

“A FUTURE FULL OF PROMISE”

WILLIAM BARTON ROGERS, 1804–1882

The Massachusetts State House, Beacon Hill, Boston—hub of the solar system, declared Oliver Wendell Holmes. When Governor John Andrew showed up on April 10, 1861, to tackle his daily pile of papers, he signed one without giving it much thought. “An Act to incorporate the Massachusetts Institute of Technology. . . . William B. Rogers, James M. Beebe, E. S. Tobey, S. H. Gookin, E. B. Bigelow, M. D. Ross, J. D. Philbrick, F. H. Storer, J. D. Runkle, C. H. Dalton, J. B. Francis, J. C. Hoadley, M. P. Wilder, C. L. Flint, Thomas Rice, John Chase, J. P. Robinson, F. W. Lincoln Jun^r, Thomas Aspinwall, J. A. Dupee, E. C. Cabot, their associates and successors, are hereby made a body corporate, by the name of the Massachusetts Institute of Technology, for the purpose of instituting and maintaining a society of arts, a museum of arts, and a school of industrial science, and aiding generally, by suitable means, the advancement, development and practical application of science in connection with arts, agriculture, manufactures and commerce . . .” The governor had played a part in the legislative back-and-forth. House approval, April 8, 1861; Senate approval, April 9, 1861; governor’s signature, April 10, 1861—a deceptively smooth, clean process, suggesting nothing of the weeks, months, even years of thought and reflection that had moved it this far along.

“I have very little of interest to tell,” wrote William Barton Rogers to his brother Henry a week earlier. He and Henry had worked toward this goal, off and on, for nearly three decades; success now, finally in reach, although with much work ahead to get the enterprise off the

ground, established, viable. Yet William sounded dispirited. Southern secessionists were gaining momentum and civil war looked all but inevitable. Confederate soldiers attacked Fort Sumter on April 12, just two days after the governor put his pen to paper. As the nation unraveled, the proposed Institute of Technology no longer seemed a high priority.



Rogers came from a family accustomed to facing down adversity. He knew what a hard fight was, and he never shied away from one that mattered. Born in Philadelphia, December 7, 1804, he was second-generation Irish. His father, Patrick Kerr Rogers, a native of County Tyrone, near Londonderry, was a hot-tempered, militant nationalist with ties to the United Irishmen, a follower of Irish patriot and martyr Robert Emmet and an admirer of both the American and French revolutions. After fleeing Ireland to escape arrest in 1798, he settled in Philadelphia, a thriving, cosmopolitan port receptive to immigrants, tolerant of religious differences, a magnet for artisans, tradesmen, Scotch-Irish Presbyterians. His interests lay in science, but as science could not guarantee a living wage, he studied medicine at the University of Pennsylvania and opened a medical practice after graduating in 1802. He and his wife Hannah (Blythe), also from a refugee family of United Irish partisans, produced a substantial brood—seven children—over the course of the next decade and a half. Three died in infancy, the youngest son, Alexander, and both daughters, Amelia and Matilda; four sons survived and followed in their father's footsteps as committed scientist-intellectuals.

Bored with medicine, Patrick Rogers sought academic jobs. When nothing turned up—Penn rejected his application for a professorship in chemistry—he went out on the independent lecture circuit, and in 1811 opened a lyceum, hoping to attract knowledge-seekers regardless of gender and from all stations in life: the genteel, the professional, the working classes. The family moved to Baltimore in 1812. In 1819, Patrick accepted the chair in chemistry and natural philosophy at the College of William and Mary in Williamsburg, Virginia. He may have had some help with this from Thomas Jefferson, whom he had

approached about a post at the University of Virginia, then in its planning stages.

Patrick home-schooled his children. A confirmed agnostic in spite of his Presbyterian roots, he kept them away from sectarian influences. His values, distinctively age-of-enlightenment vintage, revolved around independent thinking, respect for human rights, scientific knowledge, and academic excellence. He took William as a teenager, perhaps the other brothers as well, to meet the sage of Monticello. Jefferson, statesman of science and former president of the American Philosophical Society, had done original research in paleontology and was quick to discern scientific talent. He once quizzed William, then turned to Patrick and said, "Your son has a future full of promise before him."

All four of the Rogers brothers attended William and Mary (without graduating, apparently), and followed careers that were remarkably similar. The eldest and youngest—James (born 1802), Robert (born 1813)—were most like Patrick, with science as their first love and medicine, teaching, or educational administration to earn their keep. James was professor of chemistry at Washington Medical College in Baltimore, then successively at the medical department of Cincinnati College, Franklin Institute (Philadelphia), and University of Pennsylvania; Robert was professor of chemistry and materia medica at the University of Virginia before succeeding to James's chair at the University of Pennsylvania in 1852, afterward serving as dean of medicine there and later on the faculty of Jefferson Medical College, also in Philadelphia. The middle two brothers—William, then Henry (born 1808)—looked to science, however, more as profession than as hobby. It was a time of change and self-definition for American scientists. The birth of the Association of American Geologists and Naturalists (later the American Association for the Advancement of Science) and the National Academy of Sciences ushered in an era of scientific professionalism, and the brothers were charter members of this movement.

They began as teachers and remained in academe. William and Henry opened a school in Windsor, Maryland, just outside Baltimore, in the fall of 1826. By January William was also lecturing part-time at the Maryland Institute in Baltimore, a lyceum that taught science only. His lectures proved so popular that in May 1828 the Institute allowed him to open a high school, along the lines of a college preparatory

department. Henry joined him in this venture, whose purpose was "to impart such knowledge, and to induce such habits of mind as may be most beneficial to youth engaging in mechanical and mercantile pursuits."

In October 1828 William succeeded Patrick, who had died two months before, as professor of chemistry and natural philosophy at William and Mary, while Henry took a similar position at Dickinson College in Carlisle, Pennsylvania. William pushed the curriculum at William and Mary toward real-life applications and the commercial and industrial uses of knowledge. Henry, meanwhile, quickly grew restless at Dickinson. Drawn to radical social and political causes—a consequence, he said, of "the lofty spirit of my father in me"—he resigned and sailed for England in May 1832 to join up with Robert Owen, Frances Wright, and other utopian socialists. In London he was pulled, too, into scientific circles, cementing relationships with geologists Henry de la Beche and Charles Lyell, among others. In 1835, he became professor of geology and mineralogy at the University of Pennsylvania.

That same year William went to the University of Virginia, Charlottesville, as professor of natural philosophy. He was second choice; the position came to him when Joseph Henry, widely viewed as America's most brilliant scientist since Benjamin Franklin, decided not to leave Princeton. Henry put in a strong word for William: "I am confident he will do much towards elevating the scientific character of our country." At Charlottesville, in addition to teaching physics, William joined forces with the professor of mathematics to offer civil engineering. Influenced, however, by Henry's experience in England, his interests shifted rapidly toward geology.

Henry became New Jersey's first official state geologist in 1835, and, early in 1836, took on the parallel post for Pennsylvania as well. William was appointed geologist of Virginia, also in 1836, after drawing attention in a series of articles, published in *Farmer's Register* in 1834 and 1835, to greensand marls and gypsum for fertilizer in the eastern part of the commonwealth. William and Henry led teams of researchers into the wilds, then cataloged, discussed, analyzed, shared results at conferences and in published papers. The other two brothers joined in from time to time. Such collaborative efforts generated a

remarkable cross-fertilization of ideas, mostly in geology, but often on that increasingly murky boundary between geology, physics, chemistry, and metallurgy. William and Robert coauthored no less than 19 articles; William and Henry no less than 20, all of these in the period before 1854. As individual authors, William and Henry put out dozens of articles in the major scientific journals: *Silliman's*, *American Journal of Science* (*Silliman's* successor), *Edinburgh New Philosophical Journal*, and in the published proceedings of various scientific societies.

While their geological work brought the brothers into close contact with emergent technologies—agriculture, mining, railway and canal transport, surveying, road construction, steam power—their deepest passion was reserved for what they called “true science and broad philosophical views.” But the technological side fascinated them, too. As Francis Walker, MIT’s third president, wrote about William in 1887: “He, of all men the least prosaic, gifted with a fervent imagination such as is rarely coupled with the disposition and capacity for patient and protracted research, valued science not more for the sake of truth than for the sake of the virtue which is to be found in it for the amelioration of the human condition.” Science as basic knowledge, science in the service of humankind. In 1837, amid all their geologizing, William and Henry drafted a proposal to establish, under the auspices of the Franklin Institute, a science-based polytechnic school that emphasized “applications . . . by detailed practical lessons & especially by actual discipline in the workshop.” They continued to refine a vision for science, technology, and education in the modern age.

The brothers quickly gained traction as professional scientists. The elite American Philosophical Society elected them to membership in 1835. In 1840, Henry helped organize the Association of American Geologists and Naturalists and presided over the second annual meeting in Philadelphia, April 1841. William was elected to the National Institution for the Promotion of Science in August 1840. Both became honorary members of the Boston Society of Natural History in 1842 and foreign members of the Geological Society of London in 1844; also in 1844, William got word of his election to the Royal Society of Northern Antiquaries, headquartered in Copenhagen. In 1845, they were elected fellows of the American Academy of Arts and Sciences, founded in 1780 in Cambridge, Massachusetts, “to

cultivate every art and science which may tend to advance the interest, honor, dignity, and happiness of a free, independent, and virtuous people." They gave papers—sometimes jointly, other times separately but on the same program—at professional meetings in Philadelphia (American Philosophical Society, December 1841), Boston (Geologists and Naturalists, April 1842), Washington, D.C. (Geologists and Naturalists, May 1844), and elsewhere. When Amos Binney, president of the Geologists and Naturalists, died unexpectedly, William presided over the group right before it reconstituted itself, in 1848, as the American Association for the Advancement of Science (AAAS). The brothers worked hard to curb what they perceived as creeping elitism in organized science, the trend toward hierarchies separating professionals from nonprofessionals, the credentialized from the noncredentialized. They were as well regarded overseas as in America. On William's first trip to Europe in 1849, he was greeted warmly by a number of scientists, Charles Darwin among them; at the time Darwin was working through his theory of evolution, with *Origin of the Species* still a decade off.

The brothers felt restless, however, in their respective academic spheres. For William, life in the South became a source of increasing irritation. "Matters here as usual," he wrote to his brother James in March 1841, "too dull." The climate and recurrent epidemics of cholera and malaria kept him on edge and factored into the illnesses that would put him out of commission for long stretches later in life. But Southern culture bothered him more. He grew to think of the South as uncivilized, decadent, anti-intellectual. There was much violence and worse, *toleration* of violence; students at the University of Virginia toted firearms, drank to excess, rioted, and assaulted faculty members with near impunity. John A. G. Davis, chairman of the faculty and a close friend of William's, was shot and killed by a rampaging student in November 1840.

William, however, was far from a hardnosed, emotional radical; generally he projected balance, circumspection, a voice of calm reason. Elected chairman of the faculty in 1844, he garnered respect on all sides. His stance on slavery was moderate. While Henry had joined forces with abolitionists up north—Charles Sumner, the Howes (Samuel Gridley and Julia Ward), and others—William remained

noncommittal until after the Civil War was well under way, by which time he was safely ensconced in Boston. One friend and colleague from Virginia days assumed, rightly or wrongly, that William was a slaveholder himself. Levi, this friend later recalled, was a “negro serving-man [who] drove . . . behind [William] on horseback, accompanying him on his geological rambles . . . learned to think as his master thought.” Levi was said to have taken charge once, introducing Appalachian geology to a visiting English scientist, Charles Daubeny.

But William continued to think of Charlottesville as too provincial. He found little there, he told Henry, other than “stupid dullness and unvaried monotony. . . . I feel that I am but half-alive here, and am more than ever resolved, when able, to quit the scene for one more congenial to my tastes and more likely to promote my happiness.” As early as 1833 William feared that the nation could well be on the brink of “fratricidal war,” a theme he kept revisiting in the years leading up to the Civil War. The appointment of a Jew and a Catholic to the faculty in 1841 stirred up a frenzy of religious intolerance that troubled him deeply. He felt frustrated by the state legislature’s ignorance of science, and by its lack of educability. On the plus side, as state geologist he gained negotiating experience that would prove useful later on. And, even though he had little positive to say about either colleagues or students at the university, he was among the most popular, inspiring teachers there. His lectures, especially those on astronomy, found the room packed up to an hour ahead of time, the aisles filled, “even the windows crowded from the outside with eager listeners.” But he longed to join Henry up north.



No longer the provincial outpost it once was, Boston had emerged after 1800 as a mercantile and industrial power, and a seat of intellectual ferment. The city was as drawn to the Rogers brothers as they to it. A paper they gave on Appalachian geology became the talk of the Geologists and Naturalists’ convention in Boston in April 1842. “A grander geological theme could hardly be imagined,” one listener recalled. “The genius of the brothers Rogers . . . like the Egyptologist with the papyrus roll, unfolded the inverted and contorted strata, spread and

smoothed them out, as it were, in an open book and showed them to the eye of science. . . . [in a] fluent and graceful oral statement of this hitherto mysterious mountain chain." The event marked their official entrée. John Amory Lowell, trustee of the Lowell Institute—Boston's vibrant experiment in public adult education, a lyceum-style effort not unlike the one begun by Patrick Rogers earlier in the century—invited Henry back in 1844 to give a popular course in geology. William came up from Virginia to hear Henry lecture, and afterward the brothers spent several weeks carrying out geological research in New Hampshire's White Mountains.

There they got to know the Savage family, on vacation at their country estate near Nashua. The Savages belonged to Boston's creamiest social elite. James Savage, the family patriarch, traced his roots back to an English settler, Thomas Savage, who arrived in 1635, a decade and a half after the Mayflower. A lawyer, James Savage was at different times a state legislator (House and Senate) and executive councilor, delegate to the Massachusetts constitutional convention, and Boston alderman and school committee member. As cofounder of the Provident Institution for Savings, he had the means and leisure time to pursue sidelines in politics and antiquarian scholarship. He helped found the Boston Athenaeum and was one-time president of the Massachusetts Historical Society. A four-volume set that he produced on early New England settlers kept him busy for nearly two decades. *Rich Men of Massachusetts* (1851) placed his net worth at \$150,000, nowhere near the wealthiest but enough to make the grade as well-to-do.

William and Henry cultivated ties to Boston, to local scientists, educators, businessmen, and to the Savages. William courted one of James Savage's daughters, Emma, from a distance; Henry moved to Boston in 1846, intent on finding an academic position. Henry had his eyes set on the coveted Rumford professorship in applied science at Harvard. This did not materialize for him—his outspoken, radical views on science and politics offended Harvard's more conservative elements—but he took an active interest in discussions under way to create a school of science there, established in 1847 as the Lawrence Scientific School. On a related mission, he piqued John Amory Lowell's curiosity about possibly setting up a technical school under the

Lowell Institute, a venture similar to that which the brothers had proposed for the Franklin Institute in 1837.

Henry wrote William excitedly about this in March 1846. William, the more cautious of the two, was also enthusiastic; he drafted and sent Henry “A plan for a polytechnic school in Boston” for submission to Lowell. “The true and only practicable object of a Polytechnic School,” he wrote to Henry, “is . . . the teaching not of manipulations and minute details of the arts, which can be done only in the workshop, but the inculcation of all the scientific principles which form the basis and explanation of them, and along with this a full and methodical review of all their leading processes and operations in connection with physical laws.” Lowell, intrigued by the proposal, rejected it after discovering that his trust’s fine print explicitly forbade use of funds “for bricks and mortar.”

When William visited Henry in Boston, he often looked in on the Savages as well as on Harvard colleagues such as Joseph Lovering, Benjamin Peirce, Eben Horsford, and Josiah Cooke. In March 1848 he resigned his post at the University of Virginia, intending to move to Boston. When friends persuaded him that this was foolhardy without a firm job offer, he withdrew the resignation. But a year later, his marriage to Emma Savage on June 20, 1849 guaranteed closer ties to New England, relative freedom from financial worry, and a social, political, and financial network that promised to give his educational plans a lift. The Savages also saw advantages. This serious, mature scientist-educator, twenty years older than Emma, promised a solid, stable partnership for her and a close relationship with her father—and with her brother, James Jr.—based on shared values and intellectual interests. There was little doubt that the couple would settle in Boston; the only question was when. In 1853 they moved back for good, joining Emma’s father and brother in their spacious, elegant town house at 1 Temple Place, across from the Boston Common (Emma’s mother Elizabeth and sister Lucy had died in 1850). As if to cement the Rogers–Savage ties, in 1854 Henry married Emma’s half-sister, Eliza Lincoln, daughter of Elizabeth Savage by her first marriage.

Temple Place sat near the heart of Boston’s most elite residential enclave. Here, Rogers and the Savages lived first as a foursome, then as a threesome following James Jr.’s death from Civil War battle

wounds in 1862. Summers were spent at Sunny Hill, the Savages' country estate in Lunenburg, about thirty miles outside Boston. As of 1869, the family spent more time in Newport, Rhode Island, first in a rented house, Castle Hill, corner of Bellevue Avenue and Bath Road; then, from 1872, in their own cottage—Morningside—on Gibbs Avenue. By 1871, Temple Place had become so overrun by commerce, noise, and traffic that the family abandoned it for the relative peace of the Back Bay: recently made land on the other side of the Boston Common. They took rooms, first, at the Hotel Berkeley, on the corner of Berkeley and Boylston Streets. Following James Savage's death in 1873, William and Emma spent winters at 117 Marlborough Street, first as renters then as owners.

Emma's life revolved around her three men. She was their constant companion and looked after their every need with the help of an entourage of retainers. Someone called her "a type of the best New England womanhood," combining common sense, charm, and tact. She used her winning ways to balance the clashing temperaments of her men-folk. Rogers—the one with Irish roots—was the quiet, unflappable one, while James Savage, the quintessential Anglo, was excitable, "given to rather extreme opinions and violent expression of them."



Once settled in Boston, William Rogers set about renewing old contacts and forging new ones. Science, he knew from experience, could go but so far without widespread public support. His struggle with the Virginia legislature over the geological survey had been distasteful yet necessary. He had stuck with it calmly, patiently, his skill as a consensus-builder serving him well as he negotiated with stubborn, uninformed public officials—unlike his brother Henry, who kept venting frustration over his parallel encounters with Pennsylvania officials. But in Boston, William found like-minded, like-tempered individuals and organizations eager to join forces in the interests of science. The state legislature was less convulsive, too, than Virginia's—or so it seemed to William at the outset—and open to progressive, forward-looking ideas.

He arrived at just the right time. Commercial interests in Massachusetts had long yearned for a school of applied science, one that

would train men for regional, state, and local needs. Except for Rensselaer Polytechnic, founded by Stephen Van Rensselaer in 1824 “for the purpose of instructing persons . . . in the application of science to the common purposes of life,” most efforts along these lines had proven disappointing. A wave of support had gone to Harvard, Yale, and other traditional colleges within the previous two decades, much of it from merchants and industrialists who wanted their donations used to train personnel for *technical* professions. Both Harvard and Yale established scientific schools in 1847. Harvard’s, the Lawrence Scientific School, was funded by textile magnate Abbott Lawrence; Yale’s, the Sheffield Scientific School, by railroad executive Joseph Sheffield. In 1851 Dartmouth College created its Chandler School of Science and the Arts with a bequest from commission merchant Abiel Chandler. But Lawrence’s faculty—Louis Agassiz, a key figure there—was composed for the most part of men who lacked interest in the *applications* of science; their primary focus was knowledge for knowledge’s sake, reinforced by institutional cultures where the useful, the practical, the vocational, the “merely” professional, were looked down on. Study science, yes, but its practical side belonged in the trade schools. Advocates of change at the regular colleges and universities often met with resistance. When Brown University’s president, Francis Wayland, urged more emphasis on technical education, he drew little support from a faculty and governing board suspicious of his reformist vision, unwilling to rush toward all things (or anything) practical.

The field was wide open. Rogers needed to do little to raise consciousness—the understanding, the *moral* support were already in place—so he could concentrate on becoming better known outside the small group of scientists who knew him well and beyond the Savages’ social circle. He made it a point never, if possible, to miss a meeting of the American Academy of Arts and Sciences, a prime venue to circulate, where he could talk science with Peirce, Agassiz, Horsford, and other academic bright lights—many from Harvard, but some from the worlds of politics, commerce, and public affairs as well. His father-in-law helped, too, by introducing him around.

By 1855, William was in demand as a public lecturer. He gave a series for the Lowell Institute at Tremont Temple, in 1856–57—riveting accounts of his and Henry’s excursions into America’s unexplored

mountain regions, what they found there, what their findings revealed about earth's origins, untapped mineral wealth, prospects for new knowledge, discovery, and economic prosperity. His was an upbeat message that melded science with adventure, exploration, spirited travelogue. Meanwhile, Henry moved to Scotland in 1855 and, in 1858, accepted an appointment as Regius professor of natural history at the University of Glasgow.

The Lowell series reinforced William's growing local reputation. In February 1859, he joined a number of Bostonians—scholars, scientists, academic leaders, and businessmen—as a so-called Committee of Associated Institutions, which petitioned the legislature to set aside four squares of Boston's Back Bay "for the use of such public institutions as may associate together for the public good." The group included two or three dozen manufacturers, teachers, physicians, bankers, farmers, dry goods merchants, railroad men, shipbuilders, insurance executives, and import-exporters. Among the target interests were agriculture, horticulture, natural history, mechanics, manufacturing, commerce, fine arts, and public education. This rich but diffuse array made it difficult to identify or build a unified perspective. The group found common ground, however, in its proposal for a so-called Massachusetts Conservatory of Art and Science. Each square of land would group together related institutions. One, for example, would combine under a single roof (or several smaller roofs) collections of tools, models, and other items useful in agriculture and horticulture; another would connect natural history, geology, chemistry; yet another, mechanics, manufactures, commerce; and finally, history, ethnology, and fine arts. Legislators liked the educational side, especially its hands-on flavor.

In March, however, the plan was turned down—too large, too complex, too utopian. The legislature was put off, too, by a conjoint then competing proposal from William Emerson Baker, well-to-do manufacturer of sewing machines and partner in the firm of Grover and Baker (later to merge with Singer), who wanted space to construct a comprehensive museum, a so-called Conservatory of Arts, Science, and Historic Relics. While Rogers's role in this was minor—he was one of a number of petitioners, each representing a different constituency (his was the Boston Society of Natural History)—he felt drawn to Baker's ideas on technical education. "We need . . . a Polytechnic

Institute,” Baker had written, “where the advancement of the useful arts may be noticed and practically described. Where may be properly organized a school of design to increase our supremacy as a manufacturing State. Wherein could be opened a *Conversazione* which would tend to disseminate useful knowledge upon subjects of every day life, upon domestic and political economy, etc.” But Rogers understood that it would be best to let memories of the first effort fade before going back to the legislature. He worked quietly to keep the original group intact, minus Baker, and by January 1860 he was ready with a new proposal.

Meanwhile, a lucky set of circumstances added to his celebrity. The controversy over Charles Darwin’s *On the Origin of Species*, which had raged ever since its appearance in November 1859, peaked early in Boston with a series of debates hosted by the Natural History Society in February, March, and April 1860. The public flocked to listen. The two main protagonists were Rogers, in support of Darwin, and Harvard’s Louis Agassiz, opposed. Agassiz dismissed Darwin’s theory of evolution as fanciful, citing scientific evidence but mostly falling back on nonscientific creationist dogma. Rogers, in contrast, played the role of the measured, thorough, open-minded scientist. While not prepared (yet) to concede the truth of everything proposed in *Origin*, he defended Darwin against Agassiz’s ad-hominem attack. Stick to the facts, he prodded Agassiz; throw out emotion—“I *denounced* no doctrine which aims at honesty and truth, whatever might be its character, and . . . I thought no man of science would for a moment think of denouncing any scientific opinion whatever, much less the calm and candid arguments of so fair minded a philosopher as Darwin.”

Rogers bested Agassiz not only on what constituted proper scientific temperament, but also when it came to evidence that both men, drawing on immense reservoirs of knowledge and experience, marshaled forth in detail. Even Agassiz’s own students—Nathaniel Shaler, for one—gave the victory to Rogers. “Agassiz’s . . . capacity for debate was small,” Shaler recalled; “Rogers, on the other hand, was not only an able and learned geologist, but very skillful in argument, with a keen sense of the logic which should control statements.” The debates were enjoyed as much for their entertainment value—this chance to witness a clash of wills between two titans of the scientific world—as

for their content. Many in Boston, a hotbed of abolitionism, were predisposed to take Rogers's side because of Agassiz's popularity in the slaveholding south. Agassiz's reactionary racial views—"The more pity I felt at the sight of this degraded and degenerate race," he once wrote about blacks, "the more . . . impossible it becomes for me to repress the feeling that they are not of the same blood as we are"—were often cited in defense of slavery and became anathema to Rogers and other rights-of-man progressives in the North. When Agassiz died in 1873, he was still a vehement opponent of evolutionary theory, while Rogers turned into one of Darwin's most balanced, clear-headed advocates.

The *Origin* debates helped build support for Rogers's new proposal to the legislature, if for no other reason than that it increased his visibility, enhancing his reputation as unafraid to tangle with a scientist of Agassiz's stature and able to defeat him on his own turf. Rogers drafted all the necessary documents, canvassed representatives and senators, organized public meetings, gave newspaper interviews, and responded to the concerns of nay-sayers—those who worried that the proposal would adversely impact Back Bay land values and taxable income supporting the city's public schools. His efforts drew endorsements from powerful local groups like the American Academy of Arts and Sciences, Boston Board of Trade, Massachusetts Charitable Mechanics Association, and New England Society for Promotion of Manufactures and Mechanic Arts. The bill passed the House but foundered in the Senate and was voted down on March 30.

A self-critical Rogers saw that the proposal still suffered from imprecision, inadequate focus, over-ambition, trying to do too much at once. In May he started paring it to a manageable size. A new proposal emerged, *Objects and Plan of an Institute of Technology*, and this was approved, on October 5, at a meeting of interested parties. *Objects and Plan* laid out a bold yet coherent framework. First, a Society of Arts, which Rogers conceived as something of a cross between a lyceum, a salon, and a professional guild. Elected, dues-paying members would come together on a regular (perhaps monthly) basis to hear fellow members and invited guests speak on topics of scientific or technical interest. The second component, a Museum of Industrial Art and Science, or a Conservatory of Arts, would include departments of minerals, organic materials, manufacturing arts, textiles, implements and

machinery, architecture, shipbuilding, and inland transport. Both the society and the museum promised, in Rogers's view, to advance practical knowledge and the industrial arts. But these, he said, would be incomplete without the third component, a School of Industrial Science and Art, to give shape and substance to the Institute's educational goals.

This time events moved rapidly. On January 11, 1861, several dozen enthusiasts met to adopt articles of association: "We the subscribers, feeling a deep interest in promoting the Industrial Arts and Sciences as well as practical education . . . hereby associate ourselves for the purpose of endeavoring to organize and establish in the city of Boston such an Institution under the title of the Mass: Institute of Technology." The statement attracted 54 signatories—incorporators, in effect—a number of whom would become long-term supporters and serve on the Institute's board of trustees (called the Government in its early years; then, as of March 1869, the Corporation). Before dispersing, the incorporators chose a committee of twenty to frame a constitution and bylaws, to press the legislature for an act of incorporation, and to secure a grant of land for this venture in the so-called practical sciences.

Rogers, oddly, was not among the original twenty; he was added as the committee's twenty-first member and elected chairman, while John Runkle, a prized former student of Benjamin Peirce's at Harvard, became secretary. Rogers, as usual, took responsibility for moving the petition through the legislature. Governor Andrew told him point-blank in March that he—and he alone—should present the case: "Between ourselves I know *you* would have a powerful effect, left to yourself, and I fear some one else might come in and weaken it." Legislative snafus materialized anyway, some members repeating earlier concerns about land values and public school funds. But in April, the local newspapers positively glowed; support came, too, from Peirce, Horsford, and others at Harvard, and an act of incorporation was passed and signed by the governor. The Institute would share with the Natural History Society one square of land on Boylston Street. Two conditions were tacked on: first, that the Institute raise \$100,000 within the year; second, that it reimburse the state if land values declined (the latter, which Rogers described as ungracious, was later repealed).

The effort then promptly fizzled. One factor was Rogers's chronic poor health, worsened by nerves, overwork, and exhaustion. He did not have the stamina to go on, and others were too busy or lacked the requisite leadership skills. Rogers also grew increasingly preoccupied with the Civil War, filled with moral outrage toward the secessionists as well as admiration for President Lincoln's "patriotic and firm" leadership. The supporters he relied on were equally distracted, their distress centering as much on economic issues—disruption to trade, loss of assets down South—as on moral concerns, or on unionist idealism. A whole year went by with no progress on raising that critical \$100,000. A promise of half the amount came from Ralph Huntington, wealthy landowner, industrialist, and president of the Boston and Roxbury Company (a major Boston thoroughfare, Huntington Avenue, is named for him), but no funds were actually in hand by April 1862. Just before the April deadline, the committee of twenty rushed to petition for a year's extension, which the legislature granted. Rogers, meanwhile, kept the institute idea afloat—money or no—by taking steps to formalize its existence. On April 8, 1862, he called the committee together to accept the charter, adopt bylaws, appoint a board of trustees, and schedule the first annual meeting for May 6, 1862. The membership elected him president on May 6, along with four vice presidents (John Amory Lowell, Jacob Bigelow, Marshall Wilder, and John Chase), a treasurer (Charles Dalton), and five to seven members for each of four committees (instruction, publication, museum, and finance). The day before, the Institute recorded its first donation: \$3,000 from the estate of Mary P. Townsend.

Rogers projected optimism, even when he did not feel it. "The times are not favorable," he wrote to a friend in August 1862, "but we are not disheartened. The patriotism that is now so generously devoting itself to the safety of the nation and the promotion of liberty must ere long be released from its most urgent public duties, and be ready with deeper earnestness than ever to build up the peaceful structures of education and the arts." By the end of the year, still with little money in hand and only a few pledges to go on, the Institute went before the public for the first time. On December 17, 1862, the Society of Arts met at the Mercantile Library Association, in space leased by the Institute pending construction of a home of its own.

To start, Rogers laid out the society's goal: it would come together twice a month, keeping in view "as its leading object, the promotion of practical Arts and Sciences through the medium of written and oral Reports and Communications, and the exhibition of Models, Materials, Products, and other Objects relating to them . . . aim to secure a free communication and interchange of valuable thoughts on all matters relating to the Industrial Sciences and Arts." The museum and school would follow in due course, but these, unlike the society, he said, required substantial infrastructure and could not be rushed into operation; they "can be carried into effect only in an imperfect and rudimental way without . . . extensive Buildings and arrangements." A half dozen local inventors and industrialists, some of them Institute trustees, then stepped forward to speak on a range of topics: from guns fired under water and the use of wood and iron in shipbuilding, to ships' compasses, safety heating lamps for laboratory use, and cotton manufacture.

The museum idea went on hold indefinitely; the Institute would have no centralized museum until more than a century later, in the early 1970s. Whatever energy Rogers had left he put into the school, which he considered the heart of the enterprise. A large gift from William J. Walker, and smaller amounts from Nathaniel Thayer, Thomas Lee, and Henry Bromfield Rogers (a local businessman, no relation to William), boosted the tally to \$100,000 in April 1863. On April 10, two years to the day after the charter was signed, the legislature gave the Institute permission to take possession of its part of the Back Bay square on Boylston Street, between Berkeley and Clarendon and backing onto Newbury Street. The Natural History Society, relatively plush with funds, had already taken its part.

Also granted was one-third of the annual income from federal land-grant legislation (Morrill Act of 1863), the other two-thirds going to the Massachusetts College of Agriculture. Governor Andrew, who had favored Harvard's bid for the land-grant funds, suggested that several local institutions—Harvard's Bussey farm, its Lawrence Scientific School, the Observatory, the Institute of Technology, and the Agricultural College—benefit under a single, unified, Harvard-dominated umbrella. But Rogers managed to have this proposal scrapped before it reached very far. Governor Andrew's proposal met, wrote Rogers to his largest benefactor, William Walker, with "the instant reply from myself

and others that the Institute had from the beginning determined to stand alone, that its independence was essential to its success, and that it would accept no grant from the State, or from any other quarter, which should in the slightest interfere with this independence."



As momentum shifted in Rogers's favor, a building committee was appointed on May 6, 1863, architects J. & W. G. Preston were hired in August, and construction got under way by year's end. Hoping to start a few classes that fall, Rogers persuaded a generous friend—anonymous, but probably Henry Bromfield Rogers—to foot the bill for rent on a couple of rooms at the Mercantile, pending completion of the Institute's building, which progressed very slowly. A plan of instruction had yet to be mapped out, with an eye "more especially to the unbooked knowledge," so Rogers spent much of the winter, 1863–64, working up a curriculum. His loyal assistant, Runkle, joined with William Watson, a graduate of the Ecole des Ponts et Chaussées in Paris, to frame a program in applied mathematics, one that would reach "from the very elements up to the fullest demands of the scientific engineer." In April 1864, Rogers put the final touches on Tech's magna carta, *Scope and Plan of the School of Industrial Science of the Massachusetts Institute of Technology*, which was adopted by the Corporation on May 30.

Scope and Plan differed from Rogers's earlier proposal, *Objects and Plan*, in laying out a precise program of *professional* education. *Objects and Plan* had focused on the general, popular angle: lectures and demonstrations, in the style of the lyceum, to satisfy a thirst for knowledge among the general public. *Scope and Plan* retained this feature—its so-called First Department: General or Popular Course—but added another. This Second Department: Special and Professional Instruction would rigorously prepare students for careers in the working world. Five courses were to be offered:

- mechanical construction & engineering
- civil & topographical engineering
- building & architecture
- practical & technical chemistry
- practical geology & mining

The term course referred to a comprehensive program of instruction; units within a course were called subjects, not courses, a practice that continues at MIT to this day. The general department was lecture- or classroom-oriented, while the professional was practice- or laboratory-based. Fulltime professional students would follow a common core curriculum for the first two years, then specialize; part-timers—those who wanted a specific subject, or several subjects, rather than a full course—were welcome, too. Professional students, not general students, would be eligible for a diploma on completion of a full course.

While Rogers did his best to organize the departments in parallel, neither taking precedence over the other, the professional quickly emerged as the school's central feature. But to ensure that his broader goals would not get lost, he added a reminder: "In pursuing this object, it is intended to give to the teachings such scope and method, that while imparting a due measure of knowledge, and cultivating the habits of observation and exact thought,—so conducive to the progress of invention, and the development of an enlightened industry,—they may help to extend more widely the elevating influences of a generous scientific culture." While professional training took priority, then, he did not envision the Institute evolving as a narrow technical or vocational school. Through the end of 1864, both departments—he referred to the first, colloquially, as *popular* and to the second as *systematic*—stood on near-equal terms. A director of the Conservatoire des Arts et Métiers in Paris, and someone whom Rogers identified only as the ablest mathematical engineer in Britain, both endorsed the plan. Runkle captured the excitement close to home: "I knew how exceedingly able [the plan] was, yet am I more than ever delighted with it—I have analyzed it with the greatest care, carrying in imagination students through each of the courses from year to year, & I find it to my mind, perfect in all its parts."

Rogers went to Europe that summer to survey programs of technical education and to buy equipment, models, and apparatus for shipment back to Boston. He toured England, Scotland, France, and Germany, and came away most impressed by the polytechnic school at Karlsruhe, Germany—"nearer," he said, "what it is intended the Massachusetts Institute of Technology shall be than any other foreign institution. . . . Every part of the establishment is designed for use, and not for show." The trip both tired and energized him.

His next step: hire a good, solid faculty. There was not much time, so Rogers cobbled together the best group possible on short notice. Boston was full of capable educators, up-and-coming scientists, heads of firms eager to fill a growing number of slots in the civil, mechanical, and mining fields. John Runkle, Francis Storer, John Henck, and William Watson were natural choices because they had been Institute supporters early on. With Runkle (mathematics), Storer (chemistry), Watson (mechanical engineering), Henck (civil engineering), Ferdinand Bôcher (modern languages), W. T. Carlton (freehand drawing), and Rogers himself (physics and geology) all on board, the school was off to a fine start. Rogers brought in others that fall, to begin the first full academic year (1865–66). Among them were Charles Eliot, a young, up-and-coming chemist just back from Europe, who had given up on Harvard's Lawrence Scientific School, frustrated by its resistance to new ideas; James Hague, for mining engineering; William Atkinson, for English language and literature; and William Ware, for architecture. Ten in all, officially; but nine in effect, as Hague failed to show up for duty. The following two years saw the arrival of George Osborne (navigation and nautical astronomy, later mathematics), Edward Pickering (physics), Alfred Rockwell (mining engineering, to replace the perennially absent James Hague), and Cyrus Warren (organic chemistry).



The new year, 1865, dawned with a burst of optimism, the first in a long time. The Confederate army was sliding into confusion, then full retreat; Southern cities toppled domino-like to Union troops as the nation's four-year nightmare drew to a close. Boston's mayor glowed that the nation's sacrifices had begun to pay off, at least in his city, with a reenergized spirit, new businesses—signs, he said, of an America poised for fast, sustained recovery. Rogers predicted a time of "great and growing demand for Scientific Explorers, Mining Engineers, and Directors of Metallurgical Works. The vast field of industry, which is opening with the mineral resources of this Country . . . enlarged as it must soon be by the entrance of Northern enterprise and free labor on the richly endowed regions of the Southern States, calls for the services of men thoroughly instructed in the scientific principles and practical

methods appertaining to mineral exploitations, and the working of Mines of Coal and Metals; and makes the present a most opportune period . . . to promote one of the leading industrial interests of this community.”

Traffic was heavier than usual on February 20, a Monday. Hordes of merchants had descended on Boston for a sellers’ convention, bringing wares from as far away as Illinois and California. On the second floor of the Mercantile Building, Rogers waited with the half-dozen men he had pulled together on short notice. The Mercantile, a long, two-story structure on Summer Street, sat between Hawley and Arch Streets, in the heart of Boston’s fast-growing retail district. The Mercantile Library Association shared the second floor with the Mercantile Academy and the Musical Education Association. It took the grand share, however, slightly more than half, including the choice front-corner area overlooking Hawley and Summer Streets. Among its spare rooms were the ones let to Rogers for his educational experiment.

Eli Forbes, a freshly scrubbed 16-year-old, knocked at the door just after 9 a.m. His father Franklin Forbes, state legislator and spirited advocate of this innovative plan to groom young men for the practical professions, had introduced him to Rogers a few days before. What struck Eli most was Rogers’s resemblance to the iconic Ralph Waldo Emerson—tall, gaunt, and pale, with longish hair and a rugged face. Other youngsters poked their heads in as the morning wore on. Abraham Bailey, Samuel Eastwood, Eben Stevens, Joseph Stone, Bryant Tilden. Some, like Eli, had heard about the school from friends or family; a few had seen ads in the local papers announcing a four-month course in “Mathematics, with practice in Geometrical Drawing, and Shading in India Ink,—Lessons in Descriptive Geometry, illustrated by a suite of models in relief. Physics, including elementary doctrine of Forces, and Mechanical properties of Solids and Fluids, accompanied by Manipulations. Chemistry of the Inorganic Elements, with Manipulations. Practice in the use of the Plane Table, Level, and Geodesic Circle. Free Hand Sketching. The French Language.” These were practical fellows in search of a curriculum more useful, more marketable, than what Harvard had to offer.

One young man arrived a bit late. Robert Richards, older than the rest, was almost twenty-one and at loose ends. He had gone through a

series of fine grammar schools, ending up at Phillips Exeter Academy, but the dull, conventional curriculum in Latin, Greek, and mathematics left him cold. Some of his teachers considered science, and certainly technology, as a lower order of learning than the classics, or literature, or history. But Richards took after his maternal grandfather, Benjamin Hallowell Gardiner, who had opened a lyceum in Gardiner, Maine, charged five dollars for a course in chemistry, and kept all "dead languages" out. The Richards family kept a residence on Beacon Hill and knew Rogers personally; they were distant cousins of the Savages, Rogers's in-laws. While young Richards found it hard to imagine what a scientific school offered, he was certain that it could only be better than the purgatory he had suffered through at Phillips Exeter.

Eventually, the group filed out and headed for the main hall. A few dozen folks gathered—friends and family, board members, local merchants, curiosity-seekers. The ceremony was over almost as soon as it began. Rogers, the only speaker, kept his remarks brief. He outlined subjects, teaching methods, and a few rules, closing with a comment about the value and dignity of the practical professions. That was it—efficient and businesslike, no pomp or circumstance, no benedictions. The afternoon off, then next morning all noses to the grindstone. A no-nonsense approach. Classes in mathematics and civil construction promptly at 9 a.m., physics at noon. Rogers kept his emotions in check until he got home, then jotted in his diary: "*Organized the School! Fifteen students entered! May not this prove a memorable day!*"



Rogers knew how to get things done, systematically and with a minimum of fuss—a talent that inspired confidence and eased the burden on Corporation and faculty members, who could focus on what they did best: fundraise and teach. By day he radiated courtesy, warmth, and sympathy; at night he would return to his aging father-in-law's residence where he, Emma, and James Savage would entertain members of their small social set, sometimes students and faculty, or pass quiet time reading, perhaps puttering over Mr. Savage's massive genealogical projects. No. 1 Temple Place was every bit the Tech president's house, even if not officially designated as such.

The school quickly became known as Tech or Boston Tech, local shorthand for the labored School of Industrial Science, Massachusetts Institute of Technology; “MIT” would come later, a twentieth-century moniker. The Institute’s reputation for working students to death or desperation in the best—some would say worst—utilitarian spirit, consumed by a work ethic whose ends and means sometimes seemed indistinguishable, began to gel early. The epigram “Tech is Hell!” had yet to be coined, but the sentiment was already widespread. While most students wore the badge with pride, some needed a friendly ear, a comforting shoulder, a voice that soothed, a calming influence. Rogers offered all of these. “One day,” Robert Richards recalled, “a student came into the lecture on physics, and finding his favorite seat already occupied, began to sputter. . . . Rogers, understanding the situation, set his gyroscope to spinning, carried it down and handed it to the sinner who was making the disturbance. The malcontent was so puzzled and diverted by the instrument that he forgot his grievance, his whole attention being focused on trying to keep up with the antics of the ungainly thing.” Beyond that, his teaching skills were said to have been unparalleled. According to one observer, a class under Rogers was “a triumph of oratorical art. . . . whether treating of rocks, physical forces, or rigid principles of mathematics, he was always able to kindle the enthusiasm of the students, and make the most vivid and lasting impressions upon their minds.” Charles Cross (’69) appreciated Rogers’s unusual teaching style, one that mingled gravitas and scholarly intensity with playful pluck, the spirit of the proverbial kid in a candy shop. “He always,” said Cross, “showed that freshness of appreciation which too often dies as experience grows deeper, and combined the wisdom of the sage with the enthusiastic appreciation of the child.”

Other faculty favored the sink-or-swim approach, the dry, functional, impersonal style that students thrust into the working world would be faced with and must learn to handle. Charles Dickens’s brutal satire on utilitarianism, *Hard Times*, was just a decade old; laissez-faire values prevailed, however, and Dickens’s Josiah Bounderby—a man devoid of sentiment—was, to some readers, if not exactly a hero, not a villain either, more a lopsided exemplar of traits essential for commercial success. Some Tech faculty were Bounderby-like, as were many employers that students must face in the real world. Charles

Eliot came across as standoffish and authoritarian, a style brought over from Harvard, where he had a reputation for being "cold as an icicle." One student, convinced that Eliot hated nothing so much as human touch, would reach out to shake his hand whenever their paths crossed just to watch him recoil. Tech students found it difficult to reconcile Eliot's aloofness with the progressive values that he brought to the classroom, his insistence on the importance of challenging dogma, on direct observation, collection, and interpretation of data. While Francis Storer was better liked, his personality was none too pleasant either—irascible, impatient, overbearing, quick to label people dishonest, lazy, or stupid—but Tech students went for its relative warmth (heat, sometimes) over Eliot's coldness; and unlike Eliot, he made himself available at all hours and was never, apparently, too tired or busy to help a student or colleague in need.

But Rogers—and, from various reports, Runkle and Atkinson as well—embodied a different quality: compassion (Dickens would have approved). He listened patiently to each student's concerns, appealed to his sense of duty, and sent him on his way with renewed self-confidence. He kept balance, perspective, focus; rebelliousness melted away in his presence, not out of fear but in response to his "sweetness and sympathy." As James Tolman ('68), a member of the first graduating class, recalled: "Professor Rogers was always the student's friend. The lack of means and the immense amount of work assumed by the instructors sometimes caused implied promises to go unfulfilled, and inspired the restless pupils—a good proportion of whom were grown men, taking time for study from the practice of their professions—to feel rebellious against the direction of the school. I remember that some of these occasions resulted in visits to President Rogers, and that such was the invariable courtesy with which these complainants were treated, that we always came away feeling that, in so far as the means would allow, every need of the classes should be filled, and with our sense of manliness so appealed to that we were ready to recognize our duty as co-workers with the professors for the good of the School."



That first term, the half-dozen faculty and two dozen students who came together each day made do with just two cramped rooms—one for lectures, the other for lab exercises. The library's large hall could be hired on a separate, pay-as-you-go basis, but Tech used it only for public lectures and demonstrations of the Society of Arts, its announcements appearing regularly in the columns of the *Evening Transcript*. Tech's makeshift lab, as primitive as labs come, looked like space a poor inventor might have carved out for himself—very little equipment, glaring gaps, a single sample of each tool or instrument. One retort, one beaker, one condenser. Students wrangled over who would carry out the next experiment. Just one at a time, the others gawking from a few feet away. In a corner sat the prized tiny muffle furnace, where some lucky fellow might get to test or purify a sample of metal or a mineral deposit. What mattered most was the spirit inside those rooms.

The atmosphere outside inspired, too; not the street bustle so much, though that added a vitality of its own, more the feel of what went on elsewhere within the Mercantile. Tech's space was tucked off to one side. But activity swirled all around—merchants, industrialists, entrepreneurs of various stripes came, went, always on the move. Faculty and students brushed elbows with the captains of Boston commerce and industry. Lowells, Lawrences, Appletons, Cushings, Forbesees, and their assistants, agents, clients, legal counsel, advisers, rushed about talking, reviewing contracts, reading newspapers.

The Mercantile Library was Boston's central clearinghouse for commercial information, news, insights. Everyone who was anyone in business congregated there. Starting early each morning, and continuing through the day, a constant, energetic stream. The library was a quasi-public facility; members had special privileges, but the building and resources were open to all. A special side entrance that led directly into the hall, from Hawley Street rather than Summer Street, was suggested for ladies who preferred not to interrupt men conducting business in the reading and periodical rooms. But young male whip-persnappers, including those starting out as students, could mingle unnoticed if dressed appropriately. Rogers encouraged this, confident that the exposure would help aspiring professionals adapt to business life, manners, and mores. Tech may have been dwarfed by its landlord,

but the school benefited from just being where it was, in the midst of this frenetic activity.

Out went the old teaching styles—lecture, listen, learn by heart, drill, repeat, teachers ramming facts down students' throats; reward for repetition, penalty for lines not toed. "I have imagined," Charles Eliot later said, "that his [Rogers's] knowledge of the fact that I held the same opinion about teaching all sciences by the laboratory method, and not through lectures or books, probably encouraged him to offer the professorship of chemistry and metallurgy to a man only thirty-one years of age." Students touched, lifted, handled, worked directly with apparatus, got a feel for it, studied its innards. One endangered species was the teacher who preferred to hold forth from his desk with students looking on from a safe distance. Tech's instructors taught "through actual handling of the apparatus and by working on problems, shoulder to shoulder with the boys." Lab accidents turned into valuable lessons—a piece of glassware broken, a hydrogen generator blown up, a vial of acid spilt, disasters preventable and solvable in a spirit of calm, collected ingenuity.

All this a product of Rogers's lively imagination, backed by years of reflection on what worked well and what did not in a scientific curriculum. How to gather, record, and collate information; how to draw accurate, creative conclusions based on hard evidence; how to weigh and resolve conflicting conclusions; how to approach, tackle, and solve problems. Rogers brought an infectious enthusiasm to the lab and classroom. His "blackboards," according to James Tolman, were "filled with copious notes. . . . His absorption in his subject made him almost impatient of the restraint imposed by models and apparatus, and at times interfered with the smoothness of the experiments which he had always carefully prepared." Nature's laws, the only rules that counted. The classroom, a place not for laying out ideas-certain but for putting ideas-indefinite to the test. The lab, a place to identify, mix, and analyze chemicals with hydrogen explosions and nitrous oxide (laughing gas) as comic relief—fits of fun—between hours of serious learning. The perpetual-motion pendulum, a pure marvel. Geology with rock samples, three-dimensional models, and sketches from life. Geometry and mechanical drawing as tools of communication—common, universal languages. German and French not for show, or as

marks of cultivation, but as tools to grasp concepts in the literature of foreign lands.

At Tech, good common sense always trumped book learning. It was an inversion experience, as much as a conversion; students worked because they wanted to, not because they felt they ought to, or because they were forced to. Wide young eyes opened wider each day; Robert Richards described the overall sensation as “a wonderful labyrinth” whose pathways twisted off in countless directions—some more predictable than others—and with truth as the end game. One problem was how to drag oneself away from texts, journals, drawing board, and laboratory long enough to grab a decent meal or a good night’s sleep. A type of education, in other words, that “ceased to be a plague spot and became a delight.”

Classes stretched from 9 to 5 six days a week, with two hours off at midday. This routine was later compressed, *not* relaxed—9 to 4:15 on weekdays, midday break from 1 to 2:15, half-day on Saturday—to allow for extra late-afternoon spare time. Students would congregate in small groups for lunch. Some ran tabs at local taverns or purchased board by the week at local rooming houses; others, commuters especially, would haul out tin lunch-pails brought from home, then scour out an empty lecture room or other secluded spot to consume their meal. It was a regimen designed to simulate a regular workday, and thus to ease transition to life in the working world, something that traditional colleges, relatively slow-paced, often failed to do. The difficulty, of course, was that school did not end at 5 or 4:15. Evenings spent studying, and preparing for the next day, left little time for rest or recreation—and this, for Tech, would become a sore point in years ahead, with frequent, highly publicized complaints about students driven to illness, drink, or worse. But many accepted the challenge willingly, with a sense that it would toughen them for any adversity.



The permanent building was nowhere near ready in time for the first full academic year, 1865–66. But with the size of the student body more than double that of the preliminary session (approaching 70, with more likely to appear), the two rooms in the Mercantile, already

crowded, were now bursting at the seams. As a stop-gap, Rogers rented space in the home of a late justice of the Massachusetts supreme judicial court, Judge Charles Jackson, on Chauncy Street, a half block away. The crunch grew more acute when, in October 1865, John Lowell proposed that the Lowell Institute sponsor free evening courses for working adults, under Tech's supervision. Rogers gladly seized on the offer, not so much to generate extra income as to reinvigorate the public education component that he had laid out in *Scope and Plan*, then all but ditched. The Lowell courses were advertised in local newspapers a month later, and a month after that—on December 19, 1865—they met for the first time. The Tech faculty pitched in. Runkle lectured on math, Bôcher on French, Atkinson on English literature, Watson on practical science and mechanic arts. Chemistry under Eliot and Storer—among the most popular of the Lowell courses—had to be postponed until the Boylston Street building opened in 1866. The other courses, meanwhile, none of them requiring lab space, roamed between the Mercantile and Judge Jackson's house. Each course, typically, consisted of 18 lectures and met either once or twice a week; always after-hours, at nighttime.

Faculty and students spent several months that first full academic year stumbling along, quite literally, between three venues: Summer Street, Chauncy Street, and Boylston Street. Boylston was furthest off, a mile away from the other two, so classes met there, if possible, in the afternoons, following morning classes at Summer and Chauncy. "It was a long tramp," Ernest Bowditch ('69) recalled, "and a cold one as well, as there were no structures on Boylston Street below Arlington Street Church except the Natural History building, and a plank sidewalk only part of the way, west of the Public Garden. The few street cars available were drawn by horses, and ran from the Paddock Elms on Tremont Street along the Common to Boylston, through the latter to Clarendon, thence to Marlborough, where they terminated." The interval between cars was fairly regular, every fifteen minutes or so, but some students raced over on foot—even in bitter weather—rather than wait.

As Boston pushed west, road and sidewalk conditions remained primitive. Students who commuted from suburban towns—Brookline and elsewhere—came in by train and got off at the railroad terminus on Huntington Avenue, then tramped across vacant lots that

were either dusty, muddy, icebound, or ankle-deep in sludge and water depending on the weather, maneuvering between river eddies where the reclamation project had not reached far enough. On the trip home, they would go a different way, down Columbus Avenue from Berkeley Street, a more convenient route for outbound departures. Much to be pitied were those who came from exurbs, like Fitchburg and Foxboro, as their day started *so* early and ended *so* late; those from Maine, or far western Massachusetts, had no choice but to scrounge for cheap digs in town. Bowditch remembered a couple of “down-easters” who boarded with a Mrs. Page on Berkeley Street, convenient to Tech but cramped: shared space “in what was intended to be the back entry of the house and was mostly doors and windows—a sort of general passageway during daylight hours.”

The Boylston Street building—unnamed until 1883, when it became known as the Rogers Building—went up after its neighbor, the Natural History Building, was already in place. Both presented solid, elegant, neoclassical lines on a dignified, human scale, setting a tone for the neighborhood, still largely a wasteland in the process of development. Tech sat at the corner of Boylston and Clarendon Streets, Natural History at the corner of Boylston and Berkeley (the latter still survives, remodeled on the inside to house Bonwit Teller; Tech was torn down in 1938 to make way for the New England Life building).

An impressive, rectangular (90 × 156 ft.) design, Tech rose nearly 100 ft. high and consisted of four stories and a basement. “It stands,” one contemporary account observed (ca. 1869), “upon about 1,500 spruce piles, twenty-four feet in length, driven to a firm bearing upon the solid clay. . . . Rusticated free-stone piers support a terrastyle portico, on a level with the second floor, which supports a richly-wrought entablature, crowned by a pediment, designed to contain an allegorical bas-relief representing the Genius of Art bestowing her favors upon inventors and mechanics, who are in the act of presenting the results of their skill for her consideration. The pediment is surmounted by a stone pedestal, intended for the support of a colossal statue of Minerva, as patroness of art, and typical of the purposes of the Institute.” Rogers, however, wanted ornamentation kept to a minimum, which put him somewhat at odds with the architects, whose tastes ranged from baroque to neoclassical and styles in between.

As far as Rogers was concerned, the building was about functionality, first and foremost, and while efforts were made in ensuing years to decorate—a set of allegorical friezes, by Paul Nefflen, was later added as crown molding for the main hall—Minerva never showed up. Facilities were for work, not for show.

A pair of giant urns guarded each side of the main entrance, accessed by steep stone steps from street level. Inside, two administrative offices—president on the left, secretary on the right—sat off the main foyer. The rest of the first floor held lecture rooms and labs for physics and geology, plus space to store artifacts. The second floor, oriented around an enormous lecture hall that seated 900 (Huntington Hall, named for benefactor Ralph Huntington and completed in 1870), had rooms for mathematics, engineering, languages, English, and mechanics. The third floor housed architectural and engineering models. The basement held a chemistry lecture room, carpenter's shop, chemical storeroom, engine and boiler rooms; also chemical, mining, mineralogical, and metallurgical labs. Professors occupied small studies on the top floor. It all *seemed* like a lot of space.

Students quickly found that Tech's rigorous work schedule—and here work meant good old-fashioned manual labor, not just book learning—left little time for fun. The new Boylston Street building had nothing to offer besides classrooms, labs, and offices, so students looked elsewhere for recreation. A number joined the Tremont Gymnasium on Eliot Street, a few blocks away. This was a state-of-the-art facility built in 1859, run by John Doldt, a professional athlete, and frequented by local businessmen, or gentlemen-of-the-ledger as they were sometimes called. Here students sought a change of pace, a break from the grind, chance encounters with captains of commerce and industry. Whitney Conant, Eli Forbes, and Robert Richards (all '68) often arrived together and took turns at the dumbbells, swings, and parallel bars. There was no organized football team; fellows kicked the ball wherever they found space—a quiet back street, a stretch of grass on the Boston Common—and slugged it out without benefit of formal rules or referees. Injuries, some of them serious, became badges of honor, testimony to one's toughness.

With the Charles River just a few hundred yards away, Tech students also went in for rowing. Some joined the Union Boat Club.

Union sometimes competed against Harvard, which had a formal program of its own. “The Harvard men have been very helpful to us in regard to boats and in other ways,” Robert Richards declared, “and as a result a very pleasant relationship has grown up between the two institutions.” The Harvard group tried to coax one or two of Tech’s best rowers to defect, promising various perks, not the least of which was a chance to compete against the celebrated Oxford and Cambridge teams, on the legendary River Thames. Thanks but no thanks, came the response. If Tech men had wanted a Harvard-style education, they would have gone there to begin with.

Students brought high jinks to class, if they felt they could get away with them. One faculty member, William Watson, was picked on mercilessly. Watson found himself at a disadvantage because of his age—he was not much older than the boys he taught—but, in addition, he carried his slight, elf-like frame with a pompous, dilettantish air picked up in Paris. He would arrive each day coiffed, smelling like a rose, decked out in suede or felt jacket and a brightly colored cravat; then, gingerly, he would remove his silk top hat and lay it next to his gold-tipped cane, *très élégant*. The idea that such an effete fellow would teach civil construction or mechanical engineering, his specialties, struck students as ludicrous. Would he venture into a muddy alleyway, much less a construction site? The boys were surprised, however, to find that he could tough out a field trip with the hardiest of them. Whether in the depth of winter or at the height of spring mud season, Watson would show them around gas and steel works as far away as Nashua, New Hampshire—all “in aid,” he said, “of the practical studies of the School.” But they mocked him anyway. He was tagged with the nickname Squirty, for the chemical wash-bottle he carried around to clean off desks or blackboard surfaces. One day students grabbed his prized hat, turned it top side down on the floor, and stood dripping umbrellas inside. Such pranks—precursors of Tech’s famous *hacks*, its beloved ritual of student-driven mischief—helped relieve the rigors of the curriculum, providing an outlet for youthful energy at a school that did not (could not, at this point) offer organized extracurricular activities, or, in the middle of a crowded urban center, create a coherent campus feel.



Rogers brought sons of factory workers, laborers, blacksmiths, janitors, and hackney drivers together with upwardly mobile offspring of bank clerks and factory managers, together with heirs of vast family fortunes, privileged Brahmins whose families had built Boston from scratch. It was a true urban melting pot, the American fantasy played out on a small scale. The mix did not come easily, however, as these youngsters had grown up mutually hostile, separated by gulfs of class, ethnicity, and religion. The 1834 burning of the Ursuline Convent at Charlestown by a militant Protestant mob, inflamed by anti-Irish and anti-Catholic emotion, had been a watershed moment in the city's history, and in the 1860s was recent enough in memory to dredge up dark emotions. The elms and chestnuts of Boston Common provided cover for many a drawn-out skirmish, sons of Brahmins versus sons of "micks" (Irish immigrants, no Italian or Eastern European kids yet to muddy the fray further), each ranged on opposite sides hurling snowballs, some filled with rocks. Yet even with such tension in the air, Rogers drew youngsters into a setting where shared professional objectives overrode social, ethnic, and religious prejudices. Harvard had none of this flavor, nor did its feeder prep schools, Exeter and Andover. Among the Brahmins drawn to Rogers's leveling ideas were Cabots, Appletons, Lowells, Conants, Bowditches, and Forbeses, many of whom hailed from generation upon generation of Harvard loyalists. If they had not necessarily written off Harvard's curriculum as hopelessly old-fashioned or stagnant, they had grown concerned about its relevance in an age of rapid industrialization.

Tech, however, was far from broadly inclusive. At the start its reach stretched little if at all to nonwhites, and the number of admits from outside New England was relatively small; women were a special category. Rogers had voiced impassioned support for Lincoln's emancipation proclamation—"the slaves," he wrote to Henry in September 1862, would be "*forever free*" come the new year—and for expanding educational opportunities. He admired the work carried on by various commissions, forerunners of the Freedmen's Bureau; one of these, he said, "has brought within the folds of a free civilization for instruction and paid industry tens of thousands of fugitives, and of those deserted by their masters, and . . . give the fullest evidence of the capacity of these people for knowledge and training . . . to mitigate, if not remove,

the prevailing belief in the hopeless degradation of our American negroes." Yet this passion failed to draw black students to Tech. There were few if any in Rogers's time; the first documented black student, Robert Taylor, was not admitted until 1888.

Tech evidently had no policy of inclusion or exclusion with respect to race, but gender was a different matter. Women faced official, explicit barriers for more than a decade. The Lowell Institute's night classes were open to "persons of either sex" from the start, in December 1865, but Tech's regular courses were closed to women. As the number (and generosity) of women donors grew, so did the pressure to accommodate women as students in the regular program. "We would add, as a matter of just pride," secretary Thomas Webb recorded in the Corporation minutes as early as May 30, 1864, "that on our roll will be found the names of several Ladies, who, by the liberal contributions they have made, evince the interest they take in our present efforts to increase and impart knowledge, and that they fully appreciate, and are ready generously to encourage by substantial gifts, a movement which . . . must materially advance and improve every industrial class in the community, thereby adding to the sum and usefulness and happiness for the benefit and enjoyment of all." But when women in the Lowell classes, particularly chemistry under Eliot and Storer, pressed for additional coursework in 1866 and 1867, their requests were denied. Not consistent, Rogers said in May 1867, "with the present condition of the school and organization of the classes." While he believed that integrating women was a valid goal, long term, it was impractical for the present: no way to comply without "seriously embarrassing"—disrupting, that is—the school's operations.

The only women in Tech's community at the time, aside from Emma Rogers and other faculty wives, were Margaret Stinson and Charlotte Thayer. Stinson, hired in February 1865 to take charge of the chemical supply room, was advised by Rogers that she would survive quite well in this male-centric universe—"They didn't want any woman around in those days," she later recalled—as long as she exercised "a little diplomacy." In response she tacked mothering onto her job description, soothing, comforting, tending to students' scrapes, scratches, and cuts until her retirement in 1911. Thayer became "lady assistant librarian" in 1866, and was succeeded by Augusta Curtis in

December 1870; their job was "to take charge of the library and study-room and keep order therein." Curtis was one of the Lowell Institute women who had applied for admission to the regular program, and this job may have been a consolation prize; she was also assigned to help the professor of English, William Atkinson, mark students' written exercises. Tech's first woman admit, Ellen Swallow, arrived in 1871, but only as a special student "in the nature of an experiment." In 1881, by which time the policy *had* changed and two young women—Marie Glover and Evelyn Walton—graduated in chemistry after four years alongside their male classmates, Rogers talked about how wonderful it was to see the Tech credential viewed not as a male prerogative, but as "belonging to any sex." A year later, with a new building for Tech on the horizon, he threw his support behind those who wanted "special accommodations for the use of women" included in the plans.

While the student population grew rapidly under Rogers in the mid- to late 1860s, more than fourfold in three years, the pool for the regular professional courses remained relatively confined: young white men, most of them born and bred in Boston and vicinity. A few came from other New England states, a smaller number from north-eastern (non-New England) states such as New York and Pennsylvania. Smaller still was the group from the American heartland: Ohio, California, Illinois, Missouri, Kentucky, Colorado, Wisconsin, Maryland, Arkansas. The number from such far-flung places grew slowly but steadily; just 3 non-New England states were represented in the first year (1865–66), but 12 in 1866–67, 10 in 1867–68, 12 in 1868–69, and 11 in 1869–70. The first foreign students came from Nova Scotia, New Brunswick, and Upper and Lower Canada (as Ontario and Quebec were called, respectively, before Canada's confederation in 1868). One entrant from Cuba arrived as early as 1867–68. But the foreign numbers were minuscule. As state aid helped to underwrite the enterprise, and with the Corporation dominated by local businessmen, Rogers thought it a good idea if the benefits—the earliest ones, anyway—stayed close to home.



Mid-morning, Friday, October 24, 1868; near the start of Tech's fourth full academic year. Rogers gaveled open the faculty's regular weekly meeting. In the midst of business, around noon, he felt faint, struggled to speak, and lost control over one side of his body. A stroke, classic textbook symptoms. Runkle, Atkinson, and Storer rushed him home, where he was confined for the next two months. A speedy return to work looked doubtful and, by December, it was out of the question. Emma moved him to Philadelphia so that his brother Robert, dean of medicine at the University of Pennsylvania, could monitor his care. Physicians there, half-facetiously, diagnosed his condition as "Institute on the brain," which Emma took quite literally—"The Institute seems to be the one subject," she told Runkle, "most dangerous to his equanimity & it must therefore be some time before he can talk or think of the proposed plans in connection with it."

Tech had faced emergencies before, but this was its first crisis of leadership. While Rogers delegated authority from time to time, everyone—from the wealthiest Corporation member to the brightest-eyed first-year student—ultimately reported to him. There had been no time to groom a successor, nor did Rogers think in such terms. The Tech community took for granted that he would be around in full charge for the foreseeable future, a president for life, as it were, by general acclamation. Even if beyond his prime, he was not very old either, a few weeks short of 64. John Runkle, his closest friend on the faculty, took over as president pro tem for what everyone expected would be a few months. But the leave stretched to a year, then two years; and Rogers resigned, finally, in May 1870. He retained his seat on the Corporation so as to monitor developments from a not-too-distant vantage point, provide guidance as needed, and smooth the transition for Runkle, his handpicked successor.

Emma Rogers spent much of the next decade insulating him from stress, even at times from friends and allies—"his nerves," she kept telling Runkle, "are not yet strong enough to talk & think about the Inst." But Rogers also took his illness as an opportunity, a chance to recapture some of that broad-sweep drive that had kept him moving—and growing—in earlier years. While he had not felt confined at Tech, exactly, his role there had cut back on his time for other things:

research, teaching and lecturing outside Boston, playing a vigorous role in science, science education, and science policy on the national level.

He had done some of this even during the jam-packed early and mid-1860s, when Tech consumed much of his energy. In 1861 he helped out with the Illinois Geological Survey, probably as a remote adviser. In June that year Governor Andrew appointed him state inspector of gas meters, but the fumes brought on bronchial distress—this was no mere desk job—so he resigned in February 1864. In January 1862, he taught a Lowell Institute course on application of science to the arts, which dovetailed nicely, he thought, with his campaign to spread word about the new Institute of Technology. In March 1863 he and his brother Robert were invited to join the select group of 50 incorporators (founding members) of the National Academy of Sciences. Neither took an active role in Academy affairs in these early years, not for lack of interest but because the Academy was dominated by a clique—the so-called Lazzaroni, led by Alexander Bache, great-grandson of Benjamin Franklin; Louis Agassiz, Benjamin Peirce, Joseph Henry, and a half-dozen or so other distinguished scientists made up the rest of the group—whom the brothers considered elitist, exclusionary, and antidemocratic. William Rogers's other outside activities during this period included a term as vice president of the Union Club, founded that year to bolster support for the federal cause; trusteeship of the Blind Institution, begun by Henry Rogers's abolitionist friend, Samuel Gridley Howe; corresponding member of the Essex Institute; corresponding secretary of the American Academy of Arts and Sciences; and member of the visiting committee to Harvard's Lawrence Scientific School. In May 1865, he traveled to New York to attend a convention of freedmen's aid societies. At its organizational meeting in Boston, in October 1865, the American Association for the Promotion of Social Science elected him its first president. Alexander Bullock, John Andrew's successor as governor of Massachusetts, persuaded him to lead the official state delegation to the Paris Exposition in the summer of 1867. Just about the only thing he did not do was get back to his research.

This schedule would have taxed the stamina of a younger, stronger, healthier man. Yet after his illness in 1868, Rogers added more commitments. He had time now, without the burden of the Tech

presidency, to pursue other interests. Occasional winters were spent at 117 Marlborough Street or the Hotel Berkeley, but he avoided Boston and stayed in Lunenburg or Newport much of the time; by this point his sister-in-law, Eliza, Henry's widow (he died near Glasgow, Scotland, in 1866), and their daughter Mary had joined the household. Rogers traveled often, too. Depending on the season, he could be found in Philadelphia at his brother Robert's residence, 1004 Walnut Street, or in New York, Baltimore, Washington, D.C., even back at his old stomping grounds in Charlottesville, Virginia. His social life picked up after a hiatus. He grew active with several private clubs—the Thursday Evening Club (he was president at one point), the Saturday Club, and the Town and Country Club of Newport, formed in 1874 by Julia Ward Howe with the help of William, Emma, and other friends. In 1872, he sought a stronger role in the National Academy, now that Joseph Henry—a reasonable man, in Rogers's view, the least offensive of the Lazzaroni—had succeeded Bache as president.

While he published little original research after 1864, in the 1870s—his decade of illness—Rogers also began to think about getting back into science. He had wound down enough, in his mind, to donate the bulk of his scientific apparatus to Tech in May 1872, retaining—just in case—his microscope and one or two other critical pieces. Sure enough, a year-plus later, he was ready. "I am well enough to enjoy much," he wrote to a friend in December 1873, "and even to do a *little* scientific work." He resumed giving papers at professional meetings. He spoke on the geology of Newport at the Boston Natural History Society in May 1875; also that year, same venue, on gravel and cobblestone deposits in Virginia and the middle Atlantic states. His final scientific paper, on the geology of Virginia and West Virginia, appeared in 1880 in *Virginias: A Mining, Industrial, and Scientific Journal*.

This period of relative separation from Tech business also saw Rogers occupied as never before with the organizational side of science, on a national scale. Two events took center stage: his election first as AAAS president in 1875, then as president of the National Academy of Sciences in 1879. Rogers's term as AAAS president overlapped with the nation's centennial year, a distinction eclipsed only by his election as National Academy president, which Emma Rogers called "perhaps the crowning honor of his life." The Academy had just begun to

establish itself as a force to be reckoned with when its second president, Joseph Henry, died in May 1878. That June, acting Academy president O. C. Marsh accepted Congress's request that the Academy help plan surveys of still-unmapped territories out west. Rogers's background for this work was unmatched, and Marsh appointed him—"the Nestor of American geology," in Marsh's words—along with five other scientists (geologists John Newberry and James Dana, engineer William Trowbridge, mining expert Alexander Agassiz, Louis Agassiz's son) to carry out a study. The committee's report, submitted in the fall, gave Congress a basis on which to create the U.S. Geological Survey, under the Department of the Interior. Rogers's central contribution to this effort played a part in his election on April 16, 1879, to a six-year term as the Academy's third president. To everyone's surprise, he left his sickbed in Boston to rush to Washington. "[He] had been informed by telegraph," recalled George Brush, head of Yale's Sheffield Scientific School, "and although in feeble health, he responded at once by taking the night train . . . arriving early on the morning of the last day of the session, almost exhausted by lack of sleep and the fatigue of the journey. We hardly expected that he would be able to attend."

Rogers spent the next three years commuting regularly to Washington. He guided Academy business with the help of Marsh, who sometimes filled in when Rogers was ill. Rogers positioned the Academy as quasi-official adviser to Congress on yellow fever epidemics and other national health emergencies. A smaller, but still important, project, undertaken at the request of President Rutherford Hayes's interior secretary, Carl Schurz, in May 1880, involved a study of "the question of restoration of the faded writing of the original manuscript of the Declaration of Independence." Rogers was often called on to intervene with high public officials. "I know how much influence a few words from you will have," one scientist wrote in May 1881, urging Rogers to take up a particular cause with President James Garfield. The month before, Garfield had hosted a reception for Academy members at the White House and promised Rogers, schedule permitting, to put in an appearance at scientific meetings then in session. Rogers helped persuade Garfield to appoint Julius Hilgard to succeed Benjamin Peirce as superintendent of the U.S. Coast and Geodetic Survey. Garfield's

successor, President Chester Arthur, entertained Academy members at the White House in April 1882, also at Rogers's behest.



Rogers involved himself in Institute affairs only when necessary, to help fend off calamities. He often excused himself from Corporation meetings, citing not illness but business elsewhere. As a mark of appreciation, but also to encourage him not to drift too far, the Corporation named the physics laboratory the Rogers Laboratory of Physics in 1872; in 1876 a detachment of Tech students attending the nation's centennial expo in Philadelphia named their camp for him.

One crisis called for his intervention in the winter of 1869–70, while he was recuperating in Philadelphia. Charles Eliot, by this time president of Harvard (he had resigned as Tech's professor of chemistry in July 1869), floated a plan to establish formal ties between Tech and Harvard. Rogers took prompt steps to thwart it. "I am convinced that such a connection would be a decided disadvantage to the Inst," he wrote Eliot, "which owes its success in great measure to the fact that it has stood entirely unconnected with other institutions." But when Eliot refused to take no for an answer—the proposed change, he wrote back, would not make the Institute "any less independent in reality than it is now"—Rogers persuaded Emma, adamant about keeping him away from Tech business, that he must see Eliot to set him straight. Eliot went to Philadelphia in February 1870, expecting to gain Rogers's approval for some sort of amalgamation (Rogers called it an annexation). They met for a little over an hour. "I could not," Rogers told him, "see any advantage to the Institute from the proposed change but the gain of some funds—but that the Institute would be a *great loser* by relinquishing its present independence." What Rogers found particularly distasteful was Eliot's suggestion that the Institute, as a Harvard school or department, be named in honor of the Rogers family. "I expressed my repugnance to all such names," he noted, taken aback that Eliot would imagine that a bribe of any kind—much less one that appealed to personal vanity—could sway him on what course he would recommend for the Institute.

But Rogers, by and large, was content to let Tech move along on its own steam. He had done his bit; it was time for others to step in. "The Institute of Technology," he told a friend in December 1873, "is now very prosperous, and both as to extent and thoroughness of teaching and number of students is at the head of the scientific schools of the country." He wrote this just a few months after the so-called Panic of 1873, precipitated by a huge bank failure, and with the nation on the verge of a deep, decade-long depression. But while Rogers acknowledged the impact of such economic forces, he never reconciled himself to the unraveling that took place at Tech during this period. His hand-picked successor, Runkle, proved unequal to the job and drew little help from the Corporation, whose members either turned on him or retreated to attend to their own precarious finances. A disappointed Rogers watched from the sidelines as student enrollments dropped, key faculty left (for greener pastures, they hoped), and donations fell off.

By the fall of 1877, with Tech in growing jeopardy, he returned to meetings on a more regular basis—not full attendance, but enough to signal readiness for duty, to find ways to stabilize a faculty and Corporation whose mood ranged from dispirited, to angry, to downright unruly. Everyone turned to him for a magic bullet. Runkle pleaded for advice on which programs to consolidate, trim, or do away with; some had to go—the deficit was just too large—but the dilemma was how to reorganize without imperiling Tech's overall mission. The Corporation pressed him with suggestions that were at times constructive, at times defeatist: recruit more members, appoint an executive committee to help with policy and management, close temporarily, shut down altogether. Institute secretary Samuel Kneeland captured the despair felt by many, and a sense of Rogers as Tech's last, best hope: "It appears to me," he wrote in October 1877, "that you alone can save the Institute from impending danger, and save it from decline, perhaps from death. . . . I think you are the only Palinarus who can steer the bark of the Institute between this Scylla and Charybdis—having so successfully launched this bark, do not let her perish on the rocks of parsimony and business red tape."

When Runkle resigned under duress in June 1878, and all eyes turned to Rogers again, he resisted the call. But he agreed to take over as interim president on three conditions: that the Corporation make

efforts to raise \$100,000 within three months, an amount he felt “satisfied . . . would place the School in a perfectly safe and satisfactory condition”; that a faculty chair be elected to relieve him of certain executive functions; and that a new president be hired as soon as possible.

The first condition, impossibly ambitious, saw some progress within the year: \$75,000 pulled together from designated “friends of Industrial Education.” Few if any of these were alumni—still struggling, early-stage professionals, for the most part—but in anticipation of future largesse, Corporation members urged that an alumnus be appointed to their ranks so as to draw on “the cordial good will of the graduates and more and more to secure the benefit of their experience in the conduct of its affairs.” The election of John Ordway, professor of metallurgy and industrial chemistry, as faculty chair met Rogers’s second condition. But the third condition—and, in Rogers’s mind, the most essential—proved problematic. He accepted personal responsibility for this one, as the part that he had played, with near-disastrous consequences, in pushing Runkle into the presidency weighed heavily on his conscience.

Rogers served as president pro tem from June 1878 to December 1879; and then, with no successor on the horizon, as president for nearly two more years. He spent much of this period doing damage control, smoothing frayed relations between Runkle, Corporation members, and a demoralized faculty. In September 1878, William Ware slammed the Corporation for dereliction of duty. “It was mutually understood between us,” he wrote, referring to the original faculty hired in 1865, “and to the projectors of the school that a first class establishment was in contemplation . . . that money would be needed to this end; the names of the Corporation were intended to be a sufficient guaranty that no pains would be spared on their part to procure the necessary endowments and benefactions, and that their efforts would be successful; they were not men who were in the habit of failing in anything they seriously undertook. . . . We have performed our part, but we do not feel that the other party have performed theirs. They obviously have not.” Ware charged that the Corporation persistently asked the wrong question—“not what a good school would need, but what reductions the school we have got can endure and yet survive.”

This critique triggered outrage among Corporation members—Matthias Ross called it a declaration of “war before he is ready to meet the Enemy”—some of whom weighed ways to take it out on Ware personally, or even on his own department (architecture). The ever-loyal Robert Richards jumped to the Corporation’s defense, assuring them that Ware did not speak for the faculty. “I cannot think,” he wrote, “that the majority . . . hold such views. . . . It seems to me especially unkind not to say impolitic if there is any coolness of feeling in any direction among members of the Corporation to stir it up by such bombshells as this.” Richards told Rogers that Ware’s position—a minority of one, he implied—was at odds with the rest of the faculty, who had “never returned from vacation with a warmer zest for work or more encouraged by the state of things than at the present time.”

Through all this, Rogers filled the role of chief pacifier while keeping other duties to a minimum. Finances and janitorial oversight were handled by Tech’s bursar, correspondence by the Corporation secretary, “matters of discipline & in whatever relates to the interests of the students” by the faculty chair. The president’s sole official duty, as Rogers stipulated, was to preside at faculty meetings whenever he “sees fit to be present but shall not be charged with any of the business details heretofore entrusted to the President.”

He found it difficult, however, to confine himself in this way. The Corporation pulled him into drafting and editing correspondence, particularly letters to donors. John Ordway asked him for help in resolving a ticklish problem with the Chauncy Hall School, whose headmaster complained that Runkle had charged outrageous fees for part-time use of Tech’s gymnasium. Rogers paid more than usual attention to public relations issues—Tech’s growing role, for instance, as a model for other institutions; how to spread the word through paid advertising in key city newspapers from Providence to Chicago to Baltimore, and places in between; how to neutralize bad publicity, as when a professor from Illinois Industrial University complained that he had been rudely treated on a visit to Tech. A commercial group in Richmond, Virginia, solicited Rogers’s expert advice on how to go about establishing an industrial institute; the trustees of Columbian University (later George Washington University) asked for guidance in setting up a scientific school, “polytechnic in its character—looking to professional life,

and not to abstract science, except as auxiliary to the former.” Charles Venable, a former student and colleague of Rogers’s at the University of Virginia, sought ideas on how to “divert into a scientific direction a greater part of that bright intellect of the South which wastes itself in law & politics.” In December 1880 came pleas from Boston University president William Warren for help in lobbying Congress on behalf of higher education, before “the political bush-whacking & interminable debates of spring” began. The usual invitations had to be either accepted or deflected. One that arrived in February 1881, from Corporation member Charles Flint, chairman of Boston Latin and Boston English High Schools, was too important to pass up, even in the dead of winter: the dedication of the schools’ new buildings. “Many of our graduates,” observed Flint, “go to complete and ‘round off’ their education at the Institute. . . . I think we are certain to have a very large audience of the very best people of Boston & vicinity [and] your presence will be worth more to the Institute than several hundred dollars spent in advertising in the newspapers.”

Much as Rogers would have liked to accept Augustus Lowell’s invitation to prepare a new set of Lowell Institute lectures for the winter of 1878–79—two decades after his previous set—he realized the pressure would be more than he could handle. He had to conserve his energy to deal with crises: how to keep Harvard at bay again, for instance, when rumors circulated in March 1881 that the Lawrence Scientific School might consider relocating from Cambridge to a site near Tech in downtown Boston. One alumnus urged him to write a history of the Institute: “Not one among us is so preeminently well fitted to tell so much about his children and their home as their father”—a challenge that Rogers never accepted, partly because it would have required this most self-effacing of men to write extensively about himself.

It was a busy time, and some worried that the strain would overwhelm him. “Though seeming weak,” a former student wrote to Mrs. Rogers, “he has the energy and vigor of a lion, but I often wish he would give up his labors of presiding and managing, and rest on his well earned laurels.” Still, Rogers kept his eyes trained on finding a suitable successor. His position as National Academy president gave him unusual access to information on who might be qualified, available, and recruitable. By May 1880 he lit on Francis Amasa Walker, economist,

statistician, and military war hero—a proven leader in academe, as professor of political economy at Yale's Sheffield Scientific School; and in government, as head of the federal census bureau. It took more than a year of patient maneuvering, but in May 1881 Walker was elected Tech's third president and assumed office on November 1 that year.



May 30, 1882. Huntington Hall began filling up around ten thirty. The faculty gathered on stage, their new leader—this, his inaugural commencement—on duty as master of ceremonies. Students and instructors occupied the front rows; behind them ranged family, friends, curiosity-seekers. William Rogers was present, too, a special guest, to give what he hoped, finally, would be his valedictory address. No flowers, no ornaments, no music; a simple, low-key setting, the kind Rogers preferred. He disliked rituals of this sort; but when students had begged for one a few years earlier (in 1879), he relented, insisting only that Tech's be different: spare, businesslike, nothing fancy. This graduating class, May 1882, was Tech's fifteenth—24 graduates in all, including 2 women—yet only its fourth commencement ceremony. In the old days, students had simply stopped by the secretary's office, picked up their diplomas, and gone about their business.

The ceremony opened with the usual introductions, followed by a file of eager (some shy) students stepping forward to read from their theses. Next up was Rogers, to present diplomas. Walker led in with a glowing tribute. "In a high sense," he said, "Professor Rogers will always remain President of the Institute of Technology. Present or absent, his spirit will preside over it. No man can succeed him in his fame; no man can hope to do more than successfully administer the school which he alone could have created. Founder and father is his title perpetual, by a patent indefeasible." The kind of florid, semi-idolatrous homage that Rogers loathed, but he accepted it this time, making allowances for Walker's notoriously enthusiastic style.

As he rose to speak, his frame looked stooped by age, illness, and fatigue. Yet his eyes gleamed. They had been fading to gray for a while, but the familiar blue twinkle shone through again—his spirits lifted, in part, because Walker's arrival promised new, solid, creative leadership. He

aimed to capture a bit of Tech's history for an audience too young to remember. "It is true," he said, "that we commenced in a small way, with a few earnest students, in some rooms fitted up in Summer Street, while . . . the tides rose and fell twice daily where we now are. Our early labors with the legislature . . . were sometimes met not only with repulse but with ridicule, yet we were encouraged and sustained by the great interest manifested by many in the enterprise. Formerly a wide separation existed between theory and practice; now in every fabric that is made, in every structure that is reared, they are closely united into one interlocking system,—the practical is based upon the scientific, and the scientific is solidly built upon the practical." From there he moved on to outline how modern sources of energy had emerged, expanded, fed into new technologies. "Stephen Hales published a pamphlet on the subject of illuminating gas, in which he stated that his researches had demonstrated that 128 grams of bituminous coal—" And here, mid-sentence, he crumpled to the floor. Those nearby rushed to his side, but he was gone.

Among the pallbearers at the memorial, on June 2, were Runkle and William Atkinson (for the faculty), Henry Bromfield Rogers and John Forbes (for the Corporation), O. C. Marsh (for the National Academy), and Edward Pickering (formerly on Tech's faculty, now on Harvard's). Burial took place at Mount Auburn Cemetery, Cambridge, in the Savage family lot (no. 178) on Walnut Avenue, where Eagle, Magnolia, Mountain, and Spruce meet. Rogers shares a headstone with his father-in-law, James Savage; Savage's inscription faces outward, toward the street, Rogers's inward. At commencement a year later, Walker eulogized him in purplish prose—"his expositions of scientific truth radiant with a light which scarcely seemed to come from earth"—that the simple, direct, understated Rogers would probably have cringed at, but that the bereft found comforting. Emma Rogers lived to a grand old age, 87; she died on May 18, 1911, and her ashes were buried on October 11 beside her two favorite men. She spent her last years shaping her husband's personal legacy; her monumental *Life and Letters of William Barton Rogers*, issued in two volumes in 1896, was a mark of deep affection for both him and Tech. Much of her estate, the residue of her father's fortune, was willed to the Institute.