Decolonize mosquitoes: invisible labour, dissent and the re-colonial in South Asia

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Decolonize Mosquitoes: Invisible Labour, Dissent and the Re-colonial in South Asia

by Rohan Deb Roy

The minuscule, a narrow gate, opens up an entire world.[1]

Mosquitoes are minuscule creatures; yet they have been significant in world history. As widely known vectors of spectacular diseases such as malaria and yellow fever, mosquitoes have had a sustained presence in environmental, medical and military histories.[2] Historians, among them scholars who have been questioning anthropocentric notions of agency, have observed that the pathogenic properties of these insects shaped, and were shaped by, major political events such as transregional warfare in the British imperial world.[3] Few existing accounts, however, provide a substantial examination of the centrality of the colonized in shaping the history of mosquitoes in the colonial world.[4] A dialogue between decolonizing insights and the historiography of mosquitoes is in order.

The decolonizing lens contests scholarship that asserts the predominance of Europeans in world history, and instead foregrounds the presence, voices and agencies of the colonized. This is one of the anti-colonial impulses that proponents of the current decolonizing agenda share with post-colonial studies.[5] This agenda has also inspired scholars representing a range of disciplines to reveal and undo the intimate historical links between colonialism and their fields of study.[6] The histories of the environmental agency of mosquitoes are not always attentive to the ways in which colonial violence and exclusions shaped early entomological knowledge about mosquitoes.[7] Human geographers and anthropologists, who have evocatively analysed more recent episodes of the encounters of activists and professional groups from beyond Europe and North America with mosquitoes, do not engage as substantially and explicitly with the histories of colonialism as a decolonizing framework would demand.[8] In adopting the decolonizing framework, this article foregrounds the colonized in the history of mosquitoes while critiquing the practices and legacies of colonial power, and thus signals a departure from the extant scholarship on mosquitoes. British India, the focus of this article, provided one of the most enduring colonial contexts, in which pioneering entomological research on mosquitoes was conducted and put to political use.

This article additionally argues for the need to nuance a binary between extractive European colonialism versus pluralistic non-European cultures, a binary that has been constructed in many works on animals inspired by

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decolonizing ideals. Some animal studies scholars have examined how the extractive violence of European colonialisms contributed to massive endangerment, depopulation, and even extinction of nonhuman species. Others have contrasted this history of interspecies violence occasioned by European imperialisms with the inclusive ways various non-European cultures construct 'pluriverses' in which humans and other beings intermingle and co-survive.[9] Here I contest these scholarly binaries by combining three distinct lines of inquiry, which most studies inspired by the decolonizing turn pursue separately: critiquing the imperial practice of mobilizing and disregarding the fundamental contributions of the colonized in the making of scientific knowledge; examining anti-imperial nationalism among the colonized in the interwar period; and exploring how colonial prejudices are re-enacted in post-colonial political practices.

The first section of this article, 'Invisible labour', thus focuses on early works on entomological knowledge about mosquitoes in the 1890s and 1900s in British India, highlighting and explaining the invisibility of colonized south Asians – the unsung assistants, menial employees, prisoners and hospitalized patients – who were implicated in the production of this knowledge.[10] The critique of 'invisibility' here does not imply that references to colonized south Asians are totally absent from archives of imperial entomology and tropical medicine. Rather, invisibility was a condition that was produced by British colonial officials in their effort to understate the fundamental and indispensable contributions of the skills and bodies of colonized south Asians, and to project them as incidental and fleeting, ephemeral and forgettable. The second section, 'Dissent', analyses how mostly middle-class anti-colonial south Asian nationalists in the first half of the twentieth century invoked mosquitoes in reinforcing their critiques of the British imperial state. It builds on the insights of commentators who have observed that the widespread adoption of decolonization as a catchphrase and metaphor for recent efforts to contest intellectual legacies of colonialism should not happen at the expense of blurring memories of the actual historical processes through which colonial regimes were politically resisted.[11] In so doing, this section assesses how south Asian nationalists articulated a vision of dealing with mosquitoes that was not constrained by the limitations of the colonial state. The third and final section of this article elucidates some of the ways in which post-colonial nationalist governance in south Asia has enabled the persistence of colonial practices involving mosquitoes. Decolonizing approaches should neither merely recommend the substitution of European imperialisms with 'indigenous nationhood' nor lead to an uncritical celebration of 'exclusionary nativism', local non-western practices and traditions.[12] Otherwise, as various commentators have recently observed, decolonizing insights are at risk of being misappropriated by right-wing majoritarian nationalists in post-colonial regions such as south Asia.[13] In resisting such possibilities, I use the term "re-colonial" to analyse how certain problematic aspects of post-colonial nationalisms are built upon colonial precedents, and to suggest that

decolonizing approaches should inspire studies which leave room to question European imperialisms and post-colonial nationalisms simultaneously.[14]

By combining these three strands, this article decentres Europeans while revealing how south Asians suffered under, resisted, and even inherited British colonial strategies of dealing with the question of mosquitoes. It explores the various ways different groups of south Asians engaged intimately – whether as victims, dissenters, or inheritors – with the British colonial project. In focussing on a nonhuman environmental actor, this approach brings the high imperial, the anti-colonial, and the post-colonial into the same analytic field, and therefore enables the current decolonizing agenda to offer a critique of state power across chronological periods and political regimes. It also moves away from the suggestion that south Asians constituted an autonomous, idealized, and self-contained domain uncorrupted by the influences of colonialism.[15]

This article also aims to recast the history of an insect without disputing the scientific consensus about its status as a vector of diseases. At the core of its argument is the question of how social and political vulnerabilities shape environmental precarities. It urges decolonizing scholarship to focus more attention on subordinate groups' embodied experiences of enforced interspecies encounters under the care or custody of the state, as impoverished prisoners, hospitalized patients, and menial workers.[16] Social groups such as underprivileged prisoners were deeply instrumental in the construction of early entomological knowledge about mosquitoes in South Asia and also received the least protection from the state against these insects; politically-enforced interspecies encounters were an enduring and striking feature of colonial prison life, and some of their resonances can be felt in more recent times.[17]

INVISIBLE LABOUR

This photograph (figure 1) from Calcutta in the late 1890s focuses on Ronald Ross, the British doctor who played a major role in establishing how mosquitoes transmitted malaria parasites between human bodies, winning the Nobel prize for medicine in 1902, and his wife Rosa Bessie Bloxam. In the frame, there are also three south Asians: Mahomed Bux and two other laboratory assistants. Not a lot is known about Mahomed Bux, although unlike the other two he is at least named. In the late 1890s, when Ross was conducting his work on mosquitoes in different parts of British India, he frequently wrote to Patrick Manson, a pioneer in tropical medicine, in London. In these private letters that detailed his work in progress, Ross mentions Bux only fleetingly. Nonetheless, we learn from these letters that Bux collected varieties of mosquitoes for Ross in the lower Himalayas in May 1898, and organized mosquitoes in test tubes in such a way that they could bite human subjects during experiments.[18] In one letter, Ross remarked that Bux could 'make a mosquito do anything'.[19] From mentions of Bux scattered across Ross's memoir, published a quarter of a century later in 1923, we learn that Bux accompanied Ross in Calcutta, North Bengal, and Assam.[20] His activities ranged from the mundane task of driving intruding cats away from the laboratory to the more intellectual effort of identifying each

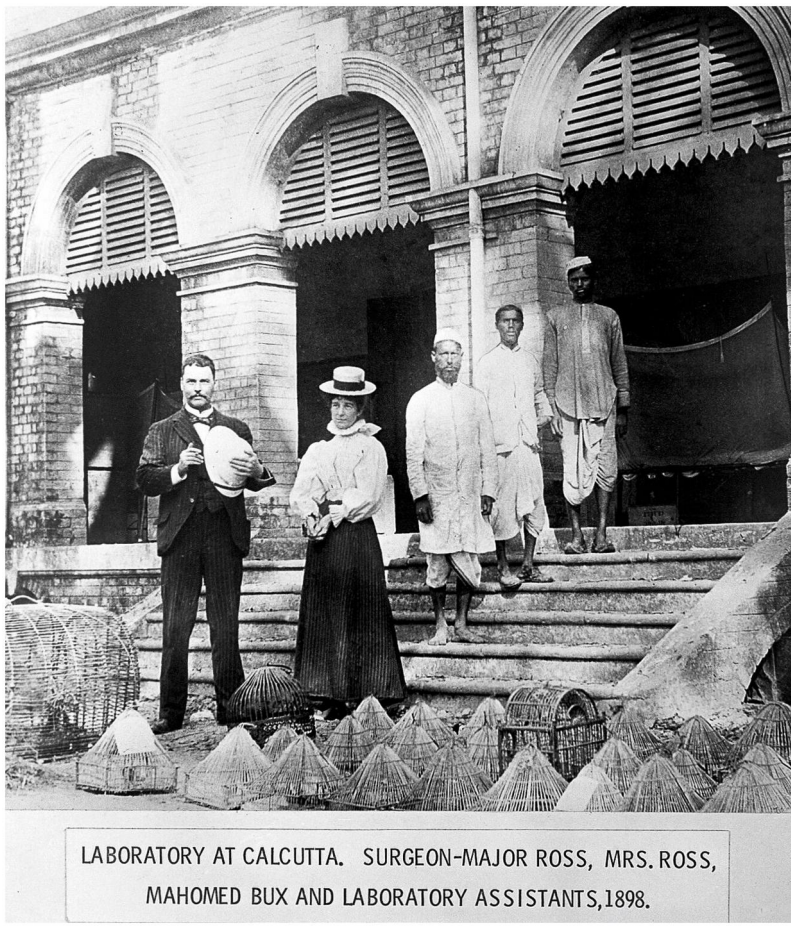


Figure 1: Ronald Ross on steps of laboratory in Calcutta, 1898. License: Attribution 4.0 International (CC BY 4.0). Source: Wellcome Collections, London https://wellcomecollection.org/works/cvjeq4gp/items

individual bird and mosquito that Ross used in his experiments, and even ascribing south Asian names to some of them.[21]

Ross engaged other south Asians, who aided his experiments by copying reports, supplying him with batches of mosquitoes and grubs,[22] observing transformations of the malarial parasite in the blood of mosquitoes,[23] allowing themselves to be bitten by mosquitoes,[24] and even by drinking water contaminated by mosquitoes.[25] Some of them, such as Lutchman, were named. Ross described Lutchman as a twenty-year-old 'native', a 'dhooley-bearer' or palanquin carrier.[26] But on most occasions, Ross left his south Asian associates unnamed in these private letters.[27] He rarely had any consistent formal scientific designation for these associates, referring to them variously as 'boys', 'natives', 'servants', or 'helpers'.[28] He described Bux, for example, on different occasions

as 'my servant', as an 'assistant' or as 'my man'.[29] Ross was not necessarily appreciative of their contributions even when more formal designations, such as hospital assistant or laboratory assistant, were used, and on various occasions he described them as 'useless', 'ignorant', and untrustworthy.[30] He confessed in his *Memoirs* that he even forgot the name of the 'worthy hospital assistant' in Secunderabad who helped him identify 'dappled winged mosquitoes' in August 1897, which led to a major breakthrough in his research.[31]

Writing about scientific research on mosquitoes, scholars Ann Kelly and Uli Biesel have observed, 'behind the big men was the work of unaccredited technicians and field workers'.[32] Ross's letters to Manson formed the basis of his Nobel lecture (1902) and his *Memoir* (1923).[33] In each of these publications, Ross mentions his south Asian associates – an eclectic group that ranged from subordinate menial workers to laboratory personnel.[34] I call their contributions 'invisible' because their labour in the scientific process is typically unsung. These recurrent references in Ross's writings hint at the ubiquity of these south Asians in his scientific work, but a sustained, systematic and comprehensive appraisal of their fundamental contributions is absent in Ross's writings from the period.[35] Even when these workers are acknowledged, the recognition is sketchy, abrupt and discontinuous.[36] In his hundred-page long Nobel lecture, for example, Ross's summary of Mahomed Bux's precise scientific contributions is confined to a one-line footnote.[37] This is unsurprising; Ross's writings were designed to reflect his own primacy among contending European scientists working on mosquitoes at the time, and his south Asian associates were incidental to his narratives.

Ross seems to have lost touch with his south Asian assistants immediately after he left India permanently in February 1899. It was another twelve years before he made an attempt to reconnect, in vain, with Lutchman, who had accompanied him from May 1895 to February 1899 in Secunderabad in South India, in North Bengal and Assam, and in Calcutta.[38] Even a quarter of a century after he left India, Ross wasn't exactly sure who employed Bux after his return to England.[39] Surely the man who according to Ross was instrumental in ascertaining the 'attitude of the [mosquito] larvae' in the 1890s deserved better.[40]

This is especially striking because Ross was very concerned with how his own contributions were being recognized (figure 2).[41] In his lifetime, he accepted innumerable accolades; he featured on the name of a British institution that specialized in research in tropical medicine, and a commemorative gate was constructed in Calcutta to celebrate his work.[42] As recognition of his contribution to work on mosquitoes, Ross had had the distinction of a species of Anopheles mosquitoes being named after him.[43] Such an honour eluded Ross's colonized associates. Imperial science thrived on mobilizing the support of the colonized, while simultaneously projecting their contributions as indistinct and ephemeral or forgettable.

Bringing 'invisible labour' to the fore does not merely involve focusing on a handful of colonized individuals. It inspires historians to explain invisibility at a deeper structural level. Colonized south Asians implicated in Ross's scientific work involving mosquitoes were invisible because most of them were recruited

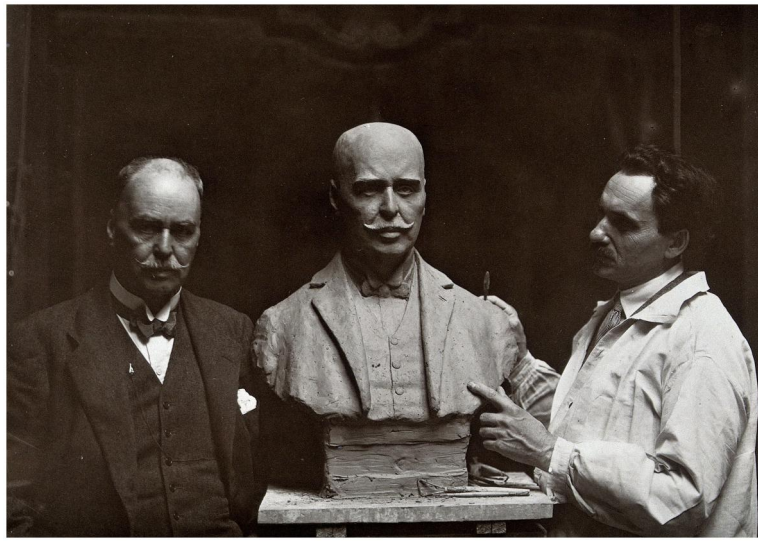


Figure 2: Grove, Son and Boulton, 'Ronald Ross standing next to a bust of himself, and Janko Bragovitch (sculptor)', 1926. License: Public Domain Mark. Source: Wellcome Collections, London. https://wellcomecollection.org/works/wuxwcy5r/images?id=gqp2s5jh

either from the most subordinated sections of society or from among those who were immediately subservient to him. In particular, Ross's south Asian experimental subjects – human beings who were used as objects of scientific study – were recruited from among those he labelled as 'servants' and 'low-caste Indians', as well as 'patients', a category that included sick sepoys (south Asian soldiers serving in the British army) and prisoners.[44] As a British imperial doctor in charge of diseased south Asian bodies, Ross had definite authority over these vulnerable groups who were either under his immediate care or custody, or in his employment.[45] Colonial privilege and entitlement enabled Ross to recruit experimental subjects in India, without requiring him to publicize their contributions more widely.

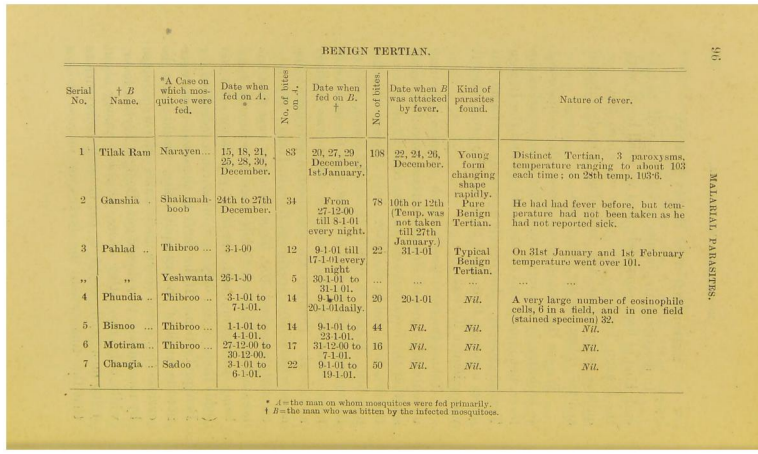
Ross referred to most of these experimental subjects as 'patients' and 'cases', and usually did not name them even in his private letters.[46] Abdul Kadir was among the exceptional few who were named, and Patrick Manson describes him as a 'complacent native...sepoy'.[47] In a hospital in the British cantonment of Secunderabad in 1895, where Ross was in charge of 'a regiment of native soldiers',[48] he would put malarial patients into a mosquito net, and let mosquitoes feed on their blood.[49] He would then observe them under a microscope to see if malarial parasites could be detected in the bodies of these mosquitoes as well.[50] Seventy mosquitoes were made to feed on Kadir's blood. This experiment was immediately repeated on three other unnamed patients in the same hospital.[51]

Publicity around the enrolment of south Asians as experimental subjects was limited, possibly because Ross was aware that these studies could prove

controversial. Ross made Lutchman drink water that was contaminated by mosquitoes which had fed on the malarial patient Abdul Kadir's blood, and then tracked whether, as a result, any adverse medical symptoms similar to Kadir's manifested in Lutchman.[52] Ross asked Manson to conceal from their colleagues in the British Medical Association the fact that Lutchman was a palanquin-bearer employed by the colonial state, quipping that 'to give a Government servant fever would be a crime!'[53] These studies involved medical risks, and European scientists warned each other about the dangers of subjecting themselves to these experiments. Manson wrote to Ross in April 1896, 'Don't experiment on yourself, as a married man and whose life is of value to medical science, you have no business to take risks of this nature'.[54] But Ross felt that he was justified in carrying out similar experiments on healthy south Asians, because he was convinced that 'malaria rarely affects natives badly'.[55]

These studies mostly happened away from the public gaze, in closeted colonial institutional enclaves such as hospitals, where ailing, less mobile and vulnerable bodies could be tamed into becoming experimental subjects with relative ease. Ross selected such sites because south Asians were generally reluctant to subject themselves to these studies. In his Nobel lecture, Ross claimed that in the hospitals he could ensure that patients were 'trained to submit to mosquito bites', and this would have been difficult elsewhere.[56] He also tempted hesitant south Asians with money, such as a meagre payment of two *annas* each time a patient was made to be bitten by mosquitoes.[57] And he even concocted deceitful explanations to persuade sceptical participants to join these studies; he once told a malarial patient that mosquito bites were beneficial to him because the insects could 'take the parasites out of his blood!'[58] Despite these efforts, Ross found recruiting experimental subjects in India challenging.[59] These difficulties explain why in the 1900s, south Asian prisoners, on whom the grip of the colonial state was most emphatic, became preferred subjects of scientific studies involving mosquitoes.

By then, Ross had returned to England. The relative lack of public awareness and scrutiny of the presence of south Asians in these entomological studies remained as the experiments were shifted behind colonial prison walls, but records of the process survive. Major Andrew Buchanan of the Indian medical service indicated that he conducted experiments on around fifty convicts in the Nagpur jail in western India between 1900 and 1901.[60] These experiments were aimed to ascertain if Ross's hypothesis that mosquitoes transmitted malarial parasites from infected to healthy human bodies was valid. Shaikmahboob, for example, was one of the prisoners at the Nagpur jail (figure 3). With 'high power microscopes', prison officials tested his blood and detected the presence of malarial parasites of the Benign Tertian variety. Between 24 and 27 December 1900, officials fed a specific group of anopheles mosquitoes on Shaikmahboob's blood thirty-four times. After a few days, the same group of mosquitoes was made to bite Ganshia, another convict in the same prison, seventy-eight times. Officials observed that once Ganshia had been bitten by these mosquitoes, malarial parasites similar to those visible in Shaikmahboob's blood appeared in



BENIGN TERTIAN.

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Serial No.	† B Name.	*A Case on which mosquitoes were fed.	Date when fed on A. *	No. of bites on A.	Date when fed on B. †	No. of bites.	Date when B was attacked by fever.	Kind of parasites found.	Nature of fever.
1	Tilak Ram	Narayen ...	15, 18, 21, 25, 28, 30, December.	83	20, 27, 29 December, 1st January.	108	22, 24, 26, December.	Young form changing shape rapidly.	Distinct Tertian, 3 paroxysms, temperature ranging to about 103 each time; on 28th temp. 103·6.
2	Ganshia ..	Shaikmah-boob	24th to 27th December.	34	From 27-12-00 till 8-1-01 every night.	78	10th or 12th (Temp. was not taken till 27th January.)	Pure Benign Tertian.	He had had fever before, but temperature had not been taken as he had not reported sick.
3	Pahlad ..	Thibroo ...	3-1-00	12	9-1-01 till 17-1-01 every night	22	31-1-01	Typical Benign Tertian.	On 31st January and 1st February temperature went over 101.
,,	,,	Yeshwanta	26-1-00	5	30-1-01 to 31-1-01.	...	...	...	... ...
4	Phundia ..	Thibroo ..	3-1-01 to 7-1-01.	14	9-1-01 to 20-1-01 daily.	20	20-1-01	*Nil.*	A very large number of eosinophile cells, 6 in a field, and in one field (stained specimen) 32.
5	Bisnoo ...	Thibroo ...	1-1-01 to 4-1-01.	14	9-1-01 to 23-1-01.	44	*Nil.*	*Nil.*	*Nil.*
6	Motiram ..	Thibroo ...	27-12-00 to 30-12-00.	17	31-12-00 to 7-1-01.	16	*Nil.*	*Nil.*	*Nil.*
7	Changia ..	Sadoo	3-1-01 to 6-1-01.	22	9-1-01 to 19-1-01.	50	*Nil.*	*Nil.*	*Nil.*

* A = the man on whom mosquitoes were fed primarily.
† B = the man who was bitten by the infected mosquitoes.

MALARIAL PARASITES.

Figure 3: Andrew Buchanan, *Malarial Fevers and Malaria Parasites in India*, Calcutta, 1903, p,96. License: Attribution Non Commercial 4.0 International (CC BY NC 4.0) Source: Wellcome Collection https://wellcomecollection.org/works/cx2m8mnn/items?canvas=134

Ganshia's blood as well. This experiment was repeated on a series of prisoners.[61] The easy accessibility of such disempowered human subjects for experiment meant that colonial officials could continue conducting their observations until the hypothesis was proven and the desired results were conclusively obtained.[62] There is no evidence to suggest that any monetary remuneration was provided to the colonized convicts on whom these experiments were conducted.

Such experiments were replicated in other colonial prisons. Between November 1900 and January 1901 C.F. Fearnside, superintendent of the central prison at Rajahmundri in Madras, conducted a series of experiments mostly on convicts and south Asian staff in the prison. Unlike Buchanan, Fearnside seldom recorded the names of the convicts. Like the mosquitoes that were made to bite them, convicts were instead generally assigned a number. In his report we note, for instance, that on the seventeenth of November, mosquito number six fed on the blood of convict no. 1718, who was suffering from malarial fever. On the twenty-ninth of November 1900, mosquito number six was examined, and the presence of malarial parasites in various stages of development was detected.[63]

The invisibility of these south Asian experimental subjects (mostly inmates of hospitals and prisons) has been shaped by the lack of widespread critical reflection on the existence of these practices among contemporaries. Buried in scientific accounts, these events were for the most part either unseen by the public or considered too routine and normal to be taken note of. South Asian experimental subjects were reduced to mere names and numbers in these accounts, presented as props that could be used with impunity in the scientific process. Their voices are correspondingly absent from the historical archive. Historians only find rare glimpses of them in the writings of the late Victorian British imperial officials whose priorities determined if, when and to what extent

the involvement of these south Asian participants were reported to the wider audience. These writings reveal only snippets about them, concealing their comprehensive life-worlds. Faced with the silencing of their voices in the archive, to retrieve their own views on empire and imperial science is difficult at best.[64] For this reason the novelist Amitav Ghosh's work of anti-realist historical fiction, with its sustained and full-fledged commitment to explore subaltern voices, rather than any work of mainstream history, remains the most evocative account of the close interactions between Ross and his south Asian colonized associates.[65]

Imperial officials spoke in the place of those who were experimented upon, and in the process, augmented further their silence. In order to present south Asian experimental subjects recruited from prisons as willing participants, both Buchanan and Fearnside referred to them as 'volunteers', thus implying that the studies conducted on convicts incarcerated in colonial prisons were consensual.[66] To emphasize the uncoercive nature of these studies, Fearnside claimed that even Europeans subjected themselves to these experiments, adding that he allowed himself and W.E. Mitchell, the jailor of the prison, to be bitten by mosquitoes alongside south Asian convicts and staff at the prison. Fearnside claimed that Patrick Manson had even subjected his own son to mosquito bites while conducting similar experiments in London.[67] This was not an unknown phenomenon; as the historian Simon Schaffer has shown, Europeans from the eighteenth to the early twentieth centuries conducted experiments on themselves as a symbol of gentlemanly science and cultivated self-discipline.[68] However, Fearnside conflated this trend, in which free and empowered Europeans exceptionally consented to becoming experimental subjects, with the colonial process which enforced the routine subjection of south Asians, including at least fifty-five convicts in Nagpur and Rajahmundry in 1901 alone, to mosquito bites. This conflation enabled Fearnside to suggest that the colonial prerogative of accessing incarcerated colonized bodies as subjects of experimentation was normal, consensual and unexceptional.

These practices of invisibility in colonial science unfolded in a context in which widespread racial prejudices prevailed more generally among prominent British imperial officials towards south Asians. Ross's comments on the wider society from which his south Asian associates and experimental subjects were drawn, for example, were pejorative. In 1901 he recommended that in order to protect themselves from malaria, travellers should 'avoid sleeping in native houses or where natives have recently slept', and they should 'prefer tents to native accommodation'.[69] He dismissed social groups such as the Bhils as 'ignorant and superstitious jungle folk'.[70] Even in his Nobel lecture, Ross described sections of south Asians, who were less amenable to becoming experimental subjects, as 'superstitious natives of India'.[71] He was more blatant in his private letters. Reporting an incident in north Bengal in 1898 to Manson, during which apprehensive south Asians had refused to cooperate with his work, Ross wrote, 'The native of India is really nearer a monkey than a man'![72]

The emerging scholarly literature on invisible labour in the history of science, often focused on south Asia, explores how colonial officials employed, objectified and undermined the embodied skills of colonized people in the scientific process.[73] It reveals that in the world of colonial science, experiences of trust and risk could be determined along racial divisions: Europeans were mostly trusted with roles in scientific authority and expertise, while the colonized shouldered much of the physical risk associated with the scientific process. This scholarship offers crucial analytic tools to foreground the presence of the colonized in the histories of science, whilst critiquing colonial power. Drawing on this literature, a decolonizing approach to the history of mosquitoes in British India reveals how certain foundational moments in tropical medicine were built on the toil and the bodies of colonized south Asians. Menial workers, convicts, and hospitalized patients were recruited as unsung associates, as well as subjects of experiments and props, in the scientific process. Our understandings of invisible labour can be further extended by focusing attention on anthropogenic interspecies encounters involving mosquitoes. Such encounters could blur the lines between colonized people and nonhuman organisms when both groups underwent comparable experiences: being reduced to numbers; being captured and incarcerated; being made to consume potentially infective fluids, whether in the form of water or blood. In the grand narratives of imperial entomology, south Asians involved in scientific experimentation were rendered voiceless, their full-fledged personalities and life-worlds were hidden, and their silences in the official registers were deepened by the determination of British colonial officials to speak on their behalf.

DISSENT

South Asians were involved in the history of mosquitoes in other ways. The project of 'decolonizing mosquitoes' also reveals how mosquitoes shaped the political articulations of colonized south Asians in the first half of the twentieth century. In this age of widespread nationalism across the subcontinent, anti-imperial middle class south Asians appropriated the problem of mosquitoes to reinforce their critiques of the colonial state by calling out the limitations of colonial anti-mosquito measures. In the process, they formulated a vision that went beyond the constraints set by the colonial state. It is to that episode that we turn in this section.

The south Asian nationalist indictment of colonial mosquito-related policies began in the 1900s, when the state introduced systematic anti-mosquito strategies. Some of these strategies were biological. To kill mosquito larvae, the colonial government contemplated releasing carp and other larvivorous fish into ponds and streams.[74] Chemicals such as kerosene were deployed to suffocate mosquito larvae generating in stagnant water,[75] while botanical items such as pyrethrum were deployed in fumigation processes to drive mosquitoes away from homes.[76] Mosquito surveys that included government inspection of private homes complemented these bio-chemical strategies.[77]

Early protagonists of nationalist politics in south Asia in the 1900s denounced these inspections as top-down state impositions, which were not based on the consent of the people. They found unsolicited government inspection of individual properties on the excuse of controlling mosquitoes unacceptable, even when the colonial state recruited south Asian surveyors.[78] In the following decade, the *Amrita Bazar Patrika*, widely recognized as a nationalist newspaper, alleged that government mosquito surveys suffered from bias because these initiatives essentially condemned the 'dwelling places, modes of living and surroundings of the poor or the nonofficial community', even when public buildings controlled by the state contained numerous insanitary spots where mosquito larvae could potentially thrive.[79]

Elsewhere, nationalists argued that the scientific techniques the British colonial state was promoting in the region had originated in distant parts of the world and were of little benefit in the south Asian context.[80] These views fed into south Asian critiques of colonial anti-mosquito measures. The *Ceylon Observer*, for example, stated in 1914 that indigenous plants such as 'kubuk' (or 'maruthamaram' in Tamil) were 'antagonistic to infection-bearing mosquito'; that the lotus contained the 'virtue of converting a harmful mosquito into an innocuous one'; and that individuals who lived on a diet of rice and curry and those who rubbed their bodies with oils before baths were more protected from the 'mosquito poison' than 'a European following the methods of eating and drinking of his own country'. The author argued that 'customs and practices' created in 'some remote time' in rural Ceylon such as generating fumes from the burning of the paddy husk, or planting trees like basil (*tulsi*), were more effective in getting rid of mosquitoes than the strategies introduced by the colonial state.[81]

By the 1920s, resisting mosquitoes had become part of the nationalist agenda of rebuilding rural India. Distinct from the allegedly imposing, prejudiced and distant nature of colonial anti-mosquito surveys, regional associations such as the Central Cooperative Anti-Malaria Society emerged, which projected themselves as voluntary and grassroots initiatives of the 'local people', relatively independent from the efforts of the colonial state.[82] The principles of self-reliance, autonomy and solidarity that were characteristic of swadeshi nationalism were echoed in this society's claim that it aimed to 'arouse the sanitary consciousness of the people', that it was 'supported by voluntary contributions', and in its slogans: 'self-help not charity', 'each for all, all for each'.[83] Early presidents of the 'general meetings' of the society included prominent Bengali intellectuals with distinct nationalist, often swadeshi, sympathies, such as the chemist Prafulla Chandra Ray, the physicist Jagadish Chandra Bose, the medic Nilratan Sarkar, and the poet Rabindranath Thakur.[84] Addressing the society in 1923 Rabindranath, already a Nobel Laureate in literature, argued that the shared goal of killing 'tiny mosquito enemies', even in the absence of sufficient government support, would establish unity and solidarity among the people of Bengal more effectively than relatively intangible nationalist notions such as *swaraj* (self-rule) and *desh* (homeland).[85]

In this period of widespread nationalist mobilization across the region, south Asian commentators used the mosquito question to blame the colonial state's policy of unbridled development. They argued that the colonial state was responsible for creating innumerable sources of stagnant water – breeding spots for mosquitoes – by constructing railway lines, by commissioning irrigation projects, canals and embankments that interfered with 'the natural river courses' and drainage, and by failing to rectify 'insanitary' ditches and drains.[86]

One of the most significant criticisms by south Asian nationalists about colonial anti-mosquito measures was that the British imperial state did not protect every section of the colonized population equally. Electoral reforms in the wake of widespread nationalist activism in the interwar period meant that many south Asians could now become members of the provincial legislative councils across British India. Many of them adopted an oppositional stance towards the British imperial government, and were invested in political mobilizations that have been broadly termed nationalistic.[87] These concerns informed their critique of the colonial handling of the mosquito question. Some of these south Asian representatives, for example in Bengal, noted that the colonial state did not extend the right to use mosquito nets at night to every prisoner, but merely to those who were 'known as special class prisoners'.[88] In 1933, a south Asian member of the Bengal legislative council, Munindra Deb Rai Mahasai, complained that prisoners in Bengal were categorized into divisions one, two, and three, and those who were classed as division three prisoners were denied permission to use mosquito nets.[89] The policy of dividing prisoners in Bengal into these three categories is explicated in its clearest form in the seventh edition of the Bengal jail code. R.E. Flowerdew commissioned and edited this seventh edition before his term as inspector general of prisons in Bengal ended in 1936.[90] Building on an earlier government order dating back to 1930, the seventh edition stated that to be categorized as division one, inmates had to be 'non-habitual prisoners of good character'; by 'social background, education and habit of life' they were required to be accustomed to a 'superior mode of living'; and they could not have been convicted of a crime that was included on the list of 'serious offences'. In division two, even 'habitual prisoners', irrespective of their crime, could be included, provided that 'by social status, education and habit of life' they were used to a 'superior mode of living', or that they had been 'convicted of offences in connection with political or democratic (including working class and peasant) movements'. Inmates who could not be included in divisions one and two were labelled as division three prisoners.[91] This edition of the Bengal jail code reconfirmed that division one and two prisoners were provided access to mosquito nets, while no such access was promised to division three prisoners.[92]

This clearly meant that prisoners would be denied the privilege of using a mosquito net at night unless the colonial state was convinced that they belonged to an elite social background, or that they were associated with activities designated as 'political or democratic movements'. Exposure to mosquito bites

and the greater vulnerability to malaria were thus integrated within the punishment reserved for division three prisoners. This deliberate discriminatory stance against a group that constituted the vast majority of the prison population is especially appalling because contemporary British colonial officials in India otherwise recommended mosquito nets as a major protection against mosquitoes and mosquito-borne diseases.[93] As early as 1926, Surendra Nath Ray, a member representing the South 24 Parganas had demanded that 'unless the government is in a position to make jails mosquito-free', it should 'supply curtains to prisoners for we cannot expect that a prisoner should work whole day and then … pass sleepless nights bitten by mosquitoes'.[94] Maulavi Tamizuddin Khan, a member of the Muslim League, also demanded in 1930 that mosquito curtains be supplied to 'all classes of prisoners'.[95] In the 1930s, criticisms of the policy are found repeatedly among the south Asian representatives of nationalist political parties in the provincial legislative councils. Rai Mahasai in 1933 described the refusal to provide mosquito curtains to division three prisoners as 'the most cruel of punishments', adding that 'mosquitoes abound in almost all the jails – the sting of mosquitoes and its after effect are most injurious to health. They cannot have good sleep with mosquitoes humming around them.'[96] In the same year, Jatindra Nath Basu, representing the Calcutta North constituency in the Bengal legislative council, described the government's refusal to provide mosquito nets to prisoners as a 'kind of torture'.[97]

South Asian members in the provincial legislative councils thus highlighted that the colonial policy of denying the vast majority of colonized prisoners the right to use mosquito nets revealed that the colonial government was prepared to undermine the scientific consensus about the pathological effects of mosquitoes on the human body. In 1931, for example, they ridiculed a member of the government's executive council for reporting that a two-year long experiment conducted at the Pabna prison in Bengal to determine if an increase in the distribution of mosquito nets in the prison among the convicts affected the incidence of malaria in the prison was 'very inconclusive'. For these members, the government's counterintuitive claim that greater distribution of mosquito nets did not necessarily reduce malaria in prisons was an example of the fact that the state could flout established scientific principles to defend their own discriminatory administrative policies.[98]

During the final decades of the British raj, prominent cultural figures in south Asia continued to reflect on the ubiquity of mosquito life in the region. In his speeches in the 1920s, Tagore attributed the persistence of the mosquito problem to government negligence and policies.[99] In the late 1930s and early 1940s even M. K. Gandhi, the most widely known anti-imperial nationalist leader in south Asia, advocated the destruction of mosquitoes, and explained that such an act was not incompatible with his cherished ideal of nonviolence.[100] In an especially iconic poem published in 1944, legendary Bengali poet Jibanananda Das referred to the mosquitoes' seamless zest for life, their resilience, and their indomitable collective resistance to man-made technologies like mosquito nets.[101] A year earlier, L. K. Elmhirst, Tagore's associate in his rural

reconstruction programme and the president of the silver jubilee session of the anti-malaria society, 'jokingly' described the mosquito as the 'king of Bengal'.[102] Ronald Ross had asserted imperial self-confidence in 1901 when he stated that through concerted and programmatic action against mosquitoes 'these winged insects will disappear as if by magic'.[103] Four decades later, comments from prominent cultural figures and activists in south Asia exposed the fact that despite its bio-chemical strategies and door-to-door surveys on a subcontinental scale, the British colonial state had failed to deal conclusively with the proliferation of mosquitoes. Even when not explicitly polemical against the colonial state, these remarks about the thriving of mosquitoes in the subcontinent revealed that British imperial control over south Asian environment had obvious limits.

The perceived invincibility of mosquitoes was incongruous with their minuscule physical appearance. The idea that these tiny creatures could have such a momentous impact, which at first glance appeared absurd, worked its way into regional literary humour. In Bengal, for example, humour was generated through literary or visual exaggerations depicting unusual mosquitoes, which ascribed extraordinarily deadly powers as well as anthropomorphic agency to these insects. Thus, mosquitoes with poisonous saliva, whose murderous bites could kill humans instantly; mosquitoes that battled Japanese soldiers and forced them to retreat; mosquitoes that spoke and petitioned like humans dotted the pages of Bengali literary humour.[104] These larger-than-life literary mosquitoes caricatured real-life mosquitoes, which had themselves become uncommonly recalcitrant. The mosquitoes of Bengali literature thrived at a time when south Asian political commentators, inspired by anti-imperial nationalism in the interwar period, blamed the colonial state for failing to control this powerful insect threat to health. Unsurprisingly, nationalists too contributed to this genre. For example, caricaturing the Hindu mythological practice of representing specific animals as companions as well as vehicles of particular gods and goddesses, Abanindranath Thakur, a leading south Asian nationalist painter of the early twentieth century, published a cartoon in 1928 entitled *'Malaria on the back of a mosquito'*. Here, malaria was shown as a devilish figure riding a gigantic mosquito-shaped vehicle.[105] Designed to disseminate awareness about the ominous pathological impact of mosquitoes, such an image would have reminded the viewer that, despite three decades of colonial governance of mosquitoes, these insects remained unvanquished and continued to cause death and debility in the subcontinent.

Thus, in the first half of the twentieth century, a range of south Asians – including newspaper columnists, activists, legislators, and cultural figures – commented on the mosquito-related policies of the British colonial state. Most were inspired by strands of the anti-imperial nationalism that was dominant in south Asia in this period. Nationalist discourse appropriated mosquitoes as agents that aided efforts to indict and mock the colonial state, whilst simultaneously condemning them as abominable creatures whose destruction was necessary for the new nation to thrive. Together these commentaries articulated a nationalist

vision that questioned the practices of the colonial state. Such a vision hinted at the ecological limits of imperial power; held the state accountable for flouting the tenets of entomological science; admonished the colonial state for augmenting the mosquito crisis through its projects of unbridled development; called out the state for being selective, partisan and prejudiced in its attempts to protect the colonized subjects from mosquitoes; promoted collective and cooperative activism based on the consent and active participation of south Asians; and was open to upholding customs that were indigenous to south Asia. But do these nationalist critiques provide sufficient foundation for this article's effort to decolonize the history of mosquitoes? Are nationalization and decolonization necessarily synonymous in the south Asian context? We turn to these questions in the final section of this article.

RE-COLONIAL

The current decolonizing turn inspires historians to critique British imperialism and south Asian nationalism simultaneously by tracing overlaps between them.[106] In the final section of this article, I explore how following the final years of British colonial rule, south Asian nationalisms adopted some of the problematic features of British imperial handling of the mosquito question. This tendency of south Asian nationalist political groups to draw on harsh British colonial precedents is what I call re-colonization. Returning to the question of mosquito nets in the prisons offers one example of this.

Although consistently criticized by Indian nationalists in the provincial legislature in the 1920s and 30s, the colonial policy of denying division three prisoners the right to use mosquito nets was retained in the 1940s, when Indian nationalist parties set up governments in south Asian provinces such as Bengal. Division three prisoners were those, let us recall, who lacked the social and political pedigree to be classed as division one and two prisoners. Even in the early 1930s, south Asian opposition to the colonial policy of denying the vast majority of prisoners the right to use mosquito nets suffered from an elite nationalist bias. In the immediate aftermath of the Gandhian civil disobedience movement, for example, in 1933, one south Asian member of the Bengal provincial council lamented that Indian nationalists who had participated in this agitation were often arbitrarily grouped with division three prisoners, and denied the right to use mosquito nets.[107] Referring to the elite and respectable status of these nationalists, this member appealed to the colonial government: 'Pray treat them like gentlemen's sons in a more generous way, look at their comforts and conveniences as far as practicable … You may call them idealists or blind followers of a great leader, but they are after all educated and cultured men, and deserve better treatment'.[108] By 1937, the year in which south Asian nationalist political parties were elected to form provincial governments across the subcontinent, prisoners who were convicted of offences in connection with 'political or democratic movements' were included in the division two category, and were allowed to use mosquito nets.[109]

However, the discriminatory treatment of denying division three prisoners the right to use mosquito nets was retained through the 1940s, when south Asian nationalist parties – Krishak Praja Party, Hindu Mahasabha, the Muslim League, and eventually the Indian National Congress – led successive provincial governments in Bengal.[110] In 1945, a proposal tabled at the Bengal legislative assembly to change the existing government policy with regard to the supply of mosquito curtains to convicts in the jails was defeated.[111] In 1947, Fazlur Rehman, a minister in charge of land revenue and jails in the Muslim League-led provincial government of Bengal, argued that denying division three prisoners the right to use mosquito nets was justified because grade three criminals could misuse mosquito nets to escape surveillance, or as a screen behind which they could plan nefarious activities.[112] In the 1950s, even as the provincial Congress government in West Bengal supplied juvenile delinquents with mosquito nets for the first time, the colonial precedent of denying '3rd class' prisoners the right to use mosquito nets continued.[113]

The 1967 edition of the West Bengal jail code confirms that a hierarchy quite similar to the colonial classification of convicts into divisions one, two and three was retained in post-colonial India.[114] While volume one of this document recommends that mosquito nets be supplied to convicts in divisions one and two, no such provision is mentioned to protect the division three convicts.[115] In the Indian state of Kerala, a similar hierarchy regarding the use of mosquito nets in prisons was enshrined in the jail code of 1958, and continued at least until 1997.[116] A judicial verdict in a court case in the state of Madhya Pradesh in 1975 asserted that upper class prisoners were 'entitled' to access mosquito nets at their own cost.[117] The prison rules in the southern state of Tamil Nadu published in the year 1983 mentions that one of the exclusive 'privileges' reserved for 'A class' prisoners – defined as those who by 'social status, education or habit of life have been accustomed to a superior mode of living' – was that they were allowed to use mosquito nets at their own expense.[118] The West Bengal correctional services act of 1992 lists mosquito nets as among the 'special provisions' allowed to division one prisoners.[119]

The understanding that the right to use mosquito nets should be restricted to certain select groups of prisoners has survived into still more recent times. The Assam prison manual of 1987 claimed that mosquito nets would be henceforth provided more inclusively by catering even to the subordinate categories of convicts – including those in 'C division'.[120] Yet this policy did not materialize in states across the subcontinent in subsequent decades. A book published in 1990 on the prison system in the eastern Indian state of Orissa notes that 'mosquito nets were conspicuous by their absence in the prison'.[121] In 2008, a newspaper article on a district jail in Orissa articulated similar concerns.[122] It was only in 2011, sixty-four years after the establishment of the Indian Union, that the Mattanchery sub-jail in the state of Kerala, a small prison housing about a hundred inmates, was reported to be the 'country's first prison house to provide a mosquito free environment to its inmates' by attaching 'mosquito nets to every window on the campus'.[123] It is unlikely that this

entailed the provision of individual bed-nets to each prisoner, or that this precedent was replicated widely across the country. Newspaper reports from different parts of India in the 2010s indicate that access to mosquito nets could be one of the privileges extended to some politically notable prisoners, who were lodged in 'VIP cells' reserved for 'upper-class prisoners'.[124] In Assam in May 2020, the then incarcerated human rights activist Akhil Gogoi claimed that four convicts were being made to share the same mosquito net even in the context of COVID-19.[125] In the state of West Bengal in 2017, during his visit to a prison in the interior district of Midnapore, the minister in charge of prisons was confronted by prisoners who alleged that they were forced to spend sleepless nights because of mosquito bites, and demanded that each inmate should be provided with a mosquito net.[126]

The minister found these prisoners' demands unreasonable, and inconsistent with existing conventions. He explained that there could be only one exception to the general rule of denying the average prisoner the right to use mosquito nets: the privilege, the minister stressed, could only be extended to inmates lodged in the prison hospital. This exception, based on medical grounds, has been permitted elsewhere in south Asia for prisoners suffering from malarial fever and other diseases.[127] Its necessity has been upheld in NGO-led twenty-first-century discussions on 'model prisons'.[128] However, the practice did not originate in the post-colonial period.[129] As in the colonial period, this occasional exception in post-colonial times highlights the more widespread practice of denying the vast majority of convicts in India the right to use mosquito nets. Much like British colonial officials in India, representatives of post-colonial nationalist governments in the region recognize mosquito nets to be one of the most reliable means of protection from relentless mosquito bites and from deadly mosquito-borne diseases.[130] Yet both the colonial and post-colonial states have been hesitant in extending this protection to the predominant majority of prisoners in south Asia. For these prisoners, increased vulnerability to mosquitoes becomes a constant feature of their incarceration. The provision of mosquito nets to prisoners under both colonial and post-colonial regimes has been discriminatory. Following on from colonial precedents, for many decades since the establishment of nationalist governments across south Asia, the social pedigree, economic background and political status of individual prisoners specifically determined whether they were eligible to access mosquito nets.

CONCLUSION

For Ronald Ross, the control of mosquitoes – 'death-dealing pests' – was tied to the civilizing ideals of the British empire. As well as suggesting that knowledge relating to malaria could enable the 'civilisation of the vast tropical areas', Ross prophesied that 'killing mosquito grubs to prevent malaria' would 'assist in giving to civilisation the gift of another half a world – the tropics'.[131] British imperial narratives on mosquitoes consistently and predominantly represented a euro-centric perspective, in which the colonized featured as incidental to the scientific process, whether as associates or as mere distractions, and even as

objects of disparagement and ridicule; it is no accident that the imperial vision of a mosquito-free world was founded on the subordination of vast sections of the colonized population.[132]

In offering a decolonizing reading of the history of mosquitoes, this article has contested such significant strands of British imperial narratives about the control of these insects. Building on the literature on 'invisible labour' in the history of science, it has foregrounded the presence of south Asians and de-centred Europeans in the history of mosquitoes in the British colonial period. In doing so, it has retold the history of mosquito-related knowledge as a history of interactions between a heterogeneous cast of characters across the imperial divide. Here a Nobel laureate like Ross, British imperial officials like Fearnside and Buchanan, dissenting south Asian members of the Bengal legislative council like Jatindra Nath Basu, a subordinate laboratory assistant like Mahomed Bux, patients in south Indian hospitals like Abdul Kadir, colonized prisoners like Ganshia, and a palanquin-bearer like Lutchman have been woven into a shared analytic field. Such a move contests imperial stereotypes about European exceptionalism as well as oriental exoticism and indifference.

In rejecting the two predominant strands of British imperial discourse on mosquitoes – the misappropriation of anti-mosquito scientific activism in the interests of asserting the civilizing ideals of empire and the Eurocentric condescension towards south Asian voices – this article goes beyond merely highlighting multiple accents and hierarchies in the history of mosquitoes. Decentring European perspectives deepens our understanding of imperial power rather than excluding it from the analysis. Behind the veneer of civilizing discourse, the production of scientific knowledge about mosquitoes in the region was embedded in colonial violence. Imperial officials objectified subordinated and captive south Asians as experimental subjects, undermined their presence in the scientific process, and deliberately exposed underprivileged sections of the colonized to routine insect bites. Decolonizing insights further reveal how mosquitoes were crucial to the ways in which south Asians not only resisted but also inherited violent colonial practices.

Foregrounding south Asians does not indicate that they constituted a self-contained world that remained disentangled from colonialism. This article focusses on three distinct groups of south Asians: subalterns (particularly those described as 'servants', 'low-caste Indians', sick sepoys and convicts in the historical sources) who performed prominent roles in the production of early entomological knowledge about mosquitoes, but whose routine contributions have been undermined or overlooked in the accounts of European scientists; middle-class nationalists who articulated (whether in provincial legislative assemblies or in vernacular newspapers and literature) how the mosquito question revealed the limitations of the colonial state; and representatives of the post-colonial nation-state who have inherited and continue to defend certain discriminatory tenets of British imperial politics around mosquitoes. History written through the lens of mosquitoes crosses conventional political

and temporal periodizations in south Asian history and, in doing so, bridges distinct lines of contemporary decolonizing scholarship: critique of colonial knowledge, examination of anticolonial politics, and exposing the re-colonial policies of post-colonial states. This explains the sustained presence, throughout this article, of innocuous mosquito nets. They were a site in which plebeian bodies under the custody of the colonial state could be experimented upon and forgotten, a theme that attracted nationalist indictment of colonial governance, and an object that reveals how the post-colonial state has inherited and reinforced colonial precedents to inscribe environmental risks on the vulnerable.

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NOTES AND REFERENCES

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