridge, Mass. and London: Harvard University Press, 2001); D. Haraway, 'Teddy Bear Patriarchy: Taxidermy in the Garden of Eden, New York City, 1908–1936', *Social Text*, 11 (Winter, 1984–1985), 20–64; J. Beattie, *Empire and Environmental Anxiety: Health, Science, Art and Conservation in South Asian and Australasia, 1800–1920* (Basingstoke: Palgrave Macmillan, 2011).

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

of drugs such as quinine for clinical diagnosis of malaria, and the projection of malaria as a commodious cause of many maladies did not entirely cease.[9] One of the lasting legacies of the nineteenth-century literature about malaria was the continued association of the category predominantly with colonial and postcolonial landscapes. Undoubtedly, malaria reemerged as a prominent concern that afflicted various parts of Europe, extending beyond 'the semicolonial appendage' of southern Italy in the late nineteenth and the early twentieth centuries.[10] However, before long, malariologists celebrated the 'disappearance' of malaria from various parts of the United States and Europe, particularly, England.[11] It was argued that the 'disappearance' of malaria could be attributed to 'civilising social influences' and 'scientific agriculture' that were in vogue in these parts of the world.[12] Published in 1946, *A Malariologist in Many Lands*, a scientific memoir written by Marshall A, Barber, a public health professional associated with the Rockefeller Foundation amongst other organisations, did not devote any of the chapters to Western Europe or even Italy.[13] A reviewer of this account took note of Barber's claim that 'decrease (of malaria) in the United States is almost universal' and that

[9] On the widespread use of quinine as an anti-malarial in twentieth-century South Asia, see Harrison, *Disease and the Dilemmas of Development*. On the continued use of quinine in clinical diagnosis of malaria, see P. Manson, 'The Diagnosis of Malaria from the Standpoint of the Practitioner in England', *Lancet*, 159, 4107 (17 May 1902), 1378. On the persistence of malaria as a perceived commodious cause of many diseases, see Anonymous, 'The Diagnosis of Latent Malaria', *Lancet*, 186, 4805 (2 October 1915), 768; Anonymous, 'Latent Malaria', *Lancet*, 170, 4376 (13 July 1907), 100. On the 'plasticity of disease concepts' and on 'the shifting boundaries of what constitutes as adequate model of disease' in relation to malaria as late as the 1940s, see Slater, *War and Disease*, 8.

[10] Snowden, *The Conquest of Malaria*, 3; P. Zylberman, 'A Transatlantic Dispute: The Etiology of Malaria and the Redesign of the Mediterranean Landscape', in S. G. Solomon, L. Murard, and P. Zylberman (eds.), *Shifting Boundaries of Public Health: Europe in the Twentieth Century* (Rochester: University of Rochester Press, 2008), 269–297; D. H. Stapleton, 'Internationalism and Nationalism: The Rockefeller Foundation, Public Health and Malaria in Italy, 1923–1951', *Parassitologia*, 42, 1–2 (June, 2000), 127–134; H. Evans, 'European Malaria Policy in the 1920s and 1930s: The Epidemiology of Minutiae', *Isis*, 80, 1 (March 1989), 40–59; S. P. James, 'The Disappearance of Malaria from England', *Proceedings of the Royal Society of Medicine*, 23, 1 (November, 1929), 71–87.

[11] James, 'The Disappearance of Malaria from England'; L. W. Hackett, 'The Disappearance of Malaria in the United States and Europe', *Rivista di Parassitologia*, 13, 1 (January, 1952), 43–56.

[12] James, 'The Disappearance of Malaria from England', 83; Hackett quoted in G. Majori, 'Short History of Malaria and its Eradication in Italy with Short Notes on the Fight Against the Infection in the Mediterranean Basin', *Mediterranean Journal of Hematology and Infectious Diseases*, 4, 1 (2012), www.ncbi.nlm.nih.gov/pmc/articles/PMC3340992/ [Retrieved on 6 June 2016.]

[13] M. A. Barber, *A Malariologist in Many Lands* (Lawerence, Kansas: University of Kansas Press, 1946).

'an analogous decrease in malaria has occurred in northern and central Europe'.[14] Instead, the memoir focused predominantly on various corners of the colonial and postcolonial world such as parts of Central America, the West Indies, the Philippine Islands, Malaya and the Fiji islands, Equatorial Africa, Egypt, India and Brazil. A twentieth-century poster (Figure 6.1) which was released in London by Her Majesty's Stationary Office as an instruction for travellers identified the vast expanses of the colonial and postcolonial world including 'Africa, Tropical America, India and the Far East' as the 'danger areas' for acquiring malaria, and recommended everyday use of quinine and mosquito nets in these 'areas'.[15]

More recent scholarly assessments have described malaria as a 'leading cause of . . . underdevelopment in the world today . . . a major contributor to the inequalities between (the Global) North and (the Global) South, and of the dependency of the Third World'.[16] Many historians who have written about early and mid-twentieth-century South Asia, Africa, Egypt, Palestine, Philippines, Indochina or postwar Mexico, have examined the significance of concerns about malaria in shaping the late imperial and postcolonial world. These scholars have shown that malaria in the twentieth century was not only a recurrent issue in imperial governance and geopolitics; but the disease was also entangled within local aspirations of development and ethnic nationalism.[17]

In reemphasising the significance of European empires in the making of modern medical knowledge, I have drawn upon the extant historiography linking science, medicine and empires. I have also been inspired by

[14] S. Jarcho, 'Review of M. A. Barber, *A Malariologist in Many Lands*', *Journal of History of Medicine and Allied Sciences*, 2, 2 (Spring, 1947), 268–270.

[15] R. Mount, 'The Malaria Mosquito under a Spotlight, with Scenes Showing How to Avoid Catching Malaria. Colour Lithograph after a Design Attributed to Reginald Mount' (London: HM Stationary Office, c. 1943–c. 1953). [Credit: Wellcome Library, London. Photo number L0024907.]

[16] F. M. Snowden and R. Bucala, 'Introduction', in F. M. Snowden and R. Bucala (eds.), *The Global Challenge of Malaria: Past Lessons and Future Prospects* (Singapore: World Scientific Publishing, 2014), vii.

[17] Harrison, *Disease and the Dilemmas of Development*; S. Watts, 'British Development Policies and Malaria in India 1897–c. 1929', *Past & Present* 165 (November 1999), 141–181; R. Packard, 'Malaria Blocks Development Revisited: The Role of Disease in the History of Agricultural Development in the Eastern and Northern Transvaal Lowveld, 1890–1960', *Journal of Southern African Studies*, 27, 3 (2001), 591–612; T. Mitchell, *Rule of Experts: Egypt, Techno-politics, Modernity* (Los Angeles: University of California Press) 2002, 19–53; S. M. Sufian, *Healing the Land and the Nation*; W. Anderson, *Colonial Pathologies: American Tropical Medicine, Race and Hygiene in the Philippines* (Durham: Duke University Press, 2006), 207–225; Monnais, 'Rails, Roads and Mosquito Foes', 215–225; M. Cueto, *Cold War, Deadly Fevers*.

Figure 6.1 Colour lithograph attributed to R. Mount, 'The malaria mosquito under a spotlight, with scenes showing how to avoid catching malaria.' (London: HM Stationary Office, c. 1943–c.1953.) [Credit: Wellcome Library, London. Photo number L0024907.]

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an emerging scholarship on postcolonial science which has asserted that empire can be a crucial analytical frame in understanding more recent developments in the sciences.[18] At the same time, I have been attentive to the ways in which historians in recent years have questioned the exclusive attention accorded to imperial agency in analysing the making of the modern world.[19] Inspired by these diverse positions, *Malarial Subjects* has contributed to recent conceptual literature about empires themselves. The history of British Empire in the long nineteenth century cannot be reduced to the activities of the colonial state alone. Instead, each chapter describes the Empire as an occasion for the interaction between the worlds of governance, knowledge and commerce. The Empire was simultaneously an overarching causal agent, as well as an immanent process that was itself sustained by these interactions. It was not necessarily an inflexible, top-down and preordained institutional framework. But rather, the long and violent life of British Empire can be explained by its ability to shape and in turn be reconstituted by various human and nonhuman histories.

'Morbus Bengalensis'

Non-European colonised groups have featured in different ways in the recent historiography of British imperial science and medicine. One of the most enduring strands of this historiography has acknowledged that science and medicine were crucial means through which imperial rule and violence were inflicted on colonised groups.[20] Other scholars have argued that the colonial state-endorsed science and medicine were not shaped by the activities of Europeans alone, but rather such forms of knowledge were also built upon the physical and intellectual labour of indigenous groups in the colonised locales.[21] While extending these insights, postcolonial scholars have further revealed that colonised vernacular groups were not passive recipients of the dictates of imperial

[18] W. Anderson, 'From Subjugated Knowledge to Conjugated Subjects: Science and Globalisation, or Postcolonial Studies of Science', *Postcolonial Studies*, 12, 4 (2009), 389–400; A. Prasad, 'Science in Motion: What Postcolonial Science Studies Can Offer', *Electronic Journal of Communication Information & Innovation in Health (RECIIS)* 2, 2 (July–December 2008), 35–47.

[19] See R. Deb Roy, 'Nonhuman Empires', *Comparative Studies of South Asia, Africa and the Middle East*, 35, 1 (May 2015), 72.

[20] See for example P. Chakrabarti, *Materials and Medicine: Trade, Conquest and Therapeutics in the Eighteenth Century* (Manchester: Manchester University Press, 2010).

[21] See especially K. Raj, *Relocating Modern Science: Circulation and the Construction of Scientific Knowledge in South Asia and Europe, 1650–1900* (Houndmills and New York: Palgrave Macmillan, 2007).

science and medicine. These scholars have shown how the contents of the colonial state-informed science and medicine were eventually translated, displaced, reinterpreted and appropriated by the colonised people to suit their own agendas.[22] Inspired by these different scholarly positions, this section comments on Bengali publications on malaria, quinine and mosquitoes in the late nineteenth and early twentieth centuries. I have focused on a specific South Asian language for the sake of in-depth analysis, apart from my own interests in the region. Besides, Bengal had one of the most enduring exposures to imperial rule in the modern world. It was home to a thriving vernacular print market, as well as one of the earliest cinchona plantations and quinine factories to be set up in the colonial world. Yet it retained the notoriety of being considered as one of the most malarial provinces of the British Empire until decolonisation. This section argues that resisting, translating and reappropriating insights about quinine, malaria and mosquitoes in the Bengali public sphere should not necessarily be regarded as extraneous to the history of imperial medicine. Rather, along with details unfolding in bureaucratic files, commercial private papers, or colonial medical journals, these processes need to be acknowledged as episodes within the history of empire and imperial medicine. I suggest that the history of imperial medicine was shaped through interactions between the more peripatetic concerns of colonial bureaucrats, medical officials, and Europeans pharmaceutical businessmen, on the one hand, and vernacular public cultures, on the other.[23] This section ends by hinting that in the final decades of British imperial rule, Bengali (often anti-imperial) writings on mosquitoes reflected the various concerns of British colonial officials, multinational charitable organisations, the US military and other dominant players in global governance in the interwar period.

British Indian subjects were not necessarily docile bodies who were inescapably colonised into consuming quinine. Colonised subjects often rejected or criticised medicines prescribed to them by the colonial state, and this constituted an integral aspect of the history of imperial medicine. Indeed, the elaborate disciplinary as well as punitive measures

[22] P. B. Mukharji, *Nationalizing the Body: The Medical Market, Print and Daktari Medicine* (London and New York: Anthem Press, 2009); I. Pande, *Medicine, Race and Liberalism: Symptoms of Empire*, (Abingdon and New York: Routledge, 2010).

[23] This is not to deny that some of these processes associated with vernacular public sphere were eventually appropriated within the emerging anti-imperial nationalist projects. These suggest overlaps and continuities between imperial medicine, on the one hand, and emergent anti-imperial nationalist medicine, on the other. For details see Mukharji, *Nationalizing the Body*.

adopted by the British Indian government to enforce the consumption of quinine amongst the colonial subjects indicate the hesitation with which the drug must have been initially received. Indigenous rejection of quinine took various forms. Female tea plantation labourers in North Bengal often refused their daily dosage of quinine by spitting the drug out.[24] More patrician critics of quinine claimed that the drug was a symbol of moral decadence and excessive reliance upon Western ways of living. An article published in the 1870s in the homoeopathic *Calcutta Journal of Medicine*, as discussed in Chapter 3, sarcastically renamed Burdwan fever as a 'cinchona disease'. The article argued that Burdwan fever was a side effect of excessive consumption of quinine in colonial Bengal. Similarly, Bengali medical journals like *Chikitsa Sammilani* published editorials titled 'Quinine is malaria', and in the process refused to distinguish between the cause and cure of disease. These kinds of statements did not merely express doubts about the efficacy of quinine as a therapeutic substance. By equating the quintessential cure with malaria, these critics were simultaneously calling into question the validity of the diagnostic category malaria itself.[25] Echoing these thoughts, an early twentieth-century Bengali article entitled 'Malaria Rahasya' or the 'Malaria Mystery' rejected quinine by labelling it as a poison. It also described malaria as an 'airy-fairy word', and an 'imaginary unfounded idea'.[26]

Most Bengali commentators, however, underscored the significance of malaria as an experiential reality, even when they continued to suspect the efficaciousness of quinine.[27] In a paper read out to the Calcutta Medical Society in the early 1880s on the theme 'Use and Abuse of Quinine in Fever', Rakhal Chandra Ghose, a Bengali trained in one of the medical colleges set up by the colonial government, argued that the 'old sufferers living in the endemic districts of Bengal and constantly imbibing the malarial poison' were victims of a peculiar form of malarial fever. He called this malarial malady which was unique to Bengal, 'Morbus Bengalensis'. He asserted that quinine was 'literally useless' in curing 'Morbus Bengalensis'.[28] These doubts were expressed in the context of the proliferation of various indigenous substitutes of

[24] Anonymous, 'The Indian Tea Industry. The Labour Question. Malaria as a Factor. VI-The application of Principles of Protection', Cutting from *The Statesman*, 1 January 1909. Home, Sanitary, May 1910, 189–231 A (NAI).
[25] Anonymous, 'Quinine i Malaria', *Chikitsa Sammilani*, 9, 10 (1893), 402–405.
[26] N. Majumdar, 'Malaria Rahasya', *Hahnemann*, 9, 11 (c. 1910), 577, 578, 583, 584.
[27] J. Basu, 'Quinine', *Chikitsa Sammilani*, 4, 1 (April–May 1887), 16–18; Anonymous, 'Quininer Opobebohar' (Abuse of Quinine), *Chikitsa Sammilani*, 6, 10/11/12 (Mid-January to Mid-April 1890), 388–391; Anonymous, 'Quinine', *Chikitsak*, 1, 1 (January/February, 1890), 93–100.
[28] R. C. Ghose, 'Use and Abuse of Quinine in Fever', *IMG* (1 May 1882), 138–142.

quinine in the Bengali vernacular medical marketplace. Many locally produced pills and tonics were advertised as superior alternatives to quinine in contemporary Bengali almanacs, manuals and pamphlets. These drugs included *Atyashcharya Batika* (The most wonderful pill), *Dasyadi Pachan*, Sarkar's tonic, *Chaitanya batika* (Chaitanya pills), *Bijoy batika* (Victory pills) amongst others.[29] All commodities associated with curing malaria, however, were not to be orally consumed. Certain advertisements recommended ritually sanctioned lockets which were supposedly endowed with divine powers that could stave off malaria and its effects.[30] A range of advertisements claimed that these local commodities were more suited than quinine to combat malaria in Bengal.

Nonetheless, the colonial state and its vernacular subjects did not always adopt completely opposite positions on quinine. The image of a unanimous medical bureaucracy imposing quinine on a reluctant Bengali people did not necessarily hold. A section of English bureaucrats themselves criticised the widespread distribution of quinine amongst 'Indian patients'. Drawing on various physiological surveys conducted in India in the early 1900s, this group of officials emphasised the differences in the 'composition of the blood of non–flesh-eating natives of India from that of the blood of the flesh-eating Europeans'. They argued that the red blood corpuscles of local inhabitants in India were characterised by a relative deficiency of haemoglobin, and this rendered the consumption of significant doses of quinine 'deleterious'.[31] On the other hand, apart from selling indigenous substitutes of quinine, Bengali shopkeepers and medics in the vernacular marketplaces also innovated their own versions of quinine. While many of them were sceptical about the effectiveness of an imported drug, others were increasingly aware of the credibility the label quinine carried with it, because of its enduring

[29] Anonymous, 'N. C. Pul & Co.'s Most Wonderful Pills', *Anubikshan*, 1, 5 (November/December, 1875), 5; Anonymous, 'D. Gupta and Company's Antiperiodic Pill', in *Nutan Panjika* (Calcutta: Benimadhab De and Company, 1887–1888), 2 [Box 1 File 7 CSSSC]; Anonymous, 'Nalhati Pharmacy: Sarkar's Tonic', *Bharat-Suhrid*, 1,10 (March–April, 1903), in M. Mamun (ed.), *Unish Satakey Bangladeser Sangbad Samayik patra Volume 7*, 363–364 [Box 5 CSSSC]; Anonymous, 'Noakhali Haldar and Company's famous Chaitanya Pills', *Asha*, 1, 7–8, (October–December, 1902), in Mamun (ed.), *Unish Satakey*, 289 [Box 5 CSSSC]; Anonymous, 'Bijoy Batika', *B. Basu and Company's Salsa* (B. Basu and Company: Calcutta, c. 1900), 2 [Author's collection]; G. Nandi, 'Malaria Jvarey Dasyadi Pachan' ('Dasyadi Pachan in Malaria Fever'), *Chikitsak*, 1,1 (1889), 70–72.

[30] Anonymous, 'Desh Bides Bikshyato' ('World Famous'), *Benimadhab De and Company's Panjika*, (1896–97), [Box 1, File7, CSSSC].

[31] S. P. James, 'Problems Relating to the Use of Quinine', and C. Donovan, 'The Most Useful Salt of Quinine for Distribution in Malarial Tracts', *Proceedings of the Imperial Malaria Conference held at Simla in October 1909* (Simla: Government Central Branch Press, 1910), 69 and 75. Home, Sanitary, May 1910, 189–231 A (NAI).

association with the colonial government. As the case of Shashi Bhusan Dutta detailed in the previous chapter suggests, various operators in the vernacular marketplace appropriated the label of quinine to describe their disparate medical products. By the 1890s, the colonial state had installed a network of mechanisms to detect and punish these acts. Contemporary Bengali novelists, as well, shared the governmental perception that the original purity of quinine was being tampered with by Indian rural shopkeepers.[32]

The interactions between state medicine and vernacular medical markets in Bengal were enabled by the increasing participation of Bengalis such as Jodunath Mukhopadhyay as subordinate members in the colonial medical apparatus. Mukhopadhyay pursued multiple careers, and inhabited different cultural worlds. He was educated in the colonial medical institutions, authored various medical manuals in Bengali, and traded in indigenous alternatives to quinine.[33] Many Bengali medical manuals written by Mukhopadhyay emphasised the virtues of quinine as a remedy for diseases associated with malaria.[34] At the same time, an advertisement published in March 1888 claimed that he had himself started manufacturing a more effective remedy for malarial fever which he called *Sarvajvarankusha*, which meant 'The cure of all fevers'.[35] This suggests that Bengalis who advertised the virtues of quinine and those who traded in its indigenous alternatives did not necessarily constitute mutually exclusive worlds. In fact, many spokesmen in favour of anti-malarial patent medicine or indigenous alternatives of quinine in Bengal were employed in the colonial medical department.[36] Therefore, it is not unlikely that directly or indirectly they were also associated with the colonial state's project of popularising quinine amongst the Indians. Bengali advocates of quinine and its indigenous substitutes were often drawn from the same cultural world, and used similar expressions in praise of these competing drugs. For example, appealing to the sensibilities of a Hindu readership, Bengali articles and advertisements referred to both quinine and anti-malarial patent medicines in Bengal as 'Brahmastra', an invincible

[32] S. Chattopadhyay, 'Ramer Sumati', in S. Chattopadhyay, *Sarat Sahitya Samagra* (Calcutta: Ananda Publishers, 1986/1913), 1572–1588.

[33] The category indigenous itself is historically constructed. See P. B. Mukharji, 'Symptoms of Dis-Ease: New Trends in Histories of "Indigenous" South Asian Medicines', *History Compass*, 9, 12 (2011), 887–899.

[34] J. Mukhopadhyay, *Quinine* (Calcutta, 1893); J. Mukhopadhyay, *Bishamjvare Quinine Proyog-pronali* (Chinsurah: Chikitsaprokash Press, 1879).

[35] K. Mukhopadhyay, 'Sarvajvarankusha', *Education Gazette and Saptahik Vartabaha* (9 March 1888), 733 [UJPL, 6/7, CSSSC].

[36] Anonymous, 'Noakhali Haldar and Company's famous Chaitanya Pills'; Anonymous, 'Sudhanidhi', *Bharat Suhrid*, 1, 10 (March/April, 1903), in Mamun, *Unish Satakey*, 363 [Box 5, CSSSC].

weapon described in Hindu mythology. Bengali medical publications did not pursue the single-minded agenda of contesting the curative properties ascribed on quinine. These were also sites in which the relevance of quinine was reasserted before a Bengali-reading audience.[37]

Those who wrote about malaria, quinine and its indigenous substitutes in Bengali medical journals, books, newspapers, magazines and almanacs (and who were cited in the advertisements of various antimalarial medicines in the late nineteenth century) mostly belonged to a class of bilingual Bengali men, who were trained in the emerging medical colleges in and around Calcutta. A majority of these Bengali authors, such as Mukhopadhyay, held 'a license for medicine and surgery' (LMS). Others possessed more respectable degrees such as Doctor of Medicine (MD) or a baccalaureate degree in medicine (MB).[38] These qualifications, which were recognised by the colonial government, enabled these authors to seek employment in a hierarchy of positions within the colonial medical establishment ranging from assistant surgeons to resident medical officers in government hospitals.[39] Bengali writings on malaria and its cures were authored not only from Calcutta, but also from other parts of Bengal including Chandannagore, Chinsurah, Murshidabad and Bolpur.[40] As already noted, apart from doubting the efficacy of quinine, some of these authors questioned the existence of malaria itself.[41] Others attributed malarial epidemics in Bengal to flaws in government policies.[42] However, most of these texts echoed the dominant concerns of the colonial government, and circulated significant contemporary medical theories about malaria and its cures.[43]

[37] Bengali texts that described quinine as 'Brahmastra' included Anonymous, 'Quininer Opobebohar', 388; Mukhopadhyay, *Quinine*, 58; J. Mukhopadhyay, *Saral Jvar Chikitsa Prothom Bhag* (Calcutta: Nityananda Ghosh, 1880), 15. Bengali texts that described patent medicines as 'Brahmastra' included Mukhopadhyay, 'Sarvajvarankusha'; Anonymous, 'Sudhanidhi'; Anonymous, 'Bijoy Batika'.

[38] See Mukharji, *Nationalizing*, 4–7. Basu, 'Quinine', 18; P. Sanyal, 'Remittent Fever e Quinine', *Chikitsa Sammilani*, 4, 1 (April/May, 1887), 245; Mukhopadhyay, *Bishamjvare Quinine*.

[39] D. K. Ghosh, *Malaria* (Sultangachi, Hooghly: Doyal Kishen Ghosh, 1878); A. Bhattacharya, *Jvar Chikitsa* (Calcutta: Valmiki Press, 1878).

[40] Nandi, 'Dasyadi Pachan'; Mukhopadhyay, *Bishamjvare Quinine*; Majumdar, 'Malaria Rahasya'; A. Pal, *Malaria* (Bolpur, 1927).

[41] Anonymous, 'Quinine i Malaria'; Majumdar, 'Malaria Rahasya'; Anonymous, 'Burdwan fever', *Calcutta Journal of Medicine*, 6, 6 (June 1873), 198.

[42] D. Mitter, *The Epidemic Fever in Bengal* (Calcutta: Hindu Patriot Press, 1873); Ghosh, *Malaria*, 50.

[43] Sanyal, 'Remittent Fever e Quinine'; R. Mitra, 'Quinine', *Chikitsa Sammilani*, 3, 1 (April/May 1886), 131–136; H. Sengupta, 'Quinine O Ihar Bebohar', *Bhishak Darpan*, 6, 11(May 1897), 447–450; Anonymous, 'Malaria', *Swasthya*, 4, 9 (December/January, 1900/1901), 257–287; K. Sen, 'Malaria o Moshok', *Bhisak Darpan*, 10, 4 (April, 1900),

While claiming to translate and disseminate knowledge about malaria and quinine in the Bengali language, these texts were highly creative and original works in themselves.[44] They displayed their authors' ability to blend wisdom acquired from superiors in the colonial medical service, college lecturers and English textbooks, on the one hand, with experiential references to more intimate landscapes, places, vegetation, cultural icons and events encountered in Bengal, on the other.[45] These were cosmopolitan texts in which references to ancient Ayurvedic verses and nineteenth-century British medical commentators (such as John MacCulloch) were intimately interspersed; some of these Bengali texts contained quotations in Latin, Sanskrit and English.[46] In his book-length treatise on malaria published in 1878, assistant surgeon Doyal Krishen Ghosh indicated that malaria was not only an enigmatic medical problem, but also a moral problem that was caused by laziness, inadequate sleep, excessive sexual activity and undisciplined diet.[47] Ghosh, therefore, combined insights from English medical journals with lessons prescribed in Bengali medico-moral manuals, which were widely in circulation in the print market.[48]

These texts did not represent a distortion of preordained imperial medical knowledge. But rather, along with English medical journals and colonial bureaucratic correspondence analysed in Chapters 2 and 3, these Bengali texts were also integral sites where imperial insights about malaria were reshaped and consolidated. As liminal go-betweens, their authors played an important role in shaping the vocabulary in which literate Bengalis, who were crucial agents in the imperial world, addressed the disease. Their mediation enabled the enmeshing of European medical categories with Bengali cultural repertoires, which paved the way for various literary liberties. If quinine was referred to as a 'brahmastra', malaria was described as a 'rakshashi' (female demon); a 'jujuburi' (witch); 'jamopam rakshash' ('a demon comparable to Lord Yama, the mythical God of Death'; and a 'dabanol' ('forest fire').[49] When he mentioned malarial fever as 'maloyarir jvar' in his well-known novel

143–154; Anonymous, 'Malariar Prokop', *Swasthya*, 3, 7 (October–November, 1899), 215–218.

[44] For more on this claim see Mukharji, *Nationalizing the Body*.

[45] Ghosh, *Malaria*, 1–26; Bhattacharya, *Jvar Chikitsa*, see especially the title page, preface and 1–18.

[46] Majumdar, 'Malaria Rahasya', 575–585; Bhattacharya, *Jvar Chikitsa*, 'The title page'.

[47] Ghosh, *Malaria*, 10–18.

[48] On Bengali medical manuals, see R. Deb Roy, 'Debility, Diet, Desire: Food in Nineteenth- and Early Twentieth-Century Bengali Manuals,' in S. Chaudhuri and R. B. Chatterjee (eds.), *The Writer's Feast: Food and the Cultures of Representation* (New Delhi: Orient Blackswan, March 2011), 179–205.

[49] K. Basu, *Malaria Nibaraner Upay o Onyanyo Prabandho* (Calcutta: Swasthya Dharma Sangha, 1924), 11; Majumdar, 'Malaria Rahasya', 577; S. Lahiri, 'Ayurbedey Malaria',

Arakshaniya (*The Unmarriageable*), the iconic Bengali writer Sarat Chandra Chattopadhyay hinted at the way in which the word malaria may have been slightly tweaked in its everyday colloquial usage in certain parts of contemporary Bengal.[50] In the same novel, Chattopadhyay suggests how young women ostensibly suffering from malaria in poverty-stricken, rural, patriarchal Bengal were perceived as ugly and unmarriageable. *Arakshaniya* represents malaria not as a distant governmental jargon, but as an everyday reality that shaped, by the 1910s, experiences of intimacy and romance in Bengal.[51]

Bengali writers on malaria shaped attitudes not only of the manual and novel reading public in Bengal, but of the colonial state also. Despite punishing fraud and adulteration, the colonial state itself drew upon various local cultural symbols to popularise government quinine amongst the Indian subjects. These state-initiated innovations also shaped the interactions between local cultural icons and apparently secular medical items. As discussed in the previous chapter, the imperial postal department distributed a signboard in the 1890s that described quinine as a remedy gifted by the Hindu deity Lord Shiva to the ailing peasants of rural Bengal.[52] The colonial state also initiated the translation of advertisements of government quinine from English into a range of South Asian languages, including Bengali. The publicity for government quinine in Indian regional languages and the use of religious icons like Lord Shiva in quinine posters must have been made easier by the increasing presence of South Asians, including Bengalis, in different levels of colonial medical governance. Bengalis, whether in their capacity as medics trained in the colonial medical colleges in India, or as employees in the colonial bureaucracy drafted unpublished routine correspondence in English, contributed to English medical journals and wrote book-length treatises in English. Their opinions may not necessarily have formed the backbone of imperial malaria policy. However, the fact that their writings made it into journals such as the *Indian Medical Gazette* indicates that their insights about the locality were given cognizance by the colonial medical establishment.[53] In Chapter 3, I have suggested that some

Bhisak Darpan, 21, 12(December, 1911), 462; Anonymous, 'Swasthyaprosongo', *Swasthya*, 3, 8 (November/December, 1899), 226.

[50] S. Chattopadhyay, 'Arakshaniya', in S. Chattopadhyay, *Sarat Sahitya Samagra* (Calcutta: Ananda Publishers, 1986/1916), 251–252.

[51] Ibid., 244–267.

[52] It is worthy of note that in an undated advertisement even an anti-malarial patent medicine in Bengal was projected as an outcome of the blessings of Lord Shiva. Advertisement of 'Bisswesswar Ross Pills' (Calcutta: Febrona Limited) [Image number DP0003, CSSSC].

[53] K. D. Ghose, 'A Plea for Malaria', *IMG* 17 (1 June 1882), 150–154; Ghose, 'Use and Abuse of Quinine'; Anonymous, 'Tincture of Iodine and Burnt Alum in Intermittent Fever', *IMG*, 17 (2 October 1882), 279.

Bengali members in the British Indian administration, such as Sunjeeb Chunder Chatterjee and Gopaul Chandra Roy, played significant roles in shaping colonial discourse about Burdwan fever. In a letter addressed to the Secretary of the Government of Bengal in 1863, Chatterjee, who was one of the first Bengali members in the colonial bureaucracy and also the elder brother of the pioneering Bengali novelist Bankim Chandra Chattopadhyay, recommended intense anti-malarial administrative intervention by the colonial state in the interiors of Bengal. That this letter was cited again seven years later in official correspondence suggests that his recommendations were taken seriously.[54] Roy, who studied medicine in Glasgow and London, was employed as inspecting medical officer of dispensaries in Burdwan, and in the 1870s wrote a book on Burdwan fever. That the book was published simultaneously by different English firms in London and Calcutta, and went into multiple editions suggests that Roy's work attracted a considerable audience.[55] Such widespread interest in how the members of the colonised society defined malaria and its solutions was not exceptional. One might recall that the Viceroy Lord Northbrook declared in 1872 a prize of Rs. 1000 for the best essay written by a 'native' sub-assistant surgeon on the causes and prevention of Burdwan fever.[56] It can be argued that regional expertise asserted by Bengalis writing on malaria in English was appropriated by the imperial project of pathologising colonised lands, landscapes and people. By sharing intimate information about plants, places and landscapes in Bengal, these writers added greater depth, texture and local flavour to imperial medical narratives about malaria.

The interchange between South Asian colonised voices and the colonial state manifested in other ways. The Bengali medical journal *Bhishak Darpan* published an article in 1911 entitled 'Ayurbedey Malaria' ('Malaria in the Ayurveda') by a physician Saracchandra Lahiri, who asserted that the authors of key texts of Ayurveda in ancient India already knew the aetiology and cures of malaria.[57] In a speech delivered as the

[54] S. C. Chatterjee, Cantalpara, to A. Eden, Secretary to the Government of Bengal, dated 1 May 1863. Home, Public, 7 May 1870, 65–71 A (NAI).

[55] G. C Roy, *The Causes, Symptoms and Treatment of Burdwan Fever, or the Epidemic Fever of Lower Bengal* (London: J and A Churchill; Calcutta: Thacker, Spink and Co. New Edition, Revised and Improved, 1876). For more see Chapter 3.

[56] General, Medical, 147–148 B, August 1872 (WBSA).

[57] Lahiri, 'Ayurbedey Malaria', 461–467. Various other contemporary texts authored by Bengalis made similar claims. K. Vidyabhushan, *What is Malaria and the Germ Theory* (Calcutta: Narendranath Vidyanidhi, 1914); Majumdar, 'Malaria Rahasya', 575–585. The *Bhishak Darpan* also published two articles subsequently that added nuance to Lahiri's assertions. P. Bhattacharya, 'Ayurbedey Malaria', *Bhishak Darpan*, 21, 12 (December, 1911), 443–461; M. Kabyatirtha, 'Ayurbedey Malaria Probondher Samalochona', *Bhisak Darpan*, 22, 6 (June 1912), 209–216.

President of the Imperial Malaria Conference held in Shimla in 1909, H.H. Risley almost anticipated Lahiri's opinions when he argued that the authors of Atharvaveda knew about malaria and its cures.[58] Therefore, Bengali revivalist ideologues in the immediate aftermath of the Swadeshi movement in the 1900s appropriated colonial medical categories such as malaria to assert the relevance of Ayurveda in modern India. In turn, senior colonial officials such as Risley invoked ancient Indian wisdom to assert the enduring historical roots of colonial medical categories such as malaria in the subcontinent.

Therefore, notions about malaria and quinine were not unilaterally imposed on Bengal by the colonial state. Imperial notions of malaria and quinine were reshaped and sustained by Bengali idioms, icons, words and politics. As evident from these examples, these interactions informed the intellectual and material meanings of malaria and quinine in Bengal. These interactions also influenced the routes and networks through which the government organised the circulation of quinine in the province. Well before the government embarked in the 1890s and 1900s on a policy of aggressively enforcing the consumption of quinine in the interiors of South Asia, there thrived in Bengal a vernacular medical market in which various medical products, indigenous as well as imported (such as quinine), circulated.[59] Advertisements published in Bengali newspapers, almanacs and medical manuals in the 1870s and 1880s indicate that Bengali operators in local medical marketplaces already devised networks through which to circulate their products into the interiors of districts, subdivisions, 'outposts', police stations, and 'small, remote, and cluttered villages'.[60] They sold their medical products in the various corners of the province through many sites closely associated with the colonial state: merchants' offices, tea plantations, government medical stores, veterinary dispensaries, district boards, municipalities, port commission offices, railway stores, collieries and dispensaries.[61] They also recruited various ostensibly credible figures in rural Bengal such as teachers, pundits, postmasters, sub-inspectors, head-constables, the rural gentry, 'native doctors' and kavirajas to sell anti-malarial drugs

[58] H. Risley, 'Popular Cooperation in the Prevention of Malaria', *Proceedings of the Imperial Malaria Conference held at Simla in October 1909* (Simla: Government Central Branch Press, 1910), 95. Home, Sanitary, May 1910, 189–231 A (NAI).

[59] Anonymous, 'D. Gupta and Company's Antiperiodic Pill'; Anonymous, 'Wanted', *Sadharani* (28 December 1879) [Box 1, File 7, CSSSC].

[60] Mukhopadhyay, 'Sarvajvarankusha'.

[61] Anonymous, 'Batakrishna Pal and Company Chemists and Druggists', in *Nutan Panjika*, (Calcutta: Benimadhab De and Company, 1904–1905), [Box 5, NL, 20c, CSSSC].

in lieu of a commission.[62] These advertisements instructed prospective consumers to request for medicines from Calcutta-based firms directly through the post, and to make payments through various postal innovations like money order and bearer's post.[63] As I have elaborated in the previous chapter, many of these strategies would in subsequent decades form the backbone of aggressive quinine distribution efforts initiated under the watch of the government.

Similarly, regarding attitudes towards mosquitoes, the views of the colonised people and of the imperial medical entomologists often coalesced. It may be pointed out as a digression that in his address on the occasion of awarding the Nobel Prize in medicine to Ronald Ross, the rector of the Caroline Institute reportedly claimed that Ross's discovery was anticipated by East African tradition. He explained his point by suggesting that 'negroes in East Africa use the same name for the mosquito and malaria'.[64] While both the politics and content of the rector's statement deserve greater scrutiny, it is undeniable that in the imperial world of the late nineteenth and early twentieth centuries, many groups of people, besides imperial medical entomologists were concerned about mosquitoes. I have shown in Chapter 5 how prejudices against insects more generally and mosquitoes in particular were shared between the worlds of colonial plantation economy, late Victorian advertisements, sanitary governance, entomological laboratory and Bengali literature.

In British India, the government continued to organise mosquito-killing initiatives into the interwar period.[65] Cleansing the environment of mosquitoes was seen to be part of a wider sanitising project through which the colonial state asserted itself as the custodian of medical well-being in the colony.[66] In the early twentieth century, the British Empire in India, however, was not the only global power which prioritised protection from or annihilation of mosquitoes as a governmental agenda. These concerns were shared by fledgling multinational philanthropic organisations such as the Rockefeller Foundation, which started interacting closely with regional caretakers of development and health across

[62] Anonymous, 'Wanted'.
[63] Anonymous, 'D. Gupta and Company' in *Nutan Panjika* (Calcutta: Benimadhab De and Company, 1887–1888), 1 [Box 1, File 7, CSSSC].
[64] Anonymous, 'The Nobel Prize for Medicine, 1902', *Lancet*, 161, 4141 (10 January 1903), 122.
[65] Harrison, *Disease and the Dilemmas of Development*, 26–42.
[66] On the wider political context in which medicalisation of insects was carried out, see H. Raffles, 'Jews, Lice and History', *Public Culture*, 19, 3 (Fall, 2007), 521–566; N. Rogers, 'Germs with Legs: Flies, Disease and the New Public Health', *Bulletin of the History of Medicine*, 63 (Winter, 1989), 599–617.

the world in Italy, Egypt and Brazil.[67] Mosquitoes also featured prominently in the military predicaments of the United States. This was manifested not just in manuals that instructed soldiers engaged in overseas military expeditions about the most effective means to protect themselves from malaria and mosquitoes.[68] I have indicated that mosquitoes even emerged as a symbol of legitimate US military aggression in the early 1950s when a squadron of the US air force during the Korean War was named after mosquitoes. Photographs taken during this period from Malaysia, Mauritius, Trinidad and Ghana, and currently held at the archives of the Royal Commonwealth Society in Cambridge, suggest that the obsession to seek protection from malarial mosquitoes dictated patterns of entomological research, urban planning, architectural design and housewifery curriculum across the colonial world.[69] These concerns even made their way into children's comic literature. Herge's 1930 work *Tintin in Congo* warns readers about the perils of venturing into the interiors of Belgian Congo without a mosquito net![70]

In this wider context, as I have indicated in the last chapter, mosquitoes also attracted considerable attention in Bengali publications across a range of literary genres including fantasies, social treatises, educational pamphlets, crime fiction, comic short stories, poems, medical manuals and popular magazines. Of course, these literary works represented disparate aesthetic, satirical and political projects, and most of them did not directly promote the medicalisation of mosquitoes. However, it is significant that over the same period both imperial medical entomology and these Bengali literary texts contributed to the metamorphosis of mosquitoes into objects of enduring public spectacle. Even when Bengali humorous pamphlets and short stories caricatured these entomological projects, they were reminiscent of the global reality that

[67] Stapleton, 'Internationalism and Nationalism'; Mitchell, *Rule of Experts*, 26–51; R. M. Packard and P Gadehla, 'A Land Filled with Mosquitoes: Fred L. Soper, the Rockefeller Foundation, and the Anopheles Gambiae Invasion of Brazil', *Medical Anthropology: Cross-Cultural Studies in Health and Illness*, 17, 3 (1997), 215–238.

[68] A. Wells, 'Mosquitoes: American soldiers in World War II can encourage them to breed them by leaving ruts in roads and unfilled earth holes, causing mosquito-borne diseases', (Washington, DC: US Government Printing Office, 1944) [Credit: Wellcome Library, London, Photo Number: L74413].

[69] These photographs are held at the Royal Commonwealth Society Collections at the Cambridge University Library. Anonymous, 'Institute of Medical Research, Antimalarial Work, Kuala Lumpur' (c. 1940s–1950s) [RCS-Y3011R-7]; Anonymous, 'Mauritius: Map Showing the Location of Mosquitoes' (Sir Henry Hesketh Bell Collection, 1922) [RCS-RCMS-36/5/4]; Anonymous, 'Mosquito-Proof House, Pitch Lake, Brighton' (Fisher Photograph Collection, August 1912) [RCS/Fisher/Y3075C/3]; Anonymous, 'Housewifery at Achimota College' (c. 1945) [RCS/Y3011U/211].

[70] Herge, *Tintin in the Congo* (London: Egmont, 1930/2005), 10–11.

public health officials were indeed engaged in a 'war with mosquitoes'.[71] Some of these texts echoed medical entomology, overtly or symbolically, to suggest that mosquitoes were villainous enemies of humans, and therefore, should be exterminated.[72]

In the 1920s, many Bengali books about public health and medicine identified malaria as one of the severest problems that plagued the 'desh' – the country. Although written at the height of anti-imperial nationalist movements in South Asia, these books rarely invoked the vision of an overarching Indian nation. Instead, words like 'desh', 'bangla', 'bangadesh', 'bangladesh' were frequently used to conjure up the image of a Bengali homeland.[73] Mosquitoes, as vectors of malaria, were described as inimical to the 'desh' – the Bengali homeland.[74] The villages – 'Gram' or 'palligram' – were projected as particularly vulnerable.[75] These texts appealed to the colonial municipal governments for devising mechanisms to protect rural Bengal from the virulence of malarial mosquitoes.

Yet, the purging of mosquitoes from the homeland, and the reconstruction of rural Bengal, it was argued, could not be the exclusive prerogative of the municipalities. It was recommended that these projects could only be emboldened through collective action involving the participation of Bengali society more generally.[76] To that end, authors of these books instructed their readers to establish associations such as 'Pallisamiti' ('Village association'), 'Malaria Nibaroni Samiti' (Society for the prevention of malaria') and 'Swasthya-raksha samiti' ('Society for the preservation of health').[77] These organisations were supposed to undertake various steps to protect the 'desh' of the Bengalis, and particularly

[71] K. Bhattacharya, *Moshar Juddha (War of Mosquitoes)* (Calcutta: Kulja Sahitya Mandir, 1922); P. Mitra, 'Mosha' ('Mosquito), in S. Dasgupta (ed.), *Ghanada Samagra 1* (Kolkata: Ananda Publishers), 21–30.

[72] R. Thakur, 'Samavaye Malaria Nibaran' ('Malaria Eradication Through Cooperatives: Text of a lecture delivered on 29 August 1923'), in *Rabindra Rachanabali*, Volume 13 (Calcutta: West Bengal Government, November 1990), 795–798; D. Ray, *Moshar Hul* (*The Sting of Mosquitoes*), (Meherpur: Manasi Press, 1922).

[73] U. Chakrabarti, *Malaria* (Kolkata: Souredrakumar Chakrabarti, 1923/24), 77–81; K. Basu, *Malaria Nibaraner Upay O Onyanyo Prabandho (How to Prevent Malaria and Other Essays)*, (Calcutta: Swasthya Dharma Sangha, 1924/25), 10; G. K. Mitra, *Malaria o Bongodesh-Sulabh Onyanyo Jvarer Protikar Samasyar Porikalpana* (*Scheme for Preventing Malaria and Other Fevers Prevalent in Bengal*), (Calcutta: Public Health Department, Bengal Government, c. 1924), 14; A. Pal, *Malaria* (Bolpur: Publisher not mentioned, 1927/1928), 'Preface'.

[74] Basu, *Malaria Nibaraner Upay*, 10–11; Mitra, *Malaria o Bongodesh*, 4–14; Pal, *Malaria*, 6–14, 191–218.

[75] Chakrabarti, *Malaria*, 77–89; Basu, *Malaria Nibaraner Upay*, 10; Mitra, *Malaria o Bongodesh*, 1–7.

[76] Chakrabarti, *Malaria*, 90; Basu, *Malaria Nibaraner Upay*, 10; Mitra, *Malaria o Bongodesh*, 14.

[77] Chakrabarti, *Malaria*, 87; Basu, *Malaria Nibaraner Upay*, 10–11.

the villages of Bengal from mosquitoes. These steps included not just the mobilisation of resources from within the localities for the destruction of the habitats of mosquitoes by sanitising puddles; putting kerosene into pits of stagnant water;[78] improving rural drainage networks;[79] replacing old decaying vegetation with newly planted trees;[80] and informing villagers about the means to protecting themselves from mosquitoes.[81]

These authors also pointed out that the goal of minimising the threat of malarial mosquitoes necessitated that these organisations set up free primary schools and schemes to reduce poverty; encourage agriculture and the weaving industry; revive a culture of athletics and physical training; establish rural courts to adjudicate local disputes; and put together plebeian Hindu gatherings, such as 'dharmasabha' and 'harisabha'.[82] According to these texts, the control of malaria and its vectors in Bengal was connected to the restoration of social cohesion, harmony, prosperity and religious values within rural communities. At the same time, it was argued that protection of the 'desh' from mosquitoes could not be ensured through activities in the public sphere alone. The shared project of resisting mosquitoes required, it was claimed, the submission of individual householders to specific codes of morality and everyday routine. These included the obligation to keep the household clean and tidy; to cover the body with clothes at all times; to fumigate the home in the evening with flames of incense sticks and camphor;[83] to remain inside a mosquito net and within the secure marital confines of one's home in the evenings and at night.[84]

Some of these instructions to the householders were particularly meticulous in their detail. A book published in 1927, for example, argued that anopheles mosquitoes were especially attracted to certain colours (such as navy blue, dark red, brown and scarlet), and that householders should avoid sleeping in mosquito nets, which bore such colours.[85] The same book began by suggesting that countries, which had effectively eradicated malaria and its insect vectors, were relatively more 'cultured and politically free' than Bengal.[86] It claimed that widespread malaria in Bengal was a reflection of a deeper cultural crisis; a crisis resulting from the inability of the Bengalis to retain their indigenous culture

[78] Chakrabarti, *Malaria*, 22; Basu, Ibid; Mitra, *Malaria o Bongodesh*, 9–10.
[79] Chakrabarti, *Malaria*, 77; Mitra, *Malaria o Bongodesh*, 10.
[80] Chakrabarti, *Malaria*, 88; Mitra, Ibid., 11.
[81] Basu, *Malaria Nibaraner Upay*, 10; Mitra, Ibid., 9, 11, 13.
[82] Chakrabarti, *Malaria*, 80–89. [83] Basu, *Malaria Nibaraner Upay*, 11.
[84] Chakrabarti, *Malaria*, 22; Basu, Ibid.; Mitra, *Malaria o Bongodesh*, 10–11.
[85] Pal, *Malaria*, 13.
[86] Ibid., 'Preface', 1–2. He uses the Bengali word 'sabhya' which could have been translated as 'civilised'. However, in page 201 he himself translates 'sabhya' as 'culture'.

during colonial rule as well as their failure to embrace 'western culture' conclusively.[87] In this phase of cultural flux, continued the author, the Bengalis had given in to excessive consumption, material pleasures and 'fashion'.[88] To resist the onslaught of malarial mosquitoes, he urged the Bengalis to observe restraint and self-discipline in their everyday life.[89] Therefore, the challenge of protecting the 'desh' from mosquitoes opened up the need for greater sanitary governance, as well as social and moral discipline in rural Bengal.

The perception that mosquitoes were a threat to Bengali health, household and homeland was reflected in the world of radio broadcasts, literature and advertisements of the time. *Betar Jagat*, a widely circulated magazine associated with the radio-broadcasting agency, published articles in consecutive issues in the 1930s, alerting the Bengali householders of the crucial role they could play in restraining mosquitoes.[90] Sarat Chandra Chattopadhyay's novel *Palli Samaj* (*Village Society*), published earlier in the 1910s, hints at how collective social projects against malaria and its vectors were appropriated within contemporary programmes of rural reconstruction.[91] In tune with the wider trends of the period, the need to protect the 'desh' from malarial mosquitoes was also articulated in military vocabulary. An advertisement of an anti-malarial drug (Figure 6.2), Baikol, published during World War II in 1942, compared the threat of mosquitoes to the fear of 'raids' carried out by Japanese fighter aeroplanes during those years in Bengal. The advertisement carries the caption 'The enemy attacks Bengal', and depicts a gigantic mosquito followed by waves of smaller mosquitoes hovering over the map of Bengal.[92]

Similarly, in a lecture delivered to the 'Anti-malaria Society' earlier in August 1923, Rabindranath Tagore, already a Nobel laureate in literature, described mosquitoes as one of the 'greatest enemies of Bangladesh' which needed to be 'evicted' from the homeland. In a speech replete with words such as 'war', 'weapon' and 'killing', Tagore asserted that the shared project of destroying mosquitoes could strengthen solidarity amongst the Bengalis much more effectively than

[87] Ibid., 201–202. [88] Ibid., 188, 201, 202. [89] Ibid., 188.

[90] S. N. Sur, 'Mosha Nibaroney Grihaster Kartabya' (Duties of Householders in Resisting Mosquitoes), *Betar Jagat*, 4, 16 (5 May 1933), 540–544; S. N. Sur, 'Malaria', *Betar Jagat*, 4, 15 (21 April 1933), 505–508.

[91] S. Chattopadhyay, 'Palli Samaj', in S. Chattopadhyay. *Sarat Sahitya Samagra* (Calcutta: Ananda Publishers, 1986/1916), 167–169.

[92] Advertisement of 'Baikol', *Ananda Bazar Patrika Saradiya* (1942), 172 [AS 46, BSP 32. Credit: The Archive of the CSSSC].

Figure 6.2 Advertisement of ‘Baikol’, *Ananda Bazar Patrika Saradiya*, (1942), p. 172. [AS 46, BSP 32. Credit: The Archive of the CSSSC.]

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lofty ideas such as 'desh' (country or homeland) and 'swaraj' (self-determination).[93]

Therefore, significant (often anti-imperial) voices in Bengal shared the anxieties of British imperial officials, multinational philanthropic organisations, and the US military about mosquitoes, even when they pursued different political and cultural projects. These overlapping concerns suggest that protection from mosquitoes emerged as one of the dominant agendas of global governance during the first half of the century. If indeed, as Warwick Anderson suggests, medicine and hygiene were appropriated in the 'civilising process' of the interwar period, then it can be argued that various Bengali publications about malarial mosquitoes were also implicated within those processes.[94]A few sources suggest that Bengali biases against insects preceded the global recognition of mosquitoes as the vectors of malaria. These texts which were published prior to the establishment of the imperial discipline of medical entomology in the 1890s had already begun featuring bugs or objects associated with bugs as symbols of moral decadence.[95]

British imperial medicine, therefore, was not merely constituted by the policies, violence, disciplinary mechanisms and classificatory practices shaped by senior British representatives of colonial governments. Imperial medicine was also a product of the ways in which the colonised resisted, internalised, reinterpreted, reinforced, interacted and competed with, and even anticipated governmental impositions. This book contributes to the ongoing efforts to narrate the history of imperial violence, while being simultaneously attentive to the close interactions between imperial regimes and the public cultures of the colonised.

Nonhuman Empire

The history of malaria, as detailed in this book, also reveals various entanglements of the British Empire with nonhumans (including plants, animals and objects), more generally, and not just mosquitoes. Colonial medical officials, bureaucrats and industrialists, while commenting on malaria and its possible cures, invoked nonhuman animals and plants recurrently. The linking up of malaria with nonhuman animals took various forms. It was not confined to the identification of anopheles mosquitoes in the 1900s as the insect vector for malarial parasites.

[93] R. Tagore, 'Samavaye Malaria Nibaran', 796–797.
[94] Anderson, *Colonial Pathologies*, 1.
[95] J. Mukhopadhyay, *Korakey kit ba Somaj Chitra* (*Worm in a flower bud*), (Calcutta: Bamacharan Dutta, 1877); S. Saphari, *Moshari Rahasya* (*Mystery of the mosquito curtain*), (Calcutta: Chandi Charan Basu, 1887).

Monsters, for example, were depicted as a symbol of malaria in a late-nineteenth-century advertisement for anti-malarial pills.[96] Architectural designs of houses within tea plantations in Assam in British India in the 1940s were shaped by the ostensible purpose of protecting the planters simultaneously from malaria and wild animals.[97] These trends have survived in postcolonial India. Recent journalistic reports have suggested that the combined threats from snakes and malaria shape military confrontations in the forests of Central India between Maoists, on the one hand, and the state-sponsored militia, on the other.[98] I have noted how the history of malaria in British India reveals a hierarchy of plants in the imperial imagination. Plants appropriated within the cosmopolitan colonial plantation economy such as cinchonas, eucalyptus or sunflower were celebrated for their therapeutic properties. Various other plants, which were described as 'wild' 'undergrowths', even when they were intimately associated with the life-worlds of various groups of people in colonial India, as Chapters 1 and 3 have shown, ran the risk of being labelled as unwanted excesses and pathological sources of malaria.

Historians have exposed, in different ways, the importance of nonhumans (particularly animals) in imperial medicine.[99] Building on these existing works, this book has carried out the methodological challenge of narrating the significance of nonhumans in imperial history, while retaining a critique of scientific determinism. In order to simultaneously resist tendencies of anthropocentrism and scientism in the history of the British Empire, it has explored the ways in which British Empire and medical knowledge about nonhumans were co-constituted. Indeed, the Empire was deeply invested in the production of medical knowledge about nonhuman animals, plants and objects. I have argued that the medical properties attributed to cinchona plants, objects described

[96] M. Mayer and Ottoman, Advertisement of 'Mason and Pollard's Anti-Malaria Pills', (Name of publisher and place of publication not mentioned, 1890) [Author's collection].

[97] See the photograph taken by P. Bose entitled, 'The Manager's bungalow, Panitola Tea Estate [Upper Assam]' (c. 1950). Shelfmark: Photo 451/1(4) [BL].

[98] P. K. Maitra, 'Mosquitoes, Snakes Rattle Naxal Leaders', *Hindustan Times* (20 April 2008, Gadchiroli), www.hindustantimes.com/india/mosquitoes-snakes-rattle-naxal-leaders/story-YFcLUrFnfjUo6QwMYxVxzN.html [Retrieved on 20 June 2016]; S. S. Bose, 'No Water, Food or Medicines. Now, Go Fight "Biggest Threat"', *Times of India* (9 April 2010, Dornapal), http://timesofindia.indiatimes.com/india/No-water-food-or-medicines-Now-go-fight-biggest-threat/articleshow/5775869.cms [Retrieved on 20 June 2016].

[99] For recent works on this theme in relation to South Asian history, see, for example, P. Chakrabarti, 'Beasts of Burden: Animals and Laboratory Research in Colonial India', *History of Science*, 48, 2 (June 2010), 125–152; S. Mishra, 'Beasts, Murrains 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.

as malarial, the drug quinine and anopheles mosquitoes did not unfold in a historical and political vacuum. Instead, the exigencies and apparatuses of British imperial rule, to a considerable extent, informed them. At the same time, these nonhumans were not passive constructs, but rather they were integral to the structural, ideological, commercial, prejudicial, biopolitical and physical foundations of the British Empire itself.

Constructs such as cinchonas, quinine, malaria and mosquitoes were amongst the many historical adhesives which bound up disparate groups and distant regions as components of a wider imperial world. As this book demonstrates, they deepened 'connections', 'tensions' and 'fractures' between the imperial realms of British India, Dutch Java, French Algeria, German and British Africa, Mauritius, Burma and the West Indies, while holding together disparate groups claiming to represent scientific and medical knowledge, pharmaceutical commerce, colonial governance and vernacular cultures.[100] The drug quinine and its source cinchona plants reinforced the ideological self-image of the British Empire as a simultaneously benevolent and profit-making enterprise. And yet, the history of the production and maintenance of objects and organisms described here reflects also the prejudices about race, colour, indentured labourers and primitives which were intrinsic to liberal empires of the nineteenth century.[101]

This book has shown that nonhumans were entangled in histories of imperial biopower at least in three different ways. First, nonhumans such as cinchonas, objects described as malarial, quinine and mosquitoes featured as instruments of imperial biopolitics.[102] Discourses and practices relating to them reinforced control over lands, landscapes and people which explain the revealing overlaps amongst geographies of plantations, disease and empire.[103] Imperial discourses about malaria and

[100] On connections and tensions see 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), 1–27. See also S. Bhattacharya, M. Harrison and M. Worboys, *Fractured States: Small Pox, Public Health and Vaccination Policy in British India, 1800–1947* (New Delhi: Orient Longman, 2005).

[101] For a pioneering work on the liberal justifications of Empire, see U. S. Mehta, *Liberalism and Empire: A Study in Nineteenth-Century British Liberal Thought* (Chicago and London: University of Chicago Press, 1999).

[102] For the overlaps between empire, biopower and race, see especially, A. Stoler, *Race and the Education of Desire: Foucault's History of Sexuality and the Colonial Order of Things* (Durham and London: Duke University Press, 1995), 80–136. See also, Pande, *Medicine, Race and Liberalism.*

[103] For foundational works on the question of biopower and colonial medicine, see M. Vaughan, *Curing Their Ills: Colonial Power and African Illness* (Stanford: Stanford University Press, 1991); D. Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-Century India* (Los Angeles and London: University of California Press, 1993).

its cures constructed colonial subjects not only as potential labourers, who required remaining healthy and productive, but also shaped them as potential consumers, who needed to be disciplined to consume various curatives. Secondly, our understandings about subjects of imperial biopower need to be extended beyond the human to include insects, plants and inanimate objects.[104] Much like the colonised Indians, cinchona plants, the drug quinine, objects designated as malarial as well as mosquitoes were subjected to imperial regimes of classification, surveillance and knowledge-production. Thirdly, distinctions between humans and nonhumans, considered by many commentators as fundamental to biopower, were asserted as well as blurred in the history of imperial medicine in British India.[105] This was particularly because of the simultaneous operation of the twin processes of anthropomorphism and dehumanisation in British imperial history.[106] The feminisation of cinchona plants imported from South America as 'fairest of Peruvian maids' and as 'delicate, beautiful and tender', as evident in Chapter 1, happened at the precise moment in which colonised 'natives' and 'aborigines' supposedly immune from malaria were being projected to inhabit 'the state of nature'. In different parts of the book I have shown how imperial medical commentators claimed that the lower animals and colonised aboriginal

[104] N. Shukin, *Animal Capital: Rendering Life in Biopolitical Times* (Minneapolis and London: University of Minnesota Press, 2009), 1–45; D. Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (Verso: London and New York, 1989), 26–58, 244–275. For a critique of the absence of the category of nonhumans in recent reconceptualisation of 'Empire' and 'multitude' by Michael Hardt and Antonio Negri, see T. E. Lewis, 'Swarm Intelligence: Rethinking Swarm Intelligence from within the Transversal Commons', *Culture, Theory and Critique*, 51, 3 (2010), 223–238.

[105] G. Agamben, *The Open: Man and Animal* (Stanford: Stanford University Press, 2004), 12–27, 80; For a sympathetic critique of Agamben, see D. LaCapra, *History and Its Limits: Human, Animal and Violence* (Ithaca and London: Cornell University Press, 2009), 149–189.

[106] H. Raffles, 'Jews, Lice and History', *Public Culture*, 19.3, 53 (Fall, 2007), 521–566. On dehumanization, 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); P. Banerjee, *The Politics of Time: 'Primitives' and History Writing in a Colonial Society* (New Delhi: Oxford University Press, 2006). See also S. Muthu, *Enlightenment Against Empire* (New Jersey: Princeton University Press, 2003), 11–71. On anthropomorphism, see S. Sivasundaram, 'Trading Knowledge: The East India Company's Elephants in India and Britain', *The Historical Journal*, 48, 1 (2005), 27–63. For a broader perspective, 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 anthropomorphising and dehumanising in relation to enlightenment Europe has been made eloquently by Simon Schaffer in '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.

groups (in Chapter 2), indigenous quacks and locusts (in Chapter 3), parasites and primitives, urban labourers and mosquitoes (in Chapter 5) shared analogous properties. Quinine, as I have explored in Chapter 4, appears to have personified various racial hierarchies of colour. In colonial factory discourses, whiteness symbolised one of the most consistent indicators of quinine's purity, while brownness and yellowness featured amongst the most obvious markers of the impurities that had corrupted the drug.

Finally, I have claimed that nonhumans such as cinchonas, objects described as malarial, quinine and mosquitoes, apart from being shaped by the histories of the British Empire, were also amongst its integral physical constituents. Both the Empire and its co-constituents can also be understood as 'localised'[107] socio-material networks. I have explored networks constituted, for example, of Wardian cases, steamers, small pots, herbariums, plantations, royal gardens, planters, bureaucrats, economic-botanists, geographers (in Chapter 1); of decaying vegetation, friable granite rocks, water casks, mouldy bed sheets, stale mushrooms, geologists, meteorologists, chemists, colonial administrators (in Chapter 2); of sunflower, paddy, bamboo, jute, 'undergrowths', physicians, landed proprietors, local officials, vernacular tradesmen (in Chapter 3); of cinchona barks, alkaloids, colouring matter, labelled bottles, sealing wax, carmine, European pharmaceutical families, office of the Secretary of State for India, chemical examiners, managers of colonial factories (Chapter 4); and of insecticides, parasites, fishes, hyacinths, tinsmiths, coolies, planters, parasitologists, sanitary commissioners and Bengali fiction writers (in Chapter 5). These social-material amalgamations shaped and sustained not only cinchonas, malaria, Burdwan fever, quinine and mosquitoes, respectively, but also constituted various moments and structures of the British Empire as well.

The British Empire was an extensive technopolitical, material-discursive and natural-cultural formation.[108] Humans alone did not constitute the British Empire. Similarly, cinchonas, malarial objects, quinine and mosquitoes did not represent a self-contained domain of nonhumans. I have argued that the Empire as well as these nonhuman co-constituents can be deconstructed into heterogeneous associations of

[107] E. C. Spary, 'Of Nutmegs and Botanists: The Colonial Cultivation of Botanical Identity', in L. Schiebinger and C. Swan (eds.), *Colonial Botany: Science, Commerce and Politics in the Early Modern World* (Philadelphia: University of Pennsylvania Press, 2005), 203.

[108] On technopolitical see Mitchell, *Rule of Experts*, 42–43; on material-discursive see H. Raffles, 'Towards a Critical Natural History', *Antipode* 37, 2 (2005), 377; on natural-cultural see D. Haraway, *When Species Meet* (Minneapolis and London: University of Minnesota Press, 2008), 25, 47, 62.

humans and nonhumans, subjects and objects. Invoking actor-network theory, perspectivist anthropology, sociology of sciences and post-Marxist feminism, I claim that the British imperial apparatus[109] as well as its co-constituents detailed in this book may be described variously as 'mangles',[110] 'inter-subjective fields of human and nonhuman relations',[111] 'cyborgs'[112] and 'collectives' which traversed the domains of 'object-discourse-nature-society'.[113] Therefore, I have refused to prescribe other-than-humans (particularly nonhuman animals, interspecies assemblages, or cyborgs) as definite agents of transgression and resistance.[114] This is because such figures themselves were often implicated within imperial structures. Thus this book has reinforced efforts to go beyond dominant anthropocentric conceptions of Empire, while claiming that nonhumans themselves did not necessarily inhabit a preordained or self-contained realm. It has also reasserted the extraordinary significance and violence of empires in the making of modern medicine, while contesting the assumption that imperial agency can be critiqued comprehensively by examining the activities of Europeans alone.

[109] The use of the word 'apparatus' here is informed by G. Agamben, *What is an Apparatus? And Other Essays* (Stanford: Stanford University Press, 2009), 2–14. Agamben proposes a 'massive partitioning' between 'apparatuses' and 'living beings (or substances)', and defines 'a subject as that which results from the relation . . . and the relentless fight between them'. See 13–14. The interpenetrating histories of empire and malaria reveal how imperial apparatuses, substances and subjects were inseparably intertwined.

[110] A. Pickering, 'The Mangle of Practice: Agency and Emergence in the Sociology of Science', *American Journal of Sociology*, 99, 3 (November, 1993), 559, 567, 576.

[111] E. V. de Castro, 'Exchanging Perspectives: The Transformation of Objects into Subjects in Amerindian Ontologies', *Common Knowledge*, 10, 3 (2004), 471.

[112] My anachronistic invocation of the late-twentieth-century evocative figure of cyborgs, as conceived by Haraway, to understand nineteenth-century imperial actors and artefacts is deliberate. See D. J. Haraway, *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991), 149–176.

[113] B. Latour, *We Have Never Been Modern* (Cambridge, Mass.: Harvard University Press, 1993), 144. For 'collectives', see, for instance, B. 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. We should note that Latour also uses 'associations' and 'assemblages' as almost interchangeable with 'collectives'. For another dense conceptualisation of 'assemblage', see G. Deleuze and F. Guattari, 'Rhizome', in *A Thousand Plateaus: Capitalism and Schizophrenia* (Minneapolis and London: University of Minnesota Press, 1987), 3–25.

[114] For other opinions on this question, see Haraway, *Simians, Cyborgs and Women*, 149–176; Lewis, 'Swarm Intelligence'.