EVERYDAY TECHNOLOGY

Machines and the Making of India’s Modernity

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Introduction

In April 2011 the long-established Indian firm of Godrej and Boyce produced its last typewriter. This is likely to have been the last such machine to be manufactured in India and one of the last to be made anywhere in the world. Based in Mumbai (previously known as Bombay), Godrej and Boyce had been making typewriters since 1955, though the history of typewriters in India extends far back before that to machines imported, mainly from Britain and the United States, in the late nineteenth century. The production of the last Indian typewriter can be taken as marking the end of a technological era—the age of the typewriter—not just for India but globally. It invites reflection on the part that typewriters and other small-scale machines, many of them pioneered in the mid and late nineteenth century, have played in the making of the modern world and in the process we now think of as globalization. Although many of these global goods—bicycles and sewing machines are other examples—were initially made in the West, they came to have a profound social, economic, and cultural influence on many other parts of the world. Indeed, one could hardly speak of them as "global goods" and as being representative of "everyday technology" unless they had found a significant place in the daily lives of people not just in the West but also in Brazil and Argentina, in Egypt and South Africa, in China and India.

This book is a study of small-scale technology in India between the 1880s, when many of these new, industrially produced goods first came into use and began to find mass markets, and the 1960s, by which time they had become widely disseminated and, like the Godrej typewriters, locally produced. How and why did these machines come into general use? Who used them, who
owned them, and who (eventually) made them locally? How did they affect not just economic life and productive processes but also the ways in which people worked? How did they become part of new ways of thinking—about class, race, and gender, about politics and society at large? How far did they become harbingers of technological modernity or encounter opposition as unwelcomed agents of change? To what extent does the history of a specific technology—or of clusters of interrelated technologies—become so embedded in the recipient society that the status of such commodities as global goods can assume less importance than their local uses and vernacular meanings?

This is a book about India. That is partly because India is the part of the world whose modern history I am most familiar with and from which I can most easily locate the kind of examples I am looking for. But it is also that India, today one of the world’s most populous countries, was also a large and significant part of the British Empire, and empire entails discussion of issues of technological transmission and use, of socioeconomic change and political aspiration, that were distinctive, even if they were not altogether unique. Looking at India helps to decenter the history of technology and restitute it outside the familiar ambit of Western societies in which it is so often located. India is by no means the only such society for which this can be done, and in recent years studies of Japan, China, Indonesia, the Middle East, and Latin America, among others, have also undertaken a similar task. But there is a virtue in selecting one particular location for close consideration, rather than embarking on a wide-ranging comparative analysis, precisely because we can thereby better understand the global by interrogating the local. And, finally, India is now acknowledged to be one of the leading economies in our globalized world. It is all too easy today, in visiting India’s megacities with their bustling traffic, high-rise office and apartment blocks, busy shopping malls, and gleaming automobile showrooms, to forget the humbler origins of India’s technological transformation or the dilemmas that informed India’s earlier engagement with the machine age. It is important to understand how India, now hailed as an “Asian giant,” first advanced into technological modernity and in particular to see how small technologies and small machines played as significant a part as big technologies and big machines in the making of modern India.

Few would question the dominant role that technology plays in modern life across the globe. Technology, to quote Wiebe E. Bijker and John Law, “is ubiquitous. It shapes our conduct at work or at home. It affects our health, the ways in which we consume, how we interact, and the methods by which we exercise control over one another.” Machines are among the most evident emblems and instruments of our modernity; they, more importantly than anything else, divide us from the technologies of the preindustrial age. Since the late nineteenth century in particular, our ideas of time and space, of body, self, and “other,” have been profoundly transformed by technological innovation and by the incorporation of new and ever-changing technologies into our daily existence. And yet the functions and meanings assigned to modern technology are not everywhere the same. Identical technologies can take on vastly different meanings between one society and another, even when that technology shares a single point of origin and its physical form remains fundamentally the same. In other words, the “social life” or “cultural biography” of mechanical objects needs to be understood in context and cannot be presumed to be uniform and universal.

This is perhaps self-evident—except that the history of technological modernity has too often been presented as a single-stranded story of advancing, and indeed progressive, globalization. Modern machines are seen as having had their birth in the cultural and economic domain of the modern West. From there they were disseminated throughout the non-Western world, whether through the agency of colonial regimes or through the distributive networks of international business organizations. In such a diffusionist model the interest in technology lies with innovation and dispersal rather than with adaptation and use. All the creative processes associated with technology are presumed to lie in and with the West. Essential stages of design and development occur in the West: that is where the capital, technical expertise, and skilled labor resources are located. This leaves the
rest of the world apparently sidelined and passive, existing simply as a compliant market, or, as Partha Chatterjee puts it, as the "perpetual consumers" of someone else's modernity.\(^2\)

But, as historical scholarship has increasingly tried to argue, this does not have to be the only model of technological modernity or the only kind of instrumentality assigned to technology within wider processes of social, economic, and political change. Old technologies do not simply wither away with the coming of the new, though materially as well as ideologically they might suffer sustained attack. And, while it cannot be denied that many of the machines that most immediately capture our ideas of technological modernity—the railroad, automobile, cinema, computer—originated in the West and were first developed there to meet Western needs and Western tastes, this does not mean that their histories, once they were transferred to other societies, to other cultures and places, were merely the extension and fulfillment of their Western forms. These machines had other lives just as they had other locations. As Bijker and Law observe, "Our technologies mirror our societies."\(^3\) Unless one takes the antiquated view that technology is an autonomous field of human endeavor and warrants study in isolation from the society around it, all technologies must in some way be grounded in the societies in which they are created, or, as is principally true in the non-West, in the societies in which they become embedded, within which they undergo adaptation, compromise, and assimilation, through which they acquire new meanings and usages. Even if the physical components remain the same, the culture of technology will, to varying degrees, differ.

But while adopting this constructionist approach—one that sees society and technology as mutually constitutive—it is also necessary to recognize issues that arise from the distinctive kind of non-Western (more especially colonial) context with which this book is concerned. Since such technological goods as bicycles, sewing machines, and typewriters were made in Britain, in the United States, or elsewhere in the capitalist, industrialized West, it was there that the primary process of their social constitution may be said to have occurred. Indians, Javanese, Egyptians, East Africans had no discernible part in fashioning the original design and basic usages of the bicycle. It arrived in their countries as the finished product of a very different, and very distant, society. Occasionally, in a vaguely orientalist echo, as in 1890s Britain, bicycles might be referred to, rather fancifully, as two-wheeled "juggernauts," but that says more about cycling's cult status in the West at the time than any suggestion that India (or the Hindu deity Lord Jagannath) was instrumental in their creation or in the spread of the "cycle craze."\(^4\) We should bear in mind, too, that in India and elsewhere the very foreignness of a British bicycle or an American automobile might add to the prestige of the machine and to the social kudos and cosmopolitan sheen of its owner. Indigeneity was not always a virtue; at times, it connoted second-best.

But in most extra-European societies the bicycle and similar products of modern Western technology underwent a second stage of social constitution, what Frank Diikötter has called "creative appropriation."\(^5\) The basic form might remain the same (though even that, as in the shape of the Asian cycle-rickshaw, might in time undergo significant modification), but as cycling passed from European enthusiasts to "native" elites and indigenous masses, the status value and cultural significance of the bicycle might change. Alongside the survival and reconstitution of older technologies, there might emerge what David Edgerton has called "creole technologies" that owed their form and function to local needs, tastes, and circumstances, and did not simply replicate metropolitan norms.\(^6\) It is suggestive of this wider process of cultural assimilation that by the early twentieth century modern machines like automobiles, motorbikes, and typewriters, along with more traditional tools of work like chisels, plows, and hammers, were venerated during the Indian festival of Ayudha Puja and daubed with sacred ash and vermillion. Even the most conspicuously alien objects might thus be incorporated into local belief and custom or be culturally reconstituted by it (though this example would be misconstrued if it were thought to suggest that ritual and religion were the only means by which Indians assimilated new technologies).\(^7\) At a time when the bicycle
was still a novelty in India, prizes were given at fairs and fetes for the best or most imaginatively decorated machine: where a European might dress up a bicycle as a steamship, an Indian might crowd a machine with lights and images of the Hindu goddess of plenty. Around 1918, at the height of its interracial popularity, even the god Ganapati could be represented as riding on a bicycle. Rather than a vehicle for the celebration of Western ingenuity, or the global replication of a single, uniform machine culture, technological modernity more closely resembled a template to which each society brought its own ingenuity and artistry, its own sense of social ownership and cultural belonging.

One could take up this discussion of the culture of modern technology in almost any part of the world outside Europe and North America—in Africa, Asia, Latin America, and Oceania. But India presents a particularly rich and challenging area for discussion. As part of the British Empire until August 1947, it was exposed to the full force of Britain’s industrial might and commercial penetration, though, significantly, it was also open to trade with other European countries, with the United States and Japan. Ever among the world’s most populous societies, India appeared to offer a vast market for modern machines and manufactured goods, but contemporaries were very aware of the limitations imposed by acute and widespread poverty and by what many saw as India’s technological and social inertia. In part because of this apparent conservatism but also because of the connections between technology and state power, colonial and postcolonial India was a society where the role of modern technology was intensively debated. While Gandhi famously contested the desirability of most modern technology, other Indians sought to build up-to-date factories or used ingenuity and entrepreneurship to make modern technology truly Indian. Although the technology of India’s craft workers and village artisans was often deemed “primitive,” privileging custom over innovation, the contrast between “tradition” and “modernity” was, in this as in many other respects, greatly exaggerated. In reality, there was constant negotiation between what were presented polemically as the polarities of old and new. The debate over technology did not end with Indian independence in 1947. Indeed, under the premiership of Jawaharlal Nehru, state planning and the pursuit of economic self-sufficiency kept technological issues to the fore in public debates and government policy.

But the modern machine did not enjoy an easy triumph. Twentieth-century observers employed a simple heuristic device to capture what they saw as the technological duality of Indian modernity. India, neither wholly new nor entirely old, was both the India of the oxcart and the India of the automobile. Sometimes the coexistence of old and new caused a tired resignation on the grounds that “in the land of the ox-cart one must not expect the pace of the motor-car.” At other times it was invoked more indignantly to assert that in “the new age of technic” India needed to embrace modern technology and not lapse back into an arcane past symbolized by the oxcart and the spinning wheel. Commonly, however, the India of the automobile was said to be perfectly compatible with the India of the oxcart since both had their appropriate place and served complementary uses. Likewise, the imagery of modern technology could infiltrate the prose of even those who did not intend to speak in favor of the machine. In his Reminiscences in 1917, the Bengali novelist and poet Rabindranath Tagore likened a certain Indian verse meter to riding a bicycle: “It rolls on easily, gliding as it dances to the tinkling of its anklets.” It was “more like riding a bicycle than walking.” In his commentary on the Bhagavad Gita in 1926, Gandhi invoked another modern machine—the typewriter—to suggest how a state of spiritual enlightenment was like a typist’s instinctive knowledge of where to find the right keys without having to look each time at the keyboard.

This repeated figurative use of technology in the rhetoric and reasoning of late colonial India is significant. It reflects in practical terms the sheer diversity of technologies—old and new—that coexisted in India by the 1910s and 1920s. But it demonstrates, too, the prominence given to questions of technology by Gandhi and his followers, and the cultural and existential dilemmas this created, and not exclusively among India’s intellectual elite. It suggests the intensity of contemporary debates about the na-
culture, value, and morality of modern technology, about the desirability or otherwise of its incipient hegemony. The repeated invocation of technology in speeches, memoirs, novels, even in religious tracts, signals awareness of the intrusive presence of the modern machine and its widening availability as a shared cultural commodity, an icon of everyday use and quotidian encounter. Even among those who did not own a bicycle or a typewriter, or had little personal access to a sewing machine or a gramophone, their presence—as spectacle, as something seen and heard—was undeniable. Few Indians in the 1930s owned an automobile, fewer still traveled by airplane, and yet there were not many individuals who had not seen or heard one or the other, or for whom they did not have some imaginary use. Colorful images of machines—trains, cars, planes, cameras, gramophones, sewing machines, bicycles—adorned billboards in the streets or were used in newspaper advertisements to sell soap, matches, fireworks, and cigarettes. Some even appeared among the images painted on house fronts and interiors, as in the havelis, the grand merchants’ houses, of northern Rajasthan. By the 1930s political activists, policemen, schoolteachers, and health workers arrived in villages on bicycles and used magic-lantern slides or cinema shows to entertain, educate, or cajole their audiences. They typed reports on their visits or phoned their superiors. When Gandhi arrived to speak against modern machines he frequently did so by motorcar, his thin voice amplified by microphones and loudspeakers. Technology did not need to be big to be significant, audible, visible, and everyday. India’s “new age of technic” was not just a middle-class affair, nor solely an urban phenomenon. Increasingly it was a rural phenomenon and an aspect of subaltern experience.

This book is intended as a contribution to the understanding of the culture—or, more precisely, the acculturation—of modern technology. It seeks to address the multiple understandings and experiences of technological modernity in late colonial and early postcolonial India. It aims, so far as such an act of “provincialization” is possible, to decenter the history of modern technology away from Europe, but also away from the chronicling of British rule, toward the inner histories of India, of its intermediate groups and subaltern classes. While many accounts of modern technology have been written—for India as elsewhere in the once colonial world—from the standpoint of industry or the state, this study proposes that the best (though by no means the only) way to understand the rise of technological modernity is by engaging with the realm of everyday perception and experience. For that purpose it uses four examples—sewing machines, bicycles, typewriters, and rice mills—each of which represents a different kind of technology and a different pattern of social use, but all of which became widespread in India by the 1960s and which, in their different yet interconnected ways, shed light on the role of technology in the making of an extra-European modernity.

In looking at “everyday technologies” I am consciously moving away from the “big technologies” that have, until recently, dominated the history of technology in South Asia and many other parts of the colonial world. Technologies such as railroads and telegraphs, large-scale irrigation projects, and electrification schemes were not only big in the sense of being large scale. They required huge capital investment, directly from the state or backed by its guarantees, involved massive environmental appropriation and modification, and have conventionally been thought of as exemplifying an essentially one-way “technology transfer” between Britain or another Western power and a recipient colonial or semicolonial territory. But there were many modern technologies—less dramatic than the railroad, more personal than a coffeeem—that, in their seemingly mundane insignificance, passed relatively unnoticed by the public or unregulated by the state, their presence only marginally attested to in newspapers and photographs, or in the incidental, background material to novels and short stories. And yet, despite their foreign provenance and lack of spectacular impact, many of these “everyday technologies” radically transformed key areas of Indian life, from the street and home to the jail and factory. They frequently possessed an intimacy, a companionable association with family life and domestic existence, which bigger machines
CHAPTER ONE

India's Technological Imaginary

The history of technology is more than a history of material objects and physical processes. It is equally an inquiry into the exercise of the human imagination. Just as the formation of modern nations or the conceptualization of a region as vast as India can be fashioned by the ways in which people, individually and collectively, think about such things, so is the history of technology molded by the ways in which people identify with particular technological goods, skills, and processes, or, conversely, seek to distance themselves from them. Technology can inform visions of the future, shape expectations of the present, and color interpretations of the past. Technology can serve the articulation of the self and the determination of the other.

In a pioneering statement of technology as the imaging and expression of imperial power, Michael Adas argues that, in the wake of its expansion from the sixteenth century onward, Europe moved from an initially appreciative attitude toward the technology of the non-Western world to an increasingly negative one in the age of industry and empire. Machines became “the measure of men,” the standard by which Europe came to understand its uniqueness and superiority, and, by contrast, interpreted the backwardness and inferiority even of civilizations, like India and China, once held in high regard. Adas offers a cogent argument for a cultural reading of technology in the imperial era, but his argument also suggests the possibility of alternative readings. Indeed, one can embark on a discussion of everyday technology in India by inverting his argument and asking not how Europe imagined its technological other but how that other—India under colonial rule—imagined itself. Adas observes that the “extent to which African and Asian peoples acquiesced
CHAPTER TWO
Modernizing Goods

From Transferred Goods to Acculturated Technologies

Beginning in the late nineteenth century and increasingly by the 1920s and 1930s, India, like many other parts of the non-Western world, became a market for an entirely new set of industrially produced consumer goods and small-scale machines. Among the most conspicuous and widely disseminated of these "modernizing goods," ranging from the domestic to the light industrial, from the utilitarian to the recreational, were sewing machines, gramophones, typewriters, bicycles, cameras, clocks, and watches. Before 1914 hardly any of these machines were made in India, though they were in many cases assembled and repaired there. They can be understood as examples of the way in which industrialization in Britain, western and central Europe, and the United States was creating global markets, and in the process forging new consumer tastes and founding the regional reputation of international brand names like Singer, Raleigh, Kodak, and Remington.

It is possible, too, to see the history of these mechanical commodities (along with earlier and grander ones like railroads, steamships, and telegraph systems) as examples of the “transfer” or “diffusion” of modern technologies outward from the West to the less economically advanced and technologically privileged regions of the world. In most cases, though, it was the products of new industrial processes that were disseminated, or the basic skills required for their operation and use, rather than the actual ability to make the goods or develop the industrial processes required for their local production. Following this line of argument, the social construction of technology accordingly occurred elsewhere, and not in countries like India, which were the recipients of machines whose design and utility had been established in and for very different societies. With respect to India, as in relation to many other colonial or semicolonial societies, the process of “technology transfer” has been directly linked to imperialism. Imperialism created the physical infrastructure and socioeconomic conditions through which new mechanical commodities could be introduced and find markets. Or, more critically still, imperial control and the favored status of foreign firms precluded or inhibited local production. Unlike Britain or the United States, colonial India lacked a substantial small-arms industry to provide the entrepreneurial and technological foundation for the manufacture of sewing machines, bicycles, and, latterly, automobiles. Nor, under colonialism, did India have the political freedom to create its own tariff walls and so exclude foreign manufactures. Like locomotives, steamships, and firearms before them, such novel commodities as sewing machines, bicycles, and gramophones long remained imported goods. The profits from their sale, and, no less significantly, the technological expertise gained through their manufacture, accrued elsewhere.

A technology transfer argument helps to explain how commodities like the sewing machine and bicycle came to India when and how they did. It might also suggest some of the reasons why, under imperialism, indigenous production struggled to compete with imported goods. But, except in its subtler forms, the transfer argument provides little explanation as to why some imported machines became widely adopted while others did not. It fails to explain why some social groups took to their use, and others didn’t, or how certain kinds of “modernizing goods” acquired a cultural, social, and political significance and so, despite their foreign origins, became integral to indigenous ways of thinking, working, and being. And, given that in India it was often, by global standards, the paucity rather than the plenitude of modern consumer goods that was so striking, a technology transfer argument does not in itself account for the relatively rapid process of cultural absorption as well as technological as-
The Coming of the Sewing Machine

In recent years the history of the sewing machine has attracted wide historical interest—not only for North America and western Europe but also for Latin America, the Middle East, and South and East Asia. This is unsurprising. Light and easy to use, the sewing machine was one of the first machines to find a global market. Its cheapness and mobility enabled its use in factories and households but also in relatively remote rural areas. One of the first machines to enter the home and make use of women’s labor, the sewing machine had a near-global impact on work practices and fueled the rise of the modern, and increasingly global, garment industry. Although sewing machines were made in Britain, Germany, and other countries as well, until the 1930s the international trade was dominated by American manufacturers, especially Singer which also introduced new forms of business organization and pioneered novel sales techniques. A commodity made possible by modern industrial mass production, the sewing machine was also the beneficiary of the post-1870s expansion of world trade, the network of steamships, railroads, telegraphs, postal services, and newspapers that facilitated its rapid dissemination and growing popularity. Emblematically modern, the sewing machine in turn encouraged the adoption of other small-scale domestic and light industrial machines. Like the bicycle, it became one of those items of consumption emerging economies—like Japan, Brazil, India, and more recently China—sought to replicate and manufacture for their own or international markets. Given its international history, the sewing machine offers a primary example of a history that is both technological and social, and one which, as well as illustrating global patterns of dissemination, demonstrates, no less emphatically, how societies responded differently to the same technological good.

Sewing machines were first introduced into India in the late 1850s (the same decade that saw the birth of its railroads), but they only began to arrive in the country in significant numbers in the 1890s. Although, in discussing global sales of Singer sewing machines, Andrew Godley remarks that sales in India “remained insignificant” in the period up to the end of World War I and by 1916 had barely reached even 1 percent of Indian households, the impact of the sewing machine, socially as well as commercially, was far greater than this meager statistic would suggest. Despite the economic and social constraints, including “arrested development” and endemic poverty, which accounted for low levels of Indian demand, between 1900 and 1950 more than two million sewing machines were imported into India (see tables 2.1 and 2.2). While the Indian market was not as large and receptive as those of many European or even Asian countries like Japan and the Philippines, imports quadrupled between 1900 and 1914, underscoring the importance of this period to technological change in India. Despite the partial boycott of foreign goods caused by the swadeshi movement and the impact of World War I on global manufacturing and trade, the volume of imported machines continued to rise until 1916–17, before declining sharply with the postwar trade slump in 1921. As with other imports, sewing machines reached a high point in the late 1920s until the Depression, which halved India’s foreign trade between 1928 and 1933, brought a further fall. Imports rose again in the mid-1930s reaching a peak in 1936–37, when just over ninety thousand machines entered India. The contrast with Japan is instructive: there Singer sales also peaked in 1937 but, faced with indigenous competition, began to fall rapidly thereafter. In India there was
as yet no local competition. Imports dropped during World War II but reached new heights in the late 1940s and early 1950s. Thereafter, stiff import duties and the indigenization of sewing-machine production finally began to impact on the sale of foreign machines in India.

Although slow to enter the Indian market—Singer's first machines were not sold there until 1875, twenty years after its operations began in the United States—the Singer Sewing Machine Company, America's "first international company," made the vast majority of sewing machines sold in India during the colonial period. Sewing machines formed part of that array of goods—from clocks and cash registers to typewriters, electric fans, and telephones—entering South Asian markets by 1914 that came not from Britain, the colonial power, but from the United States and that drew primarily upon American rather than British or European technical expertise. Under British India's free-trade regime, it was possible for American goods, like those of other industrial nations, to compete with and substantially outsell those made in Britain. In this respect, conventional ideas of a British Empire dominated by British goods need to be revisited and the extent of America's cultural, commercial, and technological penetration of India by the 1930s more fully recognized. However, from the early 1880s most of the "American" sewing machines reaching South Asia came from Singer's Clydebank factory near Glasgow and so entered Indian trade statistics as British manufactures. As early as the 1850s Singer had recognized the limits of US domestic demand and systematically set out to capture overseas markets. Initially the company faced tough competition from such British firms as Willcox and Gibbs, whose machines appear in many photographs of European domestic scenes in late nineteenth-century India. It also competed with the American company Wheeler and Wilson, which was the first sewing-machine manufacturer to establish itself in India, but which was eventually taken over by Singer in 1907.

By the early 1900s Singer machines dominated the South Asian market, as they did most other parts of the world. However, Singer never entirely excluded competitors like the German maker Pfaff, which began producing sewing machines in the 1860s, and which by the 1920s and 1930s was energetically seeking markets overseas, including Brazil and India. In 1900, 74 percent of the sewing machines imported into India were British-made compared to 5 percent each from Germany and Belgium, and less than 1 percent from the United States. On the eve of World War I the British (mostly Singer) market share had dropped to just over 66 percent while the German portion had risen to almost 32 percent. In the 1920s and 1930s the British and German shares remained at roughly the same level, about two-thirds and one-third, respectively. World War II again eliminated German competition and in the late 1940s, when almost 90 percent of the sewing machines imported were from Britain, Singer held "a semi-monopolistic position" in the Indian market. With its foreign rivals removed, Britain in 1948–49 exported nearly
fifty-one thousand sewing machines to India, while the United States, Germany, Sweden, Japan, and Italy together sent barely four thousand. Although dwarfed by machine imports for the textile and railroad industries, this was, and long remained, a lucrative trade: in 1913–14 the value of imported sewing machines was put at £238,805; by 1920–21 it had reached £552,565 (with a further £128,013 in sewing-machine parts). In 1937–38 imports were worth Rs 6,665,809.¹

Thereafter, the position began to change. The ready-made garment industry developed rapidly in India in the 1960s and 1970s: German and Japanese competition, especially in the market for industrial sewing machines, grew at the expense of British and American makes. In addition, Indian manufacturers, helped by new import controls, began to win a dominant share of the domestic market and to export locally made machines to other Asian and African countries. As the number of sewing machines in operation rose between 1950 and 1961 from 145 to 742 for every million of the population, they, like bicycles and radios, became one of the key indices used to indicate improving living standards in India.⁷

Until the early 1950s, Indian manufacturers presented little threat to foreign manufacturers. Three small-scale sewing-machine producers were established in the late 1930s: Jay Engineering, which made the “Usha” brand in Calcutta; the Delhi Sewing Machine Company, whose first machines were marketed in 1938; and the Indian Sewing Machine Manufacturing Company in Lahore. But all three remained heavily dependent on imported components (including such essential items as steel needles) and they struggled to compete with such well-established makes as Singer and Pfaff in terms of quality and after-sales servicing. Although during the war India had been “starved” of sewing machines, with supply falling far short of demand, restrictions on materials, like high-grade steel, inhibited indigenous production, and factory machinery was diverted to making munitions.

¹In the nineteenth century, an Indian rupee (Re) was officially valued at a tenth of a pound sterling (£) or 2 shillings. By the mid-1920s its value had fallen to 156d and by the mid-1930s is 4d.

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<td>1951–52</td>
<td>28,872</td>
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and war materiel. When production resumed in 1946–47, fewer than eight thousand sewing machines were made in India, rising to seventeen thousand by 1948–49, still less than a third the number of imported machines. It was only in the late 1940s that Indian manufacturers were in a position to expand and profit from the active support of the new government of India.

But a history of technology that isn’t also a history of the people who use it doesn’t make much social sense. Despite the kind of colonial rhetoric noted in the previous chapter, in which Indians were seen as averse to innovation and suspicious of new technology, there is little evidence of significant cultural resistance to sewing machines. Indeed, despite their small numbers before 1914, they passed almost effortlessly into everyday use. In India, as elsewhere, such products of modern science and technology "swiftly moved," as James Masselos has put it, "from [being] objects of wonder to objects of use; they became part of the daily round of living. Neither social constraints nor the force of custom inhibited significant use of the achievements of the nineteenth-century world." ⁹

This process of assimilation will be further elaborated in the following chapters, but it can be noted here that the sewing machine was a remarkably successful technological implant, a readily accessible machine that required very little capital investment or prior acquaintance with machinery to speed its introduction. Many "traditional" tailors were illiterate and relied on their employers to provide them with their machines. A detailed study of darzi family budgets in Madras city (now Chennai) in 1938 showed that it required only Rs 50 to set up a tailor’s shop. It cost about Rs 200 (the equivalent of ten months’ income for a
tailor) to buy a new machine, but one could be purchased secondhand for far less or hired for between Rs 20 and Rs 50 a month. Alfred Chatterton, whose enthusiasm for small machines has already been noted, remarked shortly before World War I that Singer sewing machines were to be found “in almost every tailor’s shop in the country.” Although they were “somewhat delicate and complicated” pieces of machinery, he observed, “the facilities for the repair or renewal of parts have been so widely diffused that the tailors find no difficulty in keeping them in working order.”

Without the fanfare that greeted the coming of the railroad, the sewing machine was widely, if sometimes cautiously, welcomed as a harbinger of change, reaching into even the remotest Indian villages. However, as with much else about the dissemination and reception of everyday technology, the evidence is fragmentary and often anecdotal, but works of fiction provide one useful indicator. Thus, in Rudyard Kipling’s novel, when Kim first encounters a gramophone he is able to recognize it as being “some sort of machine, like a sewing machine.” It looks and smells rather like the sewing machines he already knows from the backstreets of Lahore. The visibility and audibility of the sewing machine in bazaars and roadside tailors’ shops made its presence, and the dexterity of the tailor who worked it, a familiar trope in fictional accounts of Indian life. In Mulk Raj Anand’s 1930s novel, Untouchable, Bakha, the uneducated untouchable of the title, is said to be absorbed in wonder at the “manipulation of a sewing-machine” by a tailor in the bazaar.

During their tour of India in 1912, Sidney and Beatrice Webb encountered sewing machines in the classroom of a Hindu girls’ school in Allahabad and in Peshawar in the North-West Frontier Province, where tailors sat on the floor of their tiny shops, “working Singer’s sewing machines.” In cities such as Calcutta (Kolkata) and Dacca (Dhaka) large tailoring establishments sprang up to meet the demand for ready-made shirts, coats, and uniforms. Sewing machines found a particularly lucrative market in Punjab, especially in Lahore and Amritsar. Across the province as a whole the number of those employed in tailoring and allied occupations rose by 40 percent between 1901 and 1911. In Lahore, the largest city in Punjab, with its rail workshops and army cantonment, the local demand for uniforms spurred the growth of clothing factories. Such enterprises anticipated the later rise of the South Asian garment-making sweatshop. In this respect, the impact of the sewing machine on the mass production of cheap clothing was not very different from the Western experience, though it occurred rather later.

Nor was it only town tailors who took to sewing machines. In a still mainly rural society, penetration into the countryside remained an important marker of the effective dissemination of any modern machine. It was, therefore, significant that in Punjab in 1911 there was “hardly a tailor now without a sewing machine. Even in the villages a tailor would beg, borrow, or steal to equip himself with a cheap machine, and, if he cannot find enough customers in one village, he will rather set apart a certain amount of time for regular rounds and attach himself to a group of villages.” Darjis and their machines soon became a common sight—and sound—across rural India. In 1927 Margaret Read noted, “Almost every village tailor now has a sewing machine, whose tick-ticking makes a strangely alien sound in the street where the thick dust muffles all sound of footsteps, human or animal.” She was not alone in finding the presence of a “town Darji” at work in the village, “amid surroundings of apparently the most incongruous simplicity.”

The Advent of the Bicycle

Like sewing machines, bicycles were a pioneering technology. As elsewhere in the world, they met the growing demand for a cheaper, simpler, and more autonomous mode of individual transport than horses, carriages, and railroads could provide. They gave to men, women, and children a new sense of mobility, created the possibility of increased sociability, and, until their popularity waned, offered a new public stylishness. The durability and versatility of the “safety bicycle” by the close of the nineteenth century allowed it to be used for work as much as pleasure,
Chapter Two

for country roads as well as urban streets. The recreational and therapeutic value of cycling was widely touted. In what became a near-universal craze, cycle clubs and cycling magazines sprang up almost everywhere. The bicycle in turn provided the pioneering technology and demonstrated the market potential for the subsequent rise of the automobile and motorbus.

India was not immune to these developments. Even though the manufacture of bicycles required a more advanced engineering industry than existed in South Asia before the 1930s, India imported large numbers of bicycles and had the capacity to assemble and repair machines. There, as elsewhere, bicycles were the beneficiaries of the urban and rural road network that had been developed under colonial rule and was greatly extended after 1900 with the coming of the automobile and motorbus. By the 1920s Indians riding bicycles were common sights in cities, towns, and villages, traveling to and from work, carrying friends and family members on the crossbar or rear carrier, hawking goods, or, as one still sees today in India as in much of South and Southeast Asia, transporting all manner of bulky commodities—sacks of grain, kerosene cans, old tires, timber, bricks, and baskets of chickens.

Bicycles began to enter India in significant numbers in the 1890s but were only entered separately in government trade returns in 1905 and then at first by value, not quantity. In 1905–6 bicycle imports were worth Rs 1,615,720, with the bulk of machines arriving from Britain. The figures for the forty years from 1912–13 to 1951–52, given in tables 2.1 and 2.2, track much the same erratic progress for bicycle imports as for sewing machines. In the years following World War I (as sales of automobiles and motorcycles also increased) bicycle imports rose substantially. In 1920–21 roughly three times as many bicycles as automobiles were imported into India (47,000 to 15,000), though bicycles were worth only a fraction of the value of automobiles. In numerical terms, in the mid and late 1920s bicycles began to overtake and then outstrip imports of sewing machines, peaking at 142,052 in 1929–30. Thereafter, like other imports, they slumped in the early 1930s but recovered strongly to 170,664 in 1937–38. Before 1914 new bicycles were relatively expensive, costing between Rs 85 and Rs 250, but during the Depression the falling price of bicycles, in many cases dropping below Rs 50, made them increasingly affordable. World War II brought cycle imports almost to a standstill, but they surged again after the war, reaching unprecedented heights in the late 1940s and early 1950s. By that time the cost of purchasing or maintaining a bicycle had become a standard part of lower middle-class household budgets. Overall, between 1912 and 1946 around 2.5 million bicycles were imported into India, on average about 70,000 a year, but a further 1.2 million bicycles entered India in the years between 1947–48 and 1951–52, equivalent to more than 200,000 a year.

Of the four technologies taken up in this book, bicycles have perhaps the strongest claim to being items of mass consumption. It is indicative of increasing Indian use that Dr. Aziz in E. M. Forster’s 1920s novel A Passage to India first appears riding a bicycle. An article in the Illustrated Weekly of India claimed in April 1939 that there was now “hardly a village in India where at least one bicycle is not in use. As a cheap means of transport the bicycle has come to stay.” And yet, given the poverty of India and the size of its population, the same caveats apply to bicycles as to sewing machines. Even in the late 1940s the ratio of bicycles to population in India was much lower than in most Western (and many Asian) countries. It was calculated in 1946 that of the world’s 70 million bicycles, India, despite having around 400 million people, had only 1.5 million bicycles. This was equivalent to less than four bicycles for every 1,000 Indians, compared to 255 for every 1,000 inhabitants in Britain, 463 in the Netherlands, and 539 in Denmark. However, if we take into account the concentration of bicycles in urban areas, and the predominance of adult male users, perhaps as many as one in every ten men in a city like Madras in the 1930s owned or used a bicycle. The 1950s saw a further leap in bicycle use across India, with cycles available for hire even in small towns and villages. Perhaps it is only at this point that one can accurately speak of India having entered the “cycle age.” However, in 1960 when Jawaharlal Nehru, the prime minister, used that phrase, adding that the bicycle
had "invaded the villages" and become "a very popular means of transport all over India," he did so with evident regret that India was still a long way from joining advanced industrial nations in the age of electronics, jet travel, and atomic energy.23

Unlike some everyday technologies (such as typewriters, which were largely imported from the United States), until the 1960s the great majority of India's bicycles were made in Britain. They came from a number of different manufacturers, such as Hercules, BSA, and Rudge-Whitworth, but by the 1940s Raleigh had emerged, like Singer among sewing-machine manufacturers, preeminent, partly through a similar process of absorbing smaller rivals. There was competition in the interwar years from European makes and cheap imports from Japan. A fully-equipped Raleigh bicycle in the mid-1930s cost Rs 60, and other British or locally assembled machines between Rs 40 and Rs 50, but a Japanese bicycle could be bought for as little as Rs 19. And yet, despite their cheapness, Japanese bicycles never acquired the prestige of British makes and were considered less durable in Indian conditions: they peaked in the mid-1930s at barely 8 percent of the import market.

Not all technological goods, however, were acquired or gained circulation through purchase or by means of loans. Bicycles were supplied by employers for office workers and low-ranking government servants, such as policemen, postmen, telegraph boys, and sanitary workers. Poorly supplied with public transport, the vast expanses of the new imperial capital, New Delhi, necessitated the grant of bicycle advances and loans for government employees to get to and from their places of work. Bicycles were also stolen or obtained by fraud in significant numbers. In Madras city in the mid-1930s cycle thefts averaged around 230 a year; by 1938 that number had risen to 440 (admittedly only a tiny percentage of the estimated 33,000 bicycles in Madras at the time). Bombay and the cities of northern India were similarly plagued by bicycle thieves, with Bombay alone reporting more than a thousand thefts in 1939.24 In some places organized gangs of bicycle thieves were at work; in others cycles taken out on loan were never returned. Despite the efforts of the police, few thieves

![Figure 2.2](image-url) Since their introduction more than a century ago, bicycles have proved their value transporting goods as well as people. Here a laborer in present-day Thanjavur in south India carries sugarcane to market. Author's photo.

and fraudsters were detected, and most stolen bicycles quietly disappeared into the anonymity of the backstreets, suburbs, and villages.

The bicycle and its components lent themselves to a variety of additional uses. Bicycles were adapted by local blacksmiths
to make three- or four-wheel carts for transporting and selling goods as well as to make cycle rickshaws. In the 1920s one enterprising Calcutta firm offered for sale a "patent water cycle" whose only use appeared to be for duck shooting. The bicycle's saddle, pedal, crank, and chain could provide the mechanism for an experimental foot-powered loom, and one can still see today, on the streets of Mumbai or Ahmedabad, a knife grinder who raises his bicycle onto its stand and then uses the pedals and crank to turn a grinding wheel attached to the frame. The bicycle became a font of further local inventiveness.

The Immigrant Typewriter

Of the four main technologies examined in this book, typewriters might appear least eligible for consideration as "everyday" objects. They might be regarded, with some justification, as a technological good almost entirely confined to urban offices and literate elites, remote from popular technological encounters. Certainly typewriters were not cheap: in the late 1930s a new Remington machine might cost as much as Rs 316, several times the asking price of a bicycle. However, there are a number of reasons for the inclusion of typewriters. Along with sewing machines, bicycles, cinema, cameras, and gramophones, typewriters formed part of a series of innovative technologies developed in the second half of the nineteenth century that served, on a global scale, to articulate a new sense of modernity. As an advertisement for the Chicago-made Oliver typewriter insisted in 1904, "All progressive people should see this machine." Although India did not (for reasons we will see shortly) fully share the sentiment, the typewriter was widely seen internationally as an exemplification of modernity for its speed and convenience, for its mobility and its bureaucratic utility, and as a vehicle for artistic self-expression. Just as the bicycle introduced the foot pedal as a means of propulsion, so typewriters pioneered the manual keyboard and so helped pave the way for the computer. Typewriters are still used in India to test the keyboard skills of some applicants for government jobs.

The typewriter did not serve the creative needs of individual writers alone. It was also at the heart of the modern office, that "oasis of modernity" as Dikötter describes it in relation to modern China. There it functioned alongside a cacophony of other machines—telephones, electric fans, duplicators, calculators—that transformed bureaucratic work regimes while demanding new operational skills. In many parts of the world, the typewriter brought women into the modern workplace or helped them acquire a new status as writers, journalists, organizers, and activists. Sadly, the typewriter's social and technological impact is less well documented for India than for most Western countries. Histories of Indian business houses pass over the coming of the typewriter with such unhelpful observations as: "The revolutionary effects of this apparatus on office routine need no description or comment." And yet it is clear that in cities like Calcutta, Bombay, and Madras the typewriter, like the automobile and the electric tram, signaled the "advent of a new era." Just as home, street, and factory became prime sites for many other new technologies, so the typewriter made its noisy appearance in government and business offices, homes, clubs, welfare societies, and political organizations, transforming the ways in which novelists, journalists, politicians, and administrators pursued their daily work.

We are accustomed in the West to think of the typewriter as an indoor object, but it is still possible to see in India groups of typists sitting outside post offices and law courts, perched on stools in front of now antiquated machines, bashing out petitions, letters, and affidavits. In his novel A Fine Balance, set in Bombay in 1975, Rohinton Mistry describes typists outside the city's high court, "sitting cross-legged in their stalls before majestic Underwoods as though at a shrine, banging out documents for the waiting plaintiffs and petitioners." Forty years earlier, in 1936, the Illustrated Weekly complained about typists who had "planted themselves on the pavement" outside Bombay's central post office, obstructing passersby and forcing them to walk in the gutter. It was even alleged that the typists slept on the sidewalk alongside their machines and had their mail delivered there.
Observing pavement typists today, one gets a sense of the way in which the typewriter and other machines that became denizens of the Indian street or functioned along its margins served as the site of a new sociability, as the typist, the cycle repairman, the tailor, or the rice-mill operator chats with his (less likely her) customers or fills idle time gossiping, smoking, and drinking tea.

The volume of typewriters imported into India never matched that of sewing machines and bicycles. Between 1910 and 1950 about half a million typewriters reached India, a quarter of the number of sewing machines. It is impossible, though, to quantify the additional number of typewriters, especially portables, which entered India as personal effects. Before World War I the number of imported machines was small—barely a thousand in 1901–2 and rising to only 6,267 in 1913–14. As with other mechanical imports, the war restricted supply. Once it was over, there was a surge in imports in 1920–21, before demand fell back and only gradually recovered over the course of the decade. In 1928–29 typewriter imports stood at 21,487, the highest figure reached until the end of World War II. Even so, despite a dip in the early 1930s as the Depression hit India and forced retrenchment in government offices and commercial firms, typewriter imports remained buoyant for most of the 1930s until war again intervened.

More remarkable than the scale of typewriter imports was their provenance. In 1906–7 the bulk of machines came from Britain: of the 3,794 imported in that year, 59 percent came from Britain, 39 percent from the United States, with barely a dozen from the next nearest supplier, Germany. But already by 1909–10 American machines had begun to outstrip British makes: 59 percent of the 3,395 typewriters imported that year came from the United States and only 39 percent from Britain. As with automobiles, World War I, which saw British and European manufacturing diverted to military needs and caused serious disruption to international shipping, strengthened the hold of the United States on the Indian typewriter market until it became a virtual monopoly. In 1915–16 three-quarters of India’s typewriters were imported from the United States, and in 1920–21, as post-

**Figure 2.3.** The distribution of Remington branches and outlets across South Asia in 1939 indicates how widespread the sale of typewriters had become. Map drawn by Julie Snook, FBCartS.

War sales spiked, American machines commanded 83 percent of imports in a market worth £363,314 (with a further £35,605 in spares). The United States maintained this supremacy through the Depression and into the late 1930s with over 90 percent of typewriter imports. As late as 1952, when less than a thousand British typewriters entered India and American domination of the market was beginning to slip, nearly two-thirds of imported machines were made in the United States.

That the typewriter market in India was dominated by American manufacturers is unsurprising given that it was "a predominantly American gadget." Just as Singer ruled the sewing-machine world, so Remington, whose typewriter enterprise evolved from its small-arms expertise in the 1870s, held sway over India's typewriter empire. Occasionally, Underwood, the closest Ameri-
can competitor, protested against Remington's virtual monop-
oly in the supply of typewriters to government offices but to no
avail. Like bicycles, portable typewriters (of which Remington
claimed to have sold an astounding thirty-five thousand in India
by 1928) were sufficiently cheap and desirable to be offered as
prizes at sporting events or in promotions for other consumer
items like cigarettes. Following a trajectory similar to Singer's a
decade earlier, Remington steadily expanded its outlets in India.
In 1920 the company had fifteen branches in India (as well as one
in Colombo, Ceylon being another significant market for sewing
machines, bicycles, and typewriters). By 1939, this had risen four-
fold to sixty-two branches across India alone. As well as major
administrative centers in British India, small but commercially
vibrant towns, like Bezwada and Belgaum, had Remington offi-
ces. Other locations included the capitals of India's princely
states, hill stations, rail junctions, cantonments, and regional
hubs for the tea, indigo, and coal industries. Remington's Delhi
head office controlled a further seven branches in Ceylon, Burma,
Malaya, and Singapore, an illustration of India's centrality to the
wider commerce of South and Southeast Asia.35

The Rise of the Rice Mill

The sample of everyday technologies considered in this book re-
late mainly to urban life, though, as we have seen, by the 1930s
sewing machines and bicycles had infiltrated country areas as well.
But, as pointed out previously, rural society was one of the
principal locations, arguably the principal location, for colonial
ideas of both technological inertia and "improvement." India was
seen to be a largely rural, village-based society. As indigenous
textile production shrank in the face of British industrial com-
petition, the country's main contribution to overseas trade was
seen to lie in its agricultural sector, with raw materials like jute
and cotton, with such plantation commodities as tea and coffee,
or foodstuffs like wheat and rice. Many of the trades that were
seen to be most in need of technological innovation, or were
thought destined for technological oblivion, were to be found in
the villages, just as recurrent famine highlighted the vulnerabil-
ity of weavers and other rural artisans hit by the loss of custom-
ary "entitlements." However, it is too simplistic to assume a stark
distinction between urban and rural India when so many eco-
nomic activities, including those of handloom weavers, spanned
town and country or entailed a symbiotic relationship between
the two.36 The typewriter might remain an essentially urban phe-
nomenon, but other everyday technologies like bicycles, sewing
machines, and rice mills made use of close rural-urban linkages
or brought small-time rural capitalists into close association
with urban trade and industry.

As seen, too, in chapter 1, many of the exhibitions and fairs
staged by the British in the second half of the nineteenth centu-
ry were aimed at landlords and peasants. Much of the frustration
felt by colonial officials at the apparent failure of these exercises
in technological dissemination was rooted in the conviction that
the countryside was so sunk in tradition as to be largely imper-
meable to technological change. The resistance of handloom
weavers, many of them based in small towns and villages, to the
introduction of the fly shuttle and other adaptations reinforced
the perceived futility of expecting change in the countryside.

The rise of mechanized rice milling in the late nineteenth and
early twentieth centuries demonstrates, by contrast, how small-
scale mechanization could enter the countryside just as much as
the towns. It further shows how radical, machine-led changes in
the nature of food preparation and consumption had a social and
technological impact comparable to the kind of changes that the
sewing machine wrought with respect to clothing or the bicycle
with regard to transport and urban employment.

Rice was one of the most widely consumed cereal crops in
India as in much of Southeast and East Asia. But harvested rice
grains (paddy) can't be eaten until the tough outer husk is re-
moved. Traditionally, as discussed more fully in chapter 5, this
was done by pounding the raw rice by hand until the broken
husk could be separated from the inner grain. From the mid-
nineteenth century, however, mechanical rice milling, using en-
gines powered by steam, oil, or electricity, was introduced. The
raw grain was propelled against a rapidly rotating drum or stone cylinder, or struck against a sharp blade (still known in south India as a “knife”), until the outer husk was struck off. Husked rice could then be subjected to further buffeting and polishing to produce a clean, white grain, from which even the inner skin (the pericarp) was removed. Pioneered in the southern rice-growing regions of the United States, rice milling had begun to enter India, and more especially Burma (as part of the Indian Empire), with its huge, export-oriented commercial paddy production, in the closing decades of the nineteenth century. Unsurprisingly, given the origins of mechanical rice milling, the earliest machines employed were American Engelberg hullers, bringing India into indirect conversation with the plantation economies of the old South. Widely advertised and exhibited in early twentieth-century India, Engelberg machines remained in common use until at least the 1930s without achieving the market dominance associated with Singer sewing machines, Raleigh bicycles, and Remington typewriters. The component parts and overall design of the rice mill were much easier to replicate locally than the intricate mechanisms of the sewing machine or typewriter. Even before World War I rice mills were one of the machines most frequently encountered in paddy-growing regions. In Punjab, more a wheat-growing province than a rice-producing one, husking machines were replacing rice pounding in many districts by 1911. Rice mills seldom arrived in technological isolation but in company with other small machines. By the 1940s, it was said to be a “common experience” in the Indian countryside “to hear the ‘chug-chug’ of a little engine either crushing sugar-cane, or pressing oil[seeds], or milling rice.”

It is, however, difficult to establish the scale of the importation of husking machines. Rice-milling equipment seldom appeared as a separate category in returns of India’s seaborne trade, being subsumed instead under the amorphous heading of “machinery and mill work,” along with flour mills, jute mills, and cotton gins. In 1920–21 machinery formed the third-largest category by value of imports into India, being worth an estimated £24 million (Rs 2.4 million). In 1929–30 rice- and flour-milling machinery were together worth Rs 2,374,691, but this slumped to Rs 881,091 in 1932–33 as the Depression deepened. By that time the bulk of milling machines came from Britain, followed by the United States and Germany; some mills were also being manufactured in India. A more dependable guide to the changing use and distribution of rice-mill technology is to be found in figures for the number of rice mills and their employees. These show the early lead and continuing dominance of Burma, until 1937 a province of British India, but also the gradual, if erratic, penetration of rice mills across the country.

Although rarely discussed in the same breath as other leading industrial enterprises, such as textile mills or railroads, by the early 1920s rice milling formed the sixth-largest industry in India in terms of the daily workforce employed, though at fifty-nine thousand workers this was only one-sixth the size of the cotton and jute industries. From the 1880s, up until about 1910, rice milling was heavily concentrated in southern Burma with a score or more large mills lining the banks of the Rangoon River, alongside the petrol storage tanks, sawmills, and timber wharfs that similarly typified Burma’s export economy. In 1901 almost one in ten of the population of Rangoon was employed in rice mills. From about 1910 onward mills began to be established, on a far smaller scale than in Burma, in the paddy-growing areas of the Madras Presidency—principally along the canals and waterways of the Kistna–Godavari delta in Andhra and further south in the Cauvery River delta in Tanjore (Thanjavur). Unlike their counterparts in Burma, many of these “factories” consisted of little more than a single oil-powered engine and a solitary milling apparatus, under a thatch or corrugated iron roof and with crude brick or even mud-and-wattle walls. But others were grander affairs, with solid walls, a couple of oil or electric engines, and tall boiler-house chimneys. Like flour and sugar mills, cotton gins, cement works, and brickyard chimneys, rice mills announced the creeping industrialization of the countryside, a phenomenon evident to any traveler passing through rural India today. Between 1910 and 1930 rice mills proliferated rapidly in the Madras Presidency, erupting from towns like Ellore and Tanjore...
### TABLE 2.3. Rice mills in selected Indian provinces, 1900–1939

<table>
<thead>
<tr>
<th>Year</th>
<th>Madras</th>
<th>Bengal</th>
<th>Bombay</th>
<th>Burma</th>
</tr>
</thead>
<tbody>
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<td>0</td>
<td>0</td>
<td>83</td>
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<td>0</td>
<td>96</td>
</tr>
<tr>
<td>1903</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>188</td>
</tr>
<tr>
<td>1904</td>
<td>3</td>
<td>0</td>
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<td>161</td>
</tr>
<tr>
<td>1909</td>
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<td>0</td>
<td>0</td>
<td>164</td>
</tr>
<tr>
<td>1910</td>
<td>56</td>
<td>0</td>
<td>0</td>
<td>165</td>
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<td>0</td>
<td>165</td>
</tr>
<tr>
<td>1912*</td>
<td>68</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>1913</td>
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<td>0</td>
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<td>1914</td>
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<td>0</td>
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<td>1915</td>
<td>115</td>
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<td>0</td>
<td>281</td>
</tr>
<tr>
<td>1916</td>
<td>127</td>
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<td>332</td>
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</tr>
<tr>
<td>1930</td>
<td>493</td>
<td>345</td>
<td>80</td>
<td>613</td>
</tr>
<tr>
<td>1931</td>
<td>317</td>
<td>314</td>
<td>27</td>
<td>589</td>
</tr>
</tbody>
</table>

* Source: Annual reports on the Indian Factory Act by province.
** New legislation in force from 1932 and 1935 changed the definition of a factory according to the size of its workforce.
*** Following the separation of Sind from Bombay, 1936.

### TABLE 2.4. Average daily number of rice-mill workers, 1910–1940

<table>
<thead>
<tr>
<th>Year</th>
<th>Madras</th>
<th>Bengal</th>
<th>Bombay</th>
<th>Punjab</th>
<th>Burma</th>
</tr>
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<tbody>
<tr>
<td>1910</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>18,478</td>
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<tr>
<td>1920</td>
<td>8,089</td>
<td>3,604</td>
<td>n/a</td>
<td>186</td>
<td>35,686</td>
</tr>
<tr>
<td>1930</td>
<td>15,796</td>
<td>12,225</td>
<td>777</td>
<td>429</td>
<td>42,137</td>
</tr>
<tr>
<td>1940</td>
<td>12,783</td>
<td>18,447</td>
<td>163*</td>
<td>366</td>
<td>41,626</td>
</tr>
</tbody>
</table>

* Source: Annual reports on the Indian Factory Act by province.
** The apparent decline in the Bombay Presidency was due to the creation of a separate province of Sind in 1936.

into surrounding villages. The great majority of south Indian mills were owned by local entrepreneurs, members of "rich peasant" and trading communities for whom the move into rice milling represented an opportunistic shift away from unprofitable agriculture into the more profitable realm of factory ownership, food processing, and small-scale manufacturing. Across India by 1937–38 there were estimated to be 1,135 rice mills operating throughout the year, with a further 175 functioning on a seasonal basis with the local rice harvest. Perennial mills employed 43,579
workers (with a further 3,710 workers in seasonal factories). With more than 400 each, the provinces of Madras and Bengal held the largest number of mills, but between 20 and 70 mills were also to be found in Bihar, Orissa, and Assam. In Punjab there had been hardly any rice mills before 1918, but by 1924 there were 25 of them, employing 571 workers.40

Rice milling was one of a cluster of expanding rural industries that used modern machines to process agricultural commodities: these included flour milling, cotton ginning, the crushing of sugarcane and oilseeds, and the decorticating of ground-nuts. These emerging agrarian industries were linked in various ways—through their dependence on global as well as local markets, in their shared use of power-driven machinery, and in the largely unskilled workforce they employed. A single factory might serve several purposes, moving from one commodity to another according to the harvest season or the strength of demand. But the milling industry was also unstable. In the Madras Presidency the hunt for quick profits caused the industry to become overextended in the 1920s, and it struggled to compete with cheap rice from Burma. As the Depression hit, the number of working mills in Madras slumped, as it did in other provinces, falling from 463 in 1930 to 317 a year later. The number of mills and their employees only gradually recovered and even in 1941 stood well below the 1930 figure.

Unlike other everyday technologies considered here, in which the more conventional power of hand and foot was primary, the rise of the rice-milling industry in India was heavily dependent upon the availability of steam power and still more the power generated by oil and electric engines. That reliance depended in turn on wider market conditions and a degree of state support. Madras was in the forefront here, encouraging the early spread of steam- and oil-powered engines and by the mid-1930s low-cost electricity supplied from government hydroelectric schemes. Chatterton, whom we have already encountered as a proponent of state-aided industrial development in early twentieth-century Madras, noted with some pride in 1911 that, in the main paddy-growing districts of Kistna and Godavari and further south in Tanjore, "the primitive methods of husking by hand have to a large extent been superseded by modern machinery." Partly through state assistance but also as a result of "progressive private effort," Chatterton commented, "a number of what may be termed rural factories have come into existence, which use machine processes usually on the smallest scale that it is practicable to employ them." Given the high cost of other fuels in Madras, "the internal combustion engine, on account of its very high efficiency, especially in engines of small power, is already very largely employed, and is likely to become in time almost the sole source of power." Here, for Chatterton at least, was evidence that, given the right environment and appropriate machinery, "improvement" could work.41 However, in 1910, acting in the name of laissez-faire orthodoxy, the secretary of state for India, John Morley, reined back state support for industry, and it was again left to private enterprise to foster the growth of rice milling and other rural and small-town enterprises.42

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Sewing machines, bicycles, typewriters, and rice mills were core elements in a wide-ranging process of technological diffusion and adaptation in India from the 1880s onward. These particular technologies and the goods, skills, and services associated with them were not the only ones that could be selected to exemplify this development, but they were among the most visible and momentous. Together they spanned town and countryside, encompassed princely states and British India, and marked out a role for the innovative (or greatly extended) mechanisms of pedal, treadle, keyboard, and rotating mill that were subsequently applied to other mechanical devices. The success of these modern machines was tied to their versatility, their low running costs, the small capital investment needed for their acquisition, the minimal levels of skill needed for their use, and the limited degree of state funding and sponsorship required. Although the supply of such machines was constrained by often adverse economic conditions and by the fluctuations of international trade, there was a generally upward trajectory to their importation and
use into the 1960s, by which time indigenous production largely replaced foreign-made goods. As examples like the sewing machine and bicycle suggest, the scale of use and the impact on society was less pronounced in India than in much of Europe and North America. Yet even so, the advent of these new technologies was beginning to have a substantial impact on the way Indians lived and worked, and to serve as evidence of a far wider Indian appetite for technological change.

CHAPTER THREE

Technology, Race, and Gender

Except in connection with slavery and the racial prescriptions that governed technological innovation (or its absence) in slave-holding societies, the history of technology has rarely engaged with issues of race.\(^1\) By contrast with the history of bodies, which in recent scholarship have been comprehensively sexed, classed, and ethnicized, machines have been widely discussed in connection with gender and class but seldom in association with race and ethnicity.\(^2\) And yet, throughout most of the period from the 1880s to the 1940s, race had a very significant bearing on the understanding and use of technology, especially everyday technology, in India as in many other European colonies. Who sold a machine to whom, who used that technology or was displaced by it, who gained prestige or lost status by its use—these were questions in which issues of race repeatedly asserted themselves.

Just as race can be seen as "the most obvious mark of colonial difference," so can it be understood as one of the main ways in which technology acquired social meaning.\(^3\) Race was used to signify technological aptitude (or the lack of it), and to place the stamp of seemingly scientific authority on claims for modernity or for its denial. And yet race seldom operated alone. It was commonly qualified or reinforced by reference to class and gender, both of which had a critical role in defining the uses to which technology was put and the meanings assigned to it. But, in India, as in many other colonized societies, race ideology and practice tended to take precedence over class or subsumed issues of gender. There was, though, always an element of instability in the racialization, as in the gendering, of technology. And there always lurked the subversive possibility of empirical and ideological challenges to ascribed race and gender attributes. Our
interest in this chapter thus lies with issues of how, by whom, and to whom small machines were sold or by what other routes they encapsulated, transgressed, or transformed racial boundaries and gender divisions.

Sewing Machines as Racial Goods

In the West, guided by considerations of gender, the bulk of sewing machines were sold for women’s use, especially in the home. Sewing machines became closely associated with women’s work and the rise of women consumers. Singer prided itself on selling machines that did more than perform a utilitarian task. Especially after the introduction of its “new family model” in 1865, its machines were intended to be attractive pieces of furniture that would sit stylishly in any middle-class parlor. The domestic context of the sewing machine was further exemplified by the way in which in Western countries the salesman, or his wife, would visit the purchaser at home to explain how her gleaming new machine worked.

Initially, Singer, which sought to pursue a common sales strategy throughout its vast commercial empire, thought in similar terms with respect to the Indian market. There, however, with gender transmuted by race, the assumption was that only women who were either Europeans or Eurasians (officially designated “Anglo-Indians” from 1911 onward) were likely to buy and use such innovative machines. Europeans (and the darzis they employed) were certainly among the first to use sewing machines in India. They either purchased them from local agents or brought them in their household effects from Britain. Others were sold or passed on secondhand among European residents. It was widely believed (as we saw in chapter 1) that among Indians the “stitch-less” nature of their clothing, especially women’s clothing, made the sewing machine redundant. It was further assumed that Indians in general, and Indian women in particular, were incapable of using such machines or even comprehending their use. In 1888 John Mitchell, one of the “traveling examiners” Singer periodically dispatched from New York or London to report on local sales, remarked that Indian women were so ignorant and secluded that “if advertisements reached their hands they would be unable to understand them.” His brief tour of India had convinced him of the “absolute uselessness of the Sewing Machine for the vast majority of the population,” whose dress appeared to consist of “one or two plain pieces of cloth wound in curious folds around the figure.”

It followed, to cite another Singer representative in 1884, that the “vast native domestic population is closed to us as yet and will be so till western ideas and western dress take a firmer hold on the masses.” Pursuing this racial logic Mitchell went through the 1881 census to establish how many Europeans and Eurasians were resident in particular towns, districts, and cantonments, and hence how many machines Singer could hope to sell. Given the smallness of the white population in India (and that households rarely ever purchased more than one sewing machine) it was not likely to be many: in the 1880s Singer struggled to sell more than two thousand machines a year. And yet, in the confident spirit of international capitalism, Singer liked to represent its machines as bringing civilization to the world. A company trade card issued in 1892, in time for the Chicago World Fair, claimed that for twenty years in India Singer had “been a factor in helping the people of India toward a better civilization.” But privately Singer representatives doubted that the sewing machine had much of a future there until civilization, as they understood it, gained a more secure foothold.

There was, though, an alternative strategy. In 1875, shortly after it had begun operations in India, Singer acquired as its agent in Bombay an enterprising young Parsi, Nasarvanji Mervanji Patell, whose career as the company’s principal agent in South Asia lasted until his retirement in 1911. Patell belonged to one of the leading Parsi families in Bombay and hence to the community that stood at the forefront of the city’s commercial and industrial development. As entrepreneurs and technological intermediaries between Europeans and the mass of the population, Parsis occupied a crucial role in the dissemination and popularization of everyday technology in India. In Bombay and
in its hinterland from the Deccan in the south to Punjab in the north, and as far east as Allahabad, Parsi stores sold bicycles, motorcycles, typewriters, sewing machines, cameras, gramophones, and other “mechanical novelties.” Patell’s family was at first displeased by his decision to sell sewing machines, which they considered a “common shop business.” But he persisted and began to devise a new marketing strategy for a company whose sales in the late 1870s were behind those of its main American rival, Wheeler and Wilson.

Patell’s strategy was to bypass the small number of European purchasers and focus instead on Indian customers. He particularly sought to target Indian tailors, who potentially constituted a far larger market, and the community or caste leaders who (as master tailors themselves) made the critical decisions about purchasing or hiring sewing machines. His strategy was not easy to implement. He had to fight off or take over rival agencies and contend, through the law courts if necessary, with traders who sold “counterfeit” Singers (mostly made by rival European exporters). Patell took the view that, while European customers were primarily interested in the appearance of the machine and then in how efficiently it worked, Indians “as a rule look to cheapness.” They would buy less expensive machines, including “imitation Singers,” unless Singer sold its machines at a competitive price and was prepared, contrary to company policy, to offer discounts of at least 10 percent. Following practices common elsewhere but still new to India, Patell and his agents drew up hire-purchase and loan agreements that enabled tailors who could not afford to buy a machine (costing at the time between Rs 50 and Rs 100) to rent or own one on easy terms. As a result Singer soon disposed of more machines by hire purchase than were sold outright. In 1877, for instance, 1,093 machines were sold (599 of them to Indian customers), but a further 1,508 went through hire purchase (885 to Indians).

Patell sought to persuade the principal tailors in Bombay and Surat, known to him as the “Chanchias,” through their headman, Bacher Ghella, to abandon the Wheeler and Wilson machines with which they had been familiar since the 1850s and adopt

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**Figure 5.1.** N. M. Patell, Singer’s principal agent in India in his office. Undated photograph, unknown photographer, reproduced from the Singer Archive by kind permission of the Wisconsin Historical Society, Madison, WI (WHI-90468).

Singers instead. It is not entirely clear who the Chanchias were, but it is likely that they were a Gujarati caste more normally associated with the sale of domestic cooking oil, though in south Gujarat the term *Ghanchi-Gola* was applied collectively to several low-ranking artisan and trading communities. Winning them
over to Singers involved a protracted struggle. The Chanchias found the more open structure of the Wheeler and Wilson machines better suited to the light but bulky cotton shirtings they used and their rapid manner of work. It took Patell more than twenty years to overcome their resistance—not to sewing machines, which the Chanchias had readily adopted, but to the unfamiliar Singer machines.

Selling Singers

Patell's career demonstrates the racial terms in which Singer, like many other international firms, saw itself conducting business in India. But it also shows the critical role that Indian agency could have in selling global goods in a local market. The fact that India was seen to be a difficult place to sell sewing machines gave Patell a degree of freedom that he would not have had in most other countries. Despite the relatively small number of machines sold in India, Patell's strategy was, in local terms, highly successful. Singer sales rose steadily, and, having early on established agents in Lahore and Allahabad, the number of branches under his control increased almost yearly. In 1885 there were about thirty-five Singer outlets. By 1905 the company had more than a hundred branches across India, Ceylon, and Burma. Increasingly its shops were located in “native towns” and bazaars rather than European shopping areas. Even small towns could boast a Singer shop, and company representatives roamed the countryside in search of new customers.

But while Patell was largely the architect of local Singer sales success, he was not without his critics and detractors—and here, too, race played a part. The visiting inspectors sent from London to assess the progress of Singer operations in India in the 1880s took a skeptical view of Patell and his business methods. They found the stock in his showrooms dirty, rusty, and poorly displayed. They questioned the bookkeeping practices of Patell and his office manager, who just happened to be his brother-in-law. They criticized the “narrowness” of his marketing ideas, his failure to follow the “broad principles” of the company sales policy, and his apparent lack of interest in selling to the customers they thought really mattered—Europeans. They attacked Patell himself, finding him fussy, driven by “personal spite” against those he considered his enemies, obsessed with trying to sell their machines as cheaply as possible, while appearing offhand and brusque with his customers. Even if they accepted that Patell was “energetic and earnest,” they attacked him as a Parsi, as a virtual foreigner (the Parsis having migrated from Persia centuries earlier), as a member of a community who, outside Bombay, was as remote from the languages, customs, and manners of the local inhabitants as Europeans themselves. In other words, Patell’s “race” was used against him and the business methods he employed to sell sewing machines. It should be noted in passing, though, that this hostile attitude was at variance with the more common view of the Parsis as one of India’s most “westernized” communities, with a “genius for business.”

In June 1887 Patell was forced to resign, only to be promptly reinstated. Crucial to his survival was the support of Singer’s managing director, George R. McKenzie, with whom, through their frequent correspondence, Patell had built up a close working relationship.

Patell in turn warned McKenzie about the ways in which Europeans treated Indians like himself. “Nine hundred and ninety-nine out of a thousand Europeans who come out to India,” he confided as he waited anxiously for the arrival of London’s latest emissary, D. Davidson, “change their attitude, manners, and politeness and try to be Lords in India.” Hence, “Mr Davidson might in time feel my suggestion[s] awkward and uncalled for.” Events confirmed Patell’s worst fears, and yet, despite pleading his local expertise and knowledge of “the habits of the people here,” he needed to make compromises to survive. He agreed to sack his brother-in-law, improve the bookkeeping, and clean up the showrooms, but he also made other concessions that ran counter to his own inclinations. He dismissed as impractical the suggestion that every branch office should be run by a “smart European,” but, persisting in the belief that Europeans were the main market, Davidson obliged Patell to hire three Eurasians as itinerant canvassers, though Patell had “very little confidence
in these East Indian youths.” He even had to accept Eurasian or European women as shop assistants in the Bombay, Calcutta, and Madras showrooms to facilitate sales to white customers. 

Just as the Parsis were one type of technological intermediary in the racial and communal configuration of colonial India, so Eurasians were another. By virtue of their mixed racial origins and Western lifestyles, Eurasians were assumed to be more European than Indian in their aptitude for European technology while also having the advantage of (some) familiarity with Indian languages and customs. Cheaper to employ than Europeans, they were given privileged status on the railroads, in the telegraph service, the police, the medical service, and other state agencies. As shop assistants, Eurasians were particularly expected to attend to European customers, but Eurasian men also worked as chauffeurs, clerks, and overseers, and as technicians in factories, workshops, and plantations. Singer’s London agents were therefore following an established pattern in believing that Eurasians were the key to selling sewing machines, especially since they (like their counterparts in the United States and Britain) could visit Europeans at home in a way that Indians generally could not.

Patell did not actively sabotage this racial strategy, but he was hardly sorry when it went awry. Of the three Eurasian salesmen, Doyle died at Trichinopoly (but not before he had misappropriated Rs 83), and Allen was jailed for absconding with Singer funds. Worst of all was the third, Arnold, of whom Patell declared, “I have never found such a daring rogue.” He failed to keep proper accounts, sold only two machines, and was jailed for cheating Singer of more than Rs 500. While the Eurasian experiment failed, Patell was forced to recognize that a more aggressive sales policy was required. But, in the main, he was allowed a degree of latitude, rare among Singer employees, to decide how best to sell sewing machines in his own country.

Technology Engendered

In 1892, when Singer produced a series of colorful trade cards showing customers around the world in traditional dress, two separate designs were produced for India. One showed Patell and his Bombay office staff with a man seated at a treadle sewing machine. The other depicted a darzi and his wife. Unlike the images used for many other countries, where a woman was shown working the machine, on the Indian card she was depicted sitting on a chair alongside the machine and next to her standing husband as if in a kind of technological limbo. It looked as though they were both uncertain who should use the machine. In shifting the focus of Singer sales from Europeans to Indians, Patell helped, however inadvertently, to effect a gender change as well. Whether as customers or sales assistants, women were not central to his marketing strategy. For him selling sewing machines in India was essentially about selling them to men, particularly to those who by custom and trade were tailors (as was also the case, at least initially, in many other regions, including the Middle East). Nonetheless, it is clear that an increasing number of women in India, including in the Parsi community, were using sewing machines or learning to sew on such machines by the early twentieth century. How and why did this gender shift occur?

In part the answer returns us to questions of race, as well as of class and gender. From early in the colonial period sewing, along with embroidery, dressmaking, and millinery, was seen as a suitable occupation for poor white or mixed-race female orphans (as in the military orphanages of Calcutta) or among the destitute and “fallen” women taken up by Christian charities. The female inmates or beneficiaries of such institutions and organizations were expected to sew—in part to earn money for themselves and the charities that supported them and in order to prepare themselves for future lives as housewives and seamstresses, but also because the discipline of sewing was seen to be conducive to feminine patience, diligence, and appropriate moral conduct. However, sewing also transcended the racial divide. Making and mending family clothes was a part-time occupation for many Indian women and was considered a useful and respectable form of women’s home work. By extension, as in many other parts of the world, sewing and the use of the sewing machine came to be seen as a desirable part of a modern woman’s upbringing.
and domestic accomplishments. As Kupferschmidt observes, "In societies ... which entertain strong reservations against women working or trading outside the home, the sewing machine comes as a perfect solution." But the sewing machine also became part of the repertoire of Indian women's uplift and social reform in the second half of the nineteenth century and in the early twentieth century. In literature produced by Hindu reform organizations like the Arya Samaj or the Sikhs' Singh Sabha women were urged to take up useful domestic tasks like sewing and to cut costs or augment family incomes by making their own clothes. In one reformist tract of the period, the dutiful housewife not only runs her own home efficiently but also helps a neighboring widow to improve her domestic finances by investing in an old sewing machine.

To take a more extreme example, when women from the "criminal tribe" of the Bhantus (or Sansis) from northern India were sent to the penal settlement of Port Blair in the Andaman Islands in the 1920s they were set to work sewing; some were introduced to the use of sewing machines. In this case, the use of sewing and sewing machines as an instrument of reform was all the more marked since the Sansis were renowned for being scantily dressed "vagrants" and "nomads," barely inducted into "domiciliary civilization" and still "in the suckling stage of human progress." The sewing machine became a means of fixing them in one place: it obliged them to undertake "useful labour" and submit to social and moral reform. Sewing and embroidery were similarly disciplinary tasks imposed upon young women in "criminal settlements" located in mainland India.

The rehabilitation of criminals was not the only route by which women's use of the sewing machine spread. When self-help associations for women were set up in Bengal from 1913 onward by Saroj Nalini Dutt, sewing was among the activities women were encouraged to adopt for their gainful employment. Some acquired sewing machines or were given them by well-wishers. One of the ways in which the many thousands of women who were displaced and became refugees as a result of partition in 1947 were given work was by providing them with
denoted men’s work rather than women’s, the sewing machine enabled women to exploit the practical advantages and prestige of machine use and to earn money while remaining within the respectability of the home. In this regard, the domestic history of the sewing machine contradicts the idea that the Indian home remained a strictly segregated space, untouched by the exterior world of science, technology, and consumption.

Singer and other manufacturers began early in the twentieth century to appeal directly to middle-class Indian women and, as in the West, to present sewing machines as highly desirable domestic goods. Advertisements appeared in newspapers and journals showing smiling, sari-wearing women, working happily at their machines. One attractive lithograph image produced by Singer around 1900 or even earlier showed an Indian woman at work on her machine, closely watched by a young girl, whom one assumes to be her daughter (see frontispiece). As part of their emerging identity as instruments of women’s work, sewing machines became objects men gave to women—for instance as philanthropic gifts to women’s associations and welfare societies or as prizes for schoolgirls and female college students. Like bicycles, and later radios, motor scooters, and automobiles, sewing machines became highly prized dowry presents, given by the bride’s family to the groom’s. But where bicycles were likely to be used by the male members of the receiving household, the gift of a sewing machine emphasized the new wife’s domestic responsibilities. Dowry gifting was one of the most important social mechanisms by which new consumer goods were disseminated among middle-class households in India. Indeed, at a time when social reformers were calling for the “evil practice” of dowry giving to be abolished, the spread of sewing machines and bicycles through the social mechanism of the dowry demonstrated the increasing acquisitiveness of the rising middle class.

But, as emblems of women’s work, sewing machines also acquired—at least in the minds of men—the negative associations of a burdensome domesticity. In Bibhutibhushan Bandyopadhyaya’s novel Aranyak: Of the Forest, published in 1937, the narrator nostalgically recalls the years spent in his youth among the trib-
als and forests of rural Bhagalpur, but this serves to heighten the contrast with his present situation as a responsible family man in Calcutta. "I have left behind my life of freedom in the jungle and have become a householder," he laments. "I sit in my room in a narrow little lane in Calcutta and listen to my wife at her sewing machine." As with many other everyday technologies that announced themselves through their audibility, the repetitive sound of the sewing machine highlights for the male narrator the contrast between youth and experience, freedom and domesticity.

Bicycle Races and Gendered Cycles

In the 1890s and 1900s bicycles established themselves in India as a popular mode of recreation and personal transport for Europeans, as they did for white populations in other parts of colonial Asia. The bicycle gave Europeans a newfound sense of physical freedom—to roam around towns, hill stations, and cantonments, to venture out into the countryside, to tour archaeological sites, or to visit the encampments that sprang up for the Delhi Durbar of 1911. In a new sociability, following a trend already established in Europe, in many towns and hill stations across India white cycling clubs sprang up. When Ronald Ross, then a junior medical officer, was stationed at Bangalore (Bengaluru) between 1895 and 1897, he and his wife belonged to the local cycling club. At Secunderabad, his next posting, Ross cycled around town, musing on the "malaria problem" while riding his "excellent bicycle," rather than using a conventional pony and trap. A bicycle was substantially cheaper to buy and maintain than a horse and so was available even to low-ranking Europeans, for whom the cost of a horse and sce (groom) was prohibitive. Before 1914 bicycles were also used as a means of transport by relatively high-ranking Europeans, like police superintendents and factory inspectors, but this phase of the bicycle as a high-status European commodity passed fairly rapidly—certainly by 1920. When Gilbert Slater arrived in 1915 to take up a chair in economics at Madras University, it was considered exceptional (and rather improper) for a European of his standing to cycle around the city or ride off into the countryside. He soon switched to a motorcycle. Rather like the Japanese housewives whom Robin LeBlanc characterizes as "bicycle citizens," for many Europeans riding a bicycle became a means of identifying themselves as being on the margins of the white elite. Cycling in the heat of the Indian day, a European was likely to arrive at his or her destination sweaty and disheveled, his or her racial authority compromised. A horse, a motorcycle, better still an automobile, was a more dignified proposition and preserved greater social distance between colonizer and colonized.

Europeans began to feel vulnerable on bicycles—from fear of being jostled in the bazaar or attacked during a riot. A critical moment came in April 1919, when Miss Sherwood, an English missionary doctor, riding alone through the backstreets of Amritsar in Punjab was knocked off her bicycle and beaten up by a crowd of nationalist agitators. The treatment she received became a rationale for the imposition of draconian measures across the city, including the confiscation of all Indian-owned bicycles. But the relationship between bicycles and European women was not unambiguous. During World War II, when automobiles were scarce and petrol rationed, some white women took to riding old and battered bicycles as the only means of transport available to them. In Paul Scott's end-of-the-Raj novel, The Jewel in the Crown, the missionary Edwina Crane cycles around Mayapore on a "ramshackle-looking but sturdy Raleigh." If she remains a memsahib in the eyes of her Indian assistant, it is "in spite of the bicycle." Daphne Manners, a volunteer nurse, also rides a bicycle and uses it to meet her Indian lover Hari Kumar. Their bicycles become a symbol of racial and sexual transgression, especially when Manners is raped, and their abandoned cycles become critical evidence for the case Ronald Merrick, the investigating police officer, fabricates to entrap Kumar.

Given its affordability and limited status value, the bicycle was never a European monopoly. In Calcutta and Bombay, Indians set up and joined cycling clubs as early as the 1890s. Young, middle-class men, particularly students, took to the bicycle, went
on cycle tours in the countryside, and participated in cycle races. In Bengal the bicycle acquired the kudos of being healthy—for the race, and not just the individual. Even though the machines remained foreign, or were at best assembled locally from foreign parts, popularizing their use became a means of countering, on however modest a scale, European representations of Bengali men as "effeminate" and "effete." Winning a cycle race might not transform Bengalis into a "martial race" overnight, but it contributed to a wider, emerging cult of physical fitness. Touted as physically and morally healthy, cycling helped promote an image of Indian energy and self-reliance. As well as bicycle races, which had become major sporting events by the 1940s, in the interwar years Indians embarked on cycle tours across India and beyond. A young Parsi, Scouter Davar, set off in January 1924 on a solo journey to "encircle the world" that lasted seven years. Having covered sixty-five thousand miles, crossed the Sahara, penetrated African jungles, and scaled Andean passes, he returned home to a hero's welcome. That several leading cycle "tourists" and racers were Parsis is indicative not only of Parsi "anglophilia" but also of growing concern within such a small community that, if their reproduction rate continued to dwindle, they would face collective extinction. Cycling and other active sports was one way of trying to maintain their physical vigor.

At what point—and to what extent—Indian women became cyclists is less clear. In Europe and North America cycling has been associated with "the new woman," and with growing social, even sexual, freedom for women. This was less evident in India. It is not difficult to find examples of women from elite families who rode bicycles, at least in their youth. Lado Rani Zutshi and her daughter Manmohini Sahgal, members of the extended Nehru family of Kashmiri Brahmins, rode bicycles and went horse riding, but, in the early twentieth century, these were activities "rarely engaged in by women." In Rawalpindi in the 1940s it was rare for girls to ride bikes in public, even to go to school, while in Lahore men from the countryside gawped in amazement at the unfamiliar sight of women on bicycles. In general cycling was not common once women reached mar-
riageable age. There was an argument (made mostly by men) that it was dangerous for young women to ride bicycles for fear of rupturing their hymens and so ruining their marriage prospects. There seems to have been a broad prejudice against the physical mobility and independence women might acquire by riding a bicycle. In rural Maharashtra as late as the 1970s Hemlata Dan-
dekar noted how "you never see women or even young girls on bicycles in the village." Even in the nearby town, "a woman riding a bicycle is a rare sight." One girl told her that she wouldn't dare ride a bicycle in her village—her in-laws would be scandalized. Even those who rode bikes as girls were prevented from doing so as adults; it was considered no more appropriate for a woman to ride a bike than to plow a field or drive a tractor, conventionally men's work. Some of the women Dandekar interviewed clearly resented this restriction. So, while for young men the bicycle might be a means to adventure (including visits to cinemas and brothels), for women the bicycle symbolized the constraints patriarchy imposed on their adult lives.

But some women did ride bicycles and by the 1940s some advertising was targeted specifically at them. Others knew how to cycle when the occasion required it. Several of the accounts given by women of their involvement in the communist-led Telengana movement in Hyderabad in the late 1940s refer to their use of bicycles. Women typically rode bicycles to act as couriers for the rebels or to help insurgents elude police operations. Moturi Udayam recounted how, when the police came looking for a political activist hiding in her house, she claimed that the bicycle standing outside was not his but her own. "How can it be your cycle?" the policeman asked, 'as if women ride cycles.' And I said, 'Why not?'" To prove her point, she got on the bike and rode round the house several times. But Moturi presented herself as an exceptionally feisty woman who did what she liked. "I have no superstitions," she told her interviewers. "I have achieved whatever I wanted. From learning to cycle to [doing] my job." An association between cycling and women's status was not just historically important: the riding of bicycles and motor scooters in public remains a salient indicator of women's independence in India today.
Caste, Race, and Typewriters

Like government offices, commercial firms and private employers first took to the use of typewriters in India in the closing years of the nineteenth century. Patell in Bombay began to use a typewriter (or, more likely, to have his letters typed for him) in 1895. As was frequently the case with the introduction of what rapidly became everyday technologies, the transition from the handwritten to the typed letter occasioned little comment. However, the rapid adoption of the typewriter and the growing need for typists can be traced through the increasing number of advertisements in the wanted columns of English-language daily newspapers like the Bombay Chronicle or the Calcutta Statesman for typists and stenographers. In January 1922, for instance, advertisers in the Statesman sought an experienced Anglo-Indian male typist for a European firm at Mirzapur, a shorthand typist for an up-country tea estate, and a “competent lady shorthand typist” for a newspaper office in Calcutta, while Berry & Co., seeking an experienced shorthand typist, promised a “good salary to a fast and accurate man.” Among those offering themselves for employment were a Madras man with three years’ typing experience, a female shorthand typist who had previously worked for a European firm, and an “Experienced Lady” who sought to work from home as a shorthand typist (“own typewriter, neat and accurate”).

India had a long and sophisticated scribal tradition. Developed under the bureaucratic empires of the Mughals and Marathas and at a series of regional courts, this reservoir of clerical skill was readily utilized by the incoming British. It was partly from among traditional “service communities,” such as Brahmins and Kayasthas, that the clerks, typists, and stenographers of the modern government and business office were recruited. It is no surprise to find among the list of clerks in the Government of India’s home department in the early twentieth century a sizeable proportion of Tamil and Bengali Brahmins. In one instance, five out of six applicants for posts as shorthand typists were Tamil Brahmins. In this respect, as in many other areas of society affected by technological change, communities retooled their old skills to meet current needs.

But, if in some parts of the world the typewriter symbolized an exciting new world of reliability, speed, and individual self-expression, in India it seemed, at least at times, to suggest the more negative side of modernity. The clerks (kerja) described by Sumit Sarkar for late nineteenth- and early twentieth-century Calcutta came from the poorer sections of the Bengali bhadralok (the “respectable” castes of Brahmins, Vaidyas, and Kayasthas). These were individuals whose literacy and high-caste status appeared barely rewarded by the tedium of their working lives, the paltry nature of their salaries, and the racial abuse they received in government offices and merchant houses around the city. As Sarkar puts it, by the late nineteenth century office work and the clock time that governed it “had come to signify all that was demeaning and oppressive in colonial bhadralok life.” Or, as another recent historian puts it, the colonial clerk suffered a life of “deprivation and domination.” An equally negative impression is conveyed by the Bengali writer Bibhutibhushan Bandopadhyaya. In his novel Aparajito, Nripen, a friend of Apu, the book’s central figure, toils in an office till seven at night, enduring a “small, closed, dark, claustrophobic life.” For Apu, along with congested streets and noisy traffic, the office and its clamorous typewriters represent the tyranny of “all things modern” and leave him craving the quiet, open spaces of the Bengali countryside.

Nationalist critics, too, railed against a colonial order which reduced educated men to mere clerks when, under a more enlightened regime, they might have found recognition as entrepreneurs and intellectuals. And yet, for all this, the typewriter and the modern office did help to institute change. Colonial rule increased the availability of literacy and education, and favored the extension of technical skills like typing to communities that had previously been excluded from bureaucratic life, such as Christians, low-caste Hindus, and Sikhs. This began to erode the monopoly of the old scribal classes, a process further aided in state service by a system of communal representation.

Proficient use of a typewriter might call for some degree of formal instruction—though it is clear that in India, as elsewhere, many individuals learned to type by themselves, perhaps with
help from a family member or friend. Acquiring a job, especially in a government office, was usually dependent on having a recognized qualification or a certificate of competence from one of the many typing and secretarial schools that sprang up in India from the 1890s onward, especially in the commercial districts of Bombay, Calcutta, and Madras. By the 1920s Bombay had several such schools. The Kalbadevi Shorthand and Typewriting Institution, dating from 1898, was eager to attract clients and offered “special arrangements for ladies.” The nearby Popular Shorthand and Typewriting Institution also gave concessions to women, the poor, and the unemployed. Many such schools prepared pupils for international shorthand and typing examinations, such as Pitman’s. In a model shared by other everyday enterprises (such as “Usha” sewing machines after independence), manufacturers and importers organized courses to teach typing and encourage the use of their own machines. Remington, which established its own schools in India to “train the Babu or educated native in the ‘twin arts’ [of typing and stenography],” produced the majority of typists entering government service.

Clerks with typing and shorthand qualifications received a higher salary than those without them, earning by the early 1930s between Rs 60 and Rs 75 a month, enough to place a typist among better-off office workers. But this did not lift the mass of the clerical underclass out of poverty or free them from the prevailing sense of oppression, discrimination, and hopelessness that Sarkar describes. An article in the Social Service Quarterly in 1926 depicted the miserable existence of lower middle-class men in Bombay who earned between Rs 50 and Rs 250 a month. Trudging daily to and from work (commuting by tram or train or walking to save money), they had to endure long office hours, while their wives remained at home, barely able to meet food bills and housing costs. Their lives were “neither . . . comfortable nor absolutely destitute.” In these circumstances it is not surprising that sections of the clerical workforce sought to organize themselves in order to better their conditions and communicate their grievances. As early as 1893 a Shorthand Writers’ Association was established in Madras. In return for an annual subscrip-

tion of Rs 5, it promised to help members find employment as shorthand writers and typists in both the city and up-country. Forty years on, the Stenographers’ Association in Madras was set up for a similar purpose. But, despite poor work prospects, by the 1930s almost every middle-sized town in India had its own secretarial school, technical college, and commercial institute, churning out still more typists, bookkeepers, and clerks.

Race and Gender in the Office

The typewriter could serve to project the image of the heroic male, especially, in colonial times, the heroic white male. An advertisement for Remington portables in the 1930s showed a European official, presumably on tour, working outdoors at his desk, while a liveried Indian servant stands by, clearly proud of his employer’s ownership of so splendid a machine. Almost thirty years earlier Captain Gillespie of the Royal Engineers wrote enthusiastically of the American-made Blickensderfer portable he had taken with him on an expedition to Tibet: “It accompanied me on the march, travelling on a coolie’s back. I used it under all sorts of conditions, in pouring rain, at over 13,000 feet altitude with the rain coming in all over the tent. At least once it was dropped and went rolling down the Khud [ravine].”

However, despite the common assumption that under colonialism the office was what Sarkar calls a “man-only domain,” use of the typewriter, like the sewing machine, raised significant questions about race and gender. In his South African law practice Gandhi employed two European female secretaries, though subsequently, on his return to India in 1915, he decided that it was unnatural for Indian women, life’s nurturers and carers, to earn their living working outside the home as typists and receptionists. Gandhi may have been representative of a wider prejudice, but it is clear from contemporary newspaper advertisements that a number at least of European women in India took up typing, whether to earn a living or help augment it. In the “situations wanted” columns of the Bombay Chronicle in July 1920 an advertisement appeared on behalf of a “well-connected English
lady," with the "highest official references," who sought a position as "companion-secretary" or "companion-governess" and listed among her accomplishments "piano, singing, French, German, [and] typewriting." The Government of India employed European and Eurasian women typists in the home department in Delhi up to and during World War II. Perhaps this was because they were required to have a good knowledge of English (at a time when levels of literacy among Indian women remained low), or, more likely, because they were trusted for racial reasons to handle confidential correspondence and work alongside officials who were themselves Europeans. But Europeans were not the only women to become typists in India.

In the United States in the late nineteenth and early twentieth centuries the typewriter fed the phenomenal growth of the modern office and women's employment. In 1870 women in the United States constituted a mere 4 percent of the 154 typists and stenographers; by 1900 this figure had risen to 77 percent of the total, and by 1930 to 96 percent (775,100 out of 815,200). There was a comparable surge in office work in Britain, where 146,000 women were working as clerks by 1911. There, too, the "professional opportunities opened to women through the medium of the typewriter played an important part in the movement for social equality between the sexes." Did the typewriter have a comparable effect on women's employment and social position in India? Surely not. Unlike in the United States or Britain, the majority of typists in India remained men. But, since women, by virtue of their more nimble fingers and lower wage costs than men, had come to be seen as essential to office life in the West, it was perhaps inevitable that women should be expected to fulfill a similar role elsewhere. By the 1920s photographs of offices in India show European and Eurasian women wearing long white dresses, taking shorthand, answering phones, operating switchboards, or with hands poised over typewriters.

The number of workers in women office workers was certainly small by Western standards. The 1931 census for Bombay recorded 105 women working in the city as "public scribes and stenographers" alongside 182 men, and entered a further 2,408 females employed as clerks, cashiers, and accountants alongside 50,016 males. In Calcutta at the same date there were 182 women stenographers (to 294 men) and in Madras 43 (to 417 men), though this latter figure represented a significant increase from a solitary female stenographer twenty years earlier. If census categories can be relied on, across India as a whole it would seem that there were only a few hundred women typists by the 1930s, a modest beginning to the now widespread employment of women in Indian offices and call centers. This, though, was a situation in which, once again, gender was complicated by race.

Many of the typing and secretarial schools set up in Bombay, Calcutta, and Madras catered specifically to women. Vacancies appeared in the press for women typists, usually in private firms rather than government offices and often without reference to race. Many middle-class Indian women taught themselves to type in order to participate in the running of political and social welfare organizations; others did so to assist their husbands or for their own correspondence. But an important role in the training of women as typists and secretaries was played by the Indian branches of the Young Women's Christian Association (YWCA) and, for men, by the Young Men's Christian Association (YMCA). Like many other technological changes affecting India, this drew on American precedents. In 1881 the central branch of the YWCA in New York began teaching typing as a suitable occupation for young, single women. Twenty years later the Calcutta YWCA followed suit, offering typing lessons for women and these rapidly became popular: by 1905, 72 women were enrolled in its classes. Three years later the Calcutta YWCA moved to larger premises, which gave more room for typing and shorthand classes, "both of which the Association made a specialty." By 1920 the YWCA's "Commercial School" had 152 students and thirteen typewriters. Many of its "business girls" took up secretarial posts in Calcutta, including government offices: they were in particular demand during World War II, as Calcutta became a center of Allied military activity.

The initiative of the YWCA in Calcutta was replicated, on a smaller scale, by secretarial classes in YWCAs elsewhere in India.
and by typing, shorthand, and bookkeeping classes for men at YMCAs. By the 1900s many European, Eurasian, and Christian schools across India had added typing and stenography to their curriculum, especially not exclusively for girls, and were finding office jobs for their pupils. But the Calcutta YWCA retained a particular significance—its location allowed it to supply women office workers for one of India’s leading commercial and industrial centers. It was also patronized by the wives of the viceroys and the lieutenant governors of Bengal (until the imperial capital moved to Delhi in 1912), who donated typewriters for secretarial training.

The Calcutta YWCA was clear about its feminist agenda. Typing and secretarial work was a means of giving women a decent occupation: it helped make them self-sufficient and gave them “the gift of power in their lives.” The YWCA also targeted a specific kind of female constituency—Europeans from “home” (Britain), “domiciled” (India-born and India-educated) Britons, Eurasians, and Indian Christians. As long as colonialism lasted, this gave the secretarial enterprise a racial configuration. As with sewing machines, there was a racial assumption that white and mixed-race women were more amenable to modern technology than their Indian counterparts. They were assumed to be more literate (in English), better educated, and have the skills and disposition needed to operate a machine. Unlike most Indian women, they were free to work away from home in the socially and sexually problematic space of the modern office. The recruitment of Eurasian typists parallels their employment as nurses and midwives and shared the same rationale—a willingness to work outside the home, in forms of employment high-status Hindu women shunned.

There was, besides, a longstanding colonial concern to find suitable employment for Eurasians and domiciled Europeans who had, by dint of their racial identity, a close (if ambiguous) relationship with the imperial order. Largely debarred from the army and the upper echelons of the civil service, Eurasian men found alternative employment in a range of technology-related occupations—on the railroads as train drivers, guards, station masters, and clerks, and in the post, telegraph, and irrigation departments. However, by the early twentieth century Eurasians and resident Europeans faced increasing competition from Indians in many of these fields of employment, and the pressure to Indianize government services was mounting. At exactly the time that the YWCA and YMCA took up secretarial work as suitable employment for Eurasian and domiciled European women, a number of reports were demonstrating, especially for Calcutta, how their socioeconomic position was slipping. Some commentators blamed Indian competition; others emphasized what they saw as moral and physical laxity, a lack of drive and determination among Eurasians. Encouraging both sexes to become typists or stenographers was one way of sustaining the role of Eurasians as technological “go-betweens” while rescuing them from a life of indolence and immorality.64

In actuality, though, the outcome was somewhat different. Male Eurasians found themselves by the 1930s increasingly squeezed out of office employment. By contrast, in many private firms, especially those owned and managed by Europeans like Binny’s in Madras, “the sphere of the typewriter was reserved exclusively for [female] Anglo-Indians.”65 New urban employment opportunities—as typists and telephone operators—helped create the image of the stylish, independent, and technologically savvy “modern girl” in India as elsewhere around the world. Expressive of this new appetite for modernity and glamour, an early Hindi-language film produced in Bombay bore the title Typist Girl.66 But allocating a racially defined category of women to office work created its own, not always favorable, stereotype of the Eurasian woman. In Guru Dutt’s 1950s movie Mr and Mrs..., itself a cinematic paean to Bombay’s technological modernity—the plot revolves around telephones, cameras, automobiles, taxis, and airplanes—there is a scene in which Johnny, a Eurasian photographer, pecks out the words “I LOVE YOU” on the typewriter of Julie, a Eurasian typist. They sing and dance around the office until other workers return and disturb them. The film ends morally, with Johnny and Julie going off to get married, though arguing whether it should be in a church or a registry office. But less
sympathetic representations abound in which the Anglo-Indian woman typist is presumed to be morally loose and sexually available. Laurie Coutino in Rohinton Mistry's novel *Such a Long Journey* is one example of this. More negatively still, Violet Dixon, a character in a Mulk Raj Anand short story, is described as a "plain snub-nosed Anglo-Indian typist" with a "sing-song voice" and the "snobbish" air of the "memsahib she affected to be." As if to emphasize her half-alien identity, she boasts of having a married sister in Britain whom she wants to leave India to join.67

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Like gender, ideas of race in British India acquired added authority by association with technology. "Higher" races were branded more adept at using modern technologies than "lower" ones. Parsi men and Eurasian women exemplified the way in which specific sets of people came to be identified with, even defined by, their relationship with modern machines. In the sociology of colonial collectivities, proximity to modern technology and evidence of technological aptitude served as a means of refashioning or reimagining entire communities, ascribing to them a privileged relationship to bicycles, typewriters, and sewing machines. Conversely, colonialism denied the eligibility of certain social groups to be modern by their apparent inability to operate and identify with those machines that were passing into everyday use. Even within the many gendered contexts in which everyday technology became colonially entangled, race could remain central, as in the case of Eurasian typists, to consideration of which operatives were most appropriate for particular kinds of machine-related work. In part this privileging of race and gender was illustrative of the peculiarities of India's colonial situation, and the particular preoccupation of India's rulers with the identification of highly differentiated social categories. But, as the social availability or denial of such modern goods as bicycles, sewing machines, and typewriters also suggests, this close identification of machines with gender and ethnicity was not a colonial invention alone but drew, too, upon notions of gender and community long established in Indian society.

**CHAPTER FOUR**

*Swadeshi* Machines

Until August 1947 India was an integral part of the British Empire. The way in which everyday technologies were imported into India from Western manufacturers, through the agency of foreign firms and, initially at least, with European customers in mind, would seem to reinforce the idea that these were essentially alien goods and constituted an expression of Britain's domination of the Indian economy. It might further be argued that the relative ease with which foreign goods entered, and largely monopolized, the Indian market, demonstrated the one-sided, exploitative nature of the imperial economy and the marginalization of Indian enterprise. The fact that it took until the 1950s for Indian-made bicycles, sewing machines, and typewriters to capture a leading share of the domestic market appears to support the nationalist assertion that the British ran India in their own selfish interests and stifled Indian competition—until India won political freedom and seized control of its economic destiny.

It is not the intention here to contest this broad-brush portrayal of colonial domination and exploitation. But it is necessary, from the perspective of everyday technology, to add some qualification to this argument. For a start, as previous chapters have shown, a significant proportion of the technological goods entering India in this period came not from Britain but from American and European manufacturers, albeit through conduits of trade and governance the British had established. It is necessary, too, to consider ways in which Indian enterprise, despite the many obstacles in its path, was able to gain a degree of control over the production, and more especially the distribution and sale, of imported commodities, thereby gaining a commercial
state and those who served it. Modern technology could help make (but also unmake) modern subjects. Even such seemingly simple devices as sewing machines, bicycles, and typewriters could be pressed into state service. These could become emblems of authority or means by which the state sought to regulate and reform its subjects. The gradual extension of state power and responsibility that occurred after 1900, greatly accelerated by World War II, showed how even small machines like rice mills could become strategic sites in attempts to manage the economy and shape social practice.

Our concern here has been with small machines, not with those that were most powerful and persuasive, and yet one can conclude that India, like many colonies, did not submit easily to the authority—and the authoritarian capabilities—of the modern machine. It was less that Indians recoiled from the machine (though some undoubtedly did) than that the colonial state was in many respects too weak, its resources too slender, its ideological tools and material technologies too vulnerable, for effective command through the deployment of modern technology to be entirely possible. Technology was a two-edged weapon. The everyday technologies of the state, precisely because they were increasingly visible and accessible to others, could almost always be countered, subverted, or turned to oppositional ends. The proliferation of everyday technology and its regulation by the state might occasion corruption and resentment rather than compliance and control. Although the engagement of the state even with small machines—their making, distribution, licensing, and daily use—was undoubtedly growing as the colonial era ended, the state enjoyed no monopoly over how such technologies might be used or who might use them.

Epilogue
THE GOD OF SMALL THINGS

In 1997 the Indian writer and activist Arundhati Roy published a prize-winning novel entitled The God of Small Things.1 Her book is not about technology, or even the history of technology, though some everyday technologies (a car, the cinema) do appear in it. But it is about India and the ways in which small objects and seemingly small events and emotions shape people’s lives and cumulatively have a profound effect on their existence. The implication is not that small things are necessarily divine, though in India, as elsewhere, that association can exist, even with respect to machines. It is rather that small things can be “godly” in the sense of being of primary, even paramount, importance when it comes to daily lives and the everyday objects with which people surround themselves. I take the idea of the small as “godly” as suggestive for a reading of small-scale technologies in their global, imperial, and, not least, Indian contexts. I see this focus on small, everyday technology as a much-needed corrective to the excessive emphasis on large-scale technological systems that has dominated the discussion of technology in relation to India and the non-Western world—railroads, telegraphs, irrigation networks, and big dams. It is a means by which to highlight instead the material importance and social significance of “small things.”

The question is not whether small technologies were “godly” in a religious or ritual sense, or even “beautiful” in the way that E. F. Schumacher influentially deployed that term.2 Nor were they even necessarily “appropriate” in the sense in which many advocates of “appropriate technology” have used that adjective. Gan-
dhi was not alone in believing that some small machines, like rice mills, were highly inappropriate for a poor, underemployed country like India, or, like bicycles, catered to a needless craving after speed. The point, rather, is that such small machines impacted on people’s lives in highly significant ways, and acquired, by their use, and even by their denial, a social meaning and a cultural trachtion that belied their seemingly insignificant nature. The mundane could be momentous. This is not to say that small machines of the kind discussed here were always agents of material progress and social transformation. In some contexts they certainly were, but in others they served on the contrary to reinforce, to inscribe anew, the presumptions and privileges of race, class, and gender.

In the global history of small objects locality matters greatly. By virtue of their accessibility, affordability, and mobility, small technologies became closely entangled with the occupations, values, aspirations, even the emotions of the local populations with which they became embedded. The history of modern technology is more than a history of globalization, as conventionally understood, or a history of the rise to global ascendency of a technologically empowered West. Commodities, which by the late nineteenth and early twentieth centuries were becoming global goods and entering everyday use around the world, were simultaneously becoming local goods, subject to local needs and desires. Purveyors of local and not just universal meanings, they could morph into instruments of empowerment and subversion. They became local emblems, the subjects of individual and collective imaginaries as much as work tools or mere items of consumption.

This might be true everywhere, but in India everyday technology occupied—and still continues to occupy—a pivotal position. Some of the reasons for this have already been alluded to. India’s chronic poverty and its apparent technological backwardness, the extreme nature of its social differentiation, the constraints and ambitions of colonial rule, the rise of Indian capitalism and the pursuit of swadeshi ideals, the deep-seated uncertainty about the modern machine that manifested itself in harkening back to a preindustrial age—all combined to afford the small machine an exceptional role and a strategic significance. In colonial rhetoric and nationalist polemic, in state policy and in the materiality of production, the small machine played a symbolic, as well as practical, role. India’s quest for modernity was as much about an engagement with small things as an entanglement with large ones.

That duality was perhaps not so immediately evident with the end of World War II in 1945 and Indian independence two years later. India seemed to emerge from the war with a new confidence in its technological modernity. An advertisement for India’s National Savings in early 1946 was indicative of this, declaring:

The heavy rumble and clatter of caterpillar tracks echo across the land but not to the roar of deadly guns. Across India’s wide acres we see a great awakening. Gone are the days of the wooden plough, the spade and the sickle with which our cultivators obtained from the good earth too little with too great a labour. In their place great steel ploughs, harvesters, binders and tractors make their toil easier and force richer yield[s] from the soil. This is a picture of tomorrow as seen today.

In Jawaharlal Nehru India acquired a prime minister who, unlike Gandhi, his mentor and nemesis, believed emphatically in the benefits that modern science and technology could confer upon India. “I . . . have worshipped at the shrine of science and counted myself one of its votaries,” he told India’s National Academy of Sciences in March 1938. “Who . . . can afford to ignore science today? At every turn we have to seek its aid and the whole fabric of the world today is of its making.” Even by the time that Nehru became chair of the National Planning Committee, set up by the Congress in 1938, the technological imagination of many of India’s intellectuals and entrepreneurs had leapfrogged the problem of how to produce bicycles and sewing machines and was fixated instead on making automobiles and airplanes. With independence attained, and his ardor strengthened rather than diminished by the ordeal of partition, Nehru
focused his attention—and that of his government—on five-year plans, industrialization, scientific development, and the urgency of rapid technological progress. Despite occasional claims to the contrary, in Nehru’s grand vision it was “big technology” and “big machines” that mattered—steel mills, hydroelectric dams, nuclear reactors—not the trivia of small-scale technology. Nehru spoke eloquently in 1954 of big dams as the “temples of the new age” and observed that “small minds” and “small nations” could not undertake “big works.” “When we see big works,” he declared, “our stature grows with them, and our minds open out a little.” As noted earlier, to Nehru it was a matter of regret that by 1960 India had only just fully entered the bicycle age, not yet that of nuclear power and jet planes.

And yet it could be argued that it was the continuing progress of small technology (far more than the Gandhian option of the charka or a return to hand-husked rice) that helped bring slow but significant change to India. As any journey around an Indian city or through the Indian countryside will demonstrate, bicycles remain an essential mode of personal transport and an invaluable means of moving all manner of small goods. Even in an era of economic growth and middle-class affluence, of motorbikes, motorcycles, and automobiles, the bicycle and its offshoots, such as the cycle rickshaw and the pedal-driven cart, remain essential. The spread of bicycles, and their production on a scale unmatched by colonial-era imports (with more than seven million bicycles a year made in India in the 1990s), contributed, however unspectacularly, to the growing physical and social mobility of rural populations, of women and the ex-untouchables, easing access to education, increasing or diversifying employment opportunities. Typewriters may have largely (but not yet entirely) disappeared from Indian offices and sidewalk encampments, but manual or electric sewing machines still whirr away in roadside stalls and tailors’ shops. Rice mills (and their analogues like flour mills) have continued to proliferate—their hum to be heard in many an urban backstreet and village lane—and have conceded no ground to attempts made since the 1930s to revive and popularize hand-husked rice. Villages, towns, and cities across India testify to the utility, the versatility, the ubiquity of the small machine.

While many of independent India’s large industries and grand engineering projects have stalled, failed to deliver their grand Nehruvian promise, or, like big dams, become burdened with high environmental and social costs, small machines, like the power-driven water pumps that have been responsible for the greening of so much of the Indian countryside, have greatly impacted on livelihoods and landscapes. Many recent technology-related developments can be seen prefigured in an earlier history of everyday technology. The rise of the Singer sewing machine anticipated and facilitated the phenomenal growth of South Asia’s massive garment industry and the accompanying sweatshops, many of them reliant, as in present-day Bangladesh, on underpaid female labor. There is a tenuous but not entirely fatuous connection between the small numbers of Eurasian women typists employed in government offices and business houses in the early twentieth century and the large numbers of women who now work in India’s international call centers. Even the problem of traffic, first made evident a century ago on what may appear to us now as a curiously miniature scale, has lost none of its significance given the soaring accident rate and mortality on India’s now-congested streets and crowded highways. And just as the use of bicycles and sewing machines became fairly rapidly established in city, small-town, and village society, demonstrating that presumptions of Indian technological ineptitude or inaptitude were wholly misguided, so in recent decades have cheap and convenient cell phones proliferated across India, claiming more than three hundred million users by 2006. Small machines may not have solved India’s underlying problems, endemic poverty and rapid population growth among them, but the history of the last sixty years has shown the importance of making, selling, and imagining small things as well as large ones. The god of small things is not yet dead.

The point is not that these technological developments are necessarily right and desirable, or “appropriate” in the conventional sense. Many manifestations of what have here been called
everyday technology have not been conducive to wealth or well-being, as critics of technological modernity in India were quick to anticipate decades ago. Many, indeed, have proved instruments of exploitation and have helped to keep the poor needy, hungry, and oppressed. But they are cogent demonstrations of India’s complicated—often muted, quizzical, antagonistic—engagement with technological modernity as well as its distinctive capacity to be inventive and adaptive, to absorb new technologies (without saying farewell to the old), and to put them to its own practical and ideological uses. Even demonstrably foreign machines could become indigenized and made integral to ongoing social and economic change. The history of everyday technology in India can be rendered in many ways—as a history of colonialism and development, of postcolonialism and globalization—but it is also a history of India’s struggle with the technological opportunities and dilemmas that lie at the heart of all our modernities.

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### Notes

**Introduction**


10. As in the deliberations of the Indian planning committee: K.
Chapter One


4. Bagchi, introduction to ibid., ix, xiii.

5. Ibid., 8.


18. Ibid., 266.


20. For a critical evaluation of India’s industrial exhibitions, see Glyn Barlow, Industrial India (Madras: G. A. Natesan, 1907), chap. 3.


24. Ibid., 1-2.


Chapter Two


Chapter Three


8. D. Davidson to George R. McKenzie, May 20, 1884, box 88, folder 8, SA.


11. N. M. Patell to McKenzie, November 17, 1881, box 88, folder 8, SA; Patell to McKenzie, January 11, 1884, ibid.


15. Patell to Singer, July 12, 1886, box 88, folder 8, SA; “List of Offices in India, Burma and Ceylon,” 1905, box 89, folder 7, SA.


18. Patell to McKenzie, November 20, 1883, box 88, folder 8, SA.

19. Davidson to McKenzie, December 29, 1883, box 88, folder 8, SA; Patell to McKenzie, January 16, 1885, ibid.


23. See the photograph of the Parsi Ladies’ School in Palsetia, Parsis, 368.


37. Ronald Ross, *Memoirs* (London: John Murray, 1923), 214. A photograph held by the archives of the London School of Hygiene and Tropical Medicine shows Ross, his wife, and other European cyclists at the Cubon cycle club, c. 1896. The picture appears to show only one Indian, wearing a turban, on the extreme right of the image.


51. India, *Home (Establishments)*, nos. 145–47, January 1915, India Office Records, British Library, London (hereafter cited asIOR); ibid., nos. 8–9, February 1912, IOR; ibid., nos. 211–12, March 1914, IOR.


59. CWFG, 16.93.


61. Friedrich A. Kittler, *Gramophone, Film, Typewriter* (Stanford, CA:
Chapter Four


72. Bombay Chronicle, April 1, 1946, 5; Tuker, While Memory Serves, 38–39, 140.

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