

# MIT-Trained Swadeshis: MIT and Indian Nationalism, 1880–1947

*By Ross Bassett\**

## ABSTRACT

During the colonial period, roughly one hundred degrees were awarded by MIT to Indians. However their importance to India and to the historical understanding of India is disproportionate to their numbers. These men—and they were all men—often from elite families, formed a technological elite in the last days of colonial India. Their careers show a technological nationalism in India—several men came from families associated with Gandhi—and represent an important foreshadowing of the period after independence.

## INTRODUCTION

As the introduction to this volume notes, Jawaharlal Nehru laid claim to science as one of the foundations on which independent India was to be built. The editors' focus on Nehru and his words emphasizes the historical resources that an appeal to a universal science offered a nation builder, enabling him to create a powerful forward-looking "imagined community." But as powerful as science and technology were as symbols, one should be highly skeptical about the ability of a single person to fashion a national identity out of whole cloth. The rhetorical connections to science would have meant little without resources on the ground in India to translate lofty aspirations into material form.

This essay looks at a small cadre of Indian engineers trained in the United States at the Massachusetts Institute of Technology during the colonial period. Its starting point is a database of every person claiming a hometown in India or South Asia who graduated from MIT in the twentieth century.<sup>1</sup> Between 1900 and 1947, MIT awarded roughly one hundred degrees to Indians, not a trivial number but one that made MIT graduates a tiny fraction of the Indian engineering community. However,

\* Department of History, North Carolina State University, 478 Withers Hall, Campus Box 8108, Raleigh, NC 27695-8108; ross\_bassett@ncsu.edu.

Research for this article was supported by the National Science Foundation under Grant No. SES-0450808. The author would also like to thank the following people for their assistance and encouragement: the staff of the Institute Archives at MIT, especially Nora Murphy; David Gilmartin; Rosalind Williams; the participants in the conference on Science, Technology, and National Identity, held at the University of South Carolina, September 20–22, 2007; and Ann Johnson and Carol Harrison.

<sup>1</sup> The author constructed this database, as part of a larger project on the history of Indians who went to the Massachusetts Institute of Technology in the twentieth century, by going through MIT commencement programs and picking out every graduate who listed a hometown in India. The programs are available at the MIT Institute Archives under the primary title Massachusetts Institute of Technology, *Graduation Exercises*.

their importance both to India and to the historical understanding of India is disproportionate to their numbers. These men—and they were all men—often from elite families, formed a technological elite in the last days of colonial India. Their careers show a technological nationalism in India and represent an important foreshadowing of the period after independence.

The examination of an Indian elite that was once content to operate within the colonial structure but in the twentieth century became increasingly disaffected under colonial rule has been a major theme in the historiography of Indian nationalism.<sup>2</sup> That nationalist elite is most closely associated with the legal profession and people such as Mahatma Gandhi, Mohammad Ali Jinnah, and Jawaharlal Nehru. Not completely surprisingly, the MIT-trained engineers also came from elite families in law, business, and government service. And by the early 1930s, western India had become an important center both for the nationalist movement and for MIT-trained engineers.

In fact, the connections between MIT-trained engineers and the nationalist movement run deeper than a few vague similarities between elites. In some cases, they were the same elites. Three families associated with Gandhi sent a total of nine sons to MIT during the nationalist movement. For these families following Gandhi and sending sons to MIT were not contradictory actions; both were part of the nationalist movement.

Writing on science and technology in colonial India has focused on the dominant role played by the colonial state. The major scientific and engineering actors were colonial institutions such as the Geological Survey of India, the Public Works Department, the Indian Medical Service, and Indian universities. Gyan Prakash observes that by the turn of the twentieth century, “colonial power” was about the “scientific and technological reconfiguration” of the colonies.<sup>3</sup> The colonial state was not the only actor though: Indians attended MIT largely based on individual private initiative, getting funding from outside the British Indian state. When the colonial government, in the last days of the raj, began looking for ways to produce more and better-trained engineers, its proposals were ones that had been in some ways anticipated by the lives of India’s MIT-trained avant-garde.

<sup>2</sup> One can see this in almost any survey of modern Indian history, such as Barbara D. Metcalf and Thomas R. Metcalf, *A Concise History of India*, 2nd ed. (New York, 2006); Judith M. Brown, *Modern India: The Origins of an Asian Democracy*, 2nd ed. (Oxford, 1994); and Sugata Bose and Ayesha Jalal, *Modern South Asia: History, Culture, Political Economy*, 2nd ed. (New Delhi, 2004). The role of elites in the making and unmaking of colonial India has been a particular theme of the “Cambridge School,” whose leading figure in recent years has been C. A. Bayly. His works include *Indian Society and the Making of the British Empire* (Cambridge, UK, 1988) and *Rulers, Townsmen and Bazaars: Northern Indian Society in the Age of British Expansion, 1770–1870* (Cambridge, UK, 1983). A summary and critique of this work is given in Nicholas B. Dirks, *Castes of Mind: Colonialism and the Making of Modern India* (Princeton, N.J., 2001), 303–13. Inevitably and rightly, recent Indian historiography has lessened the focus on elites. The thinking behind this article owes much to the work of Charles S. Maier, particularly his *Among Empires: American Ascendancy and Its Predecessors* (Cambridge, Mass., 2006), 19–77.

<sup>3</sup> Gyan Prakash, *Another Reason: Science and the Imagination of Modern India* (Princeton, N.J., 1999), 178. Other works that focus on the technology and the colonial state include the essays in *Technology and the Raj: Western Technology and Technical Transfers to India, 1700–1947*, ed. Roy McLeod and Deepak Kumar (New Delhi, 1995); David Gilmartin, “Scientific Empire and Imperial Science: Colonialism and Irrigation Technology in the Indus Basin,” *Journal of Asian Studies* 53 (Nov. 1994): 1127–49; Daniel R. Headrick, *The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850–1940* (New York, 1988).

An examination of Indians studying engineering at MIT might suggest to the reader's mind some American plan for "imposing modernity" on India. This is emphatically not what happened. Almost all the impetus for the activities described in this paper came from the Indian side and occurred before the work on modernization of MIT professor W. W. Rostow. And although none of these Indian engineers wrote treatises describing his view on the role of technology in India, the diversity of their careers suggests it would be wrong to subsume them into some one-dimensional modernization.<sup>4</sup> Instead, MIT-trained Indians stand within a long tradition of Indian interaction with other societies.

MIT-trained Indians in the colonial period represent an important foreshadowing. In the first three decades of the twentieth century, thousands of Indians studied in Great Britain to prepare for careers in India as barristers, civil servants, or engineers. Great Britain, as the colonial metropole, offered Indian students advantages they could never gain in the United States. But by 1947, the relative educational importance of these two countries to India switched: more Indians went to the United States for higher education than went to Great Britain. Foreign-trained Indian engineers would play a large role in building independent India, and those engineers were increasingly American, rather than British, trained.

In the early twenty-first century, a significant portion of India's identity as a high-technology nation, either implicitly or explicitly, comes through India's technological relationship with the United States. The gleaming IT (information technology) parks of Bangalore do most of their business with American firms. The achievements of NRIs (nonresident Indians) in American high technology companies have been a source of pride within India. Indians who went to MIT in the colonial period serve as a significant point of origin for a technological identity defined in relation to the United States.<sup>5</sup>

<sup>4</sup> Rostow's most complete formulation of his work was W. W. Rostow, *The Stages of Economic Growth, a Non-Communist Manifesto* (New York, 1960). The study of modernization theory is becoming alarmingly close to reaching the large-scale industry stage itself. Work includes Michael Adas, *Dominance by Design: Technological Imperatives and America's Civilizing Mission* (Cambridge, Mass., 2006); David C. Engerman, Nils Gilman, Mark H. Haefele, and Michael E. Latham, eds., *Staging Growth: Modernization, Development, and the Global Cold War* (Amherst, Mass., 2003); Nils Gilman, *Mandarins of the Future: Modernization Theory in Cold War America* (Baltimore, 2004); Nicole Sackley, "Passage to Modernity: American Social Scientists, India, and the Pursuit of Development, 1945–1961" (PhD diss., Princeton Univ., 2004). Ironically, Adas's chapter critiquing modernization theory, "Imposing Modernity," with his own reductionist single focus and lack of nuance, replicates some of the very features that Adas finds objectionable about modernization theory. The chapter is full of straw figures, generic "ideologues," "modernization theorists," and "development specialists." Adas's work practically grants modernization theory agency in and of itself, ignoring the complex mixture of motives and interests that drive most human activity.

<sup>5</sup> As of 2007, roughly two-thirds of India's IT business was done with the United States. Nasscom, *Strategic Review 2007*, Executive Summary, <http://www.nasscom.in/upload/51054/Executive%20Summary.pdf> (accessed 5 May 2008). The importance of NRIs to India's identity can be seen by spending a few minutes with an Indian newspaper. Some representative articles that have appeared in the *Times of India* include: Chidanand Rajghatta, "Nine Indians in Elite US Science Academy," *Times of India*, 8 May 2003, <http://timesofindia.indiatimes.com/cms.dll/html/uncomp/articleshow?msid=45781586> (accessed 23 June 2008); and Rajghatta, "IIT Madras Alumnus is MIT Dean," *Times of India*, 15 June 2007, [http://timesofindia.indiatimes.com/World/The\\_United\\_States/IIT\\_Madras\\_alumnus\\_is\\_MIT\\_dean/articleshow/2124324.cms](http://timesofindia.indiatimes.com/World/The_United_States/IIT_Madras_alumnus_is_MIT_dean/articleshow/2124324.cms) (accessed 26 Sept. 2008).

**THE FIRST INDIANS AT MIT AND  
THE EARLY INDIAN NATIONALIST MOVEMENT, 1861–1920**

Perhaps one reason Indians were drawn to MIT was that it was based on a notion of engineering and engineering education largely antithetical to that held by Indian engineering colleges. The first engineering college in India began operation in Roorkee in 1847. The British established the engineering college at Roorkee and the later engineering colleges in Sibpur, Poona, and Madras, as a way to produce intermediate-grade engineers for the British Public Works Department, which had control over the schools. As a consequence, these schools had a very limited curriculum, focused on civil engineering, the discipline most needed by the Public Works Department, and within civil engineering, focused on narrow vocational training in such areas as surveying and estimating. Given their restricted conception of engineering for India, the British in India argued that there was a limited need for engineering education and that expanding colleges beyond the needs of the Public Works Department would simply lead to unemployment. British mercantilist policies did not encourage the industrialization of India, as might have happened with a broader and wider technical education.<sup>6</sup> In contrast to its position on engineering, the British encouraged scientific training to improve agriculture, which would then lead to higher crop yields and higher tax revenues. In fact, the government of Bengal sent eight students to Cornell University to study agriculture between 1905 and 1909.<sup>7</sup>

In 1846, William Barton Rogers, then a professor at the University of Virginia, penned a prospectus for what would become MIT, titled “A Plan for a Polytechnic School in Boston,” which showed his capacious vision of engineering. Rogers proposed to provide instruction in virtually all technical fields, combined with instruction in the sciences relating to those fields. Rogers expected the engineers trained at his school to be not merely competent at operating existing machinery but also inventors, men who would use their knowledge of scientific principles to improve on existing processes. Rogers planned to locate his school in Boston, to benefit from local industry, but aimed at national preeminence, claiming that the institution he envisioned would “soon overtop the universities of the land in the accuracy and extent of its teachings in all branches of positive knowledge.”<sup>8</sup>

Rogers struggled to get support for his plan for many years; then the Morrill Act of 1862 provided critical funding and showed a country widely interested in technical and agricultural education. Although MIT was one of Massachusetts’s land-grant colleges, and the great majority of students came from within the state, its distinctive approach to education attracted students from throughout the United States. The

<sup>6</sup> A typical case of an Indian educated in one of India’s engineering colleges is described in Prakash Tandon’s memoir, *Punjabi Century*. Tandon’s father, Ram Das, went to Roorkee, then joined the Irrigation Department of the Punjab government. English engineers held the higher-level positions, while the senior Tandon was consigned to the lower ranks. Prakash Tandon, *Punjabi Century: 1857–1947* (Berkeley, Calif., 1968). See also Arun Kumar, “Colonial Requirements and Engineering Education: The Public Works Department, 1847–1947,” in *Technology and the Raj: Western Technology and Technical Transfers to India, 1700–1947*, ed. Roy MacLeod and Deepak Kumar (New Delhi, 1995), 216–34; Headrick, *Tentacles of Progress* (cit. n. 3), 304–45.

<sup>7</sup> Ian C. Petrie, “Village Visions: Science and Technology in the Bengal Countryside, c. 1860–1947” (PhD diss., Univ. of Pennsylvania, 2004), 226–37.

<sup>8</sup> Quoted in Samuel C. Prescott, *When M.I.T. Was “Boston Tech”* (Cambridge, Mass., 1954), 332.

first graduate who can clearly be identified as a foreigner is Aechirau Hongma, from Tokyo, Japan, in the class of 1874, who was working in Tokyo as a government engineer one year after graduating. In 1880, the Chinese government sent nine students to MIT, making up 4 percent of the student body. (The Chinese government recalled them all the next year.)<sup>9</sup>

Although the first Indian attended MIT in 1880, only in the twentieth century is it possible to trace the lives of Indians who went to MIT with any specificity. The first MIT student to play a significant role in the technological development of India did so through a larger social movement. The early twentieth century marked the rise of the swadeshi movement in India, in which Indians developed indigenous industries as an act of resistance to British rule and dominance. In the late nineteenth century, the Poona area, on the western side of India, had been a seat of resistance to the British, led by pioneer nationalist Bal Gangadhar Tilak.<sup>10</sup>

In 1908, after two years of study at MIT, Ishwar Das Varshnei came to Poona to set up a glass factory under the umbrella of a nationalist organization, the Paisa Fund. Varshnei had grown up in the Aligarh region of northern India. Although little is known of his background, the fact that he came to MIT after receiving some training in Japan as well as the course of his later career suggests that the Indian technical education system did not suit him. The Paisa Fund, so called because it raised money by asking for donations of a paisa each (a paisa was a sixty-fourth of a rupee) from a broad spectrum of Indian society, was supported by Tilak and sought to develop indigenous Indian industry. After raising 10,000 rupees, the Central Committee of the fund decided to concentrate its efforts in glassmaking. The Central Committee convinced Varshnei to come to Poona to direct the glassmaking operation. Varshnei had apparently learned glassmaking during his time in Japan and at MIT. In 1908, Varshnei began glassmaking operations for the Paisa Fund, assisted by several Japanese apprentices. The founders of the Paisa Fund envisioned not just the opening of a factory but the training of a generation of people who could go out and run their own industrial enterprises, and so Paisa Fund combined education and production.<sup>11</sup>

Although by 1915, the Paisa Fund Glass Works had not succeeded as a business, it had successfully laid a foundation for the development of the glass industry in India. Under Varshnei's guidance, ten men had been well trained not only to work in the glass industry but also to start or run their own enterprises. A 1922 article on the state of the glass industry in India noted that Varshnei was running three or four factories in the Punjab, "trying to put his factories on a most up-to-date scale," and working

<sup>9</sup> *Ibid.*, 3–127; Massachusetts Institute of Technology, *President's Report for the Year Ending September 30, 1875*, 203; *Class of '84, Forty-Fifth Anniversary Booklet* (Cambridge, Mass., 1929), 1; *Technology Review* 1 (April 1899): 245. Given the fact that over the long term Asia would be MIT's most important hinterland for foreign students, it was appropriate that the first foreign student and the first group of foreign students both came from Asia.

<sup>10</sup> Sumit Sarkar, *The Swadeshi Movement in Bengal: 1903–1908* (New Delhi, 1973); Metcalf and Metcalf, *Concise History of India* (cit. n. 2), 153–58; Manu Goswami, "From Swadeshi to Swaraj: Nation, Economy, Territory in Colonial South Asia, 1870–1907," *Comparative Studies in Society and History* 40 (1998): 609–36; Goswami, *Producing India: From Colonial Economy to National Space* (Chicago, 2004), 242–76. *Swadeshi* is a Sanskrit term meaning "of one's own country." Amartya Sen, "The Indian Identity," in *The Argumentative Indian: Writings on Indian History, Culture, and Identity* (New York, 2005), 337. On Tilak, see Stanley A. Wolpert, *Tilak and Gokhale: Revolution and Reform in the Making of Modern India* (Delhi, 1961).

<sup>11</sup> Paisa Fund, *Silver Jubilee Number* (Poona, India, 1935), 17–23; Dwijendra Tripathi, *The Oxford History of Indian Business* (New Delhi, 2004), 158.

to add the capability to manufacture window glass. The article further noted that students of the Paisa Fund operation had started a dozen other glass factories in India.<sup>12</sup>

Ishwar Das Varshnei did not earn a degree during his two years at MIT, and in a period when funding for Indian students came almost exclusively from India, and when the prestige of an MIT degree was very small there, most Indians who attended MIT during the early part of the twentieth century also failed to earn a degree. Although the historical records do not exist to allow for a detailed analysis of every case, one suspects that Varshnei and the students after him came to MIT to learn only specific skills, ones they could employ in India.

In the late 1890s and early 1900s, the British tried to maintain their rule by incorporating a few Indians into positions of responsibility and authority in the raj. Indians could compete to enter the Indian Civil Service, and enter, in a limited way, other government positions. In the early twentieth century, Krishna Gupta was one of two Indians who reached the highest levels within the raj. He passed the examination for the Indian Civil Service in 1871, and after a steady series of appointments, he became one of two Indians appointed to the India Council in 1907. One might see in Gupta the classic case of the co-opted elite that is necessary for the maintenance of empire. But from his own flesh came an elite with a different orientation—his son, Birendra Chandra Gupta, whom he sent to MIT, from which Birendra Chandra graduated in 1907. Although the exact circumstances under which the younger Gupta came to MIT are not clear, his father's positions would have given him knowledge of educational and technological developments worldwide that would not have been available to most educated Indians. (For example, the senior Gupta traveled to the United States.) The junior Gupta spent some time at General Electric's Lynn Works, and married an American woman before he returned to India. Gupta became a professor of electrical engineering at Bengal Engineering College. As might be expected from someone with an American wife, he kept ties with the United States—in 1922 the *Boston Globe* reported that Gupta was back for two years to do electrical research.<sup>13</sup>

#### INDIANS, MIT, AND THE AGE OF GANDHI, 1920–1940:

##### I. DEVCHAND PAREKH AND BHAVNAGAR

The Indian student experience at MIT in the 1920s and 1930s was different enough from the experience of the previous period to warrant being considered a new generation. The biggest change was that there were more Indian students and they were a constant presence. Before 1919, no more than two Indians had ever studied at MIT at a time, but between 1920 and 1939, in only one year did the number of Indians go below five, and it rose as high as twelve.

<sup>12</sup> Paisa Fund, *Silver Jubilee Number* (cit. n. 11); G. P. Ogale, "Glass Industry in India," *Bulletin of the American Ceramic Society* 1 (Nov. 1922): 296.

<sup>13</sup> On efforts by the British to integrate Indians into official positions, see Brown, *Modern India: The Origins of an Asian Democracy* (cit. n. 2), 144–50. Information about Krishna Gupta is given in his obituary in *The Times of London*, 30 March 1926, 19. A visit of Gupta's to the United States is documented in "People Met in Hotel Lobbies," *Washington Post*, 10 June 1907, 6. The MIT Institute Archives considers Gupta the first Indian to have received a degree from MIT. (I did not find his name in the graduation program or in the corporation records of those awarded degrees.) Birendra Chandra Gupta, Pathfinder File, India, Institute Archives, Massachusetts Institute of Technology, Cambridge, Mass. (hereafter cited as MIT Institute Archives). His later visit to the United States is documented in "No Rebellion In India at Present, But—," *Boston Globe*, 22 Oct. 1922, E3.

The Kathiawar peninsula of what is today western Gujarat holds a special place in the history of Indian nationalism, being the home of Mahatma Gandhi and the ancestral home of Mohammed Ali Jinnah. During the 1930s, a small princely state in Kathiawar, Bhavnagar, was the leading source of Indian students at MIT. In fact, Bhavnagar, representing less than 2 percent of the population of India, produced almost half the Indians who earned degrees from MIT in the 1930s. This concentration in Bhavnagar was further concentrated in the family of a lifelong friend of Mahatma Gandhi, Devchand Parekh. Parekh had a vision of a technological India built around Indians trained at MIT and worked to realize this vision within his family.

Devchand Parekh was born in 1871 in the city of Jetpur on the Kathiawar peninsula, the son of a wealthy lawyer. In 1893 Parekh left to study at Cambridge, where he received a bachelor's degree in 1896 and his master's degree in 1899. While in Britain he studied for the bar exam and received his calling to the bar from the Middle Temple in 1897. Although Devchand Parekh returned to India in 1899 seemingly well placed to have a lucrative career as a barrister, according to Parekh's son, something happened in Cambridge that changed the course of his life.<sup>14</sup>

That something was an encounter with the economist Alfred Marshall. According to Parekh's son, Marshall counseled Devchand Parekh that Indians should not be coming to Britain to study liberal arts; instead they should go to America—specifically to MIT—to study engineering, and then return to India to set up industries that would improve the Indian standard of living. In response to this, Parekh went to the United States in 1893, visited MIT, and began a correspondence with MIT officials to receive catalogs.<sup>15</sup>

Although much of the testimony of Devchand Parekh's son (ninety-five years old in 2008, when interviewed by the author) cannot be verified directly, indirect evidence strongly supports the outline of his account. Students in Parekh's curriculum would have heard lectures from Marshall in political economy. Marshall was known for his openness—he set aside two afternoons a week in which any member of the university could call on him at home.<sup>16</sup>

Although no correspondence between Marshall and Parekh survives (and there may never have been any), a 1910 letter by Marshall is very instructive. In the letter, Marshall wrote apparently to a B. B. Mukherjee of Lucknow University:

For twenty years I have been urging on Indians in Cambridge to say to others: "How few of us, when we go to the West, think of any other aim, save that of our individual culture? Does not the Japanese nearly always ask himself in what way he can strengthen himself to do good service to his country on his return?"<sup>17</sup>

Earlier in the letter, Marshall had written in praise of Jamsetji Tata, the great Indian entrepreneur, saying the country could use a "score or two" of men like him. But Marshall maintained a pessimism about India, writing, "[S]o long as an Indian who has

<sup>14</sup>M. D. Parekh, interview by author, 20 June 2008, Mumbai, India. Further information on Parekh is included in J. A. Venn, *Alumni Cantabrigienses*, Part 2, 1752–1900 (Cambridge, UK, 1953), 5:19.

<sup>15</sup>Parekh, interview (cit. n. 14).

<sup>16</sup>J. M. Keynes, "Alfred Marshall, 1842–1924," in *Memorials of Alfred Marshall*, ed. A.C. Pigou (London, 1925), 51. Marshall's lecturing to students in Parekh's curriculum is asserted by J. Cox, deputy keeper of University Archives, Cambridge University. Cox letter to author, 8 July 2008.

<sup>17</sup>Marshall to [B.B. Mukerji?], 22 Oct. 1910, in *The Correspondence of Alfred Marshall, Economist*, ed. John K. Whitaker (Cambridge, UK, 1996), 3:268–9.

received a high education generally spends his time in cultured ease: or seeks money in Indian law suits—which are as barren of good to the country as is the sand of the sea shore—nothing can do her much good.” In an earlier letter, Marshall wrote:

I do not believe that any device will make India a prosperous nation, until educated Indians are willing to take part in handling things, as educated people in the West do. The notion that it is more dignified to hold a pen and keep accounts than to work in a high grade engineering shop seems to me the root of India’s difficulties.<sup>18</sup>

These all echo what Marshall is alleged to have said to Parekh. One might note multiple levels of irony in Marshall’s advice. First, it represents complaints about a lack of industrial spirit in India coming from England at precisely the time when some historians have noted a decline in industrial spirit in England.<sup>19</sup> Second, an heir of Adam Smith and a colonizer is urging Indians to rise above individual self interest and think of the good of the country when an appeal to narrow self (or group) interests had been one of the main strategies of the British in colonizing India. Marshall was no Indian nationalist, and he showed traces of racism. If Marshall’s statements had been made to a fellow Briton, they could sound like an apology for the status quo. But made to an Indian, who was in a position to act on the words, his counsel could be life changing. Of course Marshall’s seeming hostility to lawyers carries an irony in that lawyers were one of the prime vehicles through which India was to receive its independence.

Marshall was familiar with MIT and its approach to technical education, and that approach was consistent with his way of thinking. In 1875, Marshall went to the United States, where he spent two weeks in Boston, hosted for part of the time by Charles Eliot, the president of Harvard and former professor of chemistry at MIT. Marshall was a regular correspondent with his fellow economist and the president of MIT Francis Amasa Walker. In 1886 Walker wrote Marshall telling him of the opening of MIT’s school year and that he would send Marshall an MIT catalog so he could see “how unlike an English University is a Yankee School of Technology.”<sup>20</sup> In Marshall’s *Principles of Economics*, he described a failed effort of his at Bristol to introduce a technical education program of several years duration based on alternate six-month periods of studying science and six-month periods working on workshops, an approach consistent with MIT’s. Marshall, whose own career had its origins in being the second wrangler in the mathematical tripos at Cambridge, and whose career was marked by the consistent, if sometimes surreptitious, use of mathematics in economics, can have reasonably been expected to have been enthusiastic about MIT, which introduced mathematical and scientific sophistication to technology.<sup>21</sup>

Although it is not possible to verify that Parekh visited MIT in 1893, strong indirect

<sup>18</sup> Marshall to [B.B. Mukerji?], 22 Oct. 1910 (cit. n. 17); Marshall to Manohar Lal, 28 Jan. 1909, Pigou, *Memorials of Alfred Marshall* (cit. n. 16), 457.

<sup>19</sup> Martin J. Wiener, *English Culture and the Decline of Industrial Spirit, 1850–1980* (Cambridge, UK, 1981).

<sup>20</sup> Quoted in James Phinney Munroe, *A Life of Francis Amasa Walker* (New York, 1923), 264. Marshall’s visit to America is described in Peter Groenewegen, *A Soaring Eagle: Alfred Marshall, 1842–1924* (Aldershot, UK, 1995), 193–203.

<sup>21</sup> Alfred Marshall, *Principles of Economics*, 9th ed. (London, 1961), 209–10. On Marshall’s mathematical background and use of mathematics, see Groenewegen, *A Soaring Eagle* (cit. n. 20), 91–94, 412–13.



evidence exists to support this claim. Passenger manifests show that in June 1893, Devchand Parekh disembarked in New York City from the *Paris*. In July 1893, the *Washington Post* ran a story describing the visit of Parekh and a companion to Washington, D.C. The report shows that the two had an interest in technology—Parekh's companion observed that the main difference he noted between America and India was the widespread use of machinery in America. The report suggests the two had a nationalist bent: they described conditions under British rule and then stated, "Now that is what you would call tyranny, would you not?" Parekh and his colleague had come to Washington from Chicago, where presumably they had been to the World's Columbian Exposition.<sup>22</sup>

Back in India, Parekh led a double life, practicing law but also pursuing technological development. With the help of his younger brothers, who had studied chemistry at the University of Bombay, he set up the Bhavnagar Chemical Works in 1910, which produced tinctures and liniments. By the late 1920s, the Bhavnagar Chemical Works was exporting papain, an extract of papaya, to Europe. A 1922 British publication called the company "satisfactorily worked."<sup>23</sup>

Parekh was also a close and lifelong friend of Mohandas Gandhi. Their times in Britain did not overlap, and apparently they came to know each other as young men in Kathiawar. In 1902, when Gandhi was a largely unknown lawyer, returning to South Africa after a brief stint working in Bombay, he wrote of the possibility that Parekh might join him in South Africa. Upon Gandhi's return from South Africa in 1915, at a time when Gandhi was more a regional than a national figure, one of his first stops was at Parekh's hometown of Jetpur, where Parekh and the other citizens of the town honored him.<sup>24</sup>

A picture of Gandhi and Parekh together in 1915 in Jetpur shows Gandhi wearing Kathiawar dress, while Parekh wears English clothes. In May 1921 Gandhi wrote to Parekh: "If you will, you can see that no home in Kathiawad is left without a spinning-wheel. But can a person ever rise to heaven except by giving up his life? Do you yourself spin? Do you use khadi exclusively, at home and outside?"<sup>25</sup>

The clear implications of Gandhi's questions were that he knew that Parekh did not spin and did not wear khadi. Family testimony is that in 1921 (apparently sometime after this letter), Parekh burned his English clothes and gave up his law practice to support Gandhi. Although that cannot be verified independently, what can be verified

<sup>22</sup> "Two Hindoos Here," *Washington Post*, 17 July 1893, 6. Documentation for Parekh's entry into the United States was found searching the ellisland.org database using the search term "Parekh." See [http://www.ellisland.org/search/passRecord.asp?MID=06161316900145053280&LNM=PA REKH&PLNM=PAREKH&last\\_kind=0&TOWN=null&SHIP=null&RF=2&pID=103190080012](http://www.ellisland.org/search/passRecord.asp?MID=06161316900145053280&LNM=PA REKH&PLNM=PAREKH&last_kind=0&TOWN=null&SHIP=null&RF=2&pID=103190080012) (accessed 23 Sept. 2008).

<sup>23</sup> Bhavnagar Chemical Works Vartej, *Golden Jubilee Souvenir, 1910–1960; Report on the Administration of the Bhavnagar State for the Year 1928–1929* (Bhavnagar, 1930), 44, India Office Records, British Library, London; Somerset Playne, *Indian States: A Biographical, Historical, and Administrative Survey* (London, 1922), 386. Parekh, interview (cit. n. 14).

<sup>24</sup> Gandhi's stay in Jetpur in January 1915, where he is said to have been "[p]ut up at Devchadhbhai Parekh's," is documented in C. D. Dalal, *Gandhi: 1915–1948; A Detailed Chronology* (New Delhi, 1971), 1. The letter in which Gandhi talked about Parekh's joining him in South Africa is M. K. Gandhi to D. B. Shukla, 8 Nov. 1902, *The Works of Mahatma Gandhi*, <http://www.gandhiserve.org/cwmg/VOL003.PDF> (accessed 28 Sept. 2008).

<sup>25</sup> Mohandas Gandhi to Devchand Parekh, 5 May 1921, *The Collected Works of Mahatma Gandhi*, <http://www.gandhiserve.org/cwmg/VOL023.PDF> (accessed 21 Sept. 2008). Khadi, homespun and home-woven cloth, became one of the foundations of Gandhi's movement in the 1920s. Lisa Trivedi, *Clothing Gandhi's Nation: Homespun and Modern India* (Bloomington, Ind., 2007).

is that Parekh took a leadership role in the khadi movement in Kathiawar. In 1925 Gandhi reported that Parekh had agreed to enlist one thousand volunteers who would always wear self-spun khadi.<sup>26</sup>

The imagery in Gandhi's phrase "can a person ever rise to heaven except by giving up his own life" suggested someone willing to sacrifice everything; Parekh sacrificed much, though he did not completely subordinate his will to Gandhi's. In 1925, Gandhi launched a public, semihumorous attack on Parekh. In February 1925, Gandhi came to Kathiawar. When Gandhi got to Parekh's hometown of Jetpur, Parekh promised Gandhi the use of his own spinning wheel for Gandhi's daily spinning session. When it arrived, Gandhi found a spinning wheel in very poor condition—obviously not being regularly used by Parekh. Gandhi reported that his arm started aching with just a half-hour's worth of spinning. Gandhi claimed Parekh was mocking the spinning wheel and threatened to remove him from his position if he did not set his spinning wheel right.<sup>27</sup>

On February 16, 1925, Devchand Parekh's daughter, Champabehn, married T. M. Shah in Jetpur. Gandhi was in attendance at the wedding. Shah was serving at the time as the registrar of the Gujarat Vidyapith, a nationalist school in Ahmedabad, founded by Gandhi. By 1927, apparently at the urging and with the financial support of his father-in-law, Shah was at MIT studying electrical engineering. In 1930 he earned both a bachelor's degree and a master's degree there as part of the cooperative program. Although he must have worn khadi at the Vidyapith, the 1929 *Technique*, the MIT yearbook, shows him in western clothes. The familial connection with Devchand Parekh would suggest that he was not repudiating Gandhi by going to MIT. If there were any doubt, it is refuted by a 1932 article in the *Tech*, the MIT student newspaper, reporting that Shah and a fellow MIT student were in prison in India as part of the nationalist movement. Shah endured eighteen months further imprisonment during World War II after he participated in a strike at Tata Iron and Steel in Jamshedpur as part of the "Quit India" movement. At first glance, going to MIT for advanced training and sitting in jail would seem to be incompatible—why would someone waste his skills that way? The reasonable answer is that for Shah, working for Gandhi, going to MIT, and going to jail were all nationalist acts.<sup>28</sup>

The evidence given thus far supporting family testimony about the link between Alfred Marshall, Devchand Parekh, MIT, and India is circumstantial. The strongest piece of evidence is also circumstantial. The Parekh family, between 1930 and 1940, received a total of eight degrees from MIT; the rest of India, not associated with the Parekh family, during that time received twenty-eight degrees from MIT. This extraordinary activity on the part of the Parekhs requires some explanation. After

<sup>26</sup> "To Kathiawaris," 12 April 1925, *The Collected Works of Mahatma Gandhi*, <http://www.gandhi.serve.org/cwmg/VOL031.PDF> (accessed 21 Sept. 2008).

<sup>27</sup> "Reminiscences of Kathiawar-II," 8 March 1925, *The Collected Works of Mahatma Gandhi*, <http://www.gandhiserve.org/cwmg/VOL030.PDF> (accessed 28 Sept. 2008).

<sup>28</sup> Shah's wedding and his association with the Vidyapith is documented in Dalal, *Gandhi*, 54 (cit. n. 24). The history of the Vidyapith is given on its Web site, <http://www.gujaratvidyapith.org/history.htm> (accessed 28 Sept. 2008). Shah's imprisonment is documented in "Technology Graduates in Prison in India for Anti-British Activities," *The Tech*, 13 May 1932, 1, 5; and MIT, *Twenty-Fifth Reunion, Class of '29* (Cambridge, Mass., 1954), 60–61. Strikes at Tata Iron and Steel as part of the "Quit India" movement are documented in Vinay Bahl, *The Making of the Indian Working Class: The Case of the Tata Iron and Steel Co., 1880–1946* (New Delhi, 1995), 358–63. Shah's son, Anant Shah, asserted that his father had Gandhi's approval to go to MIT. Anant Shah, interview with author, 29 July 2008, by telephone.

Shah, Devchand Parekh sent three nephews and two sons to MIT. Almost all of them studied chemical engineering with the apparent idea that they would come back and work in the family chemical works. In 1940, Devchand's son, M. D. Parekh, earned a doctorate in chemical engineering from MIT, working under Warren Lewis, one of the founders of the modern discipline of chemical engineering.<sup>29</sup>

Although in some cases, families used MIT as part of a strategy to support the family business, this did not happen with the Parekhs. M. D. Parekh reports that his father did not insist that he work in the family business, and he did not. The 1948 MIT alumni directory shows none of the Parekhs working for the Bhavnagar Chemical Works.<sup>30</sup>

Devchand Parekh was unique, but in fact he was not the only father from Bhavnagar with connections to Gandhi to send multiple family members to MIT. Hiralal Shah was a wealthy cloth merchant who had transformed his business in line with Gandhi's movement from selling British clothes to selling swadeshi and eventually moved to Bombay. In the late 1920s, he corresponded with Gandhi about an idea for an improved charka. Shah had a keen interest in astronomy—his Bombay telex address was "Astronomy"—and in 1932, he sent Gandhi some books on the field. Shah's personal abilities in science and technology were strictly at the amateur level, but he was determined to develop greater capabilities in his family: two of Shah's sons went to MIT, where they earned master's degrees in engineering. Another son went first to Lowell Tech and then earned an MBA at Harvard.<sup>31</sup>

Both Gandhi and Parekh came from the Kathiawar peninsula, but Gandhi ultimately left Kathiawar. Its high density of princely states, where the British ruled indirectly through a local prince or maharaja, was not a favorable place for a nationalist movement. Any protests there would first have to be made against the local princes, confusing the issue. Although Gandhi left, first setting up his base of operations in Ahmedabad, Parekh stayed. One might see certain similarities between Parekh and Nehru, but whatever would have happened otherwise, the fact that Parekh stayed in Kathiawar almost guaranteed him historical obscurity. The very features that would ultimately make Kathiawar a backwater in the nationalist movement made it a favorable place for a technical movement based on sending students to MIT for education. In an environment without the constant protests, agitations, and arrests of British India, it was possible to think more for the long term. Rule by princely states allowed for the distribution of funds for students studying outside the empire in a way not possible in British India.

Outside of the Parekhs, eight more degrees were earned by residents of Bhavnagar in the decade of the 1930s, making Bhavnagar responsible for one half the MIT degrees earned by Indians. Whether the Parekhs played a role in the decision by others from Bhavnagar to attend MIT is not clear. What is clear is that Bhavnagar offered

<sup>29</sup> Parekh, interview (cit. n. 14).

<sup>30</sup> Devchand Parekh also sent two daughters to Boston University, where they earned master's degrees in the 1930s. Chanduben Parekh, "Acculturation in Marriage Institutions of India" (master's thesis, Boston Univ., 1938); Kamuben Valabhadras Parekh, "The Influence of Racial Prejudice in American Life Today" (master's thesis, Boston Univ., 1938).

<sup>31</sup> "Notes," from *Young India*, 5 Sept. 1929, reprinted in *The Collected Works of Mahatma Gandhi*, <http://www.gandhiserve.org/cwmg/VOL047.PDF> (accessed 28 Sept. 2008); Mohandas Gandhi to Hiralal Shah, 12 April 1932, *The Collected Works of Mahatma Gandhi*, <http://www.gandhiserve.org/cwmg/VOL055.PDF> (accessed 28 Sept. 2008). Further information has been provided by Shah's grandson Anand Pandya, in various emails and meetings.

a funding source not available elsewhere in India. Up until the mid-1950s, with the exception of doctoral students who might get a research or teaching assistantship, the money to fund an Indian student at MIT had to come from India. This money could come from several sources, such as families, private voluntary organizations, or philanthropies, such as the Tata Endowment. Indian princely states were another potential source.

The British often claimed that India did not need more Indian engineers, particularly engineers with advanced training, and that the training of engineers would just lead to more unemployment. However stingy the colonial government might have been in supporting technical education, the political organization of Britain's empire in India offered up a space to allow for government funding of engineers at MIT. During the colonial period, the British ruled 40 percent of India indirectly, through local princes. Although the British had a resident in many of the princely states to secure their interests, the local princes had a degree of autonomy.<sup>32</sup>

Most of the MIT students from Bhavnagar, with the exception of the Parekhs, appear to have been funded by the princely state. The grandson of the dewan of Bhavnagar entered MIT in 1936, and when the dewan himself came, he treated all the Indian students at MIT to a luncheon party at Boston's Ritz-Carlton Hotel. Later, the maharaja of Bhavnagar visited Boston and also treated the MIT Indian students.<sup>33</sup>

Bhavnagar also provided the most important Indian MIT graduate of the colonial period, Anant Pandya. Pandya was born in Bhavnagar in 1909 and largely raised by his grandfather. Pandya's father, a graduate of Cornell who had studied at Berkeley, served as an agriculturalist for several Indian princely states and spent large amounts of time away from the family home.<sup>34</sup>

In 1927, Anant Pandya entered NED Engineering College in Karachi, where he finished at the top of his class. Upon graduating, he had two options that typically would have been highly appealing to most recent engineering graduates: he could enter the Indian Engineering Service or take up a Prince of Wales Scholarship for higher studies. But Pandya did not want to work under the British, and the requirement that the Prince of Wales Scholarship be used only at British or Dominion institutions was unacceptable to him. Instead, he applied to and was accepted at MIT; a Bhavnagar state scholarship paid his tuition.<sup>35</sup>

Pandya earned a master's degree within a year and continued on for his doctorate, which he earned in 1933, in civil engineering. (After Pandya's first year at MIT, his cousin Upendra Bhatt joined him there.) Upon his graduation, Pandya returned to India and made a six-month tour of the country looking for an appropriate job. In the words of his cousin and closest friend, he did not meet a "proper response or

<sup>32</sup> Barbara N. Ramusack, *The Indian Princes and Their States* (Cambridge, UK, 2004); Manu Bhagavan, *Sovereign Spheres: Princes, Education and Empire in Colonial India* (Oxford, 2003).

<sup>33</sup> L. M. Krishnan, untitled memoir (epilogue, dated 10 Feb. 1997), in author's possession, 104–5. Independent evidence of students from Bhavnagar being funded by the state comes from B. V. Bhoota, unpublished memoir, 7 July 1997 (in author's possession); and Sriram Shastry, "Nautam Bhagwanlal Bhatt (1909–2005)," *Current Science* 89, 10 Sept. 2005, 895.

<sup>34</sup> The following account is based on R. S. Bhatt, "Anant Pandya: A Biographical Sketch," in *Dr. Anant Pandya: Commemoration Volume*, ed. Lily Pandya (np, 1955), 1–13; Upendra J. Bhatt, "Beloved Brother, Intimate Friend, Brilliant Contemporary," in *ibid.*, 25–42; Kiran Bhatt, interview by author, 16 Feb. 2007, by telephone; and numerous discussions and emails with Anant Pandya, Anant Pandya's son.

<sup>35</sup> R. S. Bhatt, "Anant Pandya," 2–3; Upendra Bhatt, "Beloved Brother," 33–4. (Both cit. n. 34.)

appreciation” in India.<sup>36</sup> His degrees from an American institution seem not to have been fully valued, and his youth and lack of experience worked against him. One of his job offers was for a position paying a humiliatingly low 150 rupees a month. He finally accepted a position at McKenzies Limited in Bombay, but after a little more than a year, he became convinced that this company would not give him adequate scope for his skills. In 1935, he went to London, so desperate to find a position in which he could use his abilities that he considered working without pay. He eventually took a job at the Trussed Concrete Steel Company as a designer. Pandya had a very productive three-year stint with Trussed Concrete, serving as a consultant on making buildings more earthquake proof in India, writing an award-winning paper, lecturing throughout England, and designing an improved air-raid shelter.<sup>37</sup>

In 1939, the government of Bengal advertised the position of principal of the Bengal Engineering College in Sibpur (across the Hugli River from Calcutta). The posting of the advertisement in London was logical because all the previous principals had been English. Pandya applied and the Selection Committee judged him the most qualified candidate. When he officially took over as the principal of the Bengal Engineering College in September 1939, at the age of thirty, he became one of the Indian engineers holding the position of greatest responsibility in India, with many British professors reporting to him. His position as one of India’s leading engineers was affirmed in 1941 by the Indian Science Congress, when it appointed him president of its engineering section.<sup>38</sup>

#### INDIANS, MIT, AND THE AGE OF GANDHI, 1920–1940:

##### II. BAL KALELKAR

In the 1930s, no young Indian had better nationalist credentials than Bal Kalelkar did. His father, Kaka Kalelkar, himself the son of a treasury officer for the raj, had developed nationalist and anti-British leanings in the early part of the twentieth century through reading the work of Tilak. The senior Kalelkar worked primarily in Indian schools, going in 1914 to Rabindranath Tagore’s Santiniketan, where he was to meet Gandhi in February 1915. Shortly thereafter Kalelkar joined Gandhi at his newly established Satyagraha Ashram in Ahmedabad. Kalelkar became Gandhi’s main educationalist, serving for a time as principal of the ashram school, and later professor at the Gujarat Vidyapith. Kalelkar spent time in jail with Gandhi, organized events, and took over some of Gandhi’s publications when he was in jail.<sup>39</sup>

Kalelkar’s younger son Bal grew up sharing his father’s and Gandhi’s work. At age eighteen, Bal became one of a select group chosen to participate with Gandhi on the Salt March. For Gandhi, this was a political, spiritual, and moral exercise, and he required each marcher to spin on a charka every day, to pray, and to keep a daily diary,

<sup>36</sup> Upendra Bhatt, “Beloved Brother” (cit. n. 34), 36–37.

<sup>37</sup> Anant Pandya to Frances Siegel, 25 Oct. 1935, folder 7, box 3, Frances Siegel Papers, SC 149, Radcliffe College Archives, Schlesinger Library, Radcliffe Institute, Harvard University, Cambridge, Mass.; R. S. Bhatt, “Anant Pandya” (cit. n. 34), 4–5.

<sup>38</sup> R. S. Bhatt, “Anant Pandya” (cit. n. 34), 6; Upendra Bhatt, “Beloved Brother” (cit. n. 34), 38; Anant Pandya, “Education for the Engineering Industry,” *Proceedings of the Indian Science Congress* 29 (1942): 347–74.

<sup>39</sup> Information on Kaka Kalelkar is provided in Madho Prasad, *A Gandhian Patriarch: A Political and Spiritual Biography of Kaka Kalelkar* (Bombay, 1965), 355–64. Prasad gives evidence that the senior Kalelkar read Marshall’s *Principles of Economics* (cit. n. 21).

which Gandhi would read. In 1944, Bal Kalelkar wrote the following synopsis of his life in the early part of the 1930s:

[I]n the year 1930, the author found the country seething with political unrest, and though still in his teens, he decided to plunge into the social and political activities carried out by the Indian National Congress under the leadership of Mahatma Gandhi. In the years 1930–35 he devoted his entire time to organizing political activities in the villages of India and was imprisoned for the same. During this period and after his release from prisons, he also did extensive social and constructive work.<sup>40</sup>

In 1939, Bal was at Gandhi's side, at Rajkot, as a hired gang of thugs attempted to violently break up a prayer meeting. As the gang approached, Kalelkar joined Gandhi in his Hindu prayers.<sup>41</sup>

Then the next year, Bal Kalelkar was off to MIT to study mechanical engineering, funded by G. D. Birla, an Indian business magnate and close associate of Gandhi. He went with the blessing of Gandhi, who gave him the following letter to take to America:

This is to introduce young Kalelkar to all my friends in America. He was brought up under my hands. He is one of the most promising among the boys brought up in Satyagraha Ashram. Any help rendered him will be appreciated.<sup>42</sup>

Kalelkar earned a master's degree in mechanical engineering from MIT in 1941 and then a PhD in mechanical engineering from Cornell in 1944. Just after Kalelkar finished his dissertation, which he dedicated to Gandhi as "that grand old man of India," Gandhi wrote to Kalelkar:

I have your beautiful letter. I can understand that western music has claimed you. Does it not mean that you have such a sensitive ear as to appreciate this music? All I wish is that you should have all that is to be gained there and come here when your time is up and be worthy of your country.<sup>43</sup>

For Kalelkar, going to MIT was obviously the end point of a long process. His Cornell biographical sketch mentions that he studied at the NED Engineering College of Karachi between 1937 and 1940. At the point at which Gandhi and Kalelkar faced down a mob in Rajkot, Kalelkar had already set down the path to becoming an engineer.<sup>44</sup>

What are we to make of the fact that Bal Kalelkar, a young man at the very heart of the Indian nationalist movement and a trusted colleague of Gandhi's, who at the

<sup>40</sup> B. D. Kalelkar, "A Study of Intake Manifold Design, with Special Emphasis on the Distribution Characteristics of a Six-Cylinder Engine Equipped with a Twin-Carburetor Layout" (PhD diss., Cornell Univ., 1944), unpaginated front matter. Further details of the Salt March are provided in Rajmohan Gandhi, *Gandhi: The Man, His People, and the Empire* (Berkeley, Calif., 2008), 308–11.

<sup>41</sup> B. D. Kalelkar, "Potter: Through the Pot's Eyes," in *Incidents of Gandhiji's Life*, ed. Chandrashankar Shukla (Bombay, 1949), 99–100.

<sup>42</sup> M. K. Gandhi, 5 July 1940, *The Collected Works of Mahatma Gandhi*, <http://www.gandhiserve.org/cwmg/VOL078.PDF> (accessed 27 Sept. 2008). Support from Birla is asserted in Kalelkar, "A Study of Intake Manifold Design" (cit. n. 40).

<sup>43</sup> Gandhi to Bal D. Kalelkar, 3 Nov. 1944, *The Collected Works of Mahatma Gandhi*, <http://www.gandhiserve.org/cwmg/VOL085.PDF> (accessed 27 Sept. 2008).

<sup>44</sup> Kalelkar, "A Study of Intake Manifold Design" (cit. n. 40).

climactic moment when independence is within sight, decamps to the United States to study connecting rods and internal combustion engines? In the twenty-first century, scholars use terms “Gandhian” and “Nehruvian,” as if they have a fixed set of meanings; however, these static terms do not correspond to lived experience. People came to Gandhi with their own interests. Gandhi drew significant support from elites, whether those elites were barristers such as the senior Parekh and Nehru or businessmen such as G. D. Birla. If the last twenty-five years of cultural history has taught us anything, it has been not to assume a simple linear relationship between texts and audiences. In this case, if Gandhi’s life itself, combined with his spoken and written words form the text, each person would have his or her own experience of Gandhi and own definition of what “Gandhian” was. The only reasonable conclusion to be drawn from the case of the Parekhs, T. M. Shah, and Bal Kalelkar is that they saw no contradiction in their support for Gandhi and going to MIT: both were an integral part of building the Indian nation.<sup>45</sup>

**ENGINEERING A NEW NATION:  
INSTITUTIONALIZING MIT IN INDIA, 1944–50**

The central role that Bhavnagar played in sending students to MIT demonstrates the idiosyncratic process by which Indians went to MIT for higher training; it was not part of a systematic countrywide process for developing talent. In 1943, the secretary of state for India asked the British Royal Society to send Nobel laureate A. V. Hill to India to provide advice on the organization of science, medicine, and technology in postwar India. Hill’s mission to India lasted from November 1943 to April 1944. He saw himself as being helpful to India, but the overall tone of the report was patronizing, giving advice on how India could be brought up to British standards. In one area, Hill sounded a different note. In the section on technology, he spent a full paragraph lamenting Britain’s lagging position in higher technical education, noting that the United Kingdom did not yet have an institution comparable in quality to MIT, although “responsible people” thought such institutions should be set up in the United Kingdom. Hill then went on to make an a fortiori argument with respect to India, stating that if the United Kingdom needed an MIT, India did even more so.<sup>46</sup>

Hill wrote as a wise father advising adolescents who were not quite as responsible as they should be. In the light of men such as the Parekhs, Pandya, and Kalelkar, who had recognized on their own the role for an MIT education in India, Hill’s wisdom was not as great as it might have seemed to some. In closing his argument for high-level technical education in India, Hill wrote, “Nationalist fervor cannot replace first-class scientific ability and technical training.”<sup>47</sup> Kalelkar, T. M. Shah, and the Parekhs would have agreed, although unlike Hill, they would have also asserted the converse.

In 1944, Ardeshir Dalal, formerly a high official working for the Tata business family, became a member of India’s Executive Council for the Department of Planning and Development. In October of that year, he announced a plan to send 500 Indian

<sup>45</sup> Robert Darnton, *The Great Cat Massacre and Other Episodes in French Cultural History* (New York, 1984); Roger Chartier, “Texts, Printing, Readings,” in *The New Cultural History*, ed. Lynn Hunt (Berkeley, Calif., 1989), 154–75.

<sup>46</sup> A. V. Hill, *Scientific Research in India* (London, 1945), 29–30.

<sup>47</sup> *Ibid.*, 30.

students abroad in 1945 to institutes in the United Kingdom, Canada, and the United States to meet the demands for “urgent needs of post-war development.” The government of India’s plan was an acknowledgement that India did not have engineers with the advanced technical training it needed.<sup>48</sup>

Dalal’s announcement produced a dramatic increase in the number of Indian students applying to MIT. Between 1920 and 1939, MIT had enrolled on average 7 Indian students per year. By the fall of 1944, that number had increased to 24. But in April 1945, with the Indian government’s offering unprecedented funding for graduate training abroad, MIT had 271 applications on hand from Indian students, a number representing over half of the scholars the Indian government was planning to send to the United Kingdom, Canada, and the United States. Although MIT was able to admit 16 for the fall semester, it had placed 180 Indian students on its waiting list, implicitly stating that the students were well qualified for MIT but that there was no room for them. Although information does not exist to determine who was responsible for decisions about which schools prospective students applied to—the students themselves, their professors, or administrators—the increase in applications to MIT (particularly given that some of the 500 students would be working in fields, such as agriculture, where MIT offered no programs) suggests that for engineering students the preferred meaning of “studying engineering either in the UK, Canada, or the United States” was simply studying at MIT.<sup>49</sup>

In Dalal’s first press conference, echoing Hill’s report, he announced that the establishment of an institution on the order of MIT was being considered. Shortly thereafter, at Dalal’s urging, the member of the Viceroy’s Executive Committee with responsibility for the Department of Education, Health, and Agriculture constituted a committee to consider the development of higher technical institutions in India. This committee, called the Sarker Committee, after its chair, N. R. Sarker, has become well known in India for its role in laying out the framework of the Indian Institutes of Technology.<sup>50</sup>

This committee of twenty-two had nine Britons and thirteen Indians. Among the Indians were some of India’s leading scientists, such as J. C. Ghosh and S. S. Bhatnagar, and representatives of India’s leading industrial enterprises, such as A. D. Shroff, who worked for the Tatas. On the committee also, but unnoticed before by historians, were two young Indian engineers with doctorates from MIT: Anant Pandya and M. D. Parekh, with Pandya sitting on the working subcommittee. They came with a deep knowledge of what an MIT education was and what it might mean for India. The creation of the Indian Institutes of Technology was an act of the imagination, but

<sup>48</sup> “Progress in Reconstruction Plans for India,” *Times of India*, 15 Sept. 1944, 1; “Report of the Selection Board Overseas Scholarships, 1945,” 2 V/27/864/8, India Office Records, British Library, London.

<sup>49</sup> Committee of Stabilization of Enrollment, “Report on Foreign Students, to be presented to the Faculty on April 13, 1945,” MIT Faculty Records, AC 001, MIT Institute Archives; Massachusetts Institute of Technology, *President’s Report, October 1945*, 90. Out of fear that an increase in foreign students would squeeze out returning GIs and reshape the character of the institute, the faculty voted to place a quota of 300 on the number of international students the institute would accept.

<sup>50</sup> Kim Patrick Sebaly, “The Assistance of Four Nations in the Establishment of the Indian Institutes of Technology, 1945–1970” (PhD diss., Univ. of Michigan, 1972), 12–28; Central Bureau of Education, India, *Development of Higher Technical Institutions in India (Interim Report of the Sarker Committee)*, Feb. 1946.



it was not solely an act of the imagination: it institutionalized what Parekh and Pandya had done on their own, without the help of the government of India.<sup>51</sup>

In his report, Hill observed that one of the “most important needs today of Indian science, medicine and technology is of better facilities to send the ablest of their young people abroad, particularly to the United Kingdom.”<sup>52</sup> After India won its independence in 1947, Hill proved to be half right. The government of India continued the late colonial policy of paying to send students abroad for higher studies, and in 1947–48, 900 Indian students studied in the United Kingdom. However, more than 1,200 studied in the United States. The preference for American universities over British universities among Indians studying abroad would grow more pronounced over the years. A variety of factors contributed to this. America had far greater capacity in its universities, and its schools had a greater orientation to engineering and agricultural education than those in Britain. Lingering resentment over colonialism may have caused some students to prefer the United States.<sup>53</sup>

Although by the late 1940s the numbers of Indian MIT alumni had grown too great to allow for a comprehensive examination of their careers, some sense can be gleaned from looking at the three men from Bhavnagar who earned doctorates from MIT between 1933 and 1940: M. D. Parekh, N. B. Bhatt, and Pandya. M. D. Parekh worked for Delhi Cloth Mills, where he designed plants for producing alcohol, vegetable ghee, and caustic soda. In 1949, he left to become the chief technical officer of the newly established National Rayon Corporation. Bhatt, who had earned his doctorate in physics, became the first head of the Department of Electrical Communications at the Indian Institute of Science and then in 1949 became one of the leading figures in India’s Defence Science Organization. After World War II ended, Pandya took the position of director and chief consulting engineering for the contracting firm Hind Construction, where he sought to build up a firm with indigenous capacity to undertake large construction projects for newly independent India. In 1949, the Government of India asked him to take over the general manager position at Hindustan Aircraft Limited, a position he held for nine months before returning to contracting. In June 1951, Pandya died tragically in an automobile accident.<sup>54</sup>

MIT alumni saw themselves as having a corporate identity and a corporate responsibility to India. In 1945, a group of MIT alumni including M. D. Parekh and Pandya established an MIT Alumni Association based in Bombay. In independent India, the group saw itself as having an informal advisory function to the Indian government. In 1950, it published a report analyzing the Fischer-Tropsch process for producing liquid fuels from coal, arguing against its use in India. Between 1950 and 1968, the group published three other reports. The MIT Alumni Association also circulated

<sup>51</sup> *Development of Higher Technical Institutions in India* (cit. n. 50), 1–2; Parekh, interview (cit. n. 14).

<sup>52</sup> Hill, *Scientific Research in India* (cit. n. 46), 7.

<sup>53</sup> For data on Indian students in the United States, I have used Federal Security Agency, Office of Education, *Annual Report 1948*, 524; Robert C. Story, *Residence and Migration of College Students, 1949–50*, Office of Education, Misc. No. 14. For data from 1950 onward, I have used the annual reports of the Institute of International Education, *Open Doors* (New York). For Indian students in the United Kingdom in 1947, I have used *Yearbook of Commonwealth Universities, 1948* (London, 1948), 1002–3. Further data on Indian students in the United Kingdom comes from subsequent volumes of the same serial.

<sup>54</sup> Parekh, interview (cit. n. 14); Shastry, “Nautam Bhagwanlal Bhatt,” 895 (cit. n. 33); R. S. Bhatt, “Anant Pandya” (cit. n. 34), 1, 6–13.

speeches of its members to the Planning Commission of India and government departments.<sup>55</sup>

For many years, India's MIT-trained engineers would have had a very limited public presence as "MIT-trained engineers." Even well-educated Indians would have had little reason to know of their existence. This first changed with the death of Anant Pandya in 1951. In 1952, the Gujarati upper-class youth magazine *Kumar* published a special issue memorializing Pandya. It featured pictures of his time at MIT and his later career and tributes from leading engineers in India and some of Pandya's professors in the United States. Pandya's education at MIT was a particularly prominent feature. Pandya received a level of acclamation rare among engineers anywhere.<sup>56</sup>

It is impossible to know exactly what this meant for young Gujarati men who read *Kumar*, but one person who claims the Pandya memorial changed his life was Kirit Parikh, the then seventeen-year-old son of a barrister in Ahmedabad. Parikh was considering the next step in his education after receiving his first college degree. After seeing the *Kumar* tribute to Pandya, Parikh, who was raised in a Gandhian school, which taught spinning on a charka, decided to become an engineer and attend MIT. He did both, earning a doctorate in civil engineering from MIT in 1962. The editors of *Kumar* would doubtless have been pleased with that result.<sup>57</sup>

#### CONCLUSION

The 1930s and 1940s were full of consequential events as Indians worked to create an independent nation, so it can hardly be considered surprising that in spite of all the writing on the period and on Gandhi, the connection between Gandhi's followers and MIT has not been noticed. The connection is subtle but important in understanding the India that a group of nationalists was fighting for—a technological India.

Indian MIT-trained engineers were an extraordinarily tiny group, utterly unrepresentative of the larger Indian population. In the 1930s, the Parekhs and the others from Bhavnagar were beneficiaries of a special set of circumstances that gave them access to MIT, in a way not available, even to elites, in other parts of India. However there is reason to believe that the Parekhs and other elites in Bhavnagar stood proxy for other elites in India: the latter would have done the same as the former if they had had the means and the opportunity to do so. In the decades after independence, they did have means and opportunity. The sons of Indian elites—lawyers, civil servants, educationalists, businessmen, and engineers—went to MIT in increasing numbers in the 1940s, 1950s, and 1960s.<sup>58</sup>

In the first forty years of independence, MIT graduates occupied an astounding

<sup>55</sup> Program, Eleventh Convention of MIT Alumni Association (1968), 7, folder "Bombay," box 54, Collection AC224, MIT Institute Archives; Parekh, interview (cit. n. 14).

<sup>56</sup> *Kumar*, Aug. 1952 (in Gujarati), in author's possession. I thank Anand Pandya, son of Anant Pandya, for providing me with a copy of this magazine. Many of the articles also appeared (in English) in *Dr. Anant Pandya: Commemoration Volume* (cit. n. 34). I thank Anand Pandya for providing me with a copy of this volume.

<sup>57</sup> Kirit Parikh, interview with author, 11 June 2008, New Delhi. Although I was aware of the *Kumar* tribute to Pandya, Parikh brought it up without prompting by me. As of 2008, Parikh is a member of the Indian Planning Commission.

<sup>58</sup> By the late 1950s, the Indian student population had grown to approximately 60 (out of approximately 6,000 total students). In the late 1960s, it was approximately 100 (out of approximately 8,000 total students). These data are from MIT's *President's Report* (available online at <http://libraries.mit.edu/archives/mithistory/presidents-reports.html>).

number of the highest-level positions in the Indian technical community—more than graduates of any other single school in the United States or the United Kingdom, and quite possibly more than the graduates of any single school in India. Although part of this disproportionate representation might be attributed to MIT and the training gained there, a greater part was due to the frequency with which people from the highest levels of Indian society sent their sons to MIT.<sup>59</sup>

The “dominance by design” narrative bespeaks American power and a lack of Indian agency in the face of that power. The lives of MIT-trained Indians suggests a confidence that they could use their MIT education to build India according to their interests and the interests of the nation. If policies pursued in India ultimately benefited elites more than they did the masses (which they certainly did), explanations should be sought in terms of Indian society and Indian politics, not in terms of theories made in America.<sup>60</sup>

To say that India’s technological identity owed something to MIT is not to deny its legitimacy as a national technical identity, any more than to say the fact that the framers of the U.S. Constitution owed something to John Locke is to deny the legitimacy of an American identity. Rabindranath Tagore, the great Bengali poet (who sent his son Rathindranath to study agriculture at the University of Illinois), wrote to the British priest Charles Andrews: “Whatever we understand and enjoy in human products instantly becomes ours, wherever they might have their origin.”<sup>61</sup>

In 1963, a memorial museum to Mahatma Gandhi opened adjacent to his former ashram in Ahmedabad. The museum was designed with the same types of materials used in the ashram buildings and attempted to give the feel of an Indian village. The museum, built without windows, used only wooden louvers and contained a water court at the center to provide cooling from the heat of Indian summers. The memorial’s architect was Charles Correa, M. Arch. MIT 1955.<sup>62</sup>

The same year the Gandhi memorial opened, an Indian graduated with a master’s degree in civil engineering from MIT, by this time hardly noteworthy, except for one fact: the graduate was Kanu Ramdas Gandhi, the grandson of Mahatma Gandhi.<sup>63</sup>

<sup>59</sup> Although proving this statement is beyond the scope of this paper, an example of how it happened can be seen in the case of Aditya Birla. Aditya Birla, born in 1943, was the grandson of G. D. Birla, the man who was the head of the Birla business empire and had funded Kalelkar to go to MIT. Aditya was seen by the Birla family as the likely heir to run the Birla business empire. When Birla went to college, the family sent him, not to an IIT, not to Cambridge, Oxford, or Harvard, but to MIT. Birla received a degree in chemical engineering and became the leader of the Birla empire and one of the most important business leaders in independent India. Minhaz Merchant, *Aditya Vikram Birla: A Biography* (New Delhi, 1997). My general statement about the social backgrounds of Indians graduates of MIT is based on dozens of interviews I have conducted with them.

<sup>60</sup> Adas, *Dominance by Design* (cit. n. 4). Daniel Headrick has made a similar critique. Daniel R. Headrick, “Dominance by Design,” *Journal of World History* 18 (March 2007): 108–10.

<sup>61</sup> Rabindranath Tagore, *Letters to a Friend* (New York, 1929), 136. The work of Amartya Sen drew my attention to this quotation. Sen, *Development as Freedom* (New York, 1999), 242. For Rathindranath’s time at the University of Illinois, see “History of the Tagore Festival,” <http://tagore.business.uiuc.edu/history.html> (accessed 6 May 2008).

<sup>62</sup> Correa, an Indian of Goan ancestry, but not Portuguese, is by any standard the most important Indian architect and urban planner of the post-1947 period. Charles Correa, *Charles Correa* (Bombay, 1996); Jon Lang, *A Concise History of Modern Architecture in India* (Delhi, 2002).

<sup>63</sup> Kanu R. Gandhi, “Theoretical and Experimental Study of Kinematic Characteristics of Subtalar Joint in the Human Foot” (master’s thesis, MIT, 1963). Kanu Gandhi is identified as the grandson of Mahatma Gandhi in “Grandson of Gandhi Weds,” *New York Times*, 5 Oct. 1961, 34; “Cambridge Residents,” *Washington Post*, 18 Oct. 1961, B15.