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AUTHOR
Ute Hasenöhrl
Department of History and European Ethnology, University of Innsbruck (Austria)

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Contested Nightscapes: Illuminating Colonial Bombay

Abstract
In the British Raj, colonial lighting oscillated between "Tool of Empire" and everyday technology. While the British used modern lighting to visualize power and accentuate social differences, it was also a contested object of appropriation and protest. In fact, both colonial light and darkness were ambivalent. Focussing on Bombay, the "second city of the Empire," the paper explores ambivalences of colonial light and darkness in a series of short vignettes, investigating the often contentious development of lighting infrastructures in British India, but also different perceptions and experiences of light and darkness.

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INTRODUCTION

1 The British Empire consisted of manifold empires of light and darkness – both materially and symbolically. Even before the "lighting revolution" of the 19th and early 20th centuries gained momentum, the British framed their empire as an empire of light, supposedly bringing progress and enlightenment to the "dark" places of the world as part of their "civilizing mission."[1] However, his lofty ambition did not necessarily translate into better lighting services. In most parts of the empire, modern lighting technologies – and electric light in particular – remained exclusive luxury goods, often restricted to European quarters and, at times, the indigenous upper and middle classes.[2] Shaping later decisions on who should (and could) benefit from services and who might be excluded, the colonial history of lighting had far-reaching consequences. On the macro level, the uneven electrification of the British Empire contributed to current disparities between Global North and South in energy access and availability.[3] Colonial grid designs and blueprints set the trajectory for post-independence infrastructural developments, either by following in colonial footpaths or by deliberately adopting alternative policies.[4] While large parts of the inhabited globe, particularly in the Global North, are subject to light pollution today, many former British colonies, especially in sub-Saharan Africa, are still shrouded in darkness.[5] Colonial legacies can also be traced on the micro level, within specific municipalities and communities. As the hybrid result of formal urban planning, capitalist market economy, and constant societal (re)negotiations, the distribution of urban light and darkness reflected a social geography of inequality that, in some cases, has lasted until the very present.

2 However, the history of artificial light in the British Empire is not as clear-cut as this dichotomy between light pollution and lack of light, energy dissipation and energy deprivation might suggest.[6] Building on recent research in urban colonial history that has challenged traditional

1 E.g., in general, Harald Fischer-Tiné, Michael Mann, *Colonialism as Civilizing Mission: Cultural Ideology in British India* (London: Anthem, 2004); on visual cultures of illumination in the Netherland Indies see Susie Protschky, "The Empire Illuminated: Electricity, 'Ethical' Colonialism and Enlightened Monarchy in Photographs of Dutch Royal Celebrations, 1898-1948," *Journal of Colonialism and Colonial History*, vol. 13, n° 3, 2012, https://doi.org/10.1353/cch.2012.0040 (accessed 28/11/2018); for an example of British colonial rhetoric of light and darkness, see Woodhouse and Rawson's advertisement "What is wanted in Darkest Africa is the Electric Light" from the 1890s, discussed in Ute Hasenöhrl, "Rural Electrification in the British Empire," *History of Retailing and Consumption*, vol. 4, n° 1, 2018, 14-15.

2 E.g., Moses Chikowero, "Subalternating Currents: Electrification and Power Politics in Bulawayo, Colonial Zimbabwe, 1894-1939," *Journal of Southern African Studies*, vol. 33, n° 2, 2007, 287-288; Srinivasa Rao, John Lourdusamy, "Colonialism and the Development of Electricity: The Case of Madras Presidency, 1900-1947," *Science Technology & Society*, vol. 15, n° 1, 2010; Kate B. Showers, "Electrifying Africa: An Environmental History with Policy Implications," *Geografiska Annaler*, Series B, vol. 93, n° 3, 2011; Ronen Shamir, *Current Flow: The Electrification of Palestine* (Palo Alto: Stanford University Press, 2013); Julia Tischler, *Light and Power for a Multiracial Nation: The Kariba-Dam Scheme in the Central African Federation* (Basingstoke, New York: Palgrave Macmillan, 2013); Fredrik Meiton, "The Radiance of the Jewish National Home: Technocapitalism, Electrification, and the Making of Modern Palestine," *Comparative Studies in Society and History*, vol. 57, n° 4, 2015; Hasenöhrl, "Rural Electrification" (cf. note 1).

3 As argued earlier in Ute Hasenöhrl, "Denn die einen sind im Dunkeln und die andern sind im Licht…: Globalhistorische Perspektiven auf Lichtmangel und Lichtverschmutzung," *in* Konrad Scheurmann, André Karliczek (eds.), *Gesprächsstoff Farbe: Diskurse aus Wissenschaft, Forschung und Kunst* (Wien: Böhlau, 2017), 436-441, and Hasenöhrl, "Rural Electrification" (cf. note 1).

4 On India's post-independence electrification policies, see Sunila Kale, *Electrifying India: Regional Political Economies of Development* (Stanford, CA: Stanford University Press, 2014).

5 On global light pollution, see Ben Panko, "Nighttime Light Pollution Covers nearly 80% of the Globe," *Science Online*, 10.06.2016. Url: http://www.sciencemag.org/news/2016/06/nighttime-light-pollution-covers… (accessed 07/02/2018); see also Josiane Meier *et al.* (eds.), *Urban Lighting, Light Pollution and Society* (New York, London: Routledge, 2015); Sara B. Pritchard, "The Trouble with Darkness: NASA's Suomi Satellite Images of Earth at Night," *Environmental History*, vol. 22, n° 2, 2017.

6 This paper is part of my Habilitation project, "Empires of Light, Empires of Darkness: Technology, Politics and Culture in Colonial History," at Innsbruck University. Looking at different regions of the British Empire (e.g., India, Gold Coast, Sudan), the project investigates key resources, institutions, and actors involved in the global transfer and appropriation of lighting technologies as well as their impact on society and the environment.

views on the dualistic nature of colonial space and society,[7] the paper argues that there was no monolithic "Indian" or "European" experience of urban light and darkness in the British Raj, as complex (and shifting) mixtures of ethnicity, status, and wealth – as well as sometimes sheer determination – decided on who might gain access to modern infrastructures and energies over time. The colonial history of lighting was closely intertwined with municipal electrification efforts. However, it is important to bear in mind that electric light was not the only, or even the most important, source of artificial light available. Wood and beeswax, fish and vegetable oils, and later kerosene were used as "everyday energies" for domestic purposes in both European and indigenous households, while gaslights had been employed for street lighting since the 1860s.[8] This heterogeneous mix of fuels, energies, and technologies that reflected social disparities between rich and poor, urban and rural, was typical for the lighting situation of the time (and not only in colonial contexts[9]) – and continues to shape India's energy landscape and urban fabric of light and darkness.[10]

Focussing on the "lighting history" of Bombay[11] in the 19th and 20th centuries, the "second city of the Empire" and figurehead of "Indian modernity," the paper explores the makings and ramifications of an elemental urban infrastructure and household technology that has received little attention so far in urban colonial history, energy history, and global history of technology. While there is considerable literature on the history of lighting (and its related infrastructures and energies) in Europe and North America, there is very little known about the "lighting revolution" – if there ever was one –, its energy resource base and its effects on nocturnal practices and perceptions in the non-Western regions of the world.[12] Likewise, most works on colonial cities, including Bombay, have focussed on sanitary and transport infrastructures[13] – and rarely differenti-

7 E.g., William Cunningham Bissell, "Between Fixity and Fantasy: Assessing the Spatial Impact of Colonial Urban Dualism," *Journal of Urban History*, vol. 37, n° 2, 2011; Eric Lewis Beverley, "Colonial Urbanism and South Asian Cities," *Social History*, vol. 36, n° 4, 2011; Douglas E. Haynes, Nikhil Rao, "Beyond the Colonial City: Re-Evaluating the Urban History of India, ca. 1920-1970," *South Asia*, vol. 36, n° 3, 2013.

8 See Henry Coneybeare, "Appendix K: Report on the Introduction of Gas Illumination at Bombay," *in* Henry Coneybeare, *Report on the Sanitary State and Sanitary Requirements of Bombay* (with Appendices) (Bombay: Bombay Eduction Society's Press, 1855), 1-22; P.R. Cola, *How to Develope Productive Industry in India and the East: Mills and Factories* (London: Viertue and Co, 1867), 184-188; Pestoniji D. Mahaluxmivala, *The History of the Bombay Electric Supply and Tramways Company, Limited, 1905-1935* (Bombay: Times of India Press, 1936).

9 See, e.g., Ruth Sandwell, "The Coal-Oil Lamp," *Agricultural History*, vol. 92, n° 2, 2018, on the persistence of kerosene lighting in (rural) Canada.

10 Simron Jit Singh et al. have argued that India is still "in the early phases of a socio-metabolic transition from an agrarian to an industrial resource regime." Singh Simron Jit *et al.*, "India's Biophysical Economy, 1961-2008: Sustainability in a National and Global Context," *Ecological Economics*, vol. 76, 2012, 60.

11 As this paper exclusively discusses the British colonial period, the city will be referred to by its contemporary name, Bombay, instead of its present denomination, Mumbai.

12 See Ute Hasenöhrl, "Neue Perspektiven auf die Geschichte der Beleuchtung und der Nacht: Ein Forschungsbericht," *Neue Politische Literatur*, n° 1, 2014, and Hasenöhrl "Rural Electrification" (cf. note 1) for an overview on the state of the art. For Europe and North America, notable works include Wolfgang Schivelbusch, *Lichtblicke: Zur Geschichte der künstlichen Helligkeit im 19. Jahrhundert* (München, Wien: Hanser, 1983); Murray Melbin, *Night as Frontier: Colonizing the World after Dark* (New York: Free Press, 1987); Harold L. Platt, *The Electric City: Energy and the Growth of the Chicago Area, 1880-1930* (Chicago: Univ. of Chicago Press, 1991); Joachim Schlör, *Nachts in der großen Stadt: Paris, Berlin, London 1840-1930* (München, Zürich: Artemin und Winkler, 1991); Craig Koslofsky, *Evening's Empire: A History of the Night in Early Modern Europe* (Cambridge: Cambridge Univ. Press, 2011); and Jean Brox, *Brilliant: The Evolution of Artificial Light* (Boston: Mifflin Harcourt, 2010). Among the few publications explicitly discussing colonial lighting projects are: Eric Tagliacozza, "The Lit Archipelago: Coast Lighting and the Imperial Optic in Insular Southeast Asia, 1860-1910," *Technology and Culture*, vol. 46, n° 2, 2005; Protschky, "Empire" (cf. note 1); Isenstadt *et al.* (eds.), *Cities of Light: Two Centuries of Urban Illumination* (Stanford: Stanford University Press, 2014); and Rudolf Mrázek, *Engineers of Happy Land: Technology and Nationalism in a Colony* (Princeton, Oxford: Princeton University Press, 2015).

13 E.g., on Bombay/Mumbai: Dinsha Edulji Wacha, *Rise and Growth of Bombay Municipal Government* (Madras: G.A. Natesan & Co., 1913); Mariam Dossal, *Imperial Designs and Indian Realities: The Planning of Bombay City, 1845-1875* (Bombay: Oxford University Press, 1991); Prashant Kidambi, *The Making of an Indian Metropolis: Colonial Governance and Public Culture in Bombay, 1890-1920*

ated between daytime and nocturnal experiences of urban spaces or specific night-time practices.[14]

4 Taking up this lacuna, this paper argues that colonial lighting and darkness were ambivalent phenomena, the former oscillating between "Tool of Empire"[15] and "everyday technology".[16] While the British used modern lighting to visualize power and accentuate social differences,[17] it was also an object of appropriation and protest. As a "weapon of the weak,"[18] it could be utilized to challenge power structures by appropriating "European" amenities by legal or illegal means (e.g. electricity theft),[19] declining colonial illumination projects,[20] or using the cover of darkness for subversive activities beyond the watchful eyes of the authorities.[21] All in all, modern lighting was a contested commodity, both sought after and spurned, and decisions for (or against) illumination projects were influenced by a variety of actors, motives, and factors – within and beyond colonial power politics.[22] The paper explores these ambivalences of colonial light and darkness in a series of short vignettes, starting with Marc Twain's description of nocturnal Bombay in 1895, and then tracing the city's lighting history from the 1830s to the 1940s. In doing so, the paper investigates the often contentious development of lighting infrastructures in British India but also different perceptions and experiences of urban light and darkness.[23]

(Aldershot: Ashgate, 2007); or Gyan Prakash, *Mumbai Fables: A History of an Enchanted City* (Princeton, Oxford: Princeton University Press, 2010). A growing number of publications addresses the electrification of Indian cities (albeit most do not focus on issues of lighting), including: Pierre Lanthier, "L'électrification de Bombay avant 1920: Le projet de Jamsetji N. Tata," *Outre-mers, revue d'histoire*, vol. 89, n°334-335, 2002; Tilman Frasch, "'Empowering the City': Indische Städte und Elektrizität, ca. 1880-1920," *in* Ravi Ahuja Christiane Brosius (eds.), *Mumbai – Delhi – Kolkata: Annäherungen an die Megastädte Indiens* (Heidelberg: Draupadi, 2006); Rao, Lourdusamy, "Colonialism" (cf. note 2); Kale, *Electrifying* (cf. note 4); Suvobrata Sarkar, "Domesticating Electric Power: Growth of Industry, Utilities, and Research in Colonial Calcutta," *The Indian Economic and Social History Review*, vol. 52, n° 3, 2015; Leo Coleman, *A Moral Technology: Electrification as Political Ritual in New Delhi* (Ithaca: Cornell University Press, 2017); Animesh Chatterjee, "'New Wine in new Bottles': Class Politics and the 'Uneven Electrification' of Colonial India," *History of Retailing and Consumption*, vol. 4, n° 1, 2018.

14 Both Dossal and Kidambi, for example, do not explore the nocturnal history of Bombay, even though Kidambi touches upon night-time issues such as sleeping arrangements in worker's quarters or night schools. Prakash explores topics such as Bombay cinema and entertainment, but does not discuss nocturnal activities systematically. Neither do the authors of the edited volume Bombay: Mosaic of Modern Culture. One of the few exceptions is Woods's short article on Mumbai as an illuminated city, published in an edited volume on Cities of Light. – Dossal, *Imperial Designs* (cf. note 13); Kidambi, *Making* (cf. note 13); Prakash, *Mumbai Fables* (cf. note 13); Sujara Patel, Alice Thorner (eds.), *Bombay: Mosaic of Modern Culture* (Delhi, Calcutta, Madras: Oxford India, 1996); Mary N. Woods, "Mumbai: Illuminating first Bombay and then Mumbai: Urbs Prima in Indus from the 1800s to the 2000s," *in* Sandy Isenstadt *et al*. (eds.), *Cities of Light: Two Centuries of Urban Illumination* (New York, London: Routledge, 2015), 37-44.

15 Daniel Headrick, *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century* (New York: Oxford University Press, 1981); see also: Michael Adas, Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance (Ithaca, NY: Cornell University Press, 1989).

16 Mikael Hård, Andrew Jamison, *Hubris and Hybrids: A Cultural History of Technology and Science* (New York: Routledge, 2005); David Edgerton, *The Shock of the Old: Technology and Global History since 1900* (Oxford: Oxford University Press, 2007); David Arnold, *Everyday Technology: Machines and the Making of India's Modernity* (Chicago: University of Chicago Press, 2013).

17 E.g., Chikowero, "Subalternating" (cf. note 2); Shamir, *Current Flow* (cf. note 2); Hasenöhrl, "Denn die einen" (cf. note 3).

18 See James C. Scott, *Weapons of the Weak: Everyday Forms of Peasant Resistance* (New Haven: Yale University Press, 1985).

19 See Tanja Winther, "Electricity Theft as a Relational Issue: A Comparative Look at Zanzibar, Tanzania, and the Sunderban Islands, India," *Energy for Sustainable Development*, vol. 16, n° 1, 2012, 111-119.

20 Rao, Lourdusamy, "Colonialism" (cf. note 2).

21 Bryan D. Palmer, *Cultures of Darkness: Night Travels in the Histories of Transgression* (New York: Monthly Review Press, 2000); A. Roger Ekirch, *In der Stunde der Nacht: Eine Geschichte der Dunkelheit* (Bergisch Gladbach: Lübbe, 2006).

22 For a similar discussion on how imperial ideologies were both driving and limiting electrification in British colonies, and how they were negotiated, see, e.g., Fredrik Meiton, "Electrifying Jaffa: Boundary-Work and the Origins of the Arab-Israeli Conflict," *Past & Present*, vol. 231, n° 1, 2016. For comparative research on Indians embracing colonial infrastructures and the discriminations that shaped their extension, see Ritika Prasad, *Tracks of Change: Railways and Everyday Life in Colonial India* (Delhi: Cambridge University Press, 2015), on the Indian railway.

23 It should be noted that the majority of sources utilized in this paper are British (e.g., Indian Office records; newspaper articles; travelogues). As a result, "Indian" voices

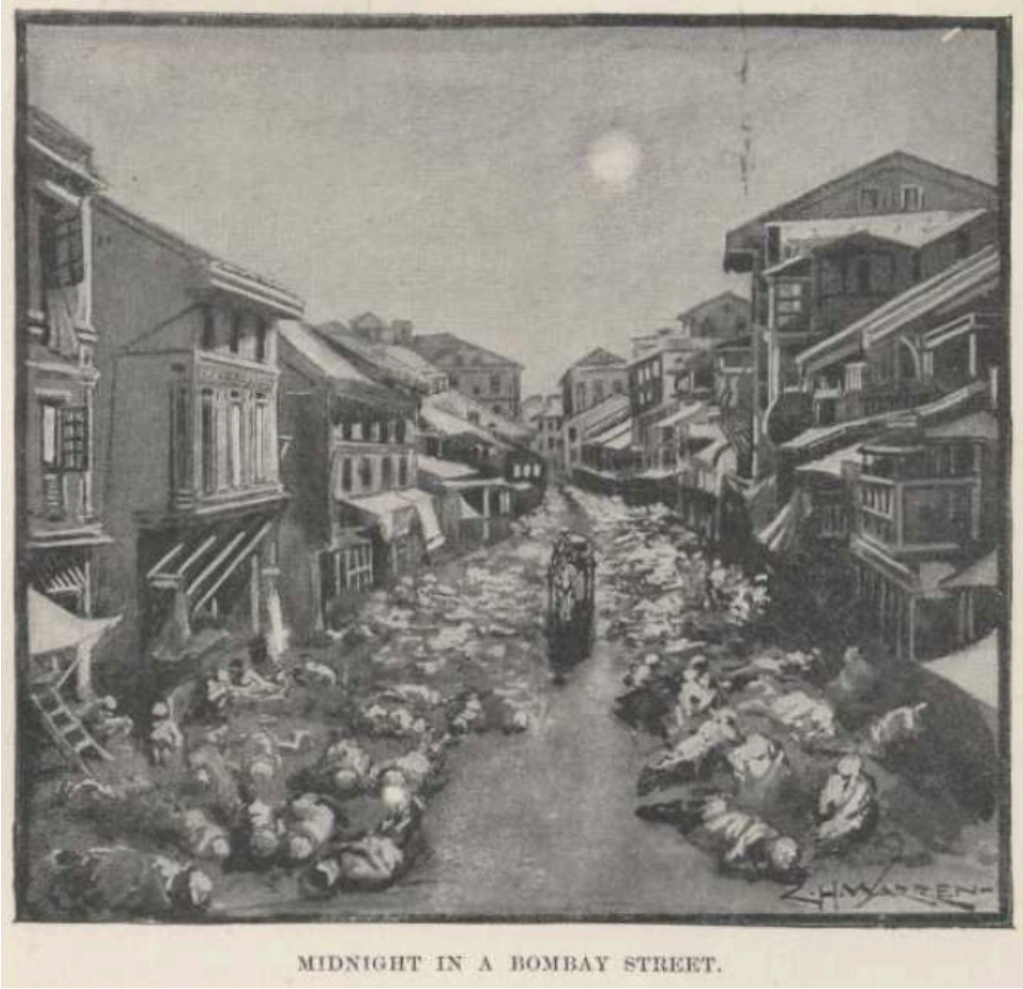


Figure 1: C.H. Warren (illustrator), "Midnight in a Bombay Street," 1898. Plate from Mark Twain (1898), Following the Equator A Journey around the World. Urbana, Illinois: Project Gutenberg. Retrieved February 10, 2019, from http://www.gutenberg.org/files/2895/2895-h/2895-h.htm#ch38.

FLASHES OF BRIGHTNESS IN THE GLOOM?

5 Bombay, 1895: the Empire's second city has received a sharp-tongued visitor: Marc Twain (1835-1910), the American author. Plagued by financial troubles, Twain had embarked on a year-long lecture tour across the British Empire, a journey later to be immortalized in his travelogue "Following the Equator" from 1897. One night in Bombay, Twain was invited to a Hindu betrothal ceremony, celebrated at midnight. The trip to his host took him through a city at sleep (fig. 1):

> We seemed to move through a city of the dead. There was hardly a suggestion of life in those still and vacant streets. [...] But everywhere on the ground lay sleeping natives – hundreds and hundreds. They lay stretched at full length and tightly wrapped in blankets, heads and all. [...] The shops were but sheds, little booths open to the streets; and the goods had been removed, and on the counters families were sleeping, usually with an oil lamp present.[24]

are often mediated through British commentary, limiting our insights into the Indian side of the story. I have strived to counterbalance this bias through a careful and critical analysis of British sources. The larger project will include a greater variety of sources from Indian archives. However, research in India has not yet been completed.

24 Marc Twain, *A Tramp Abroad; Following the Equator; Other Travels* (New York: Library of America, 2010), 667.

6 The scene changes once Twain has reached his destination. The visitor is blinded by a great glare of light: "It was the home of the bride, wrapped in a perfect conflagration of illuminations, – mainly gas-work designs, gotten up specially for the occasion. Within was abundance of brilliancy – flames, costumes, colours, decorations, mirrors – it was another Aladdin show."[25] Twain's account of Bombay at night plays with oppositions and premonitions: the deathly silence and gloom of the streets with the corpse-like sleepers, foreshadowing the bubonic plague epidemic of 1896/97, is contrasted with the colour, noise, and light of the betrothal celebrations; the poverty and constriction of the "native town" with the opulence of its social elite; and the bleakness of ordinary nightlife with the abundance of special festivities – according to Twain, the betrothal ceremonies would last all night, for a week or more.

7 Twain's travelogue, hinting at the importance of illuminations in Indian society, offers only a glimpse at the richness and variety of Indian nightlife. His vignette of nocturnal Bombay is especially noteworthy for its vivid depiction of the encompassing nocturnal darkness and abysmal living conditions in the city's Indian quarters at the end of the 19th century. At the time, "large sections of the labouring poor were forced to appropriate the street for their needs. It was estimated in the 1890s that around 100,000 labourers usually slept on roads or footpaths."[26] Twain's account on Bombay's limited state of illumination was not the only one. Stanley Reed, the English editor of the *Times of India*, recalling his arrival in Bombay in 1897, also expressed his shock "to find the empire's second city plunged into such darkness at night given that his hometown of Bristol had been electrified for many years,"[27] – although his description, as a foreword to an anniversary publication of the Bombay Electric Supply and Tramways Company (B.E.S.T.), was probably not without bias.[28] Bombay's electrification did not really take off until the early 20th century; however, the city was not without light at night. Twain himself remarked upon private lights situated next to sleepers or attached to house-fronts:

> Close at hand on house-fronts on both sides of the narrow street were illuminations of a kind commonly employed by the natives – scores of glass tumblers (containing tapers) fastened a few inches apart all over great latticed frames, forming starry constellations which showed out vividly against their black backgrounds. As we drew away into the distance down the dim lanes the illuminations gathered together into a single mass, and glowed out of the enveloping darkness like a sun.[29]

8 And these private oil lamps were not the only lights illuminating the city at night at the time of Twain's visit to India. Since the 1860s, Bombay had also had a public lighting infrastructure, namely gas lights, that complemented its traditional lighting technologies and everyday energies.

A FOOL'S ERRANT? INTRODUCING GASLIGHTS IN BOMBAY

9 Bombay, 1865: the "great day" has arrived. On Saturday, October 7, Bombay's streets are lighted with gas for the first time, illuminating the Esplanade, Church Street, and Bhendy Bazaar with 133 lamps.[30] Reflecting patronizing assumptions about colonial subjects at the time, the *Times of India* raves about this event and its supposed effect on Bombay's inhabitants:

> The lamps were lighted during the afternoon, and as the lamplighters went from lamp to lamp they were followed by crowds of inquisitive natives who gazed in mute astonishment at the new Western wonder that had appeared

25 *Ibid*.
26 Kidambi, *Making*, 38 (cf. note 13).
27 Woods, "Mumbai," 38 (cf. note 14).
28 Stanley Reed, "Foreword," *in* Pestoniji D. Mahaluxmivala, *The History of the Bombay Electric Supply and Tramways Company, Limited, 1905-1935* (Bombay: Times of India Press, 1936), V-VII.
29 Twain, *A Tramp*, 668 (cf. note 24).
30 Wacha, *Rise*, 90 (cf. note 13).

Figure 2: George M. Woodward, "A Peep at the Gas Lights in Pall Mall," 1808. Retrieved February 10, 2019, from https://commons.wikimedia.org/wiki/File:A_Peep_at_the_Gas_Lights_in_Pall_Mall.png, Public Domain US expired.

> in their midst. Until a late hour in the night this feeling had not subsided; and in the native town around nearly every gas-lamp crowds of the native population were collected, who contemplated the lights with evident astonishment.[31]

10 Disregarding the condescending description of Bombay's citizens marvelling at the latest Western benefaction (which, by the way, largely matches earlier accounts of public reactions to the introduction of street lighting in European cities[32] [fig. 2]), the new gas-lamps apparently were a great public success. "[The] idea of gas-lighting caught on so well that several well-to-do citizens donated large ornamental gas-lamps for being put up at some important spots in the city."[33] By the end of 1865, 220 public gas-lamps were installed, three years later, numbers had risen to 700.[34] Bombay was the second city in India to be equipped with such installations, following Calcutta's lead in 1857.[35]

11 Putting into practise Bombay's gaslight infrastructure was a bumpy, tedious, and contested process. Bombay's first gaslights appeared as early as 1834 at the private residence of Ardeseer Cursetjee (1808-1877), a member of the city's

31 "Lighting of Bombay with Gas," *Times of India*, 9 October 1865, 2.

32 Compare, for example, the famous caricature "A Peep at the Gas Lights in Pall-Mall" by George M. Woodward, from 1808, https://commons.wikimedia.org/wiki/File:A_Peep_at_the_Gas_Lights_in_Pal... (accessed 29/11/2018)

33 BEST Company, "History," n.d. Url: http://www.bestundertaking.com/in/page.asp?i=2 (accessed 14/03/2018); see also Cola, *How to Develope*, 185 (cf. note 8).

34 Karing Doyle, *Bombay: A Historical Review and Travel Guide* (Bombay: New Book Co., 1952), 50.

35 Ministry of Law and Justice, "The Oriental Gas Company Act, 1857 (Act N° 5 of 1857): An Act to Confer Certain Powers on the Oriental Gas Company, Limited," 13.2.1857, http://indiankanoon.org/doc/333275/ (accessed March 18, 2016)

Parsi elite and scion of the wealthy Wadia family of shipbuilders. The first Indian to be elected as fellow of the Royal Society, London, Cursetjee was famous for introducing a number of engineering novelties to Bombay, including the sewing machine, photography, electro-plating – and gas-lights. On March 10, 1834, he lighted his bungalow and gardens at Mazagoan with gas, in the presence of the Governor of Bombay, John FitzGibbon.[36] According to legend, Bombay's first gas-lighted dinner party did not go well. As gas was not purified at the time, "[some] of the invitees were so overcome by the noxious smell that they had to be removed and the party itself had to be given up."[37] Bombay's first gas-lights were a mere curiosity, prestige objects to demonstrate both the prominent status of the Wadia family and the manifold possibilities of technical modernity, and they were not translated into urban infrastructures. Bombay's first street lights were fuelled with kerosene and not gas, installed in 1843 in public streets after ten years of arduous administrative debates.[38] It is difficult to gauge how much light those early street lights provided. Later descriptions of the lighting situation of the time speak of

> primitive *oil buttee* which shed its most indifferent light according to the interest of the contractor entrusted with the work. The older generation will tell us how it was unsafe to drive or walk after nine or ten in the evening on the Esplanade Road. People were often robbed and sometimes even murdered. [...] As to lanes and bylanes there was nothing. Houseowners, especially Parsis, [therefore] used to have a lantern hung up in the *otla* or verandah of their houses, a practice still observed here and there.[39]

12 Whether because of insufficient public security and/or technical improvements in gaslight technology, in the early 1850s, proposals for implementing gas illuminations accumulated at a time of intense discussions on urban reform and Bombay's future infrastructural development. The thirty years between 1845 and 1875 have been termed Bombay's "second phase of urbanization," a time of rapid economic and population growth that "created severe strains on the already limited civic facilities of Bombay town" and resulted in numerous plans and proposals for public works improvements.[40] Eliciting mixed reactions from both the colonial municipal administration and the public, the debates of the 1850s not only show how different urban infrastructures competed with each other for scarce resources, but also how notions of "Indian consumers" and supposed "native customs" were instrumentalized in these arguments – a constant thread in colonial discourses on "native" infrastructural requirements.

13 Four companies had offered to light Bombay with gas in the early 1850s, demanding an exclusive municipal privilege in return. In response, C. F. Collier, Acting Clerk to the Board of Conservancy, appointed the English civil engineer and architect Henry Conybeare (1823-1892)[41] to investigate the soundness of these offers in 1853.[42] Conybeare, recently appointed as Superintendent of Repairs, had just finished his report on the sanitary state and requirements of the city, urging the Bombay Board of Conservancy to install efficient water and sewage systems.[43] Conybeare did not look upon gaslights as sympathetic. Considering the relative cheapness of lamp oils (fish oil, refuse castor oil, coconut oil), differences in prices would severely limit demand for gas-lighting he argued, rendering the enterprise unprofitable. As an alternative to gas-works based on expensive import coal, Conybeare suggested utilizing

36 Woods, "Mumbai," 38 (cf. note 14); "Ardaseer Cursetjee Wadia, first Indian Elected to Royal Society," n.d. Url: https://web.archive.org/web/20180419183803/http://www.auspostalhistory... (accessed 30/11/2018)

37 Doyle, *Bombay*, 50 (cf. note 34).

38 BEST Company, "History" (cf. note 33).

39 Wacha, *Rise*, 90-91 (cf. note 13).

40 Both citations from Dossal, *Imperial Designs*, 2 (cf. note 13). Dossal's Ph.D. thesis offers a detailed account of the urban planning discourses and projects of the time.

41 On Conybeare, see Murali Ranganathan, *Govind Narayan's Mumbai: An Urban Biography from 1863* (London: Anthem Press 2009), 335; Dossal, *Imperial Designs*, 47-50 (cf. note 13).

42 Coneybeare, "Appendix K," 1-2 (cf. note 8).

43 Henry Coneybeare, *Report on the Sanitary State and Sanitary Requirements of Bombay* (with Appendices) (Bombay: Bombay Education Society's Press, 1855).

local resources and everyday energies, namely vegetable oils, for production of illuminating gas and to think small, starting with experimental installations first.[44] India's large domestic coal deposits in Bengal and Bihar did not factor into his equation as these reserves were situated on the opposite side of India (and would, in fact, soon be utilized in nearby Calcutta for production of illuminating gas).[45]

14 Conybeare's argument was primarily economic and rested on a mismatch of demand and costs. The author identified three potential major consumers of illuminating gas: public street lights, large commercial customers, and private households. He dismissed all of them on both economic and cultural grounds. Public street lighting in Bombay, he argued, was negligible, with only fifty public kerosene lamps lighted from dusk to midnight during the four rainy months on each night, and on all but the bright moonlight nights during the fair season, accumulating to 1,680 hours annually.[46] With scarce financial leeway, Conybeare saw little chances for additional public lights. Even if all kerosene lamps were converted to gas and operated all night, street-lighting would only consume about 5,500 rupees per annum, an insufficient amount for the profitable operation of gas-works.[47] As for other large consumers, he stated categorically that "no manufactories, public offices, theatres, or churches, would require to be lighted in Bombay" as it would not be economical to employ gas where only occasional lighting was needed.[48] So, profitability of gas-works would rest on the shoulders of private consumers, particularly the "native population." Conybeare took great pains to dissect the notion of a "native market" for illuminating gas. His description of Bombay at night is a picture of seclusion and early retirement:

> [A] very good idea of the probable gas-consuming power of a town population might be formed by going through the streets of the town to be supplied between the hours of 9 and 10, and observing the extent to which the houses were lit up: at these hours there are very few lighted houses to be seen in the streets of Bombay, except on Duncan Road and Bhendy Bazar. In fact, the domestic expenditure of the middling and lower classes of Hindoos is proportionably as small in light as in food: they begin to light their lamps at dusk, usually one in the verandah of their houses, one in the hall or general sitting-room, and a third in the eating-room. [...] In general, all three lights are extinguished at about 10½ o'clock.[49]

15 Conybeare emphasized that many Bombay inhabitants did not have the budget for lavish illuminations, and would find the switch to new light sources with high initial costs for installations hard to bear. In other words, Conybeare argued that Bombay's non-European citizens neither required additional nocturnal illuminations, nor would they be able to afford their costs. Commonly used everyday energies and technologies would do. While not stated explicitly in the text, the crux of the matter was not only lacking demand or ability to pay for better illuminations, but also the question of how – and which – urban infrastructures should be developed with limited municipal means.

16 Conybeare's primary concern was sanitation, and with good reason. Urban hygiene was one of the most pressing issues of the 19th century.[50] Cholera or typhus epidemics were claiming thousands of lives, in 1833 more than 10,000 in London alone, resulting in the formation of public health movements in Europe.[51] Urban conditions in India were

44 *Ibid*.

45 Charles K. Ebinger, *Energy and Security in South Asia: Cooperation or Conflict?* (Washington, D.C.: Brookings Institution 2011), 16, 20; on the parallel gaslight debate in Calcutta, see Thomas Jones, *Advantages of the Use of Gas in Private Houses in Calcutta, with a Description of the Manufacture of Coal-Gas* (Calcutta: Calcutta Gazette Office, [1854]).

46 Coneybeare, "Appendix K," 4 (cf. note 8).

47 *Ibid*., 5-6.

48 *Ibid*., 7.

49 *Ibid*., 9.

50 E.g., Dieter Schott, *Europäische Urbanisierung (1000-2000): Eine umwelthistorische Einführung* (Köln: Böhlau, 2014).

51 Michael Mann, "Delhi's Belly: On the Management of Water, Sewage and Excreta in a Changing Urban Environment during the Nineteenth Century," Studies in History, vol. 23, n° 1, 2007; Colin McFarlane, "Governing the Contaminated City: Infrastructure and Sanitation in Colonial and Post-Colonial Bombay," International Journal of Urban and Regional Research, vol. 32, n°2, 2008, 416; Dossal, Imperial Designs (cf. note 13).

even more challenging. In Bombay, seven times more people were living on the same amount of space than in London.[52] Not only population density, but also climatic conditions enhanced health risks. European colonizers lived in constant fear of tropical diseases, expecting contagion from hazardous "miasma."[53] Conybeare's report was part of this larger discourse. His recommendations were clear: by installing efficient water and sewage systems, mortality rates might be reduced by at least twenty percent.[54] Compared to this vital and costly task, installing gaslights which might divert precious funds and manpower from essential water and sanitary works was not exactly high up on his agenda.

17 Few of the civic improvements discussed in the early 1850s actually saw the light of day, the most prominent exception being the Vihar project (1856-60), also initiated by Coneybeare, India's first municipal water project that served 7,500 houses primarily in the European quarters of the town with fresh water. Additional plans for water, drains, and street lighting were deferred on financial grounds, primarily for two reasons. On the one hand, military expenses had rocketed since 1857, first to curb the Indian Rebellion, then to prevent a recurrence, resulting in a drastic reduction in the financial allocations to public works in all presidencies.[55] Municipal funds for infrastructural works, on the other hand, were also scarce as ratepayer associations often opposed costly public health schemes. It was not before Bombay's Municipal Act of 1865 had vested first municipal commissioner Arthur Travers Crawford (1835-1911) with extra powers and revenues that urban reform gained momentum again in an almost Haussmannesque fashion.[56] Crawford was a controversial figure – today as well as at the time. He was both hailed as "the most gifted [...] of Municipal Commissioners"[57] and condemned as a "lavish spender"[58] of municipal funds. Crawford simultaneously embarked on a number of civic projects, including road repairs, sanitation, drainage, garbage disposal, and street lighting. Municipal revenues for these projects were to be obtained from a number of additional taxes vested on house owners, including a lighting rate of not more than two percent on the annual value of houses, buildings, and land.[59]

Crawford's municipal reforms came at a turning point in Bombay's history. In the early 1860s, the city had first experienced an unprecedented economic boom, fuelled by the soaring British demand for Indian cotton during the American Civil War from 1861 to 1865. The "cotton boom" of the time not only skyrocketed export figures, but also led to frenzied speculations on the Bombay stock exchange – resulting in a severe market crash in May 1865, after the American Civil War had ended, depleting both the city's finances and its population.[60] Against the backdrop of this disastrous financial crash and the accompanying trade depression, Bombay's mounting municipal expenditure encountered growing resentment. In 1870, two petitions signed by five thousand ratepayers accused Crawford of wasteful expenditure and unreasonably high levels of taxation. Petitioners argued that "there was no adequate return for ratepayer's money, as improvements were confined to a few select localities, and not shared by the greater portion of the town 18

52 Michael Mann, *Geschichte Indiens: Vom 18. bis zum 21. Jahrhundert* (Paderborn: Schöningh UTB, 2005), 317.

53 James Beattie, *Empire and Environmental Anxiety: Health, Science, Art and Conservation in South Asia and Australasia* (Basingstroke: Palgrave Macmillan, 2011); see also Robert Peckham, *Empires of Panic: Epidemics and Colonial Anxieties* (Hong Kong: Hong Kong University Press, 2015); Harald Fischer-Tiné (ed.), *Anxieties, Fear and Panic in Colonial Settings: Empires on the Verge of a Nervous Breakdown* (New York: Palgrave Macmillan, 2016).

54 Coneybeare, *Report*, 1-2 (cf. note 43).

55 Dossal, *Imperial Designs*, 74 (cf. note 13).

56 Tristram Hunt, *Ten Cities that made an Empire* (Milton Keynes: Penguin, 2015), 286-291.

57 Samuel T. Sheppard, *Bombay*, 133, cited in Dossal, *Imperial Designs*, 218 (cf. note 13).

58 Christine Dobbin, *Urban Leadership*, 132, cited in Kidambi, Making, 44 (cf. note 13).

59 Dossal, *Imperial Designs*, 85 (cf. note 13).

60 Within a few years, Bombay lost almost a quarter of its former inhabitants. – Nissel Heinz, "Bombay/Mumbai: Stadterweiterung und Stadtumbau einer 'Globalizing City'," *in* Ravi Ahuja, Christiane Brosius (eds.), *Mumbai – Delhi – Kolkata: Annäherungen an die Megastädte Indiens* (Heidelberg: Draupadi, 2006), 22.

occupied by the ratepayers."[61] Crawford was forced to resign in October 1871, and municipal investments in urban infrastructures were curtailed until the plague epidemic of 1896/97 initiated a new phase of municipal reforms.

18 Implementing Bombay's first gaslights in 1865 had been part of the short infrastructural boom of the 1860s – and street lighting one of the items in question on ratepayer's list of complaints regarding inappropriate expenditure.[62] As a result of the subsequent reduction in municipal investments, extension of Bombay's gaslight infrastructure largely rested on private individuals who donated additional lanterns near their places of residence and business. Most of "Crawford's Fireflies" were placed at the junction of large roads.[63] However, Bombay's gaslights were not an exclusively European and upper-class affair. Despite Conybeare's dictum that "native shops and dwellings" required and desired no brighter lights,[64] Bhendi Bazaar, the traditional commercial hub of the Muslim quarter north of Fort George, was also amongst the first to receive gaslights in 1865.[65] While gaslights were not utilized as extensively in Bombay as they were in Calcutta, they became and remained an important part of its lighting infrastructure, some surviving until 1968 (fig. 3).[66] The debate of the 1850s on the lighting requirements of Indian citizens, instrumentalizing supposed cultural patterns of illumination as justification for maintaining the status quo, also lingered on, resurfacing in the early 20th century when the introduction of electric lights was being discussed.

Figure 3: Maintenance of Gas Light: Worker Cleaning Old Street Lights, Fort, Bombay, 1946. Dinodia Photos / Alamy Stock Photo https://www.alamy.com/stock-photo-maintenance-of-gas-light-worker-cleaning-old-street-lights-fort-bombay-3663223.html.

(NO) NEED FOR A "BETTER CLASS OF LIGHT"? NEGOTIATING ELECTRIC LIGHT AND POWER

19 London, 1914/15: A peculiar debate unfolded between the British War Office and India Office. The 3rd Mountain Battery of the Royal Garrison Artillery had applied for free lighting of the quarters of "native personnel" serving in Egypt. The issue quickly turned into a matter of principle. While Indian troops serving in India had to pay for their own light, Indian Revenues had covered the costs for troops quartered in Burma, the Andaman or Nicobar Islands, a practice that had spread to other foreign stations in China, Ceylon, or the Straits Settlements.[67] The War Office was disinclined to continue this practice. The Secretary of State for India, in contrast, cautioned against actions that might invoke resentment of Indian troops. He identified two lighting

61 Kidambi, *Making*, 45 (cf. note 13).

62 E.g., Christine Dobbin, Urban Leadership, 132, cited in Kidambi, *Making*, 44 (cf. note 13).

63 Dossal, *Imperial Designs*, 198 (cf. note 13).

64 "I believe, that by far the greater portion of the private lights supplied by the London Gas Companies would be found to be used for lighting shops, and there would be no demand of this sort at Bombay – no 'early closing moment' is wanted here, for all shops save two or three chemists are habitually closed immediately after sunset." Coneybeare, "Appendix K," 7 (cf. note 8).

65 Woods, "Mumbai," 38 (cf. note 14).

66 *Ibid.*; see also: "Bombay's Street Lighting: Factors Underlying the Basis of Illumination – Artistic Lighting Foreshadowed," *Times of India*, 12 January 1933, 14.

67 British Library, IOR/L/MIL/7/7181, Secretary, War Office, to Under Secretary of State, India Office, 19/01/1914.

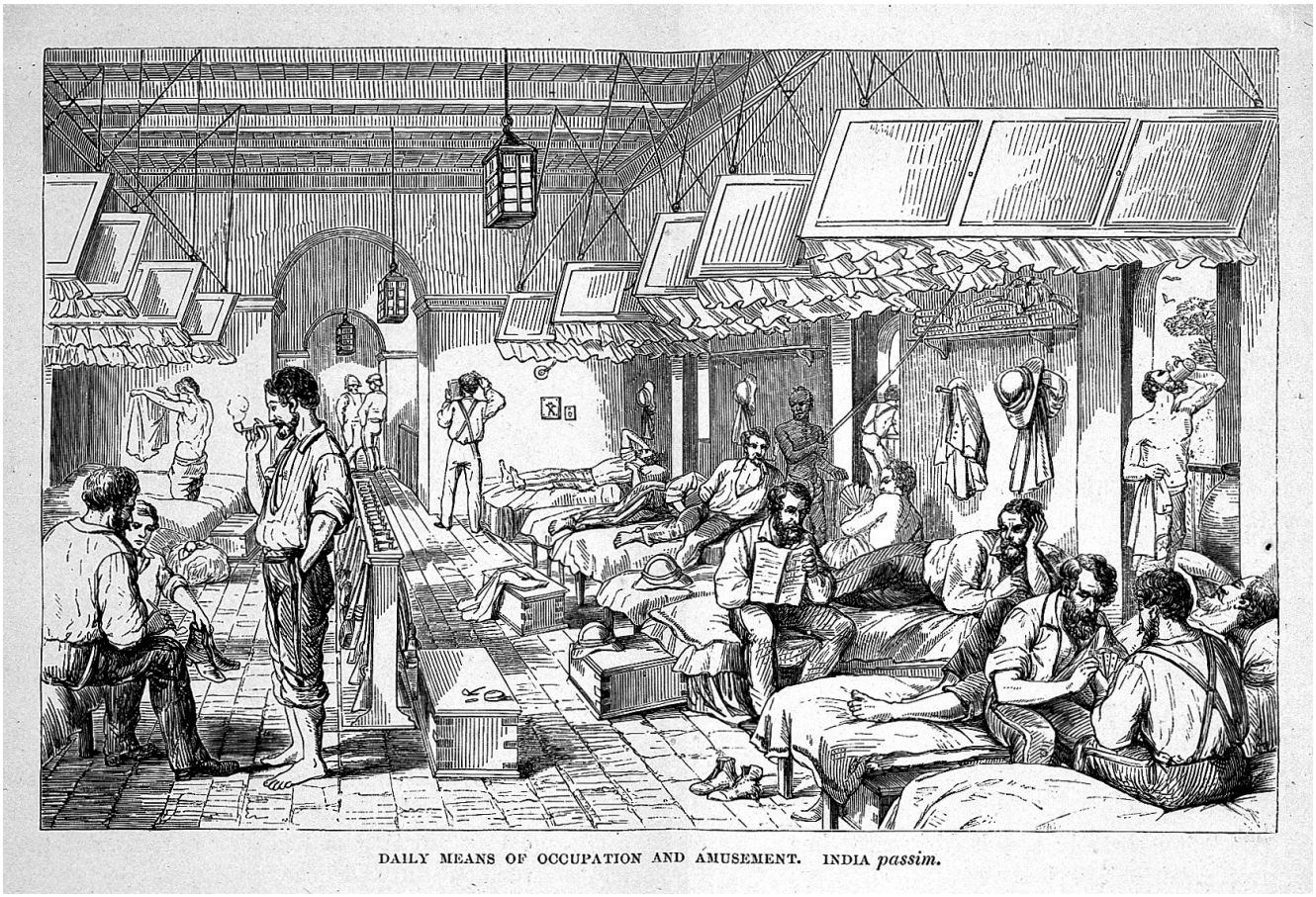


Figure 4: Illumination of British Troops Barracks in India, n.d. The British Army at rest in their barracks; Wellcome Collection (2018-04-03): https://wellcomecollection.org/works/x9t2xex9; CC-BY.

situations: temporary mat sheds, where special lanterns were required to reduce fire risk; and Government barracks equipped with permanent gas, or electric, lighting installation (fig. 4):

> In neither case [...] would it be either fair or politic to require Indian troops to defray the cost of light: for the first case the need of a better class of light arises from the character of the lines, for which the Indian troops are not responsible, and in the second case light is provided of a better and more expensive kind than they are accustomed to [first draft: which they do not require, and the convenience of which they cannot appreciate].[68]

20 It was precisely because Indian troops did not require "a better class of light" that it would be unreasonable to charge them for unwanted amenities. For a change, the trope "natives need/desire no modern lighting" was utilized to sanction and not withhold access to topical infrastructures.[69] The latter, of course, was far more common as many studies on colonial lighting have pointed out.[70] In this vein, when the Army Department had finally expanded the principle of free lighting of Indian troops barracks to India itself in 1921[71], its implementation was delayed for years by the Government of India, excusing this protraction once again with the soldiers home situation: "I suppose that the men who enlist in

68 *Ibid*., draft letter India Office, Military Department, to Secretary, War Department, 05/01/1915.

69 One exception was the Mountain Battery in Egypt whose request had initiated the debate. Judging that, in this case, quarters were equipped on the same lines as in India, the War Office refused free issue of artificial light to "native" personnel. *Ibid*., Secretary, War Office, to Under Secretary of State, India Office, 14/03/1915.

70 In particular: Chikowero, "Subalternating" (cf. note 2); Showers, "Electrifying" (cf. note 2); Shamir, *Current Flow* (cf. note 2); Tischler, *Light and Power* (cf. note 2).

71 British Library, IOR/L/MIL/7/10005: Army Instruction (India) 732 of 27th September 1921.

the Army are seldom accustomed to anything but a minimum of lighting in their villages, and as a result are unaccustomed to do reading of any sort after daylight. It is indeed doubtful if the Indian soldier will read much, even when he gets electric light in his barracks."[72] This line of argumentation caused the India Office great irritation. While the latter advocated the concurrent electrification of British and Indian barracks to avoid charges of benefitting British soldiers first,[73] the Government of India rather suggested transferring second-hand oil lamps from now-electrified British quarters to Indian units.[74]

21 These episodes, once again, nicely illustrate the persistent British view on the lighting needs of Indian citizens (and soldiers), equating the status quo with actual desires, and instrumentalizing supposed Indian customs to postpone costly reforms. The clash of positions between India Office and Government of India also hints at a tentative change of policies in the interwar period due to the ambivalent political situation of the 1920s. Improvements of infrastructures were regarded as a promising measure to increase legitimacy and pacify public discontent. But it was not before the Colonial Development and Welfare Act of 1940, that Britain actually committed to spending more metropolitan resources in its colonies.[75] Indian voices were missing in the archival records on the provision of (free) lighting for Indian troops, giving direct evidence to their wishes and habits. Still, concurrent discussions on urban lighting and electricity indicate that there was not only a need for a "better class of light," but also how local customers and stakeholders contributed in shaping India's urban fabric, adding another mosaic stone to recent research in colonial urban history that has challenged traditional views on the dualistic nature of colonial cities.

22 In the British Raj, there was no monolithic "Indian" or "European" experience of urban light (or darkness) as a complex mixture of ethnicity, status, and wealth determined who might gain access to modern technologies and energies over time. From the very beginning, demand for electric light and power by Indian consumers, particularly from the urban upper and middle classes, by far exceeded supply. As the capital of India until 1911, Calcutta had been the first Indian city to be electrified. Here, commercial generation of electricity took off in 1899, drawing on Bengal's rich coal deposits. At first, each new household connection required a joint application of consumer and undertaker to the Bengal government, and the responsible department was flooded with applications from Indian customers.[76] Affluent Indian citizens had utilized electricity even before urban infrastructures were installed. Electrically illuminated marriage processions powered by portable generators had already become fashionable in the early 1890s, showing once again how "traditional" practices flexibly incorporated new technologies.[77] However, the enthusiasm for electricity was not universal. Similarly to many European and North American households and businesses[78], electricity – as an unfamiliar commodity – had to be popularized first through precedent, advertisements, door-to-door canvassers or electricity showrooms, and exhibitions. As Suvobrata Sarkar has shown, some potential Indian customers initially assumed that household connections would require a hole in the wall of their houses or feared danger from overhead wires.[79] Deadly accidents provided ample fodder for newspaper headlines, sometimes even globally as in the case of an incident in Mysore in 1909 where a *mahout* (elephant

72 British Library, IOR/L/MIL/7/10005: extract from a private letter from Lord Irwin (Viceroy of India) to Lord Birkenhead (Secretary of State for India), 07/09/1927.

73 *Ibid*., Lord Birkenhead (India Office) to Governor General of India, 30/09/1926 (Military n°. 19); minute 30/06/1927.

74 *Ibid*., extract from a private letter from Lord Irwin (Viceroy of India) to Lord Birkenhead (Secretary of State for India), 07/09/1927.

75 On the developmental colonialism of the 1940s and 1950s, see also Jonas van der Straeten, Ute Hasenöhrl, "Connecting the Empire: New Research Perspectives on Infrastructures and the Environment in the (Post)Colonial World," *NTM*, vol. 24, n° 4, 2016, 366; Frederick Cooper, *Africa since 1940: The Past of the Present* (Cambridge: Cambridge University Press, 2002).

76 Sarkar, "Domesticating," 367-368 (cf. note 13).

77 *Ibid*, 366.

78 E.g., Brox, *Brilliant* (cf. note 12); Sandwell, "The Coal-Oil Lamp" (cf. note 9).

79 Sarkar, "Domesticating," 361 (cf. note 13).

keeper) of the palace guard was electrocuted when jokingly touching overhead wires.[80] But most of these concerns were soon alleviated: insulation improved, underground cables were laid in crowded areas, and architects accommodated building designs to conform to the electricity supply plan.[81]

23 Compared to Calcutta, Bombay was an electric latecomer. First attempts to electrify the city can be traced back to the early 1880s, but had been of limited success. In 1882, a private company installed a generator to supply Crawford Market (Bombay's wholesale market) with electric lights. When visiting the market in the same year, Bhagvatsinhji, the Maharaja of Gondal, was so impressed by the display that he decided to introduce electricity in his new palace. Despite its dazzling effect on spectators, the utility soon went bankrupt, as did its successor, the Eastern Electric Light and Power Company.[82] The city government took over and constructed a municipal generating plant in 1894, but the plant's small motors were prone to break down.[83] Most utilities in India were commercial enterprises as English municipal law did not encourage the formation of municipal companies but favored allocation of licenses to private businesses instead.[84] Private generation of electricity was also quite common. Due to lacking or insufficient supply, some wealthy homes, hotels, and factories had taken matters into their own hands and installed private generators since the 1890s. The Taj Hotel, owned by the prominent Tata family, was the first public building in Bombay to be lit by electricity in 1903. It was supplied by a steam-powered electric generator in the hotel garden, with a back-up system for gas-lighting.[85] In the early 20th century, complaints about lack of electricity were getting louder and louder, from both private citizens and businesses. For the rich, electricity had great potential for improving living conditions in the tropics, e.g., by powering mechanical *punkahs* (fans) or refrigerators. During the hot months of May and June, electric lights also promised a respite from the heat emanated by candles, oil, or gas-lamps.[86] Even more important than these private conveniences, Bombay's major industries, particularly its jute and textile mills, were eager to modernize in order to remain competitive with British textile production, uniting British colonial and Indian elites in their quest for more power.[87] In addition, with Bombay rapidly expanding its territory, the municipality was also looking for new ways of transport to connect its bourgeois and working-class suburbs to the city via a network of horse-drawn and electric tramways.[88]

24 The question of who might supply the lucrative Bombay market and how this should be accomplished was controversial. Jamsetji Nusserwanji Tata (1839-1904), "father of Indian industry" and one of the founders of today's TATA Group, applied for a concession for utilizing the waterfalls at Marble Rocks, Jubalpore, as early as 1875, but the concession was not granted.[89] In the end, the municipal government awarded the contract for generating electricity to the British company B.E.S.T. (Bombay Electric Supply and Tramways) in 1905. With its thermal plant, B.E.S.T. primarily supplied power for electric trams, with little electricity left for private or commercial customers even though its license granted the company an exclusive right to distribute electricity in the city.[90] To resolve this unsatisfactory situation and cater to growing demands for an opening of the domestic energy market for Indian vendors, the new Governor of

80 Frasch, "Empowering," 36 (cf. note 13).
81 Sarkar, "Domesticating," 358, 361-365 (cf. note 13).
82 Frasch, "Empowering," 38 (cf. note 13).
83 Woods, "Mumbai," 38 (cf. note 14).
84 Frasch, "Empowering," 39 (cf. note 13).
85 *Ibid*, 39.
86 Reed, "Foreword," v-vi (cf. note 28).
87 S. M. Rutnagur, *Electricity in India: Being a History of the Tata Hydro-Electric Project with Notes on the Mill Industry in Bombay and the Progress of Electric Drive in Indian Factories* (Bombay: Proprietors, 1912), 12.
88 Mahaluxmivala, *The History* (cf. note 8); Frasch, "Empowering," 40-44 (cf. note 13).
89 Rutnagur, Electricity, 4 (cf. note 87); on the Tata's business and family history, see also R.M. Lala, *The Creation of Wealth: The Tatas from the 19th to the 21st Century* (New Delhi: Penguin Books India, 2004).
90 Kale, *Electrifying*, 72 (cf. note 4); Mahaluxmivala, *The History* (cf. note 8).

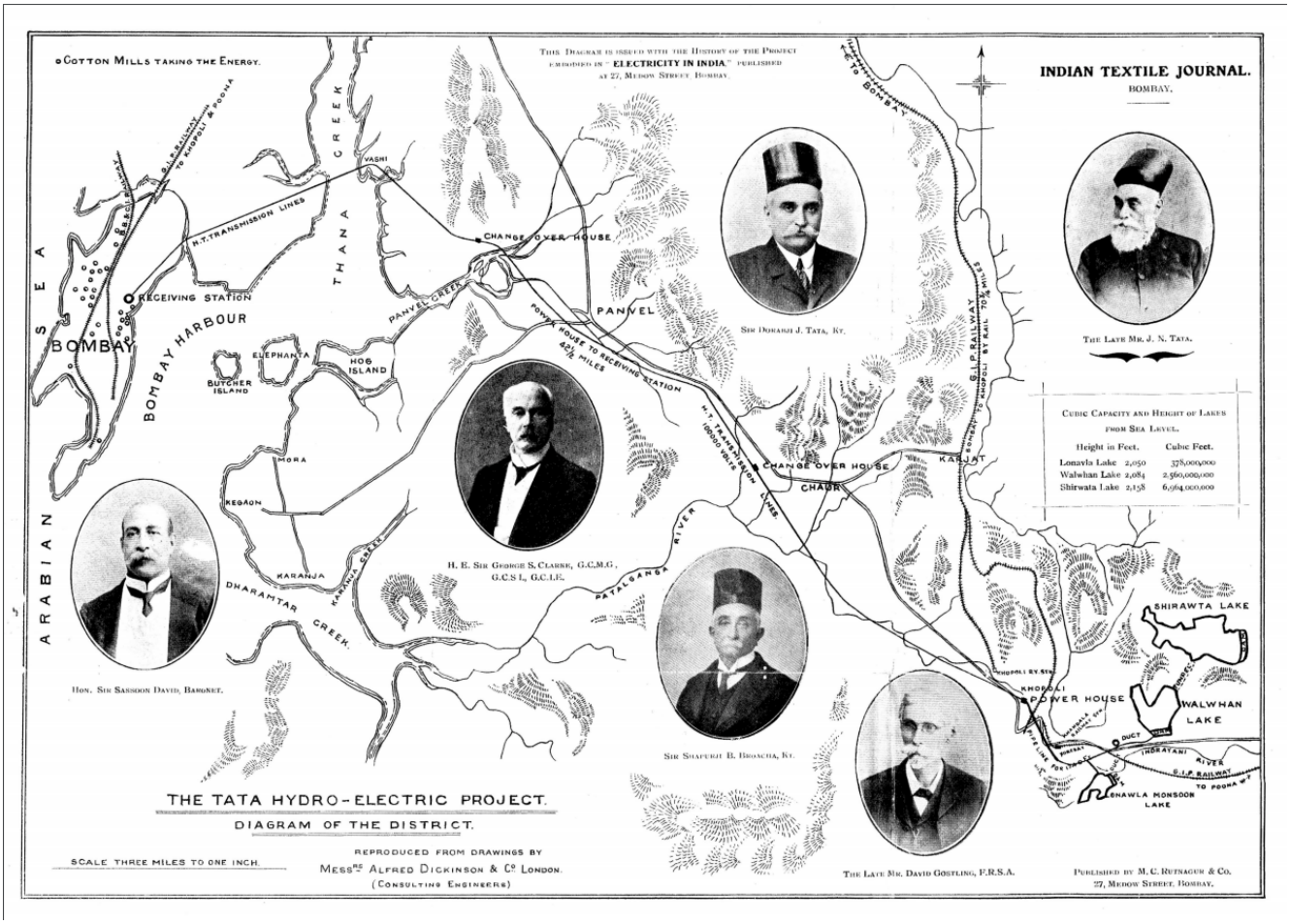


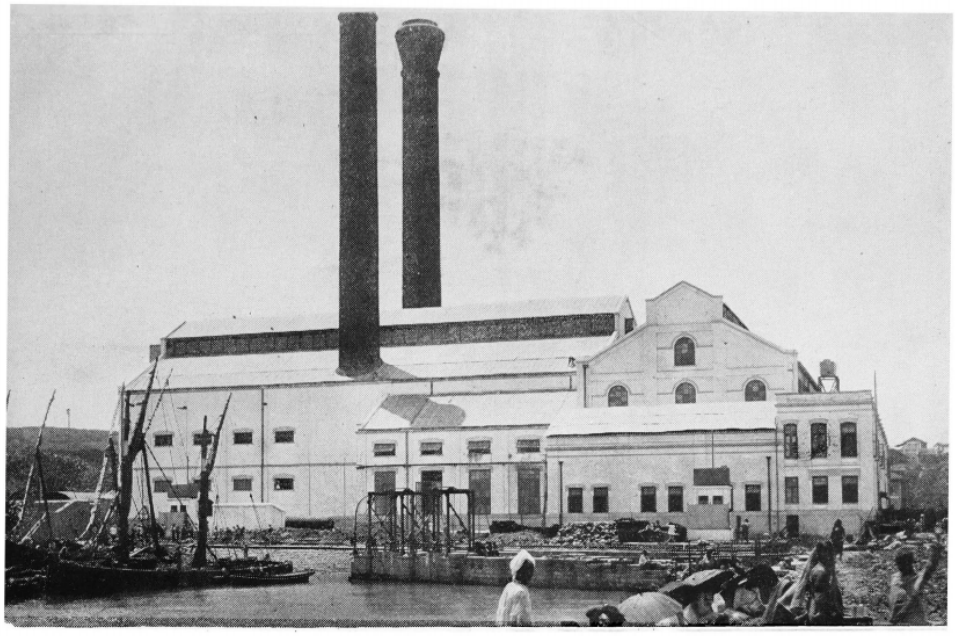
Figure 5: The Tata Hydro-Electric Project, 1912. S.M. Rutnagur (ed.), Electricity in India. Being a History of the Tata Hydro-Electric Project with Notes on the Mill Industry in Bombay and the Progress of Electric Drive in Indian Factories. Prop. India Textile, Bombay 1912, supplement; Retrieved February 10, 2019, from https://archive.org/details/ElectricityIndia/page/n95 (Public Domain Mark 1.0).

Bombay, Sir George Clarke (1848-1933), encouraged another electricity scheme for Bombay, the Tata Hydro-Electric Project (fig. 5).[91] First considered in 1895, it was comprised of two reservoirs collecting monsoon waters at the Lonavla and the Wahlwan in the Western Ghats, a mountain range east of Bombay (with storage capacity of 380 resp. 2,800 million cubic feet), a 72-MW-generating plant at Khopoli, and 43 miles of transmission lines to Bombay. Licensed in 1907, Khopoli station was brought online in 1915, one of the first "Swadeshi" utilities, financed entirely by Indian capital and providing power solely to Indian enterprises.[92] In order not to infringe on the B.E.S.T. license, Khopoli station was only allowed to supply customers requiring more than 500,000 units of electricity annually (equivalent to 250 horsepower per hour) and not the general public.[93]

The Tata Hydro-Electric Project was a turning point in Bombay's energy history. It was so successful that in 1925, B.E.S.T. abandoned its own thermal plants (fig. 6) and simply purchased power from the Tatas.[94] Tata hydroelectricity indirectly allowed broader public access to electricity as well. Starting with 107 consumers in 1905, B.E.S.T.'s number of costumers rose significantly in the interwar period, from 12,041 in 1918 to 30,485 in 1923, reaching 65,412 in 1935.[95] At a time when the city's population roughly numbered 1.4 million,[96] this meant that about 4.5

25

91 In detail: Lanthier, "L'électrification" (cf. note 13).
92 Rutnagur, *Electricity* (cf. note 87).
93 *Ibid*, 16; Kale, Electrifying, 72 (cf. note 4).
94 Woods, "Mumbai", 39 (cf. note 14).
95 Mahaluxmivala, *The History*, 437 (cf. note 8).
96 Population numbers according to https://de.wikipedia.org/wiki/Mumbai_City (accessed 30/11/2018)



THE POWER STATION OF THE BOMBAY TRAMWAY AND ELECTRIC SUPPLY COMPANY, LIMITED, BOMBAY.

Figure 6: The Power Station of Bombay Tramways and Electrical Supply Company, Limited, Bombay. https://archive.org/details/ElectricityIndia/page/n75 (Public Domain Mark 1.0).

percent of Bombay's citizens had legitimate access to electricity in the mid-1930s, leaving out the great majority of the population. Particularly for the urban poor, electricity was still nowhere near an everyday energy. "Unofficial" access was probably much higher. Omitted from grid design and/or unable to pay tariffs, potential customers frequently took matters into their own hands, tapping wires or tampering with meters, as clauses on electricity theft in lighting acts and bills suggest.[97] Preparing the Indian Electricity (Amendment) Act of 1922, the Official Report of the Council of State Debates commented on this practice: "Section 39 penalises theft of energy, but in actual practice it has not proved very effective; usually impossible to prove who actually made an illegal connection; yet unless we succeed in doing this, it is usually impossible to obtain a conviction".[98]

While most Indian households and businesses still relied on traditional forms of energy and illumination, electricity started to become an increasingly familiar item of Bombay's urban spaces and culture in the interwar years. Electric tramways specifically targeted young urban professionals and "white collar workers" commuting to their workplaces.[99] Night schools and "modern" nocturnal entertainments such as cinemas, theatres, and nightclubs catered to diverse audiences, and often utilized (or even relied on) electric light and power.[100] Electric street lighting also increased moderately in the 1920s and 30s, from 156 electric lamps in 1921 to 1,433 in 1935, the majority now operating throughout the whole night.[101] For the most part, Bombay remained a gas-lit city, showing once again that "new" technologies did not necessarily take over "old" ones.[102] From 8,523 street lamps in use

97 E.g., Calcutta Electric Bill 1895 (British Library, IOR/L/PJ/6/412, File 85); The Indian Electricity (Amendment) Act 1922 (British Library, IOR/L/PJ/6/1744, File 2394).

98 British Library, IOR/L/PJ/6/1744, File 2394, extract from Official Report of the Council of State Debates, 23/01/1922, 647.

99 Frasch, "Empowering," 40-44 (cf. note 13).

100 See Kidambi, *Making* (cf. note 13), on Bombay's working class culture; Prakash, *Mumbai Fables* (cf. note 13), on the city's entertainment industry and culture.

101 Mahaluxmivala, *The History*, 377-380 (cf. note 8).

102 See Edgerton, *The Shock* (cf. note 16).

in 1933, nearly 7,000 were gas-lamps.[103] At the time, the *Times of India* raved about the quality of lighting achieved in Bombay, "superior to that of any other city in India, and [...] not inferior to that of cities of a similar size in other countries."[104] With lamps converted from one-light to two-light design to ensure a wider diffusion of light, and combined with domestic and commercial lighting, illumination in some streets was even described as excessive.[105] The enhanced nocturnal brightness even elicited complaints about what today would be called light pollution as "the light of our electric lamp-posts erected near their houses came straight into their bedrooms."[106] This conflict could at least be resolved easily: the Municipality covered the expenses of fitting glare guards.[107] Bombay seemed to have transformed itself into an Indian "city of light," albeit one with a clear distinction between rich and poor quarters.

TOWARDS A BRIGHT(ER) FUTURE? IMAGINATIONS OF LIGHT AND DARKNESS

27 Bombay, 1950: newly independent India is in a process of redefining itself. One of the questions up for debate is how the young nation should present itself to attract visitors and encourage tourism. In an article published in the *Sunday News of India* in the same year, Bombay is painted as a sublime mixture of Western and Asian lifestyles:

> Bombay, as the port by which tourists are most likely to enter India, is an impressive and beautiful city to approach. Should the ship arrive during the night or at dawn, the jeweled slenderness of the Rajabai Tower, the Queen's Necklace of lights outlining the sea-front and hiding the sordidness of the box-flats, the Gateway of India backed by the massive façade of the Taj, are spread before the newcomer in invitation and welcome; it seems, more even than by day, an enchanted city.[108]

28 Much of Bombay's "architecture of the night,"[109] which played such a major role in defining (and explaining) its public appeal, dated back to colonial times, particularly the interwar period. At the time, not only the city's daytime character, but also its nocturnal face was "modernized" by both its European and Indian citizens. Since the late 19th century, Bombay had turned into India's most important industrial city, a soaring center of commercial activity with a diverse population that had exceeded the one-million-mark during WWI.[110] Living conditions differed widely across the city – from the elitist residential areas of Colaba or Malabar Hill with their Neo-Gothic or Art Deco buildings, to the idyllic middle-class settlements of Matunga, Dadar, and Sion that had been constructed according to Garden City principles, to the overcrowded, dark and ill-ventilated houses of the Fort Area and New Town, and, finally, the modernist multi-apartment blocks (*chawls*) that the City Improvement Trust had constructed as part of its public housing program.[111] With many of its poor inner city quarters razed and their former inhabitants dislocated,[112] "modern" Bombay framed itself as

103 "Bombay's Street Lighting" (cf. note 66). – With its reliance on gas-lamps, Bombay was no exception. In Europe, there were also a number of cities that continued to utilize gas for urban lighting purposes in the interwar period. Particularly cities that had invested strongly in municipal gasworks tended to continue on this technological path. Berlin, for example, only switched to electric street-lighting on a larger scale after WWII had wrought havoc on its gas infrastructure. On Berlin's history of lighting, see Ute Hasenöhrl, "Die Stadt im Licht: Städtische Beleuchtung als Infrastruktur," *Informationen zur modernen Stadtgeschichte*, n° 1, 2015.

104 "Bombay's Street Lighting" (cf. note 66).

105 *Id.*

106 Mahaluxmivala, *The History*, 380 (cf. note 8).

107 *Id.*

108 "Come to India," *The Sunday News of India*, 2 July 1950, 8.

109 Woods, "Mumbai", 39-42 (cf. note 14).

110 Nissel, "Bombay," 25-26 (cf. note 60).

111 See Kidambi, *Making* (cf. note 13), on Bombay's disparate urban fabric; on its architecture, see Norma Evenson, "An Architectural Hybrid," *in* Sujata Patel, Alice Thorner (eds.), *Bombay: Mosaic of Modern Culture* (Delhi, Calcutta, Madras: Oxford India, 1996).

112 As Kidambi has shown in detail, the activities of the City Improvement Trust, initiated in 1898 in the aftermath of the plague epidemic of 1896/97 to improve public health, were at best ambivalent. Destruction of houses often aggravated living condition in remaining dwellings as dislocated residents rather moved in with their neighbours that to newly-constructed tenements far from their places of work. Kidambi, *Making* (cf. note 13).

a cosmopolitan city of dreams. Art Deco was its architectural style of choice, reflecting the aesthetic ambitions and international inclination of Bombay's upper and middle classes, as well as their fascination with rational, functional technologies.[113] By the mid-1930s, most of these well-to-do neighborhoods were also connected to water mains, sewage canals, telephone and electrical lines – and well-lit at night.

29 Public and private lighting was not just a pleasant convenience and a matter of public security that facilitated urban life, but also ideologically charged from the very beginning.[114] As Susie Protschky has shown for the Netherlands Indies, electric lights and nocturnal illuminations were a vital part of the symbolic politics of European colonial powers, showcasing the "enlightenment" and modernity of their rule.[115] In the British Empire, the illumination of colonial buildings, monuments, and events also worked as visual manifestations of imperial might, distinguishing between "modern" and "backwards" lifestyles.[116] As a consequence, representative or administrative buildings such as the Viceroy's lodge in Simla, governor's mansions, telegraph offices, or railways stations were amongst the first to be equipped with electric light and power.[117] Dazzling illuminations provided British colonial rule with a seductive luster of brilliance and sophistication. At the Imperial Durbar of 1903, Viceroy Curzon (1859-1925) illuminated the European encampment "with more than a hundred arc lamps [...], while ninety-three hundred incandescent lightbulbs were supplied to light the tents. The electricity for the Central Camps was provided by a power station situated near the Viceregal Logde."[118] Lady Curzon's famous peacock gown was inwrought with glittering metal threads and sparkling jewels so as to attract attention in the electrically illuminated ballroom.

Not only did the British play the illumination 30
game, but also Bombay's Indian inhabitants, particularly its wealthy business elite. At the forefront was the Tata family. Keen on producing and transmitting electricity, the family built the Taj Hotel as a showcase of electrical modernity [Figure 7], equipped with the latest amenities such as electric fans, lights, and elevators. For special events, its façade was illuminated with a string of electric light bulbs.[119] When King George V visited Bombay in 1911, illuminating the building cost over 9,000 rupees – a powerful demonstration not only of the Tata's loyalty to the crown, but also of their economic prowess, modernity, and confidence as British citizens. Jamsetji Tata conceived the Taj "as a grand and modern hotel where Indians and European could meet as equals at the entrance to Bombay's harbour,"[120] ostensibly a response to the insult of being denied entry to a European-only hotel. The Taj was Bombay's prime location for cultivated, slightly frivolous night-time entertainment. It was the "Mecca for the city's jazz aficionados"[121] and hosted an upscale nightclub and cocktail bar.

More socially encompassing than the exclu- 31
sive Taj were Bombay's cinemas. Bombay's film industry started in 1896 with the exhibition of imported films, but, starting in 1913, also produced movies of its own.[122] Culturally and architecturally, Bombay cinema soon turned

113 Prakash, *Mumbai Fables*, 95-104 (cf. note 13).
114 For Europe, see Schivelbusch, *Lichtblicke* (cf. note 12).
115 Protschky, "Empire" (cf. note 1).
116 E.g., Rao, Lourdusamy, "Colonialism" (cf. note 2); Chikowero, "Subalternating" (cf. note 2); Showers, "Electrifying" (cf. note 2).
117 E.g., Public Works Department, *Completion Report of the new Viceroy Lodge in Simla* (Calcutta: Government Printing, 1890); Tanja Winther, *The Impact of Electricity: Development, Desires and Dilemmas* (New York: Berghahn Books, 2011).
118 Coleman, *Moral Technology* (cf. note 13); Frasch, "Empowering," 43 (cf. note 13).
119 Woods, "Mumbai", 39 (cf. note 14).
120 *Ibid*.
121 Prakash, *Mumbai Fables*, 104 (cf. note 13).
122 On Bombay cinema, see Kaushik Bhaumik, "A Brief History of Cinema from Bombay to 'Bollywood'," *History Compass*, vol. 87, n° 2, 2004, 1; Annemarie Hafner, "Die frühe Kinokultur in indischen Großstädten," *in* Ravi Ahuja, Christiane Brosius (eds.), *Mumbai – Delhi – Kolkata: Annäherungen an die Megastädte Indiens* (Heidelberg: Draupadi, 2006).

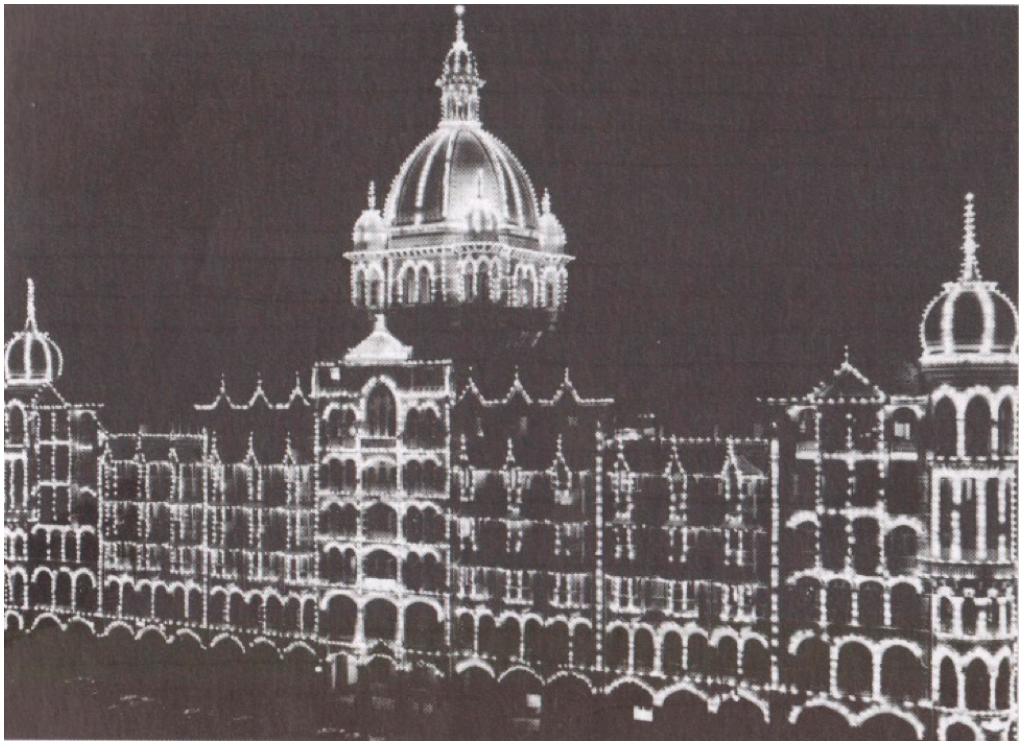


Figure 7: The Taj Hotel, Bombay, 1953 (from: Woods: Mumbai). Copyright Taj Mahal Palace Hotel Collection, Mumbai.

into an icon of Indian modernity, contributing a new facet to urban nightlife, as well as to Bombay's architecture of the night. Figurehead was the Regal, established by Parsi showman Framji Sidhwa in 1933. The Art Deco building at Colaba Causeway was the first air-conditioned theatre of India and the first to introduce neon lighting to Bombay.[123] Bombay's cinemas give a vivid impression of the city's two-tier society. While elegant venues such as the Regal catered to the tastes of Europeans, Anglo-Indians and the Indian social elite by broadcasting international films to the sound of the Wurlitzer organ, the great majority of movie theatres increasingly playing domestic productions since the late 1920s were Spartan, overcrowded affairs. Bombay cinema had considerable influence on Indian social practices and values, reflecting India's quest for national identity, as well as acting as a vehicle for social reform. Cinema had also altered night-time habits. In the 1920s and 30s, many workers congregated twice a week between 20:00 and midnight for *bhajans*, chanting religious and mythological songs. As cinemas became more and more popular, this practice almost disappeared, as did other nightly leisure activities, such as amateur theatre, poetry readings, or musical gatherings.[124]

Bombay's third emblem of the illuminated night was Marine Drive, the promenade curving along the Arabian Sea constructed between 1935 and 1940. As Gyan Prakash has pointed out, at night Marine Drive presented the city at its finest, both a "spectacle of modernity" and an incarnation of the "good life."[125] As a living and working space, the apartment and office buildings lining Marine Drive were amongst the most costly and exclusive of the time. In contrast to the Colonial Gothic style of Esplanade Road with its row of government and institutional buildings, Marine Drive with its stylish

123 Woods, "Mumbai," 39-40 (cf. note 14); "Bombay's New Theatre Opened by the Governor," *Times of India*, 16 October 1933, 11.

124 Hafner, "Kinokultur" (cf. note 122); see also: Jim Masselos, "Spare Time and Recreation: Changing Behaviour Patterns in Bombay at the Turn of the Nineteenth Century," *South Asia*, vol. 7, n° 1, 1984, on changing recreational patterns in Bombay at the turn of the 19th C.

125 Prakash, *Mumbai Fables*, 75-79 (cf. note 13).

Art Deco architecture represented the glamorous, cosmopolitan dreams of Bombay's Indian elite.[126] The "Queen's Necklace," however, was more than an exclusive social space. It soon became a popular site for recreation at the city's shore. At night, large crowds promenaded along Marine Drive or went for a ride – and later moved on to nearby Churchgate Street, the epicenter of Bombay's nightlife with its restaurants, bars, and jazz clubs.[127]

33 In the 1930s, Bombay was perhaps "the most completely electrified city in Asia,"[128] a vibrant showcase of Indo-Western modernity. Its electric lights epitomized a bright(er) future – not just for the city itself, but for all of India. In this vein, modernizers such as later Indian Prime Minister Jawaharlal Nehru (1889-1964) framed electricity as a fundamental of life and demanded vigorous national electrification to improve the standard of living.[129] This vision of modern India mirrored Western as well as socialist notions of energy modernity – and, after independence, turned into one of the guiding principles of India's economic and social policies.[130] It was not uncontested. Traditionalists such as Gandhi (1869-1948) regarded large-scale modernization with skepticism, including "mass production" of life essentials such as light or water, and emphasized the benefits of traditional, village-level, labor-intensive technologies, and decentralized solutions instead.[131] Non-profit groups and environmental organizations later revived this narrative as the ecological and social impact of energy projects (e.g., resettlements, pollution) became ever more apparent. But as early as the 1920s, villagers launched a (ultimately unsuccessful) *satyagraha* campaign against the Mulshi scheme of Tata Power Company (in Pune district near Bombay) as the proposed reservoir threatened to submerge their ancestral lands and homesteads – probably the first anti-dam movement in India.[132] Since the late 19th century, public debates on the design of and access to modern energies and technologies such as lighting had put not only colonial policies into question, but also helped to sharpen and reframe visions of India's future as a "modern," "traditional" or "hybrid" society.

CONCLUSIONS

34 The colonial history of artificial light and darkness is an ambivalent one – and its Bombay thread only one of numerous narratives. As "Urbs Prima in Indis," Bombay was the exception rather than the rule, not least because it actually turned into an Indian "city of light" during colonial times. Even though Bombay's lighting history in many ways resembles the "classic" expansion story of artificial light, there were, however, more variables in play in a colonial than in a Western setting. While in Bombay ethnicity did not factor as heavily as, for example, in Northern Rhodesia, where access to electric lighting was systematically segregated on racial lines,[133] supposed "native habits" were still instrumentalized by the British to excuse lack of modern infrastructures in Indian quarters. Nevertheless, there was no monolithic "Indian" experience of urban light and darkness. Bombay's wealthy and influential business elite also exerted a significant influence on municipal decisions, both advancing and impeding infrastructural developments

126 Sidharth Bhatia, "The Making of Marine Drive," The Indian Quarterly, [2015]. Url: http://indianquarterly.com/the-making-of-marine-drive/ (accessed 29/11/2018)

127 *Id*; Woods, "Mumbai," 40-41 (cf. note 14); "Night Driving Risks," Times of India, 15 September 1939, 13.

128 Reed, "Foreword," VI (cf. note 28).

129 E.g., "Premier Opens Rs. 100-Crore Hirakud Dam: Era of Plenty Ahead for Orissa – Power for Villages, India's Objective," *Times of India*, 14 January 1957, 1, on the inauguration of the multi-purpose Hirakud Dam in Odissa in 1957.

130 In detail: Kale, *Electrifying*, 1-61 (cf. note 4).

131 "While it is true that you will be producing things in innumerable areas, the power will come from one selected centre. That, in the end, I think would be found disastrous. It would place such limitless power in one human agency that I dread to think of it. The consequence, for instance, of such a control of power would be that I would be dependent on this power for light, water, even air and so on. That, I think, would be terrible." Gandhi, "Mass Production" (1934), cited in: Kale, *Electrifying*, 28 (cf. note 4).

132 Rajendra Vora, *The World's First Anti-Dam Movement: The Mulshi Satyagraha 1920-1924* (Ranikhet: Permanent Black, 2009).

133 E.g., Chikowero, "Subalternating" (cf. note 2).

with donations and ratepayer's veto rights – although not even the powerful Tata family was able to obtain licenses for electrifying Bombay at first. A mixture of wealth, status, and race thus decided on who might benefit from modern amenities, with more and more Indian citizens gaining access since the interwar period. The prosperous elite (both European and Indian) "clustered along the south and west side of the city while the poor were shunted together amid ill-planned and insanitary alleys north of the fort."[134] Unsurprisingly, Bombay's slums were amongst the last to receive modern infrastructures, if at all.

35 Lack of light should not be confused with lack of interest in (modern) lighting as many contemporary Western voices discussing the nocturnal darkness of Indian quarters did. On the contrary, in Hindu culture and religion, light is highly venerated as an auspicious life-force, while darkness is related to death. One of the few Hindu gods associated with (and worshiped in) darkness is the goddess Kali, the "ultimate destroyer," while Lakshmi, the goddess of prosperity, is celebrated with lavish illuminations during Diwali, the Hindu festival of lights – interestingly enough both on the same night.[135] And even outside special occasions and festivities such as Diwali, clearly not everybody was asleep at night as recurring European comments on Bombay's supposed lack of nightlife suggested.

36 So far, historical research – including this article – has only touched upon this rich area of study. Many questions are still up for debate: (how) did urban (lighting) infrastructures and technologies turn into objects of everyday, or rather, everyNIGHT, life in different strata of society? How did gender come into play? Which kind of "everyday energies" was utilized for lighting purposes and how did this resource base change over time? How did artificial light alter perceptions of light and darkness, and, last but not least, how did lighting impact on different areas of nocturnal society, e.g. religious processions, safety and crime, night-time entertainment or night work? To answer these questions, we need to look beyond "traditional" archival materials on the development of infrastructures and colonial urban planning, to capture more than just the voices of the European and Indian elites – an endeavour of increasing difficulty as we go back in time. There is still much to be learned about the nocturnal history of Bombay, the Raj, and the British Empire, whether dark or illuminated.

134 Hunt, Ten Cities, 274 (cf. note 56).
135 Ralph W. Nicholas, *Night of the Gods: Durga Puja and the Legitimation of Power in Rural Bengal* (New Delhi: Orient Black Swan, 2013), 44, 48, 143-144.

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