Rensselaer

WHERE IMAGINATION
ACHIEVES THE IMPOSSIBLE

An Illustrated History of
Rensselaer Polytechnic Institute

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We dedicate this work to the individuals who have chronicled Rensselaer's past, especially Samuel Rezneck, Henry Nason, Palmer Chamberlaine Ricketts, Ray Palmer Baker, and William Young. Without their efforts, this volume would have been unrealizable.
knowledge and thoroughness.

With those two powerful words, I describe a proud tradition of technological education begun in 1824. Stephen Van Rensselaer and Professor Amos Eaton created a special environment for learning, a place where, with knowledge and thoroughness, students unlocked the keys to technological advances the likes of which our country had never seen before.

Rensselaer's students and graduates opened the wilderness by building the railroads and designing the bridges that paved the way for the Industrial Revolution. Our proud association with the military helped defend this country in times of war. Rensselaer's research and know-how have helped put men on the moon, have automated industry, have advanced medical science, and have propelled areas such as microelectronics.

Rensselaer Polytechnic Institute has charted a course of leadership in technological education for over 170 years. Indeed, Rensselaer's founders were individuals of remarkable vision and purpose, forging and sustaining Rensselaer's reputation as a premier technological university. In the course of meeting alumni from all over the world, I have often remarked on my unwavering respect for the great tradition and the rich history of this fine institution, for the people who shaped it, and for the generations of faculty and students who have joined together to “apply science to the common purposes of life.”

I believe we must have a reverence for, and an understanding of, the events and people that have brought us here — those men and women who taught an experimental, hands-on education, who built the beautiful, green-roofed campus, and those who helped bring Rensselaer to the national prominence we enjoy today.

We must remember that the world around us shaped the Institute as well, and understand Rensselaer's evolution as it paralleled our nation’s. The Civil
War. The Industrial Revolution. The world wars. Space exploration. The university's work in science and technology played key roles throughout this country's development, and its graduates have been the leaders of their times. Indeed, Rensselaer has long been a place where “imagination achieves the impossible.”

This book introduces us to many of the great leaders in the Institute's history, documents the growth of technological education, charts the birth of a campus, and highlights the long-standing traditions that make Rensselaer so unique. I think its collection of rare, archival photographs will capture your imagination as they did mine. Most importantly, this book helps to remind us that the Rensselaer of today is successful, vibrant, and leading edge because generations of men and women worked hard to make it so. We reap the rewards of their talents and work, and we must leave the same legacy to tomorrow's generation.

Rensselaer's history of world-class technological education is the foundation from which we will launch into a new century. We remain true to Rensselaer's founding principles, and just last year the Rensselaer community reaffirmed our central mission with this simple, but powerful, mission statement:

*Rensselaer educates the leaders of tomorrow for technologically based careers. We celebrate discovery, and responsible application of technology, to create knowledge and global prosperity.*

Knowledge and thoroughness are Rensselaer's priceless gifts to the world. It has been true since 1824, and it is true today.

It is my distinct honor to join in such a worthy mission.

R. Byron Pipes, President
ow do you capture an institution as historic, diverse, and dynamic as Rensselaer within the covers of a book?

It can only be done with humility, and with the sobering realization that the best efforts will inevitably fall short.

This is the fifth published history of Rensselaer. Among people interested in our long and distinguished history, there was consensus that Professor Samuel Rezneck’s account, published in 1968, needed to be brought up to date. Further, the Rezneck history was scholarly. We felt that a somewhat more popular, illustrated history — one that would be appealing to the many people who make up Rensselaer’s family and friends — was called for.

For Carl Westerdahl, Mike Ross, and myself, the researching, writing, and assembling of this book has been a labor of love. We are grateful to R. Byron Pipes, Rensselaer’s 17th president, who enthusiastically initiated this project. Like Dr. Pipes, we see this as a first step in the celebration of our 175th anniversary, in 1999.

Having spent the last year and a half working on this book, we now look back in amazement at the number of alumni and alumnae who have distinguished their alma mater by making such important contributions to our nation and the world. Other facts uncovered in the writing also intrigue us. Rensselaer, it seems, has always responded to aggressive leadership; overall we appear not to have handled less directive governance as well. Also, we realized that without the backing of Troy, and particularly of its leading citizens, at difficult junctures in our history, we might well have had to close our doors.

Finally, we wondered at the outset whether three people could collaborate to produce a book. We have found to our surprise that the three of us have worked together extraordinarily well. I supplied the overview as well as the larger historical context, and also checked for accuracy. Carl Westerdahl did
an enthusiastic and ingenious job uncovering sometimes never-before-utilized photographs. He did much of the research that needed to be done. And Mike Ross wove it all together with beautiful prose.

As this book goes to press, we are mindful of the long line of distinguished alumni and alumnae who have brought honor and fame to their alma mater while making significant contributions to "the common purposes of life," and of the Rensselaer faculty who have shaped generations of scholars and leaders with their example and have contributed immeasurably to our knowledge of the world with their research, and of the people of Troy, New York State, and the nation who have supported this magnificent educational experiment in good times and bad.

The deeds of many of these outstanding individuals are summarized in the pages that follow. Those we have inadvertently overlooked will have to wait for the next Rensselaer history to be written. We know there will be another book in time, for Rensselaer will continue to be an integral part of the unfolding story of our nation; Rensselaer will continue to make history.

I invite you to enjoy this extraordinary story with us.

Thomas Phelan, Institute Historian
An enterprise like this one requires the contributions and good will of many persons. The authors express their gratitude to the numerous alumni, staff, and friends of Rensselaer who have provided support, proposed ideas, and helped shape this volume, and supplied encouragement along the way.

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CHAPTER I
Convergences

The confluence of three strategic waterways, the Hudson and Mohawk rivers and the Erie Canal, helped produce along their banks a harmonious and dynamic cluster of communities in the early years of the 19th century.

Geography had made Troy, on the east bank of the Hudson, and Albany, on the west, centers of commerce and trade. Likewise, from the time of the earliest New Netherlands settlements, geography had destined this as a jumping-off point for adventurous souls seeking a path west through the mountains. The Mohawk River Valley led to one of only a few breaks in the Appalachian chain from Maine to Georgia.

The Great Canal
If geography opened up to the region the potential of westward travel and trade, it was engineering — an intuitive, pragmatic engineering required to dig the Erie Canal — that turned this potential into actuality.

Begun in Rome, New York, on July 4, 1817, and expanded east and west over 363 miles of swamp and highland, the Great Canal was completed in...
The Canal brought prosperity to the communities along its route. Shown here is the waterfront of a typical Canal community about 1830. Troy's location near an entrance to the Erie and Champlain canals made it a starting point for commercial traffic headed to the west and north. Stephen Van Rensselaer supported canal construction in New York as early as 1790 and served as a member of the original Canal Commission in 1810.

1825. And long before the last link was completed, the Canal had opened up the West to the manufactured goods produced at the confluence of the two rivers, brought a stream of raw materials to these growing industrial centers, and propelled the state and the nation into a period of unprecedented expansion and prosperity. The Erie Canal had established Troy at a crossroads.

It was the convergence of two radically different lives that produced at this dynamic junction in 1824 a unique experiment that would transform American education.

An Inquisitive Mind

Amos Eaton was all restless intelligence — a scholar, lawyer, botanist, geologist, chemist, educator, and innovator.

Stephen Van Rensselaer was a republican version of the “manorial lord,” responsible for thousands of tenants who farmed his land. He was also a legislator, soldier, philanthropist.

It was the convergence not just of Eaton's and Van Rensselaer's personalities, but of the philosophies of the age, that favored the founding of an experiment called, appropriately enough, The Rensselaer School. The young American Republic had emerged from the War of 1812 with an exhilarating sense of the triumph of democratic institutions, and with an intensified nationalism. The people looked to the vast continent to the west which, as Henry Adams wrote, lay before them “like an uncovered ore bed.” The Monroe Doctrine had declared all the Americas off limits to European expansion.

The spirit of romanticism — a belief in a limitless destiny and human capability, and symbolized by the grand canvases of the Hudson River School of painters — complemented the ideas of the Enlightenment, with its emphasis on rational, scientific methods of investigation, and faith in human progress.
Amos Eaton embodied the ideas of the late Enlightenment. Born in New Concord, near Chatham, in Columbia County, New York, into a devout Presbyterian household in 1776, the year the colonies declared their independence from England, Eaton was an ardent patriot for all of his life, and an advocate of the ideals of freedom, equality, and individualism. He was born with an inquisitive mind, eager for knowledge of the world.

He received practical training in surveying from village blacksmith (and distant relative) Russell Beebe — using crude instruments the blacksmith had fashioned. Beebe constructed for Eaton a needle magnetized from kitchen tongs and a good working surveyor’s chain. Eaton also received theoretical instruction in Latin, Greek, geography, logic, natural philosophy, and mathematics from the Reverend David Porter, of Chatham. Thus, very early in life, the two aspects of education — the practical and the theoretical — were joined in the mind of the young scholar. In 1793, when Eaton was just 17

**Kindred Spirits**  This work by Asher Durand, a painter of the Hudson River School, captures the spirit of the Romantic Era in which Rensselaer was founded. Humanity is seen in a vast wilderness bigger and more powerful than anything in Europe. This wilderness was to be tamed by humanity’s creative and technical genius.

**Amos Eaton**  The first senior professor of The Rensselaer School, Eaton advocated educational theories that created the academic foundation for the school and for a great deal of scientific and technical education in America. Born near Chatham, New York, in 1776 and educated at Williams and Yale colleges, Eaton came to Troy in 1819 as a scientist, teacher, and lecturer with a growing reputation.
years old, he prepared a monograph titled *The Art of Surveying, Unshackled with the Terms and Sciences of Mathematics, Designed for Farmers’ Boys*, which was published in 1800 by a Mr. Croswell, an Episcopal clergyman.

Eaton attended Williams College. He had to drop out temporarily for financial reasons and supported himself through a stint of teaching in the country schools around Chatham before returning to Williams. Eaton used this opportunity to refine his ideas about improving the design of schoolrooms.

At the time, the method of instruction at Williams was the Oxford tutorial system. Eaton was fortunate in having as his tutor Jeremiah Day, who later became president of Yale College. Eaton married Polly Thomas on October 16, 1799, after graduating from Williams with an AB degree, and “with much reputation for knowledge of mathematics and philosophy.” Now he needed a profession.

This period in the early history of the Republic was marked by speculation in land. Fortunes were being made quickly, and lost just as fast. It
seemed to Eaton that the study of law — combined with his experience in surveying — might lead to a lucrative livelihood for an ambitious, newly married scholar.

Eaton began the study of law under the Honorable Elisha Williams in Spencertown, New York, in 1799, and he continued his studies under the Honorable Josiah Ogden Hoffman, the attorney general of New York. He also studied law for a time under Alexander Hamilton, and he corresponded with another student of the law, Washington Irving. Also during this period, Eaton met David Hosack and Samuel L. Mitchell, both leading scientific investigators, with whom he studied botany, chemistry, and natural philosophy (physics), and cultivated his taste for the natural sciences. These subjects provided him with a respite from the drudgery of his legal studies.

In 1802, at the age of 26, Eaton entered the practice of law. For the next decade, he gave his full attention and energy to law and business — pursuits to which such an open-spirited and guileless man was ill-suited. Nevertheless, for a while he prospered in his chosen career of land agent and attorney — first for John Livingston of Schoharie County, and afterward in his own business. Then disaster struck.
NEW YORK STATE PRISON,
GREENWICH VILLAGE. Following his
conviction for forgery in 1811, Eaton was
sentenced to life imprisonment. He was
released in 1815, but was exiled from New
York State. In prison, Eaton abandoned his
law career for a new life in science.

A Near Catastrophe

Early in 1804, Eaton and his father, Abel, purchased 5,000 acres of land
near Catskill, in Greene County, from Nathaniel Pendleton for $13,500. The
fortunes that were being made in land speculation attracted the unscrupu-
lous and corrupt. Pendleton, it would seem, was one of these.

In September 1810, Eaton was arrested on a charge of forgery in connec-
tion with the Greene County purchase — charges filed by Pendleton, a man
Eaton had confided in and trusted as a friend. Pendleton followed this legal
action with a scurrilous advertisement in a local newspaper that, in effect,
convicted Eaton before the matter went to court. Eaton strenuously protested
his innocence, but the negative publicity resulted in his financial ruin. Eaton
liquidated his assets to satisfy his creditors, but the criminal indictment of
forgery remained.

In a trial that would probably not stand up to modern legal scrutiny,
Eaton, on August 26, 1811, was found guilty of forgery and sentenced to
confinement in the state prison at hard labor for life. Throughout the rest of
his days, Eaton felt the keen injustice of the charges and of his conviction,
and referred frequently to the “cruel malignity” of his enemies.

Nevertheless, so strong was his belief in his own integrity that he did not
allow the time spent in the state prison in what is today Greenwich Village,
on Manhattan Island, to shake his self-confidence, affect his spirit, or blunt his intellect. As an educated man, Eaton was quickly afforded the equivalent of trusty status, which allowed him privileges not available to other prisoners. In prison he worked on his botanical studies, developing a new method to exhibit all known species of plants (40,000) in one small volume. The scarcity of scientific books in English, and the high price of those written in Latin, French, and other foreign languages, induced Eaton to write his own textbooks for the common people.

He also laid the foundation for his future reputation as the father of modern American geology, preparing a manuscript of the 342-page *A System of Mineralogy, Being the Essential Part of the Second Edition of Kirwan’s Elements of Mineralogy.*

If Amos Eaton had powerful enemies, he also had influential friends who were convinced of his innocence and worked tirelessly for his release. Eaton corresponded frequently with the leading scientists, educators, and public figures of the day, who were painfully aware of his situation. In November 1815, their efforts were rewarded, justice was served, and Eaton received a conditional pardon from New York State Governor Daniel D. Tompkins, later Vice President of the United States under James Monroe. Under the terms of the pardon, Eaton was released from prison, on condition that he leave New York State and not return.

**A Career in Sciences**

At the age of 39, his freedom at least partially restored, Eaton began the last and most important phase of a life devoted to the betterment of society, a phase that would culminate in the establishment of a school that would embody his ideals and dedication to scientific education. To prepare himself, he attended Benjamin Silliman’s lectures in chemistry and mineralogy at Yale in 1816 and 1817, and continued his botanical work.

Starting in May 1817, Eaton lectured in mineralogy and botany at Williams College, and in the same year published *A Manual of Botany for the Northern States Comprising*
This 1823 certificate of attendance (note the engraver's spelling correction) contains the signature of Amos Eaton, who served as a faculty member during its most prosperous years. Located in Castleton, Vermont, this institution graduated more physicians than Harvard in the early 19th century.

Generic Descriptions of all Phenogamous and Crystogamous Plants to the North of Virginia. In all, this affordable, useful text went through eight editions; more than 13,000 copies found their way into the hands of botanists. Also in 1817, the corporation of Williams College conferred on Eaton the degree of Master of Arts, and New York State Governor DeWitt Clinton awarded Eaton a full and unconditional pardon.

Following his successes at Williams College, from 1817 to 1824 Eaton traveled through the Northeast states, teaching and expanding his knowledge in the natural sciences. He accepted invitations to lecture to audiences of men and women in Northampton, Belchertown, and Worcester, Massachusetts, and studied the geology of the countryside as he traveled to his assignments. He lectured at the U.S. Military Academy at West Point and at Amherst in 1821. He began a long association with Castleton Medical Academy in Vermont as a lecturer in botany. In 1818, he settled in Albany for a year, and gave his personal attention to the printing of the second edition of his Manual of Botany. At the request of DeWitt Clinton, he lectured on geology and chemistry, and their application to agriculture, to members of the New York State Legislature, and at that time made the acquaintance of Stephen Van Rensselaer, a member of the Assembly. A firm friendship resulted — a friendship that would produce great benefit to science education in America.

In 1819, Eaton became the official lecturer of the Troy Lyceum, an organization devoted to the propagation of scientific knowledge. It included among its members John D. Dickenson, a representative in the U.S.
Congress, and William L. Marcy, later the governor of New York State. Hundreds of men and women attended his lectures on botany, experimental philosophy, and chemistry in Troy. Eaton also lectured on Wednesdays and Saturdays to the women who made up the student body at Emma Willard's new Troy Female Seminary. Because of his wide correspondence and numerous friends, Eaton could provide his audiences with news "flashes" of current scientific events, such as discoveries of scientific interest in the western United States.

In the spring of 1819, Amos Eaton moved with his family to a house on Second Street, near Ferry Street, in Troy. The bustling, industrially expanding town would be his home for the remainder of his life.

As a scientist, lecturer, and teacher of growing prominence, and as a correspondent with some of the most important public figures of the day, Amos Eaton was pleased to add Stephen Van Rensselaer, the Patroon of Rensselaerswyck, to his growing circle of influential and learned friends.

Stephen Van Rensselaer's ancestor, Kiliaen Van Rensselaer, the original Patroon of Rensselaerswyck, had been an astute businessman, jeweler, diamond merchant, and member of the Amsterdam chamber of the Dutch West India Company. Kiliaen saw the possibility of substantial profits in the agricultural colonies in the New World, and pushed through the Charter of Freedoms and Exemptions of 1629, which established the patroon system. Kiliaen and two partners staked their claim in New Netherlands and, through agents, purchased land along the Hudson River from the Native Americans over a period of years.

Rensselaerswyck — which Kiliaen Van Rensselaer never saw — began at the southern end of Barren Island, in the Hudson River, and ran north along the river as far as the Great Falls at Cohoes. It included the land on both sides of the Hudson, running inland approximately 25 miles from each bank, an area extending to the Massachusetts border on the east and to the Helderberg Mountains on the southwest, and encompassing approximately 750,000 acres.

The Good Patroon

The patroonship passed from father to eldest son. As the largest landowner in New York at that time, Stephen Van Rensselaer was a member of one of the state's four leading Colonial families. (The others were the Schuylers, the Livingstons, and the Van Cortlandts.) His mother was the daughter of Philip Livingston, of Livingston Manor. His first wife, Margaret, was the daughter...
of General Philip Schuyler, of Revolutionary War fame; his second wife, Cornelia Paterson — with whom he would have three daughters and six sons — was the daughter of William Paterson, the governor of New Jersey.

Stephen Van Rensselaer attended the College of New Jersey at Princeton in 1779, and in 1781 applied for admission to Harvard College. He graduated with 34 other members of the class of 1782.

On November 1, 1785, Van Rensselaer arrived at his 21st birthday, and legally became the Lord of the Manor, the Eighth Patroon of Rensselaerswyck. The celebration in Albany was reminiscent of medieval festivals.

One of Van Rensselaer's first orders of business was to complete the settlement of Rensselaerswyck and make it profitable. The manor had no more than a few thousand tenants. Van Rensselaer sent surveyors into the property and divided it up into farms of approximately 160 acres each.

These farms were offered for lease on attractive terms. The use of the land was free to the leaseholder for the first seven years of the lease. Afterward, rents varied, but a typical yearly rent was 14 bushels of winter wheat per 100 acres, plus four fat fowls, and one day's service with carriage and horse. The patroon retained mineral and water rights. As such, Van Rensselaer's leases were more generous than those available on other manors and estates. For

**Van Rensselaer Manor** The wealth and power of the Van Rensselaers was rooted in the manor of Rensselaerswyck, a huge parcel of land including the critical junction of the Hudson and Mohawk rivers. This map shows its enormous size.
example, a leaseholder on Van Rensselaer Manor possessed the land forever, and could lease parts of the property to others. On Livingston Manor, in contrast, the land reverted to the owner after two or three generations.

A stream of settlers — many of them “Yankees” from New England — were migrating into the upper Hudson River Valley, and the patroon’s development efforts succeeded. By 1840, the tenant population had reached 50,000.

Colonial agriculture was primitive by today’s standards. Farmers tended to plant the same crop year after year until it refused to yield, at which time they allowed the field to lie fallow, covered with weeds. Productivity was low. The chief crops, in addition to wheat, were rye, oats, corn, buckwheat, hemp, and flax. There was little in the way of livestock. Van Rensselaer had a vested interest in seeing agricultural methods improved.

He was, by every written account, a liberal and benevolent landlord. In later years, he became lax in collecting rents, and it was said of him that he would prefer to go into debt than make demands on tenants who were in financial straits. The Eighth Patroon of Rensselaerswyck richly deserved the label “The Good Patroon.”
ACHIEVING THE IMPOSSIBLE

Building the Transcontinental Railroad

"Crazy Judah," or Theodore Dehone Judah, who attended The Rensselaer School, dreamed of a railroad that would link America's East and West coasts. Judah presented a plan for the Sacramento-to-Folsom line to California merchants Collis Huntington, Mark Hopkins, Charles Crocker, and Leland Stanford, all of whom had roots in the Albany-Troy area. With the backing of the "Big Four," a bill authorizing a railroad to the Pacific was signed into law by President Abraham Lincoln on July 1, 1862.

Early Rensselaer graduate Judge E.B. Crocker, brother of one of the Big Four and director of the Central Pacific Railroad's legal department, wrestled with the complicated legal problems connected with this monumental undertaking. He was also the railroad's largest stockholder.

Another alumnus, Percy T. Browne, surveyed the difficult and dangerous route from Fort Sanders to Green River, Wyoming, for the new Union Pacific Railroad. Browne found a surprisingly low-elevation (7,100-foot) pass across the Continental Divide, but was killed by Native Americans in 1867 before he could complete the surveys.

A member of the Federalist Party that included Alexander Hamilton, John Jay, and Philip Schuyler, Van Rensselaer approached politics as both a responsibility and a pleasure. He ran successfully for the State Assembly in 1789 — the first Assembly meeting under the new U.S. Constitution. Though only 25 years old, he played an active role on the Ways and Means Committee, and introduced bills in sessions held in Albany and New York City.

In 1795, Van Rensselaer won election as Lieutenant Governor of New York State on the Federalist ticket with John Jay, but in 1800 he was an unsuccessful candidate for governor. The capstone of his political career was his election to a seat in the 17th U.S. Congress in 1822, at the age of 57.

Van Rensselaer was deeply committed to the role of education in a democracy. As lieutenant governor, he was on the Board of Regents of the State of New York. But he also served as a trustee of Union College from 1795 to 1800, and of Rutgers College. He financially supported The Albany Academy, and was the first president of the Academy's Board of Trustees, serving from 1813 to 1819.

Economic Development

As a landowner and a businessman presiding over hundreds of thousands of acres, Van Rensselaer was also vitally interested in economic development, and the links between transportation, navigation, and land values. His interest in improved navigation by water began before the close of the 18th century. In February 1790, he introduced into the State Assembly a bill titled "An Act to Improve the Navigation of Hudson's River."

Van Rensselaer knew as well as anyone that the commercial development of the state would be accelerated by an inland navigation route from the Hudson to Lakes Ontario and Erie. In 1810, when the Erie Canal was proposed, he was selected to serve on the Canal Commission (along with DeWitt Clinton, Robert Fulton, Robert B. Livingston, and Gouverneur Morris), and he personally reconnoitered the western part of the route to determine the practicality of
THE ALBANY ACADEMY  In continuous existence since its founding in 1813, this institution included Stephen Van Rensselaer among its trustees. Its students include Joseph Henry, Herman Melville, and Judge Learned Hand.

STEPHEN VAN RENSSELAER IN CONGRESS  The Institute’s founder served one term in the United States Congress. This painting by Samuel F. B. Morse, inventor of the telegraph, shows the members of that body. Van Rensselaer is among them.
extending the Canal from Oneida Lake to the Seneca River. From then on, Van Rensselaer's name was closely connected with what came to be called the Great Canal, and in 1824 he was made the president of the Board of Canal Commissioners.

So when his friend Amos Eaton, the increasingly eminent scientist, lecturer, and educator, expressed his desire to conduct an agricultural and geological survey along the route of the Erie Canal, Van Rensselaer was receptive. (Earlier, in the summer of 1820, Eaton and Theodore Romeyn Beck had made an agricultural survey of Albany County, and one of Rensselaer County a year later — both financed by Van Rensselaer.) The patroon shared with Amos Eaton and New York Governor DeWitt Clinton the conviction that scientific knowledge, and the wide dissemination of useful information, would inevitably put the state's agriculture and manufacturing on a sounder footing.

Eaton completed his survey of the region adjoining the Erie Canal in November 1823, traveling more than 1,000 miles. Eaton also lectured, with Van Rensselaer's encouragement, on agricultural subjects in the villages along the Canal route. Eaton's friend and teacher, Benjamin Silliman, assisted in analyzing what he found. The results of the survey were published in a volume titled *A Geological and Agricultural Survey of the Great Canal from Albany to Buffalo, a Distance of 380 Miles*, printed April 30, 1824. It was known thereafter as Van Rensselaer's *Canal Survey*.

The notable success of this expedition led Eaton to suggest a second scientific project to Van Rensselaer: a geological survey of New York State — the first geological survey of any state in the United States — and that once again won Van Rensselaer's approval. Eaton and Cortlandt Van Rensselaer, the patroon's son, conducted the first part of this survey, which took them across sections of New England. The second half of the survey included New York and New Jersey. These geological surveys were early landmarks in the history of geology in America.

By all accounts, it was during this period of intense scientific activity and intellectual ferment, when Amos Eaton was conducting geologic investigations and lecturing on agricultural chemistry to the villagers in the Canal towns, that he first conceived the idea of establishing a revolutionary scientific school in Troy.

In 1822, Eaton had produced a practical chemistry textbook, which he called *Chemical Instructor: Presenting a Familiar Method of Teaching the Chemical Principles and Operations of the Most Practical Utility to Farmers, Mechanics, Housekeepers, and Physicians; and Most Interesting to Clergymen*.
and Lawyers. In that text, Eaton made explicit his objective “to bring down
the sublime science of chemistry within the reach of the laboring agriculturist,
the industrious mechanic, and the frugal housewife... I have not intention­
ally omitted any principle which applies to the common purposes of life...”

It was natural for Eaton the educator to speculate on the formation of a
school where his own firsthand approach to scientific investigations and the
application of science to useful endeavors could be conveyed to teachers,
who would then pass it on to the general population. It was just as natural
for Eaton to convey his thoughts to his prominent and supportive mentor, a
man whose desire to advance learning for the benefit of society was just as
great as his own.

A Revolutionary Idea
On August 21, 1824, on the back of a circular advertising a course in prac­
tical chemistry, Eaton wrote to Van Rensselaer with his idea for a school that
would be different from every other. The premise was as simple as it was
attractive: Teachers learn more about their subject than do students. The
necessity to teach others forces the learner out of a passive role into an active
one. Eaton wanted to start a school of science that would apply scientific
principles to practical problems. As to method, he would place the student
in the role of teacher. After some preliminary instruction, the students would
perform rather than watch experiments, and lecture their colleagues on the
REVEREND SAMUEL BLATCHFORD
The first president (chairman of the trustees) of The Rensselaer School, Blatchford was born in England. A Presbyterian minister, he arrived in America in 1795 and came to Lansingburgh in 1804. Interest in science was quite high among the Presbyterian clergy in the early 19th century. Blatchford was a friend of Van Rensselaer's and served as the young school's president until his death in 1828.

principles demonstrated. For materials, the students would use apparatus inexpensive enough to be affordable by every student — or simple enough to construct themselves. Eaton would be able to judge the success of his plan readily: by the increased facility with which the students demonstrated their knowledge, and their ability to teach others. Eaton asked for Van Rensselaer's financial help in underwriting the project.

It was a sign of Van Rensselaer's trust and confidence that within six weeks of receiving Eaton's request, he agreed to help finance the plan. And so, on November 5, 1824, Stephen Van Rensselaer addressed a famous letter to the Reverend Samuel Blatchford, Presbyterian minister of Lansingburgh, stating the philosophy behind a school he wished to establish in Troy — a letter that became part of the constitution of The Rensselaer School.

I have established a school at the north end of Troy, in Rensselaer County in the building usually called the Old Bank Place, for the purpose of instructing persons, who may choose to apply themselves, in the application of science to the common purposes of life. My principal object is to qualify teachers for instructing the sons and daughters of farmers and mechanics, by lectures or otherwise, in the application of experimental chemistry, philosophy and natural history, to agriculture, domestic economy, the arts and manufactures. From the trials which have been made by persons in my employment at Utica, Whitesborough, Rome, Auburn, and Geneva, during the last summer, I am inclined to believe that competent instructors may be produced in the school at Troy, who will be highly useful to the community in the diffusion of a very useful kind of knowledge, with its application to the business of living....

Thus, the ideas expressed were really Amos Eaton's, developed over years of experiment and observation, but were warmly and explicitly endorsed by Stephen Van Rensselaer.
The Rensselaer School

With Van Rensselaer's help, Eaton obtained the Old Bank Place, a handsome Federal structure and the former site of the Farmer's Bank, approximately one-quarter mile north of the Troy Court House, as the location of the new school — as well as home for Eaton and his family. On November 2, 1824, Eaton, in high spirits, began alterations to transform the building.
Carpenters and masons worked for six weeks. Into this structure were fitted living quarters, an assay room, a chemical laboratory, natural history and natural philosophy rooms suitable for small experiments and lecture sections in various subjects, and even an astronomical observatory, five feet square and about nine feet high, on the ridge of the roof. The building had a suite for geological specimens, and the laboratories were well stocked with an air pump; optical, mathematical, and electrical instruments (all inexpensive but efficient); a forge; cisterns; glassware; and chemical substances. (A second-hand solar microscope, purchased in November for $25, did not arrive until the end of March 1825.)

On December 28, 1824, the Troy Sentinel announced, “Everything is in readiness at the Rensselaer School for giving instruction in chemistry, experimental philosophy and natural history, with their application to agriculture, domestic economy, and the arts; and also for teaching land surveying and mathematics.”

The Board of Trustees first met on December 29, 1824, when it was formally decided to call the institution The Rensselaer School. Dr. Samuel Blatchford, who had accepted the presidency of the Board of Trustees, announced that The Rensselaer School would be open to pupils on the first Monday in January 1825. The fees charged were $25 per term, and $5 per course. Board and lodging were available at the school for $1.50 per week.

Two well-cultivated farms on the manor — near what is today Hoosick Street — were designated as places for scholastic exercises. Field trips were also planned to various manufacturing plants — a tanning and curing establishment, a cement factory, a brick-making concern, a bleaching shop, and a smithy — so that students could learn processes first-hand.

The founding of the unusual school in Troy actually reflected a growing national interest in science and its applications. In that same year — 1824 — the Franklin Institute was established in Philadelphia for the “study and progress of the mechanical arts and applied science.” The Franklin Institute took as its mission the encouragement and development of the country’s early industries.

On January 3, 1825, Eaton welcomed 30 young men (including two of his sons) to the first school of science in the United States. The entrance requirements stated that the candidates must be well-versed in reading, writing, common arithmetic, and English grammar. A knowledge of Latin was also desirable. Each class was divided into four parts: one in natural history, one in pneumatic chemistry, one in assaying chemistry, and one in practical math
and experimental philosophy. Eaton was senior professor, and he selected Lewis C. Beck as his junior professor.

On January 5, 1825, The Rensselaer School was formally opened with the reading of the patroon's letter of establishment to Dr. Blatchford in the presence of the trustees, faculty, students, and a number of visitors.

Asa Fitch, Jr., who, at the age of 17, spent the year 1826-27 at the school (and who would also serve as a professor at the school and distinguish himself in science) recorded a typical day's schedule in his diary:

The morning bell rings at sunrise, when we are all to get up and prepare ourselves for examination, which begins at the ringing of the second bell twenty minutes later. . . . the examination usually lasts about one hour to the ringing of the breakfast bell. After breakfast till 9 or 10 we have to study our subjects and prepare the apparatus. . . . Usually at 10 o'clock the Lectures in Natural Philosophy and Natural History commence. Those of the sections in the Common Laboratory and the Assay Room begin rather earlier. Our lectures generally last till near dinner time which is one o'clock. From dinner till supper each one does as he chooses. Supper at six o'clock. At half past seven the bell rings and we all assemble in the Reading Room, where we study our lectures till nine. We can remain longer if we choose.

Fitch described the food at the school as poor.

THE FRANKLIN INSTITUTE  Founded in Philadelphia in 1824, this institution was established for many of the same reasons that Rensselaer was established. There is some evidence that in the 1840s the director of Rensselaer, Benjamin Franklin Greene, offered to move the school from Troy to Philadelphia to become part of the Franklin Institute.
Exercise was also a part of the regimen at The Rensselaer School, for in Eaton's view, “corporeal exercise is not only necessary for the health of students, but for qualifying them for the business of life.” This exercise was not to consist of jumping, running, etc., but was to improve the mind and exclude “those vulgarisms which are too often rendered habitual among students.” They were to engage in “land-surveying, general engineering, collecting and preserving specimens in botany, mineralogy, and zoology, examining workshops and factories.”

**Other Educational Innovations**

What came to be known as the Rensselaerean Plan for communicating scientific knowledge — directly involving students in laboratory demonstrations and lectures — was often compared to (and confused with) two other educational innovations, the Fellenberg Plan and the Lancasterian Method. The Lancasterian Method, named for English educator Joseph Lancaster (1778-1838), was a method of disseminating instruction quickly and cheaply, especially to the underprivileged: a room where perhaps 100 elementary school students were arranged on benches, ten students and one monitor to a bench. The teachers instructed the monitors and the monitors, in turn, instructed the students in their charge.

The Fellenberg Plan, like the Rensselaerean, was based on the diffusion of useful knowledge. In both cases, the preparation of competent teachers was one of the main objects. But essential to the Fellenberg Plan was the provision that manual labor performed by the students cover the cost of instruction. The Rensselaerean Plan, as originally conceived, included no provision for student labor covering all or part of the cost of instruction. Costs were to be underwritten by Van Rensselaer.

Over time, the Fellenberg Plan and Lancasterian Method were superseded. The Rensselaerean Plan, however, revolutionized scientific education, and its effects are still being felt today.

In the face of the rigor of the Rensselaerean Plan, the students sometimes reverted to behavior indicative of their youth. According to entries in Eaton's diary, when the senior and junior professors were temporarily absent from the school, some students made playthings and missiles of the scientific models. Some wrestled during the lectures of their peers. Some made it their business to use “the most low, vulgar, and unsuitable language” with the lecturers. And, in a few instances, “some directly cursed and abused during the lecture the assistant in the natural history room.”
Van Rensselaer always appointed the school examiners, usually at the suggestion of Eaton, who, at the end of each term, directed a public demonstration and exhibit of student performances and recommended the awarding of degrees. Very early in the school’s history, Van Rensselaer named Joseph Henry, then professor of mathematics at The Albany Academy, as one of the examiners, and also inquired as to “the propriety of inviting the Governor [DeWitt Clinton]. I will convey him to Troy if he accepts. His presence would give some éclat to the exhibition.”

The first commencement at The Rensselaer School took place on April 26, 1826, and an account of the proceedings is included in Asa Fitch’s diary. The laboratory, reading room, and officers’ room became one large room by opening folding doors, but the “space thus obtained was insufficient to suitably accommodate the large audience which assembled on that occasion.” It was then decided to have subsequent commencements in one of the city’s churches.
The first graduate was Stilman Arms from Canaan, New York. The ceremony opened with prayers by President Blatchford. The 10 graduates, including Eaton's sons, Timothy Dwight Eaton and Hezekiah Hulbert Eaton, delivered demonstration lectures on scientific subjects — perhaps the first of their kind in educational history, "in plain, familiar language, no one attempting to be elegant or flowery in his discourse." Beck, the junior professor, then read an address on the origins and objectives of The Rensselaer School, "after which the degrees were handed to the several candidates by the President, and the exercises were closed with prayer."

When Blatchford died in 1828, he was succeeded as president of the Board of Trustees by the Reverend John Chester, pastor of the Second Presbyterian Church of Albany; and when Chester died just six months later, he was succeeded by the Reverend Eliphalet Nott, who was also the president of Union College in Schenectady. Nott, an eloquent preacher, a crusader against slavery and alcohol, a skilled inventor of steam boilers and anthracite-burning stoves, would serve simultaneously as the president of both schools. As president of Rensselaer, Nott was expected to visit the school every third week from nearby Schenectady, and to inspect its activities, for which he received $1 per visit and all graduation fees. Nott resigned the Rensselaer post in 1845. He continued as Union president until his death in 1866 — a tenure of 62 years.

Courses for Women

It was Eaton's original intent to offer education to women as well as men at The Rensselaer School, but it was not until four years after its founding that he advertised courses for women in chemistry and natural philosophy. Female students attended lectures given by the senior professor in a public room, then retired to a separate room, where they performed experiments and delivered lectures under the supervision of a female instructor. Women were not boarded at the school, but were conveyed back and forth from respectable boarding houses in the neighborhood.

Women also conducted lectures. Ann Clarke and Laura Johnson, Eaton's sister-in-law and the author of The Botanical Teacher, taught courses at The Rensselaer School, primarily to students from Emma Willard's Troy Female Seminary. Another of Eaton's female students, Almira Hart Lincoln Phelps, the sister of Emma Willard, was the author of many science textbooks.

Eaton's reputation helped attract to The Rensselaer School other outstanding scientists as well as talented students. In 1835, Eaton appointed Professor Ebenezer Emmons, of Williams College, as junior professor. Both
For introducing experimental and demonstrative science into Academies and Common Schools.

Remarks.—The Rensselaer School was not located at Troy on account of any partiality for this place. The Patron wished to try the experiment; and it happened to be most convenient to make the trial here.—It is now almost four years since the experiment commenced; during which time about one dozen important changes have been made in the method of applying the general principles proposed by the patron: These principles were:

1. To put the student in the place of teacher; as he is thereby subjected to the necessity of making the subjects of study his own.
2. To cause the student to commence with practical applications of science; as he will better understand elementary principles, after he has become acquainted with the end and object of them.
3. To direct the student in his hours of exercise and amusement, to objects of a dignified and profitable nature; such as land surveying, civil engineering, &c.

Though the duty of teachers was well defined, as it related to the object; it required great labor, long experience, and much expense to the patron, to bring his views into practice. The plan is so far perfected that there has been no occasion for any material change, during the last year.

Emmons and James Hall, who graduated from the school and, after a leave of absence, became professor of chemistry at Rensselaer from 1835 to 1839, achieved prominence in science.

With the exception of Emmons, Hall, and Paul Eugene Stevenson, who was junior professor from 1830 to 1835, Eaton had relatively little faculty assistance during his 18 years as senior professor, but depended chiefly upon student assistants. Eaton was professor of geology from the founding of the school until 1835, when Ebenezer Emmons took over the field. He was professor of chemistry from 1824 until 1835, at which time James Hall became professor and served until 1841, followed by George H. Cook, who served until 1846. Eaton was professor of botany from 1824 to 1838, at which time John Waite, who collaborated with him on the eighth edition of his Manual of Botany, became professor of that subject until 1848.
James Hall, Distinguished Graduate of 1832
If Amos Eaton was the "father of American geology," Hall was the best of sons. During his long and distinguished career, Hall became New York’s first state geologist, the first director of the New York State Museum, and an internationally respected scientist and scholar.

An Emphasis on Engineering
With the increasing construction of canals and railroads in the 19th century, and the development of manufacturing industries, civil and mechanical engineering came into their own; and though apprenticeship continued to be the leading form of engineering education, Eaton saw that engineering belonged in the curriculum of his school. As early as 1830, Eaton initiated a course of lectures in technology. Five years later, in 1835, when interest in technology and engineering was flourishing, Eaton secured legal authority from the legislature to add these two subjects to the program at The Rensselaer School. Rensselaer was among the first institutions in the country to award a civil engineering degree.

By 1841, Eaton was giving full courses of lectures on geology, botany, civil engineering — including land surveying, latitude and longitude, water works, mechanical power, and milling — and also condensed courses in experimental philosophy, astronomy, architecture, navigation, rhetoric, etymology, composition, and the law of nations.

Despite the growing reputation and substantial success of The Rensselaer School, Eaton frequently found himself in financial difficulties as a result of extending credit to students when cash was needed. At one time, Eaton considered selling the Old Bank Place — and then leasing it from a new owner — as a way of getting capital. In this and in numerous other instances, Van Rensselaer came to his assistance. The Patroon wrote to Eaton, “As long as I am able and blessed, you shall not be oppressed.”

Eaton’s innovative instincts were not satisfied with the successful launching of the school; he hatched schemes constantly to extend the influence — and strengthen the finances — of The Rensselaer School. For a short while, Eaton established a preparatory program as a branch of the school. Young students could prepare themselves in the sciences and other useful subjects for admission to The Rensselaer School. The experiment with the preparatory branch lasted only a little over two years.

Eaton also took to Van Rensselaer an idea for expanding the advantages of the Rensselaerian Plan throughout the state by creating a traveling demonstration school. When this did not meet with speedy approval, Eaton came up with an alternative proposal to offer the services of the school to the State of New York as a site for the training of county schoolmasters. Each county in the state was to send a prospective schoolmaster to Troy to attend The Rensselaer School for one term at no charge, provided the scholar agreed to return to the home county and teach others. Van Rensselaer agreed
to underwrite the costs incurred. This program lasted for two summers, and a number of counties took advantage of the offer.

Another innovative notion advanced by Eaton was an annual field trip. The first trip was in 1826, during May vacation, when Eaton took approximately 20 students on a geological tour along the route of the Erie Canal. A favorable student response led to a tour on a grander scale.

In March 1830, Eaton advertised that a 10-week School Flotilla would depart that June 23. The tour began at the steamboat dock at the end of Courtlandt Street, in New York City, and moved north to Albany by steamboat. From there, students and professor traveled by towed canal boats to Lake Erie, and returned. Eaton would lecture, and the students would debark to collect specimens. The senior professor made clear the serious educational intent of the exercise. There would be, he wrote, “no ardent spirits, wines, nor strong beer” allowed on board “unless sickness should require it in particular cases.”

The expedition left New York City on the steamboat “General Jackson.” Less than two weeks after departing, Eaton became ill and had to curtail his activities. On August 18, all of the students had returned from the tour, and by August 23, Eaton had recovered sufficiently to resume his lectures in chemistry.
The 10-week flotilla trip was apparently the first and last of its kind. But in the following year, a land tour to the Connecticut River was undertaken for the purpose of examining rocks.

**The Rensselaer Institute**

With success came recognition and a change in status for The Rensselaer School. By an act of the legislature, passed on April 26, 1832, the trustees were empowered, with the consent of Van Rensselaer, to change the name of the school to The Rensselaer Institute, and also to remove the school to a more spacious location in Rensselaer County. Sites in Greenbush and Sand Lake were under consideration.

Eaton began negotiating to rent the Vanderheyden Mansion in Troy as a new home for The Rensselaer Institute. Renovating the mansion as a school
building and a home for the senior professor and his family would cost $200, which Van Rensselaer provided.

On April 28, 1834, Eaton moved his family into the remodeled mansion, and on April 30, the first term of The Rensselaer Institute in its new setting began with a lecture before the students in the Natural History Room at 10 AM.

Nevertheless, despite the growing reputation of the school of science in Troy, financial difficulties continued to plague Eaton and distracted him from what he felt was his mission. His health seemed to be in steady decline. As he approached the age of 60, not a year went by when he did not have a spell of serious illness. These problems finally degenerated into chronic asthma.

A Tremendous Loss

Then, in the midst of these setbacks, the worst possible blow fell. Eaton lost his best friend. On January 26, 1839, at the age of 75, Stephen Van Rensselaer died. It is not an exaggeration to say that something died in Amos Eaton as well. Only his own burning desire to complete his work and assure the perpetuity of the institution that bore Van Rensselaer’s name kept alive in Eaton the spark of enthusiasm and purpose for the next three years.

Stephen Van Rensselaer’s sons, keenly aware of their father’s priorities and legacy, worked to carry on the mission of The Rensselaer Institute. Philip Van Rensselaer assumed the position of trustee in 1833 and continued in that capacity until 1844. Then William Van Rensselaer accepted an appointment as trustee from 1845 to 1849, at which time he became Institute vice
Concocting a Non-Yeast Leavening Agent

Rensselaer civil engineering graduate Eben Horsford’s dream became a seven-year quest. Horsford ’38, a Harvard faculty member who had studied chemistry in Europe, was intrigued by the German chemist Baron Justus von Liebig’s study of the chemistry of bread and his efforts to replace yeast as a leavening agent.

Horsford’s persistence produced a chemical yeast powder, a blend of calcium acid phosphate and bicarbonate of soda, more popularly known as baking powder. Over 130 years later, his product is still made by Rumford Baking Powder, the company he founded with George F. Wilson.

president until 1864. And Alexander Van Rensselaer was a trustee of the Institute for 19 years from 1848 to 1868.

Yet there could be no doubt that the guiding spirit of the institution — Eaton’s ally, defender, and friend — was in his grave. The burden of nurturing and perpetuating the extraordinary school fell entirely on Eaton’s shoulders.

In 1841, The Rensselaer Institute moved back to the Old Bank Place to ease somewhat Amos Eaton’s continuing economic difficulties. Daniel Cady Eaton, Eaton’s eldest son and a successful businessman, bought the deed to the Old Bank Place from his father for $2,500, giving Amos Eaton some badly needed capital.

Despite illness and infirmity, Eaton continued to lecture and counsel students according to a schedule that would tax a much younger man. Then, on May 10, 1842, he died at the Old Bank Place, at the age of 66. He was buried at Oakwood Cemetery.

The End of an Era

Eaton had been one of the leading scientists and educators of his era. He had educated men and women from many sections of the United States, many of whom had risen to the top ranks of their professions. The Rensselaer School had furnished more than half of the state geologists in the Union, and a large proportion of the country’s civil engineers and teachers of natural science.

Besides being the first school of engineering in the English-speaking world, in its application of science to agriculture, The Rensselaer School was probably the first school of agriculture as well. Then, in 1835, by adding courses in civil engineering, Eaton had changed the direction of the institution, reflecting the transition of America from an agricultural to an industrial society.

The influence of his ideas was wide. On one occasion, Eaton claimed that students trained in the Rensselaerian Plan were teaching in schools in Kentucky, Alabama, Louisiana, Pennsylvania, Ohio, Michigan, Georgia, South Carolina, and Canada, in addition to New York and New England.
The Rensselaer School turned out some of the leading men of science in the United States. In the class of 1829, for example, was Douglas Houghton, who became state geologist of Michigan. James Hall, who studied under Eaton from 1831 to 1836, and later became a member of the faculty, gained a worldwide reputation as a geologist and paleontologist. Asa Fitch, Jr., became New York State Entomologist.

One more convergence would work to the benefit of the unique educational experiment in Troy. Just seven years before his death, Amos Eaton received an application from a prospective student named Benjamin Franklin Greene. Greene entered the Institute on November 5, 1841, and graduated with the class of 1842. He served as Director of the Institute from 1850 to 1859, and it was under Greene's leadership that the innovative institution fostered by Eaton and Van Rensselaer received new life and vigor, and progressed to the next stage in its development.
CHAPTER 2
Transformations

Not surprisingly, after the deaths of Amos Eaton and Stephen Van Rensselaer, the fortunes of the school they founded went into temporary decline. Eaton had been the guiding spirit and inspiration of the enterprise; Van Rensselaer, a sympathetic and faithful source of funds and encouragement. With both visionaries gone, many could legitimately ask whether or not this experiment in scientific education would endure.

Fortunately, many in Troy and throughout the country had taken note of the usefulness and rigor of the education offered in the modest school building on the north side of town. Also, it might be said that Eaton’s ambitious educational designs and the destiny of the young Republic were moving in parallel. America was positioning itself for a future transformed by technology. Rensselaer was providing exactly the kind of practical, scientifically based education needed and not available anywhere else in this form. Nevertheless, to survive and prosper in the approaching age, Rensselaer needed a transformation of its own.

After Amos Eaton: 1842–46
In September 1842, the trustees of The Rensselaer Institute named George Hammel Cook — a graduate of the class of 1839 — as senior professor and agent, as well as “Professor of Civil Engineering, geology, etc.” (Dr. John Wright, a graduate of Yale’s medical department, who taught botany and zoology

GEORGE HAMMEL COOK, CLASS OF 1839
He was appointed senior professor on the death of Amos Eaton in 1842 and served until 1846. Later he was professor of chemistry and natural sciences at Rutgers College, where he led the fight to have it designated as New Jersey’s land grant institution. Cook has been called the most important single figure at 19th-century Rutgers. Today, Cook College at Rutgers bears his name. In 1859 Rensselaer’s trustees invited Cook to return to Troy to succeed B.F. Greene, but he refused.

A VIEW OF TROY FROM MOUNT IDA
detail, opposite) Troy appears here in 1846, shortly after Amos Eaton’s death.
part-time, constituted the rest of the faculty.) Cook was only 24 years old at the time of his appointment. Born in New Jersey, he was engaged in railroad surveys in the Hudson Valley before coming to Rensselaer as a student in 1838. After acquiring both the bachelor of natural science and civil engineering degrees in one year, he remained at the school as an assistant and adjunct professor to Eaton.

Upon Cook’s young shoulders fell the academic and financial responsibility of preserving the legacy left by Eaton and Van Rensselaer. No one could envy him the job. The school no longer had even a home of its own, since the Old Bank Place belonged to the Eaton estate, and had to be sold. Among Cook’s papers — preserved at Rutgers University — is a memorandum dated December 21, 1842, stating that “the Marshall disposed of the property of Prof. Eaton and also that of Rensselaer Institute.” The sale amounted to $372.26, including the library ($200) and philosophical apparatus ($172.26).

Yet fortunately, in this instance as in many others throughout the development of the Institute, a distinguished local citizen applied his skill and dedication to the service of a historic local and national asset. Dr. Thomas Brinsmade, a physician educated at Yale College, president of the Rensselaer County Medical Society, and a man committed to scientific investigation in all of its forms, purchased the school’s equipment at the sheriff’s sale and returned it to the struggling school. According to one report, he had to borrow the funds to make the purchase. ( Appropriately, Brinsmade would later serve as a trustee of Rensselaer, become its vice president in 1864, and president in 1868.)

The question of a site for the school was settled in 1844 through the combined efforts of the City of Troy and the Van Rensselaer family. The city turned over to the Institute in perpetuity a public school lot and building, known as the Infant School, located at the northeast corner of State and Sixth streets. The brick school, two stories high, 50 by 32 feet, had been built in 1829. The property also held a brick laboratory — one story high, 50 by 26 feet — beside a wooden “back house,” with a vault underneath and an upper floor for the storage of minerals. Buildings and land were appraised at $6,500. William Paterson Van Rensselaer, one of the patroon’s sons, matched the city’s gift with a note for $6,500 at seven percent, thereby establishing the school’s first modest endowment and an annual income of $455. Both the property and the note were to revert to their donors in the event the school went out of existence.
The trustees also authorized repayment of Dr. Brinsmade's note given in return for the books, scientific apparatus, and other school property purchased at the public sale. And a subscription fund of $1,260 was raised, to be used for construction of a laboratory on the new site. At the same time, the trustees made provision for storing the scientific collection of the Troy Lyceum of Natural History, and for housing its meetings.

But the school's difficulties were far from over. Total enrollment declined steadily, averaging below 20 students and falling as low as six in 1843-44. The number of graduates dropped to just three in 1843 and 1844, and six in 1845. (In fairness, the decline was due in part to a severe national economic depression in the 1840s, and a slump in public works, reducing the demand for engineers.)

Nothing seemed to help the sinking fortunes of the school. Cook, deeply discouraged, submitted his resignation on November 30, 1846. After leaving

INFANT SCHOOL BUILDING  Located at State and Sixth streets, this building was the home of The Rensselaer Institute from 1844 until it burned in the fire of 1862. Following Amos Eaton's death, the Old Bank Place was sold, and the Institute was without a home. The City of Troy donated the Infant School, Brinsmade saved the equipment, and the Van Rensselaer family provided an endowment equal to the value of the property. These efforts enabled the struggling school to continue. This combination of private and public gifts set a pattern of support that would aid the Institute's recovery following the tragic fires of 1862 and 1904.
Rensselaer, he became, by turns, a glass manufacturer, an instructor of mathematics, and then principal at The Albany Academy. In 1853, he returned to his native New Jersey and an appointment as professor of chemistry and natural sciences at Rutgers College, where he achieved distinction, serving as state geologist of New Jersey and vice president of Rutgers. A college at Rutgers is named for Cook.

**B.F. Greene Arrives**

For Cook's successor, the trustees, seeking a candidate with the idealism and energy to reverse the school's decline, looked again to a young academic and graduate of the school — in this instance, B.F. Greene, then professor of mathematics and natural philosophy at Washington College in Chestertown, Maryland, and barely 30 years old when he assumed the senior professorship in 1847. Greene was the last student registered in Amos Eaton's record book. The trustees could never have guessed that their decision to hire Greene, based probably on little more than a desire to keep a foundering institution afloat, would in the long run change Rensselaer utterly — as well as have a profound effect on the course of scientific education in America.

Benjamin Franklin Greene was born in 1817 in West Lebanon, New Hampshire, the oldest of 10 children in a farm family originally from Rhode Island. His first association with The Rensselaer Institute was not until 1841, when he was almost 24 years old. He was employed at the Forestdale Iron Works in Brandon, Vermont, when he wrote to Amos Eaton in October, wondering whether The Rensselaer Institute was not a place "of more advanced standing, or of greater scholastic attainments, than I dare to possess." Nevertheless, Greene reported that he studied on his own "Natural Philosophy, Geology, and Mineralogy. And I think I may safely say I am very fond of them." He requested information about the school and its costs, but added, "I have come to the conclusion to go to your city the first of next month."

Come he did, staying through the year in which Amos Eaton died. He earned both the Bachelor of Natural Science and Civil Engineering degrees, with special commendation from the public examiners on his performance. Whether out of necessity or appreciation for a deserving student, Eaton extended credit to Greene. In his last recorded transaction, Eaton noted, "With a view to qualifying himself in said course as teacher, experimental and practical operator...credit shall be given him of the year...on his note or due bill" for tuition and board.
Immediately after graduation in 1842, Greene took up a career as an itinerant teacher. Late that year, he became an instructor at a girls’ seminary in Richmond, Virginia. He left the position in Richmond to become professor of mathematics at Washington College — a venerable institution boasting George Washington as one of its first trustees.

Thus, when Greene took over leadership of Rensselaer, he did so with the advantage of a varied academic experience and a self-confidence that made him the bold and forceful administrator Rensselaer needed. He almost immediately labeled himself as director, a new title for the chief academic officer of the school.

Greene saw that the country was in the midst of profound changes. Railroads were replacing canals as the main avenues of commerce and were accelerating population shifts and economic development. Bridges and roads were beginning to topple natural barriers. John A. Roebling, the German-born genius who was to design the Brooklyn Bridge and who would send his two sons, Washington and Charles, to Rensselaer for their education, constructed the first large railroad suspension bridge in the world, over the Niagara River, to span the gorge separating Canada and the United States.

**ROEBLING’S NIAGARA BRIDGE**

Completed in 1855 by John Roebling, father of 1857 Rensselaer graduate Washington Roebling, this large suspension bridge was among the first of many later such bridges. The bridge carried a railroad and generated wide admiration. Such an accomplishment helped to inspire a generation that included many Rensselaer graduates, including Lefferts Buck, class of 1868, who modified the bridge in three separate major projects, all without interrupting traffic.
Docking the United States Navy

Mordecai Endicott, class of 1868, was appointed to the United States Navy's Civil Engineering Corps in 1881. Designer of the world's largest floating drydock, the "Dewey," he was the first individual named both Chief of Civil Engineering Corps and Chief of the Bureau of Yards and Docks.

Admiral Endicott began a tradition of Institute graduates in positions of civil engineering command in the Navy. Seventeen individuals who have served as Chief of the Civil Engineering Corps have held Rensselaer degrees.

Among others who made contributions to the Navy's civil engineering efforts was Rear Admiral Lewis Combs '16, Assistant Chief of Yards and Docks in World War II. A leader of the famous "Sea Bees," he returned to Troy after the war to head Rensselaer's civil engineering department.

That engineering triumph — the first truly modern suspension bridge — presented a spectacle almost as great as Niagara Falls.

In addition, civil engineers were perfecting the vast water, drainage, and sewage systems that would allow the opening up of large urban commercial centers. And the great Civil War that was approaching, rather than slowing technological development, would accelerate it, advancing existing technologies and creating new ones.

A More Modern Curriculum

Greene felt strongly the necessity of reorganizing The Rensselaer Institute from a rather desultory one-year school into an institution that offered three-year programs in engineering and scientific education that were both systematic and inclusive. Searching for a prototype, Greene saw nothing in the United States that sufficed. So on a trip to Europe in 1848, he studied the institutions of scientific education in England, France, and Germany. He found examples and inspiration in many different European technical institutions, but in essence what he was looking for was embodied in France's L'Ecole Polytechnique, and, to an even greater extent, L'Ecole Centrale des Arts et Manufactures — both located in Paris.

Here was rigorous preparation for a technical career that not only was equivalent to the liberal arts curricula offered in classical colleges for centuries, but was in fact more demanding because it was based in the pragmatic and the practical. Here was a program that gave to scientific thought the same central position that the study of ancient languages had held in more traditional curricula. Here — in sum — was an education that would prepare Americans to respond to the challenges of a technological age.

Greene began the reorganization of the Institute in 1849, but even he felt that measures this radical would require several years for full implementation. His primary purpose was "the education of the Architect, the Civil Engineer, Constructing and Superintending Engineer of Machines,
Hydraulic Works, Iron Works, etc., and Superintendents of those higher manufacturing operations requiring for their successful prosecution strict considerations of the scientific principles involved in their respective processes.”

Needless to say, Greene found it necessary to devise a series of engineering degrees beyond civil engineering, and advocate a complex of numerous buildings to achieve his goals. He proposed that a general school should embrace “a system of general disciplinary culture — scientific, literary,
philosophic, artistic — prior to entrance upon any form of applied science or art.” Clearly, in Greene’s mind, the education of engineers or “technists,” while focused, should be the opposite of narrow and one-sided.

The need for reform was accelerated by a new element of competition in scientific education. The director himself acknowledged that Rensselaer was being challenged, when he alluded, in 1851, to “scientific schools” recently established at several colleges. In fact, the Lawrence Scientific School had been founded at Harvard in 1847 as a result of a gift of $50,000 from Harvard graduate Abbott Lawrence. By 1854, Yale College would acquire the Sheffield Scientific School, growing out of a school of applied chemistry established in 1847 by Eaton’s teacher, Benjamin Silliman.

In 1851, at Greene’s invitation, the young American Association for the Advancement of Science met in Albany and spent a day at Rensselaer. At this session appeared a galaxy of scientific stars, including Louis Agassiz, president and professor at Harvard’s Lawrence Scientific School, who opened with a tribute to Amos Eaton. Others present were Joseph Henry, one-time protégé of Eaton and now the first secretary of the Smithsonian Institution; Eben Horsford, also one of Eaton’s students, the inventor of baking powder, and now Rumford Professor of Applied Chemistry at the Lawrence School; and William Barton Rogers, professor of geology at the University of Virginia and author, in 1847, of A Plan for a Polytechnic School in Boston, which ultimately led, in 1870, to the founding of Massachusetts Institute of Technology.

By 1852, 99 students were enrolled at Rensselaer — more than a threefold increase over a decade earlier — and the faculty had grown proportionately.

In 1855, Greene formally published a comprehensive document that represented his vision of an enlarged and transformed Rensselaer Institute. This was the famous report, The Rensselaer Polytechnic Institute; Its Reorganization 1849-1850; Its Condition at the Present Time; Its Plans and Hopes for the Future; by the Director of the Institute. The visionary concept, titled The True Idea of a Polytechnic Institute, comprised the second half of the report.

In this report, he advocated formation of six technical schools at Rensselaer, including civil engineering, architecture, mining engineering, and mechanical engineering, as well as a school for technologists and ornamental artists. He also proposed construction of a library, an institute hall, an observatory, and a mechanical laboratory — facilities adequate for accommodating several hundred students. These buildings, Greene felt, could be grouped into quadrangles, while each would retain an individual character and purpose.
The report also called for establishment of 26 chairs of instruction, among them, chairs in political economy and jurisprudence, intellectual and ethical philosophy, gymnastics, railway economy, aesthetics, social arithmetic and statistics, landscape gardening, English composition and criticism, and inductive philosophy.

Greene strongly advocated the cultivation of the arts of industrial design at the new Rensselaer Polytechnic Institute. He was a champion of the scientific and practical training of manufacturing chemists. He wanted to provide a sound preparation for those who would construct and manage potteries, porcelain, glass, and other works.

And he supported the establishment of departments of rhetoric and philosophy. To those who would scoff at the usefulness of teaching rhetoric and philosophy to technically oriented people, the director wrote, “And what studies are so suitable as those which cause us to turn from the observation of things without, to the contemplation of the wonderful phenomena and resources within, the Human Mind?”

Professional Preparation

In 1855, Greene was made a trustee, as well as director and professor of mechanics, machines, and constructions — a rare honor accorded not even to Amos Eaton.

In connection with Greene's plan for an expanded Institute, he issued in 1857 The First Annual Register of the Training or Preparatory School of Rensselaer Polytechnic Institute. Originally established in 1855 and later to be called Troy Academy, the Preparatory School shared Rensselaer's faculty, and was a four-year secondary school in its own right. The new school had both classical and mathematical curricula, the latter especially oriented toward preparation for programs at Rensselaer Polytechnic Institute.

The civil engineering course now took three years to complete, not counting the preparatory year for those too young or insufficiently prepared to start their studies at the Institute. To earn a Bachelor of Science degree required two years, and the course was more limited. Reminiscent of Eaton's methods...
Young engineers learned the surveyor’s art by hiking through remote areas of New York and New England to practice their future profession. These outings were a perfect example of Eaton’s belief that exercise and learning went hand in hand. Note their traditional surveying equipment.

and traditions, afternoons were reserved for practical activities in the field and laboratory. This work included various types of surveying — topographical, hydrological, and railroad — and excursions for studying works and processes.

The demands Rensselaer made on its students can be verified by the direct testimony of Washington A. Roebling, a member of the famous bridge-building family. He and his wife, Emily Warren Roebling, supervised construction of the Brooklyn Bridge between 1869 and 1883, after the untimely death on the project of his father, John Roebling. Washington Roebling reported in his diary that 17, the age at which he entered Rensselaer in 1854, was at least a year too soon for “that terrible treadmill . . . an avalanche of figures and facts poured into young brains not qualified to assimilate them as yet. . . .” He added a comment frequently heard over the history of the
Institute: “the boys were ground down and crammed with knowledge and mathematics that their young brains could not make use of... When a class starts with sixty-five and only graduates twelve, it is proof of the terrible grind.” However, Roebling’s younger brother and his only son followed him as students and graduates of Rensselaer, which would indicate a high degree of satisfaction with the results of a Rensselaer education.

Student/Alumni Affairs
The lack of adequate student housing assumed a major role in the True Idea of a Polytechnic Institute. Greene made provision in that document for construction of both student and faculty housing on campus, replicating the atmosphere at many traditional colleges.

By 1850, the custom of housing increasing numbers of students in Troy’s boarding houses had become almost intolerable. “Students,” the director observed, “are now necessarily too much scattered over the town, their rooms, from the absence of all original adaptation, are quite too often deficient in light and ventilation....”

Unsatisfactory living conditions contributed to the formation of fraternities at Rensselaer some years later, and assisted in their steady growth. Organized Rensselaer fraternities, in the modern sense, date from 1864, but they appear to have had predecessors at least a decade earlier. Theta Delta

CALCULUS CUFFS Invented in Troy, detachable collars and cuffs became the major industry of the “Collar City.” Evidence presented here indicates that creative Rensselaer students used these items of fashion as “ready reference” during examinations. Aids to education such as these were called “skins,” and the act of cheating was called “skinning.”
The Burden Iron Works was perhaps the greatest example of Troy's industrial prominence in the 19th century. The focal point of the upper works was the "Niagara of water wheels," which was 60 feet in diameter and 22 feet wide. Facilities such as these enabled students to study first-hand the possibilities of technology applied to manufacturing. The later lower works are pictured at the top and the earlier upper works at the bottom.

Chi was founded at Rensselaer in 1853, but was disbanded. Another secret society, Sigma Delta, was established as a competitor in 1859, and its dissolution in 1864 led to the creation of Theta Xi, the oldest fraternity in continuous existence at the Institute.

With the expanded time required for a degree, student life at Rensselaer had an opportunity to become more formalized. Students developed school spirit, and even debated the issue of student uniforms. A committee was formed in 1850, and, according to the diary of Edward A.H. Allen, a student and professor at Rensselaer, the committee recommended a "dark blue frock coat, single breasted, with two sets of moveable buttons, one brass, having on each R.L stamped, and that these should be worn on holidays, at lectures, etc., a silver level on the breast." The custom of student uniforms lasted a few years and then disappeared.

Students also began to act more in concert; student political activity had begun. Allen reported an early example of such activity, amounting to "considerable disorder for several days." This occurred in 1850, at the death of Professor Greene's wife, Mary, together with their newborn twin daughters.
Greene himself wanted school exercises to continue as usual, but the students thought that, out of respect, classes should be suspended until after the funeral. At one of the student meetings, a Brazilian graduate assistant, Jose Ferrao, “an excellent but impetuous man, went around getting signatures to a paper...” This proved to be a “Declaration,” demanding suspension of classes for three days. The faculty would have none of it, since their “authority, of course, would soon fly away.” The faculty met with the students, explained the situation, and in the end they reached a compromise.

A student’s promotion from term to term and final graduation were determined by public examination before a board “composed of literary, scientific, and practical men.” Covering all subjects practically and demonstrably, the examiner also required “all candidates for graduation to exhibit and defend a special thesis.” The thesis requirement, established under Greene, continued at Rensselaer for a century.

Troy, a bustling industrial center with a population of 39,000 in 1860, provided an abundance of subjects for these engineering and scientific theses. Topics could be found at the Burden Iron Works; the Corning, Winslow and Company rolling mill; and dozens of other industrial and transportation enterprises. At this time, a faith in technology and its ability to produce

**SENIOR THESIS**  Students in their last year were expected to present and defend a thesis. The subjects for these academic exercises were often taken from the outstanding examples of modern civil and mechanical engineering in the Troy area. As part of his presentation, William Auchincloss, class of 1862, drew the engine of the steamboat “Francis Skiddy” using the standard medium of India ink on linen.
spectacular benefits combined with inherent American optimism to produce a vision of a future that was unbounded. For example, the population idealized and romanticized technology, frequently attaching affectionate names to steam engines. Troy was at the epicenter of national trends.

Concrete evidence of a school spirit that would carry on beyond graduation began to appear. At its last meeting, the class of 1857, on hearing that the previous class had agreed to meet for a reunion five years hence, decided that it was appropriate to initiate "either a Society of Alumni, or an Association of Civil Engineers (whether graduates or not)," in order to keep up "a friendly intercourse, and general knowledge of the state of the profession." The class appointed a corresponding secretary with whom each member of the class was to communicate at least once yearly before May 1. The information was to be compiled and circulated to the graduates, wherever they might be.

This was the first stirring of interest in an alumni association which would manifest itself fully in November 1868, when Professor S. Edward Warren, writing for the faculty, asked permission of James Hall, of the class of 1832, to use his name in a circular calling for a meeting of alumni at the next commencement. He referred to unsuccessful attempts in the past, but thought the time was now ripe. The circular offered as reasons for delay in forming an association the fact that graduates were few, "as befitted a professional school of exact science," and that the faculty had been too busy with instruction to take the lead. The circular also remarked that "professional schools are not generally... remembered by their graduates, or regarded by students while attending them, with the attachment often displayed by collegians for their institutions, an attachment which leads to the formation of alumni associations. This doubtless arises from the comparative pressure of concern for the nearer future of active life which bears upon the mind of the professional student."

The first formal meeting of the Association of Graduates took place at commencement in June 1869, and was conducted in a businesslike manner. Ninety alumni attended, some from as far away as Chicago, Pittsburgh, Michigan, Ohio, Canada, and Cuba, and from classes as far back as 1827 and 1829. They adopted a constitution, set annual dues at $2, elected officers, with James Hall as president, and named various committees. They approved the collection of the records of all graduates, which materialized many years later in the Biographical Directory, compiled by Henry B. Nason in 1887. Above all, they discussed the matter of an endowment, and trustee William Gurley announced that about $15,000 had been pledged by various persons and groups.
Coincidentally, 1869 was the year in which Rensselaer received its first substantial bequest, $15,000, from the will of General John Wool, Troy's most distinguished military personality up to that time, whose career stretched from the War of 1812 to the Civil War.

The first issue of the *Transit*, the student yearbook, appeared in 1865. The main purpose of this publication was to provide a school record, prepared by the junior class, of student organizations and their activities. Among those described in the first *Transit* were associations such as Companion Knights of the Silver Square and Knights of the Black Cross. There was also a Polytechnic Union — consisting of a Chemical Section, a Graphic Section, Geological Tourists, and Botanical Tourists — and comprising both professors and students. An RPI Glee Club, Chess Club, Whist Club, and something called a Taliped Club (dedicated to dancing) bore witness to organized student amusements. The flair for organization characteristic of American college students was further revealed in the long list of class officers, headed by the grand marshal of the student body.

In all, the *Transit* listed a considerable catalog of activities for a school of 150 students and also cited the introduction of "Institute Customs," including "hazing" and "rushes" between the lower classes. "Smoke outs" — driving students out of enclosed spaces by covering the chimney — appear to have occurred frequently, but sophomores were cautioned to be "more guarded in future" against hostile faculty reactions.

The interests and activities of this spirited student body expanded every year. The second issue of the *Transit*, in 1867, included the first published record of athletics, in the form of an RPI Baseball Club, the Wenona Boat Club, and a Gymnastic Club. In ensuing years, cryptically named organizations, including the Knights of the Golden Shears, Brotherhood of Sarim Lok, Ye Crocodile Club, and the Owl Club, were on the increase. During the remainder of the century, the *Transit* expanded from a factual yearbook of school and student life into a substantial volume of student commentary and criticism of faculty and school.

Rensselaer's first venture into college journalism was the *Polytechnic*, issued biweekly for three months in 1869, after which it disappeared. The second manifestation of the *Polytechnic*, a monthly, appeared in 1885, with much more staying power, and has endured, in a weekly version, to this day. (Its original promoters included Tracey C. Drake, of the class of 1886, who was to become a prominent citizen and the owner of several large hotels in Chicago, one known by the family name.) A serious journal of fact and
This student organization, founded in 1866, fostered serious academic interchange outside the classroom. The young J.A.L. Waddell (seated, left) achieved international honors as a civil engineer. In 1882 the organization changed its name to the Rensselaer Society of Engineers (emblem below). For the next 50 years the society played a significant role in networking and professional development among the Institute's engineering graduates.

Today RSE has a more social focus and is the only local "fraternity" at Rensselaer. It still maintains a comprehensive library of late 19th- and early 20th-century engineering publications.

opinion, the Polytechnic was addressed to alumni as well as to students and faculty, and by April 1885 already enjoyed a circulation of 600 in a school of 200 students. Five years later, it claimed a widespread distribution in 35 states and six foreign countries.

Professional organizations also began to appear on campus at this time. The most noteworthy was Pi Eta Scientific Society, founded in 1866 and embracing both students and faculty. It attracted the more serious students, who prepared scientific papers for presentation to the members. After 1882, the society assumed the more fitting name of Rensselaer Society of Engineers (RSE).

The unique education Rensselaer offered helped account for the international character of the Rensselaer student body at the time. Two other factors may have been the wide distribution of Greene's bulletins and publicity, plus
the numerous teachers who had been taught science at Amos Eaton's school. For example, in 1856, the year in which the True Idea of a Polytechnic Institute was disseminated, the total number of students at Rensselaer was 123. Fifty-eight of these were from New York State, and only 20 from Troy, Albany, and the immediate area. The rest included 15 foreign students: eight from Cuba and Brazil; six from Canada; and one from the Hawaiian Islands. Nearer home, they came from 12, or half, of the states then in the Union — all in all, an impressive pattern of distribution matched by few colleges of the period.

In this age of railroad and bridge construction, the graduates of 1856 were widely employed, for the most part as assistant engineers on railroads under construction — one as far away as the Honduras Interoceanic Railroad, and another in Peru. Others worked on the Burlington and Missouri, the Iowa and Nebraska, the Dubuque and Pacific, and the Southern Michigan and Indiana. Still others found employment on the Brooklyn Waterworks and as assistants to bridge contractors.

Besides offering a degree in civil engineering, Rensselaer offered degrees in topographical engineering and general science, which required two years. The preparatory course, taken in the training school, was considered increasingly important, and in 1862 was made the first year of the regular programs in engineering, thus marking the first full four-year curriculum in engineering education in the United States.

**Competition in Troy**

From the start, Greene was aware that his educational ideas were radical for the times, and he knew that he had to secure wide public support for his ambitious plans if he were ever to see them fulfilled. As early as 1850, and repeatedly thereafter, he sponsored petitions for financial aid to the State Legislature, and in 1851, Rensselaer received a grant of $3,000. Greene based his appeals for community support on the fact that Rensselaer had a national and international reputation that brought increasing honor and attention to Troy.

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[Achieving the Impossible]

**Spanning the East River**

Emily Warren Roebling and Washington A. Roebling, class of 1857, completed Washington’s father’s consuming dream: a monumental suspension bridge vaulting the East River in one uninterrupted span, connecting Brooklyn with lower Manhattan. As husband and wife, their partnership was responsible for the successful completion of the gigantic enterprise.

Washington Roebling succeeded his father, John Roebling, as chief bridge engineer and builder, when John was accidentally killed on the project. Emily Roebling served as adviser, aide, and emissary.

The towers that hold the bridge stand on immense pneumatic foundations resting on the riverbed — a technology then in its infancy.

Dedicated in 1883, the Brooklyn Bridge represents a triumph of engineering — and love.
In 1854, Greene prepared a series of nine articles for publication in the *Troy Daily Whig* on “The Institute and its Improvements.” The articles inspired local interest. Public meetings were held on the subject of Rensselaer improvements, and committees of leading citizens worked to gather “subscriptions for establishing additional professorships” and to make “applications to the legislature.” Nevertheless, tuition continued to be the major source of Institute income.

Greene’s appeals for support from Troy ran into competition from local efforts to raise $100,000 for the founding of a Troy University—a Methodist college to be established on the classical and theological model. A public debate ensued on the benefits to the city of a traditional center of learning versus the unconventional scientific school that had been making its mark for a quarter-century. Soon a large and impressive structure crowned by four spires rose on a prominent hilltop overlooking the city to house the Troy University, which opened in 1859. It failed to prosper, and closed with a sheriff’s sale in 1862.
An Abrupt Departure
Perhaps it was inevitable that an educator with the extravagant dreams and forceful personality of a B.F. Greene would eventually come into conflict with the trustees. The discrepancy between what the director envisioned for Rensselaer and what was practical, given the finances of the Institute, became more and more pronounced. It was also true that, like many visionaries before and since, Greene could occasionally be careless with financial details — a trait that could not have endeared him to the sober industrialists and merchant princes on the board.

A serious rift developed. Unfortunately for history, only one side of the controversy is available for consideration: contemporary correspondence between William Gurley, a graduate, trustee, and manufacturer of engineering instruments in Troy, and George Cook, Gurley's classmate, previously senior professor, and at the time of the crisis, professor of chemistry at Rutgers College. There are no surviving materials presenting Greene's side.

As early as June 1859, Gurley, who had been trying to interest Cook in returning to Rensselaer as Greene's successor, reported that a special committee of trustees had been set up to investigate improprieties in Greene's management of funds and discrepancies concerning his salary. Aside from the serious impropriety of Gurley's revealing internal Institute matters to an outsider, it was clear that the foundation of confidence and trust on which any institution is built was crumbling. Greene abruptly submitted his resignation to the trustees; it was accepted on August 8, 1859.

Greene's last graduating class, in June 1859, totaled 15, including Alexander J. Cassatt, later president of the Pennsylvania Railroad, which became one of the industrial powerhouses of the 19th century (George Roberts, also a "Pennsy" president, graduated from Rensselaer in 1849). The graduates also included Russell Sage II, nephew of the financier Russell Sage, whose widow, Margaret Olivia Slocum Sage, would become one of the most generous benefactors in Rensselaer's history.

As it turned out, Cook was satisfied with his position at Rutgers and declined the directorship at Rensselaer. In 1859, the trustees named the Reverend Nathan Beman as acting director. Beman, a prominent Presbyterian minister in Troy, had served as president of the trustees for 14 years (he had replaced Eliphalet Nott in 1845). They also named Charles Drowne as senior professor, a post from which he was promoted to director in 1860. It was during Drowne's directorship that Rensselaer offered the first courses in mechanical engineering in the country.
TROY'S CIVIL WAR FERVOR  Both Trojans and Rensselaer students volunteered to fight on both sides of the Civil War. The men of the regiment advertised in this poster fought in 21 battles, including Gettysburg. James Cromwell, president of the class of 1861 and a major in the infantry, was killed at the age of 23 at Gettysburg. The first edition of the Transit in 1865 listed 71 students and alumni who had participated in the war.

WILLIAM METCALF, CLASS OF 1858, IRON AND STEEL PIONEER  Before the age of 30, he was named general superintendent of Pittsburgh’s Fort Pitt Foundry. During the Civil War, he produced more than 3,000 heavy guns and projectiles for the Union, including the two largest guns in the world (each weighing 80 tons). His success helped establish Rensselaer’s long relationship with industries of the Pittsburgh area.

A Research Career  Greene left the area for Washington, D.C., and at the age of 46, launched a new career in research. He became the chief clerk, or head civilian official, of the newly formed Bureau of Navigation. Greene developed a system of signals for use in navigating in fogs. He also investigated the magnetic deviations of ship compasses resulting from the use of iron hulls.

Greene retired from the Navy Department in 1879 and returned to his childhood home in New Hampshire, where he constructed a large house for himself and his sister (he remained a widower after the death of his wife). Upon his death in 1895, Rensselaer’s trustees adopted a resolution in which the disagreements of the past were put into perspective and his services as director were acknowledged and saluted.
Although Rensselaer lost prematurely the services of one of its most visionary leaders, the benefits of his vision endured. The extent to which the modern Rensselaer reflects the ideas and philosophy set forth in *The True Idea of a Polytechnic Institute* is impressive. If, in the last analysis, there was a serious flaw in B.F. Greene's thinking, it was simply this: His ideas were at least a century ahead of their time.

**The Civil War**

As an educational institution that drew its students from a national constituency, Rensselaer was bound to be deeply affected by the great national conflict that marred the years 1860-65. The 20 students in the graduating class of 1861, in particular, grew increasingly restless and investigated the possibility of concluding their schoolwork early to enlist as a group in the engineer corps. Six members of the class eventually found their way into military service, one as a mate on the Confederate privateer, the "Jeff Davis." The class president, James Cromwell, was killed at the Battle of Gettysburg, a major of infantry at 23.

Rensselaer students and graduates contributed extensively to the war effort in many capacities, both in regular military duty and particularly as engineers on land and in the Navy. The first issue of the *Transit*, in 1865, included a "Roll of Honor" of men in active service. It contained 71 names — a respectable showing for a school that had graduated only a few hundred since 1826. Eight of these were recorded as having died in the war.

A few examples illustrate the range of military service rendered by Rensselaer graduates. In addition to B.F. Greene, who became confidential secretary to the chief of the Bureau of Steam Navigation of the U.S. Navy, Gilman Trafton was acting general superintendent of U.S. military railroads, and Edwin Thacher and Frederick Vaughn were principal assistant engineers on these railroads; Horace Crosby was engineer in charge of U.S. government fortifications; Joel Woodruff was chief engineer on the staff of the Surgeon General; and Colonel Washington Roebling was U.S. topographical engineer and became a hero at Little Round Top, in the Battle of Gettysburg. Dr. Reed Bontecue became head of a military hospital. William Metcalf of Pittsburgh made major contributions to the development and manufacturing of heavy ordnance.

And there was Major A.M. Harper, of Pittsburgh, who would return to Rensselaer after the war, having been wounded in the Battle of the Wilderness — one of many former soldiers who wanted to complete an interrupted education. Harper was elected Rensselaer's first grand marshal.
by the student body in 1865, and graduated in 1867, only to die soon after from typhoid and the effects of his war wounds.

It was during the Civil War — in May 1862 — that Rensselaer experienced a crisis of its own, when a fire destroyed its facilities along with much of downtown Troy. The fire began on a windy Saturday morning, when locomotive sparks ignited a covered wooden railroad bridge over the Hudson. In that era, wood construction predominated, and the fire swept quickly over a large portion of the city, so that by the end of the day more than 500 buildings on 75 acres — buildings valued at nearly $3 million — were destroyed. Seven lives were lost, and thousands were rendered homeless — the greatest urban catastrophe in Troy’s history.

For Rensselaer the calamity became in a sense an opportunity. The facilities in the former Infant School had been far from satisfactory, due to their proximity to railroad tracks and the resulting lack of room for expansion. Here, then, was a chance to rebuild on a site more appropriate to an educational institution.

The cost of replacing Rensselaer’s facilities was estimated at $50,000 — far beyond the school’s resources. Yet through the almost heroic efforts of the trustees — all of them prominent members of the Troy community — the

CAUCUS NIGHT REFORM (opposite)
The election of the grand marshal has undergone many changes since the position was created in 1865. In the 1880s the GM was elected by a “caucus” of students at a location off campus in an environment that might not have been conducive to intelligent voting. These 1886 Transit illustrations indicate that the process was reformed. Institute regulations, city and state laws, and changes in society have continued to modify election events. In spite of change, Rensselaer alumni share fond memories of these GM nights, days, or weeks, whether they were held on or off campus and with or without certain beverages and entertainment.

THE GREAT TROY FIRE OF 1862
This fire during the Civil War devastated the heart of the city. The Institute at the time of the fire was located on State Street. In spite of the war, a new building was ready for use in 1864, just two years after the fire. Note the Troy University building that dominates the site of today’s Rensselaer.
physical transformation of Rensselaer took place. By 1864, just two years after the fire, the trustees, with wide Trojan support, had succeeded in securing for Rensselaer a new, more appropriate location on a hillside overlooking Troy and the Hudson River — no mean accomplishment, considering that the rest of the city had to be rebuilt and a war was in progress.

The major figure behind this transformation was trustee John Flack Winslow, then at the height of his career as a wartime iron manufacturer. Winslow and his partner, John Griswold, also a trustee, were the principal contractors for the iron plates of the "Monitor" and similar ironclad ships. They were also responsible (with trustee Alexander Holley) for the introduction into America of the Bessemer steel-making process and for construction of the first American Bessemer steel plant in Troy, in 1865.

The State Legislature appropriated $10,000 for construction of a new building in 1863. The new site was on the west side of Eighth Street, overlooking the city — the current location of the Approach — and two blocks south of the Vanderheyden Mansion, where the school had been located between 1834 and 1841. On Winslow's recommendation, plans for a building were adopted in August 1862, and Winslow became chairman of a building committee of the trustees. Two years later, the structure, which was to be called the Main Building, was completed at a cost of some $44,000 — the first building designed and built specifically for the needs of the school. It was a handsome structure, four stories high and measuring 115 by 50 feet. The master plan called for construction of a chemical laboratory and an astronomical observatory as well.

In 1866, Rensselaer added the chemical laboratory — 60 feet by 40 feet and three stories high — completed under the auspices of another committee headed by Winslow, who was then president. Built alongside the Main Building, at a cost of some $10,000 — toward which Winslow contributed $5,000 — it was named the Winslow Chemical Laboratory, the first building at Rensselaer to commemorate an individual. (The astronomical observatory had to wait more than a decade, until 1878, when the Proudfit Building was erected.) Thus Rensselaer emerged from a destructive fire and a devastating war in the best physical condition in its history.

The Holley Report
In 1870, a significant reappraisal of Rensselaer's educational status and direction appeared in the form of The Report of the Holley Committee — a committee made up of members of the Board of Trustees and chaired
LIBRARY OF THE MAIN BUILDING

Interior photographs of the Main Building are rare. The library served a variety of functions including classroom and student meeting space. The stove that dominates the room demonstrates the importance of one of Troy's major industries in supplying comfort to 19th-century Americans.

MAIN BUILDING  Completed in 1864 at a cost of $44,000, this structure provided the classroom facilities for Rensselaer until it burned in the fire of 1904. The State Legislature provided $10,000 for the project, which was located at the head of Broadway, on the site of the current Approach.
WINSLOW BUILDING  This building, opened in 1866, housed the Institute's chemistry laboratory. Named for John Flack Winslow, who contributed half its cost of $10,000, it stands today as Rensselaer's oldest facility. Plans for the building's future use as a museum are being developed today by Troy's Junior Museum and Rensselaer. The Troy Hospital (West Hall) and Rankin House, a former private residence used by Rensselaer, can also be seen at the right.
PROUDFIT OBSERVATORY  Named in honor of William Proudfit '77 and constructed in 1878 with funds contributed by his mother, Mrs. Ebenezer Proudfit, this building completed the campus as envisioned by John Flack Winslow. Mrs. Proudfit's gift also began a tradition of strong financial support of Rensselaer by women.

RENSSELAER'S FIRST GYMNASIUM
Located just south of the Main Building at the head of Broadway, this building was the first Rensselaer facility constructed in part through student contributions. It was completed in 1886. The members of the classes that contributed as students later generously supported the construction of the '86 Field and the '87 Gym as alumni. The old gym was used as a playhouse for student dramatic productions before it was razed.
Alexander Holley  He has been called the “father of the modern American steel industry” because of his successful efforts to bring the Bessemer process to Troy and to other American iron-producing centers. A member of Rensselaer’s Board of Trustees, he expressed deep interest in scientific and engineering education. In 1870 Holley chaired a committee to recommend improvements in the school. The committee’s report was far-sighted and progressive, but was rejected by the faculty.

PROFESSOR HENRY B. NASON  The bearded man pictured here in field gear with a group of students, Nason played a role at Rensselaer as professor of chemistry. His lasting gift to the Institute was his Biographical Directory of the Officers and Graduates of the Rensselaer Polytechnic Institute 1824-1886. This work details the careers of almost 3,000 of the Institute’s students, graduates, faculty, trustees, and leaders. It presents an invaluable picture of Rensselaer’s contributions to the development of America in the mid-19th century.

by Alexander Holley, a major figure in American engineering and in the Bessemer steel industry. The report consisted of a catalog of recommendations designed to restore Rensselaer to its historic position of leadership in scientific education in the face of growing competition from Yale and Harvard. It called for strengthening the scientific courses, raising admission standards, and establishing a professorship of mechanical engineering, a professorship of physics, and lectures in electricity. It also emphasized courses to improve students’ communications skills. Unfortunately, for all of its farsightedness, the report was not embraced by the faculty, and so it was not adopted. In 1872, perhaps as a result of the faculty’s rejection of the Holley report, Professor S. Edward Warren left Rensselaer for MIT.

The building program continued in 1883, when Rensselaer students began to put pressure on the faculty and administration for a gymnasium. Students subscribed nearly $1,300, the trustees were petitioned to provide land, and the citizens of Troy were asked to participate. Slow in coming, however, the gymnasium was not completed until 1886 — Rensselaer’s first concession to nonacademic student needs. (A more substantial athletic structure would be launched in 1912 and named in honor of the 25th anniversary of the class of 1887.)
Conflicting Views

It is frequently maintained that the years 1860 to 1902 — the period between B.F. Greene’s departure and the beginning of the P.C. Ricketts presidency — were characterized by inertia and drift for Rensselaer. That is one perspective, but not the only one.

It is true that in this period, the number of degree programs was radically reduced, and that money was consistently in short supply. Yet considering the superb faculty the Institute attracted and nurtured, and the outstanding graduates that faculty produced, Rensselaer performed its essential mission very well indeed.

The faculty included Samuel Edward Warren, who came to Rensselaer in 1850 from the Boston area and graduated in civil engineering in the last of the one-year classes. He was not only a disciple of Greene’s but stayed on to become one of his colleagues as professor of descriptive geometry. This “little spindle-legged professor” was known among the students as “Windy Warren,” an allusion to the fact that he was an articulate, voluble, and perhaps abstract, although dedicated, teacher and writer. Warren was the prolific author of a new series of books on descriptive geometry and graphics, among the first of its kind in America. In 1866, Warren published Notes on Polytechnic or Scientific Schools in the United States, Their Nature, Position, Aims, and Wants, one of the first accounts of the development of American scientific schools. He followed this with a series of five articles in the Journal of the Franklin Institute, on “The Future Development of Scientific Education in America.” His texts remained in print and were in use for more than half a century.

Henry B. Nason was Amherst- and German-trained and a professor of chemistry at Rensselaer starting in 1858. His biographical sketches of early Rensselaer graduates, painstakingly compiled through questionnaires, provided a unique early record of the institution and its personalities.

William Pitt Mason, a graduate of 1874, was later a distinguished professor of chemistry at Rensselaer for half a century.
Among the graduates was Henry A. Rowland, of the class of 1870, with a degree in civil engineering and largely self-educated in physics. He was employed as an instructor of physics in 1872, and remained at Rensselaer until 1875, carrying on some of his early researches in electromagnetism in Troy. Rowland became a world-renowned physicist and professor at The Johns Hopkins University, and was considered by some to be the most eminent American physicist of the 19th century.

Alfred Tredway White, a native of Brooklyn and a graduate of 1865, pioneered the development of well-engineered housing for low-income families.
Mordecai Endicott, of the class of 1868, received a commission in the U.S. Navy and developed improved steel and concrete drydocks for the repair of ships, as well as the “Dewey,” the largest floating drydock ever built up to that time.

Lyman Cooley, a graduate of 1874, became one of Chicago's best-known hydraulic engineers. In 1895, he was one of the first engineers to investigate the feasibility of a shipping canal between the Great Lakes and the Atlantic Ocean.

G.W. Ferris graduated in 1881 and a dozen years later would design the Ferris wheel at the Columbian Exposition in Chicago.

J.A.L. Waddell, of the class of 1875, taught briefly at Rensselaer, and his subsequent activities as professor and consulting engineer took him to Japan, China, Russia, South America, and Canada.

Palmer Chamberlaine Ricketts, also of the class of 1875, would distinguish himself as an engineer on the Troy and Boston Railroad, as an educator, and as president of RPI. On him would fall the responsibility for the next transformation of Rensselaer.
Paradoxically, Rensselaer faced the momentous changes at the end of the 19th century and the beginning of the 20th in the best condition in its history in terms of physical facilities. The school occupied a number of buildings — Main, Winslow, Proudfit, among others — that could be adapted, with the addition of wings and annexes, to the changing academic needs of students and faculty. It was located in a well-heeled city that had prospered from the growing industrialization of America. In addition, Rensselaer, through its founder, could trace its history back to the origins of the country, and consistently attracted a small but talented group of students from all of the Americas.
TROY AT THE TURN OF THE CENTURY

This scene illustrates the energy of one of the nation’s early industrial cities. Troy iron, steel, stoves, bells, shirts, collars, and cuffs were known throughout the land and abroad. Women provided the labor that was necessary, even under early mass production, to operate Troy's huge collar shops.

Yet at this very moment, Rensselaer was, in fact, ill prepared to respond to the enormous changes at work. The country was undergoing rapidly accelerating technological growth, with increasing demands for trained personnel in both traditional and emerging fields of engineering. Expanding industrialization would, in a very short period, usher in the modern era of mass production and mass consumption. Populations were moving out of the countryside and into the cities, and modes of transportation were changing. Railroad building, Rensselaer's chief interest in the latter part of the 19th century, was past its peak. As the engineer assumed a more critical role in effecting these changes, the pressures to broaden engineering education intensified.

Yet Rensselaer at the end of the 19th century was essentially an engineering school that offered just one engineering degree, in civil engineering. It relied almost entirely on tuition income for its operating funds, had a meager endowment, and had no expectation of substantial federal, state, or municipal aid. It had an inadequate library and insufficient scientific apparatus, and a dedicated, if undercompensated, faculty.
Perhaps reflecting these pressures, in 1885, Director David M. Greene (no relation to B.F. Greene) charged some of the faculty with insubordination, which he attributed to the “indifference or supposed sympathy of the trustees.” Greene, a Rensselaer graduate with a distinguished record of practical engineering service, had never been popular as director, and had frequent disagreements with the faculty, students, and trustees. In 1891, Greene abruptly resigned. For six months, the choice of a successor engaged not only the trustees, who were to make the actual selection, but also alumni and students, whose views were published in the Polytechnic.

Albert E. Power, acting head of the trustees, acknowledged the general dissatisfaction with the direction of Rensselaer’s affairs and pleaded that all elements be “harmonized into a compact body so that this force shall not be wasted in needless conflict, to the detriment of the Institute.” The trustees invited applications for the position of director, at a salary of $5,000, for full and adequate services in this capacity. At this time, a committee of trustees even recommended the union of the offices of president and director under “one able and responsible head.” The new leader was to manage everything connected with the Institute except the finances, and the committee’s report proceeded to outline the functions of such an officer: “He should possess zeal, influence, fairness, decided executive capabilities, ability to grasp details and not let go of larger matters. He should be . . . fully awake to the needs of the time.”

In the competition for the director’s office in 1891, there were four candidates, all graduates. There was, in the first place, a pair of older men, C.C. Martin, chief engineer of the Brooklyn Bridge, and G.W. Plympton, director of engineering courses at Cooper Union and professor of physical science engineering at the Brooklyn Polytechnic Institute. The younger candidates were William Pitt Mason, the suave and popular professor of chemistry, known affectionately as “Billy,” who served as secretary of the alumni association, and who would win an international reputation for his work in water analysis and urban water supplies. The other was the aristocratically named Palmer Chamberlaine Ricketts, the gruff but effective professor of mechanics.

Ricketts had already displayed some of the characteristics required for the position of director and president, as specified by the trustee committee, in his replies to a questionnaire circulated by the trustees on the state of his department and of the Institute generally. In addition to the usual requests for more apparatus and space, Ricketts propounded more generally needed improvements. He recommended, among other changes, the adoption of the
practice at the Columbia School of Mines “requiring each student to write a thesis on some subject approved by the faculty during each summer vacation. . . . This would tend to give the students practice in writing reports, and otherwise in the use of the pen, in which they are generally deficient.” This was adopted as a requirement soon afterward.

Martin, for reasons of his own, declined the trustees’ offer of the office, and Ricketts was named director — as the result of an 11 to 5 vote — in January 1892, amid general approval. At the midwinter alumni dinner the following month, graduates acclaimed the choice, and Professor Mason graciously accepted his defeat.

Thus began one of the most extraordinary 40-year periods in the history of the Institute. First as director, and then as director-president, Palmer Chamberlain Ricketts put his personal stamp on the character and appearance of The Rensselaer Institute just as surely as Eaton, Van Rensselaer, and Greene had before him. Gradually at first, then with increasing confidence, Ricketts accumulated virtually all decision-making powers, and then used those composite powers to transform Rensselaer. By turns eccentric, brilliant, dictatorial, and visionary, Ricketts over the next four decades would bring about — almost entirely through the force of his distinctive personality — the rebirth of a venerable but beleaguered institution, install it in a beautiful new campus, expand its curriculum with modern educational offerings, and lead it toward a financial stability that had been elusive up to that point. He was, in every sense of the word, a Rensselaer “original”: strong-willed, brilliant, and having a superb sense of timing in terms of institutional and societal needs.

**Application and Irreverence**

P.C. Ricketts was born in Elkton, Maryland, in 1856. The family moved to Princeton, New Jersey, and Ricketts was prepared for college by a private tutor affiliated with Princeton. His was an engineering family: a brother, Lewis H., achieved prominence in mining engineering in New Mexico.

Ricketts arrived at Rensselaer in 1871, at the age of 15. His career as a student was more or less uneventful. He joined a fraternity, Theta Xi, and as a junior produced (with J.A.L. Waddell) one of the more irreverent volumes of the *Transit*, reviewing satirically the Institute’s administration, faculty, and students. He managed to incense most of the faculty, who seriously considered expelling the board of editors for lack of respect.

Upon graduation in 1875, Ricketts received an appointment as an assistant in mathematics and astronomy. He became an assistant professor in
1882. In 1884, on his own written application to the trustees, Ricketts became the William H. Hart Professor of Rational and Technical Mechanics, a newly established post, with a salary of $1,800 per year. He retained this position for more than 20 years, even after assuming administrative functions as director and president.

Both as student and teacher, Ricketts was grounded in the traditions of Rensselaer, and also in rigid methods of pedagogy, including rote recitation, then prevailing in many American colleges. Nevertheless, Ricketts's humor and humanity mitigated a sometimes-stern exterior, and he was popular with students, as indicated in this opinion expressed in the Transit of 1899: "A course as dry and tiresome as rational mechanics must have to be taught in an attractive manner in order to arouse the interest of the student. Director Ricketts succeeds most admirably in this. His interrogations abound in witty remarks and amusing criticisms, which keep the class in a continuously humorous mood."

The Academic and Practical
Ricketts was able to combine teaching with an active role in practical engineering and public affairs. He served as a consulting bridge engineer for the Troy and Boston Railroad and the Rome, Watertown and Ogdensburg Railroad. In 1891, he became chief engineer of the Troy Public Improvement Commission, and he was engaged to design a sewage system for his home town. He also advised the city of Corning, New York, on its flood control projects.

Between 1881 and 1883, Ricketts obtained patents for the invention of an electromagnetic station indicator and a railway car electrical circuit coupler; in later years, he was vice president of the Trojan Car Coupler Company. He did research on testing materials, and in 1885, the English journal Iron reprinted an article by Ricketts from Van Nostrand's Engineering Magazine on "Physical Tests of Malleable Cast Iron, with Ten Tables." Thus, Ricketts's background was academic, but also included a mixture of

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Creating Shirts That Don't Shrink
Sanford Lockwood Cluett, class of 1898, dreamed of revolutionizing the textile industry by inventing a process that would prevent shirts from shrinking after washing.

As director of Cluett, Peabody & Company, Inc., Cluett perfected the process in which fabrics are "pre-shrunken" so that they are stronger and more resistant to wear, with improved finish and appearance. A man of encyclopedic interests and talents, Cluett held more than 200 patents and licensed "Sanforized" fabrics in the U.S. and 19 foreign countries. His invention opened new markets for fabrics and created a fortune for the Troy company.
These photos, which illustrate some of the practical work required in the courses of engineering, were aggressive promotion for the curriculum of the Institute. Appearing in the American University magazine in 1896, they demonstrate Ricketts's flair for publicity. He knew about "marketing" before it was a popular concept.

teaching and engineering practice — a characteristic product of Rensselaer's educational program and well suited to its traditions.

In the following decade, as director but not yet as president, Ricketts did not make any startling departure from existing trends and traditions. The director's office, created nearly a half-century earlier by B.F. Greene, did not carry the authority, nor did it convey the awe, that it later acquired under Ricketts, when fused with the presidency. The director title signified the leader of the faculty under the close control of the trustees — control exercised particularly by the president and the Prudential Committee of the trustees, who were Trojans and therefore supposedly almost always available for consultation. In a sense, such a division of authority tended to nullify all power — or rather left the deciding vote primarily to lawyers, ministers, and businessmen in the local community, for whom, no matter how dedicated and involved they might be, the Institute was not their main focus.

Slowly but surely, over the course of the next decade, Ricketts won the confidence of students, trustees, faculty, and alumni with his combination of
deeply conservative and diplomatic approaches to problem solving, combined with impressive planning skills. In the back of his mind was a program of sweeping action that would result in the rebirth of Rensselaer. But that would come in due course.

**A Flair for Publicity**

Early on, Ricketts displayed a flair for publicity. He personally assumed the task of advertising — as he called it in his unvarnished, plain-spoken manner — the Institute and its thorough approach to educating engineers. Articles and advertisements, written by Ricketts and others, began to appear in national journals, and he produced brochures for popular circulation in which he stressed the claim that Rensselaer was “the first school of engineering to be established in any English-speaking country.”

For general distribution, Ricketts had printed in 1893 an illustrated *Handbook of Information* about Rensselaer, accompanied by *A Partial Record of Work of Graduates*, reissued frequently in later years in illustrated form.
RENSSELAER AT THE WORLD'S COLUMBIAN EXPOSITION IN 1893

This stationary exhibit showing the campus and alumni was another of Ricketts's ways to promote Rensselaer as an institution. At the same event, a moving exhibit, the great wheel designed by G.W.G. Ferris, class of 1881, demonstrated the achievements of Rensselaer's graduates. Also a major presence at the exposition was Edward Shankland, class of 1878, engineer for the exhibition's spectacular structures.

Ricketts also understood the uses of history and historical claims, and so, in 1895 appeared the first edition of his History of Rensselaer Polytechnic Institute, a book that was, in fact, a pioneer work in the field of technological education. Then, successive issues of American University magazine, in 1896, carried accounts of Rensselaer and its graduates, written by Rensselaer President John H. Peck and by graduate and trustee Orthiel F. Nichols.

These efforts at publicity by Ricketts reached a culmination of sorts in his plans to prepare an exhibition representing Rensselaer Polytechnic Institute, through the work of its graduates, at the World's Columbian Exposition in Chicago in 1893. Commemorating the 400th anniversary of the discovery of America by Christopher Columbus, the Columbian Exposition was the first of the modern-day world expositions and may have been the most influential. Many illustrious architects, including New York's McKim, Mead and White,
designed the exhibition's buildings. Edward Shankland, a Rensselaer graduate employed in the architectural firm of Daniel Burnham, was the engineer of the exhibition's structures.

Ricketts asked alumni for exhibit suggestions. What he received in response was representative of Rensselaer's diversity. One of the most unusual suggestions was the offer of Edwin Ford, at that time an architect in Boston, to send the design of a window he was working on for Harvard's Memorial Hall. And from Brazil, Miguel Argollo sent samples of diamonds from a mine he was operating, as well as photographs of a railroad in Bolivia that he had helped build.

But one of the most famous alumni was George W. Ferris, who, with other Rensselaer engineers, constructed the Ferris wheel for the Chicago Exposition; this became one of the exhibition's principal showpieces, and an engineering marvel to rival the Eiffel Tower.

All in all, the Rensselaer exhibition must have been both impressive and various, for it won two medals and a diploma. Ricketts also delivered an address at the Columbian Exposition, emphasizing that engineering education should properly take place on a graduate level, so that students might first acquire a liberal education. While radical, the Ricketts proposal pointed to the need to broaden engineering education to prepare engineers for increasing responsibilities. The engineering profession as a whole would not generally recognize such a need until the 1920s, when Rensselaer began to make significant changes in this direction.

Alumni Developments
Ricketts's relations with fellow alumni were extremely close from the start of his directorship. As director, his letters, reporting on the state of the Institute, were thorough, informative, and plain-spoken. This close relationship would produce significant benefits over the next three decades, not the least of which came in the form of fund-raising.

Rensselaer's alumni had begun to take a more active role in the Institute's affairs. In 1881, a group of graduates had met at the residence of Clarkson Nott Potter, on New York City's Gramercy Park. Potter, an 1843 Rensselaer graduate, was a lawyer in the city and a grandson of Eliphalet Nott, president of Union College. The meeting was widely reported in the professional and popular press. Among the invited guests at this impressive, formal affair were Russell Sage, A.L. Holley, James Burden, and Amos Eaton's grandson, D.C. Eaton, of Yale University.
The gathering at the Nott townhouse established the midwinter "black-tie" alumni meeting in New York City as a fixture on the Institute's calendar. The meeting that June of the alumni in Troy resulted in an agreement to raise a graduates' endowment fund for the school, and participants formed a committee to solicit funds. The stated purpose of the endowment was to make it possible for the director to devote full time to administration, to finance a professorship of architecture, and to provide instructors in electrical engineering and marine architecture. The goal was $250,000, but $100,000 would do for a beginning. This, the first nationwide graduates' fund drive in Rensselaer's history, was formally approved at the second midwinter reunion in New York City in January 1882, which drew 200 alumni and was presided over by Benjamin Franklin Greene himself, symbolizing the rebirth of his ambitious vision a generation earlier of a polytechnic university.

Modest success crowned these first efforts to raise money. The graduates' endowment fund brought in approximately $38,000 in cash and pledges. To this, Rensselaer added a number of other gifts and acquisitions. In 1883, Mary E. Hart, of Troy, whose father-in-law had been one of the first trustees of the school, donated $60,000 to the Institute to endow a professorship of rational and technical mechanics.

Pittsburgh was another early center of alumni activity, reflecting the growing wealth and influence of that capital of iron and steel production. As early
as 1889, an energetic group of Rensselaer alumni centered in Pittsburgh persuaded the Association of Graduates to hold its midwinter dinner there, the first held outside New York City. Graduates living in the city formed a local association of Rensselaer alumni, which became a model for others nationwide. Pittsburgh would play a significant role in the rebuilding of Rensselaer after the fire of 1904, as attested to by the Carnegie and Pittsburgh buildings on the campus.

It was at this first midwinter meeting in Pittsburgh that James Hall, New York State Geologist, announced the gift of his fossil collection to the Association, and the 137 graduates present immediately raised $20,000 for a building to house it. The outcome of this spontaneous gesture was the construction in 1893 of the Alumni Building in downtown Troy, a building that today stands next to and is part of the Troy Savings Bank, on Second Street. The Alumni Building, a quarter-mile from the campus, would house the Hall collection, the Institute's library, and the RPI administration — an inconvenient location from an academic standpoint, but a symbol of the increasing visibility, influence, and activism of Rensselaer alumni.
ACHIEVING THE IMPOSSIBLE

Making a Texas-Sized Difference

Everything that J. Erik Jonsson '22 has dreamed — and achieved — is of a scope beyond most people's greatest imaginings.

The son of naturalized Swedish immigrants, Jonsson had to work his way through Rensselaer. After graduating, he joined what became Texas Instruments, where he rose to the positions of president and chairman of the board and played a key role in the development of the microelectronics and computer industries, as well as of new management techniques for technology-based companies. In 1978, TI was the 12th-largest industrial organization in the U.S.

As mayor of Dallas from 1964 to 1971, Jonsson led the resurgence of the city and spearheaded development of Dallas International Airport. His late wife, Margaret, inspired the beautification of the Rensselaer campus. The leadership, vision, and generosity of Erik and Margaret Jonsson have been instrumental in transforming Rensselaer into a modern technological university.

Courses in Electrical Engineering

One of the most significant achievements of the first Ricketts decade was the introduction of a course in electrical engineering into the general curriculum. To implement his plans, Ricketts enlisted the aid of Margaret Burden Proudfit (the daughter of Troy iron maker Henry Burden), who had donated money for the Proudfit Observatory, to convert that observatory into a memorial laboratory for mechanical and electrical engineering. Westinghouse Electric Corporation and General Electric Company donated equipment — among the earliest corporate gifts to education. As a faculty member, Ricketts had disapproved of the original dedication of Proudfit to astronomical observation; the conversion responded to increasing demand for courses in electrical engineering and fit his penchant for practical engineering pursuits.

Early in 1902, Ricketts announced the appointment of William Robb, a graduate of Columbia University, as professor of electrical engineering and physics. Robb came to Rensselaer from Trinity College and had engaged in the practice of electrical engineering at Hartford, Connecticut. He became the symbol and founder of a new direction in engineering education at Rensselaer — and, in his blunt and strong-willed fashion, he served as Ricketts's right-hand man and chief support on the faculty in the generation that followed. Robb was almost as much a fixture as Ricketts on the Rensselaer campus in these years.

In 1901, John H. Peck, Troy lawyer and the last of the nonprofessional trustees to serve part-time as president, resigned after 15 years of service. Ricketts had complained to the trustees — respectfully but firmly — that on one occasion he had had to make four separate trips to Peck's office in one day to get a decision on an important Institute-related matter. On three of those occasions, the president had been too busy with legal matters to receive the director. Surely this was a grossly inefficient way to conduct business in a modern technological school.

The choice of Peck's successor was not left to chance, and a concerted movement developed to promote P.C. Ricketts
for the position. Alfred H. Renshaw, a graduate and the president of the Standard Railroad Signal Company, worked to “engineer” the election. He addressed a letter to alumni all over the country, directing them to write to the trustees on behalf of Ricketts. Many responded; few objected to the choice. The Alumni Associations of New York City and Pittsburgh recommended Ricketts in group resolutions.

The trustees unanimously elected Ricketts president in February 1901. They voted him $1,000 in salary, to be added to the $4,000 he had been receiving as director. Alfred Renshaw became a trustee in the same year, and President Ricketts married Renshaw’s sister, Vjera Conine Renshaw, in 1902. As recorded in the Transit for 1902, the seniors disconnected the horses from the wedding carriage and pulled it themselves to Alfred Renshaw’s house, as the other classes marched behind and cheered.

Thus, at the very beginning of the 20th century, a new era began in the history of Rensselaer Polytechnic Institute, an era marked by the advent of an extraordinarily strong leader. Ricketts was the first to effect a long-term union of the offices of director and president. He brought to these offices a dedication and devotion they had rarely known before. In a single stroke, he had become “Mr. Rensselaer,” heading what amounted to a one-man enterprise, with all of the benefits (and at least some of the less happy consequences) that result when power, authority, and control of the destiny of an institution rest in the hands of one person. Over the next 32 years, he would make his mark indelibly on this venerable institution and add to the title of “Mr. Rensselaer” another that an engineer might consider almost as flattering: “The Builder.”

Rensselaer’s physical growth would be the most conspicuous feature of the Ricketts era. But before Ricketts “The Builder” could assert himself, a major crisis — in the form of another devastating fire — occurred, which, in effect, swept aside the old Rensselaer and made way for the new.

Within a few weeks, in May and June 1904, two separate fires severely damaged Winslow Chemical Laboratory and gutted the Main Building. The school year was ending, but beyond the immediate issue of finding space for classes for the few remaining weeks was the larger question of rebuilding Rensselaer. These two buildings represented the heart of the campus. Four smaller buildings were left standing, and at issue was whether to rebuild on the same crowded site on Eighth Street at the head of Broadway, within an area of less than three acres, or to remove to a new location more suitable for future growth.
MAIN BUILDING FOLLOWING THE FIRES OF 1904

Following this disaster, Ricketts mobilized alumni, friends, and the city leadership to construct a new campus. More than any other event, this fire was the impetus for building the modern Rensselaer. The trustees chose as the site of the new Institute the 10-acre estate of Walter Phelps Warren, which was to become the heart of today's campus.

Then a third possibility presented itself: leaving Troy altogether. Columbia University promptly made an offer for Rensselaer to take over responsibility for all of its engineering education, merging with Columbia's School of Mines, while retaining the Rensselaer name and identity. Ricketts went to New York City to confer with Columbia President Nicholas Murray Butler, and an exchange of correspondence took place. But neither Ricketts nor the trustees were favorably inclined, and the trustees resolved on June 13 that "the sense of this board is that we should prepare for the increased usefulness of the Institute by making larger provision for the necessities of the institution." They agreed to name a committee of five "to outline a plan for the construction of adequate buildings on a suitable site and to provide for the present and future requirements of the Institute."
The fires of 1904 — like the fire of 1862 — activated a movement for enlarging as well as rebuilding Rensselaer. Once again, a new Rensselaer was reborn out of the ashes of the old, but this rebirth would locate the Institute permanently in a setting appropriate to its history and its aspirations, at the crest of a hill overlooking the Hudson River Valley.

The Troy Chamber of Commerce held a public meeting at which Ricketts spoke, appealing to the city's self-interest. And he named a committee of distinguished alumni living in Troy to make an appeal for funds. Citizens and alumni rallied to the cause. There was one proposal to extend the campus downhill and toward the town. In the end, however, the trustees selected the extensive estate of Walter Phelps Warren, consisting of 10 acres just above the existing site. The land and a large house were available for $125,000, and purchase was agreed upon before the end of the year.

In addition, the Institute surrendered the old site of the Main Building to the City of Troy, which used it to build an Approach costing $40,000 and carrying Broadway up the hill by means of a broad, granite staircase. This grand and ornamental staircase symbolized the continuing close relationship between Rensselaer and the still-thriving city in which it was located.

In the meantime, monetary contributions and pledges were flowing in at a generous rate from alumni and friends. It was as if the urgent crisis, coupled
THE APPROACH  Classical in feeling and symbolic of the interdependence of city and institution, the Approach reflected Troy's wealth and its pride in Rensselaer. The city's merchants built the Approach on the site of the old Main Building after the 1904 fire, as a demonstration of the physical and financial linkage between the City of Troy and the Institute. It provided easy access from the new campus above Eighth Street to the railroad station, to the commercial areas of the city, to the Institute's gymnasium, and to student rooming houses.

with a concrete program of reconstruction, had released the energies, imagination, and munificence of many.

In February 1905, industrialist Andrew Carnegie announced that he would give $125,000 for a new building, thanks to the persuasiveness of Captain Robert Hunt, Chicago steelmaker, one-time resident of Troy, and Rensselaer trustee. Mrs. R.J. Walker, of Philadelphia, mother of Rensselaer graduate Dr. W.W. Walker, contributed more than $200,000 — the largest donation to date — to build the Walker Chemical Building.

This was an early stage in the development of large private American fortunes and substantial philanthropy. Joseph Albright, of Buffalo, and John Marshall Lockhart, of Pittsburgh, among others, responded liberally. Lockhart, son of the president of Standard Oil of Pennsylvania and an 1887 graduate, became a steel manufacturer in Pittsburgh; his company was later merged with United States Steel Corporation. He maintained a lifelong
interest in Rensselaer and contributed in excess of $5 million — almost all of it anonymously — over the course of Ricketts's presidency.

On the first anniversary of the fire, in June 1905, total donations and pledges exceeded $500,000 — more than double the previous value of the Institute. This made possible the rapid acquisition of the site and the construction of Carnegie and Walker. President Ricketts could report to the trustees that, despite the fire, 1905 "had been the most prosperous year in the history of the school."

The strains of this year, however, had exhausted Ricketts and brought on a breakdown in his health. He was compelled to take a leave of absence in 1905-06, and spend it in Europe for recuperation. Fortunately, by now he had acquired the services of two close assistants who were to remain with him for the rest of his life, and who could handle many matters when Ricketts was away from the campus. These were John W. Nugent, who helped him in various confidential and financial capacities as comptroller,
Like many American institutions, Rensselaer benefited from a major gift from steel baron Andrew Carnegie. The gift of $125,000 was solicited by Captain Robert Hunt, Chicago steel man, one-time resident of Troy, and Rensselaer trustee. Other major contributors included Emily and Washington Roebling and Joseph Albright, class of 1868.

Seated at the bench desks that were standard equipment on the Ricketts campus, well-dressed Rensselaer men with fashionable attire and shining shoes, but few notebooks, prepare for chemistry lecture.
and Elmer W. Siple, his private secretary and director of admissions and publicity. (Ricketts rarely hired a person to handle a single job.) To this roll of talented lieutenants could be added the name of Mary Burke, the first female administrator hired at Rensselaer; she served as registrar for many years.

Despite his yearlong absence, Ricketts kept closely connected to Rensselaer affairs. Thus, he was aware that Russell Sage, a former resident of Troy and an inactive Rensselaer trustee, had died in New York at the age of 90, leaving a vast fortune, no children, and a widow, Margaret Olivia Slocum Sage, intent on entering upon a course of philanthropy. Upon his return to the United States, Ricketts lost no time in approaching Mrs. Sage with a project long on his mind: a plan to expand Rensselaer both physically and academically by adding curricula and degrees in mechanical and electrical engineering. (The need for diversification in engineering education was obvious. In 1903, Ricketts had warned the trustees that the civil engineering curriculum at Rensselaer had reached the limits of its growth, with some 300
Construction of the Sage Laboratory made possible the introduction of new engineering programs, of which electrical engineering was very important to the institution's future. The large switch panel in the photo was preserved as part of the 1985 renovation of the Sage Laboratory.

Mary Burke During the Ricketts years, Rensselaer began to employ individuals to help manage the growing institution. The first registrar, Miss Burke was also the first woman to serve as an administrator.

students, and that Rensselaer must now become “a true polytechnic,” in B.F. Greene's sense of the term.)

Ricketts was persuasive. At the alumni midwinter dinner in February 1907, he was able to announce a gift from Mrs. Sage of $1 million. This more than doubled the value of the Institute, and Ricketts proposed using $300,000 to construct a building that would house the new departments of electrical and mechanical engineering, to name the building in memory of Russell Sage, and to designate the remainder as an endowment for these departments. Thus, a combination of chance and initiative enabled Ricketts to move Rensselaer away from its long and exclusive preoccupation with civil engineering.

His decision met with resistance from some alumni and trustees reluctant to leave the past behind, but such were Ricketts's stature and credentials within the institution that he was able to overcome it. Enrollment in electrical and mechanical engineering degree programs began immediately, in 1907, since the first two years of instruction were to be identical with civil engineering. This common first two years was, and would continue to be, an effective argument for economy, since diversification would require relatively few new staff members. Each diversification Ricketts carefully justified on
the basis of growing student demand and increased tuition revenues. Thus, the most innovative academic measures were almost always couched in practical terms.

In June 1909, Ricketts dedicated the Russell Sage Laboratory during the annual alumni reunion gathering. The presidents of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers addressed the gathering, and Onward Bates, president of the American Society of Civil Engineers, delivered the commencement address. It was a memorable occasion in Rensselaer history and in the development of engineering education.

Once initiated, this pattern of steady physical growth picked up momentum, and neither war nor economic depression interrupted the transformation over the next quarter-century. Rensselaer added new land to its campus on the hilltop, reaching a total of nearly 25 acres in 1910, and 48 acres by 1925. Ricketts was concerned with every aspect of this growth, from the raising of money to the planning and construction of the distinctive Georgian Revival brick buildings with Indiana limestone trim and copper roofs that aged to an attractive green; these buildings together have come to be called “the Ricketts campus.”

At the 1909 midwinter alumni dinner in Pittsburgh, Ricketts won the promise of financial support for yet another new building to bring the administration, the geological museum, and the library up to the campus from the Alumni Building on Second Street in Troy. In 1912, Rensselaer dedicated the Pittsburgh Building — the first of its kind in the history of American education to be sponsored by the alumni of a single city.

Student Life
In the next few years, until the outbreak of World War I, Rensselaer under Ricketts undertook a new type of expansion to serve the extracurricular needs of a growing student body. Enrollment grew from 200 to a peak of 1,700
PITTSBURGH ALUMNI AND A SPECIAL VISITOR  Ricketts (fourth from left in back row) often traveled to meet with alumni clubs in major cities across the country. Pittsburgh was a very important city. Among these obviously prosperous graduates is generous and shy John M. Lockhart, class of 1887 (first in back row left).

during the Ricketts era, corresponding to the increasing demand for engineers in an industrialized society. The “1886” athletic field and the “1887” gymnasium, named after the classes that financed them on the occasion of their 25th anniversaries, were dedicated in 1911 and 1912, respectively.

Student traditions were also evolving. Early in Ricketts’s directorship, the Main Building had been an early focus of “rushes” between freshman and sophomore classes. One of the most frantic was the flag rush. The freshmen hid their flag on a Friday, and the sophomores had 24 hours to discover and seize the flag. On one occasion, the freshmen planted the flag on the steep roof of the Main Building, and the Troy newspapers reported “a bloody battle for it between more than 130 men. The building’s banisters were broken and injuries were suffered, but the sophomores finally got the flag and marched through the streets of Troy with fife and drum corps.” In subsequent years the classes went to even greater lengths, planting the flag on islands in the river and engaging in boat-landing battles.
PITTSBURGH BUILDING UNDER CONSTRUCTION Designed by W.G. Wilkins, class of 1879, this building enabled Ricketts to move his offices from Second Street in downtown Troy to the campus. Today it still houses the offices of the president and senior administration.

CAMPUS MAP CIRCA 1912 Twenty years after Ricketts was named director, and eight years after fire destroyed the old Main Building, the modern Rensselaer campus began to take shape in its new location. The buildings shown as one moves up the hill along the northern axis are the following landmarks: the Approach, Winslow Laboratory, Pittsburgh Building, Carnegie Building, Walker Laboratory, Proudfoot Building, Russell Sage Laboratory, and the 1887 Gymnasium. The two frame structures to the south are the Warren estate house, which was used as a dormitory, and the Club House of the Rensselaer Union.
FRESHMAN’S PROGRESS  Student publications often satirized the life of new students at the Institute. Freshmen were portrayed as naive children as illustrated here. On the other hand, seniors were always depicted as mature, debonair men of the world.

FROSH POSTER  Displayed by the class of 1908 at the start of the academic year to instruct the members of the class of 1909, this poster describes some of the hazing practices inflicted on first-year students. Note that the required and forbidden behaviors applied to both on-campus and off-campus situations. Other, more serious and potentially harmful hazing practices caused Ricketts to oppose hazing vehemently.
STAIR RUSH  Among the practices that concerned Ricketts was this "rush," in which the freshmen tried to get up the staircase held by the sophomores. Despite the presence of peaceful onlookers, this event appears somewhat like a battle scene.

FLAG RUSH  Rivalry between the classes extended beyond hazing. These photos show a flag — placed on a building on an island in a reservoir — by the freshman class of 1914, which challenged the sophomores to take it down. Among the victorious students who put their names on the captured flag was Livingston "Liver" Houston, who later became President of the Institute.
Throughout the early 20th century, one of Rensselaer’s most important student traditions was the celebration of finishing the difficult and challenging calculus course. Creative invitations heralded a ceremony full of hooded and mystical characters who burned and buried the mathematical demon. A celebration followed, accompanied by large amounts of lager.

Student election customs were well established by 1883. On May 26 of that year, the students selected William A. Aycrigg as grand marshal. The students then headed into the streets and, led by a band, paraded through the city, with fraternity houses illuminated by bonfires. The aggregation stopped at Boughton’s hat store, where they presented the new marshal with a silk top hat. The top hat is still used today as a symbol of the office.

Another ceremonial student ritual surrounded the “Burning of Descriptive” by the junior class, and the corpse was represented by S.E. “Windy” Warren’s *Projections of Descriptive Geometry*. This had evolved by the end of the century into a “Cremation of Calculus,” with a torch parade, a band, and a bonfire of Bowser’s *Calculus*, which became the high point of the academic year. The “Cremation of Calculus” took place, in one form or another, at Yale, Columbia, and Rutgers colleges as well. The custom persisted well into the 20th century.

A more academic custom was the junior and senior geological tours, which usually occurred in the spring and summer. For a week each year, a sizable group of Rensselaer students, bent on fun as well as work, descended
STUDENT UNION  Turn-of-the-century yearbooks frequently begin the Rensselaer Union section with artwork portraying the organization's role in promoting social contact between the sexes. Dances or "hops" were often held in the Pittsburgh Building on the top floor, which was formerly a large open area.

CLUB HOUSE  This beautiful frame building was the home of the Rensselaer Union. Located on the west end of the '86 Field, it was the headquarters of the Union until construction of a second Club House, which today is the Lally Management Center.
Perfecting the Cathode Ray Tube

Alan B. DuMont entered the Institute in 1919, attracted by the historic achievements of Rensselaer graduates. Intrigued by the wave forms appearing on the oscillograph in a campus laboratory, DuMont dreamed of turning this phenomenon to practical and commercial applications as a meter or indicator.

A few years later, when he lost his job as a result of the closing of the DeForest Radio Company in New Jersey, DuMont took $500 of his own money and went to work in the basement of his home to develop the cathode ray tube. After many setbacks, DuMont had perfected the technology that became the basis for modern radar and television.

on a rural town, usually receiving notice — not always favorable — in the local press. In 1887, the Middletown, New York, Argus reported the arrival of 42 students, singing “lively student songs... thoroughly equipped for a rough pedestrian tour.” These tours were replaced in the 1890s by summer railroad surveys in the isolated countryside, which furnished occasions for student work and play particularly adapted to the outdoor nature of engineering practice at the time. These tours helped develop esprit de corps, and contributed to the stereotype of the rough-and-ready engineer.

The growth in enrollment under Ricketts saw the development of more orderly channels for student activity and organization. A Rensselaer Union, responsible for all student social and athletic activities, had come into existence in 1890, but it languished. In 1906, under the stimulus of a group of alumni, a movement by the RPI Young Men’s Christian Association to provide a clubhouse on the new campus helped revive the dormant Union, and in 1908, the two merged.

Ricketts — whose view of appropriate student activities did not extend much beyond hard work in the classroom and laboratory — surprisingly endorsed this movement. Thus began the first officially organized and recognized student association on the Rensselaer campus — one that endures to this day. Its officers were the grand marshal and the president of the Union, and by 1912, its support was assured through the introduction of a compulsory student fee of $5 per year. The Union became Rensselaer’s principal student organization, under whose auspices were gathered the athletic activities, publications, and musical interests of the Rensselaer community. It occupied the Student Union Club House, first located in a frame building at the west end of ’86 Field, and later relocated to what is today the Lally Management Center.

A Student Council came about in 1910, as an outgrowth of a confrontation between students and administration. In October 1909, sophomores defaced the rocks overlooking the new ’86 Field with the numbers 1912 — their anticipated graduation year. Incensed, Ricketts immediately closed the
field and suspended all athletic activities during the football season. A general uproar ensued, and students held mass meetings and formally protested. Negotiations with Ricketts resolved the situation amicably, and out of these discussions came a proposal for a permanent Student Council to represent student interests. In 1912, the Student Council established Phalanx, a student honor society composed of leaders in various nonacademic extracurricular fields.

Another indication of enrollment growth was the proliferation of fraternities, which played an increasingly important and practical role, especially after 1912, when they began to acquire houses. Between 1900 and 1938, the number of fraternities grew from eight to 23 chapters, including both national and local organizations.

Intercollegiate athletics also flourished. The principal sports had made their appearance haphazardly in some form by 1902. Baseball was the first, as far back as 1867, followed by football in 1874, basketball in 1896-97, hockey in 1901, and track in 1902.
As early as 1906, the trustees approved, with reservations, the encouragement of athletics, but did not "intend such use to in any way interfere with the high standard of scholastic work required of students." Games were to be played only between 5 PM on Friday and midnight on Saturday. The trustees also approved Rensselaer's membership in the Intercollegiate Athletic Association. But even in 1906, football had no special coach, and the team competed against both colleges and athletic clubs. Among the former were Rochester, Fordham, Hamilton, Middlebury, and Stevens, and only one, the game with Hamilton, was a victory, while those with Middlebury and Rochester were ties. There were also games with the Crescent Athletic Club of Troy and the Pittsfield Athletic Club.

In the face of this mediocre record of intercollegiate athletics, Ricketts expressed a preference for intramural athletics for all students. However, he could not conceal his lukewarm attitude toward athletics in general, emphasizing that medical and law schools had no intercollegiate athletics, and that MIT managed quite well without an athletic program.

Other student organizations continued to flourish at Rensselaer. After 1900, a variety of urban and regional clubs made their appearance, testifying to the national character of Rensselaer's enrollment. A Southern Club, as well as a Buffalo Club, existed in 1908, to which were added Connecticut,
Vermont, New Jersey, and Western clubs. There were clubs with obvious objectives: the Scholarship, Rifle, Aero, and Dramatic clubs. This last, appearing in 1896, was reorganized in 1921, and again in 1929, as the RPI Players, acquiring its own theater in the converted old gymnasium at the foot of the Approach. This organization has consistently presented excellent productions by capable student actors, directors, scene designers, and lighting experts ever since.

Professional societies were initiated in the engineering departments, under the guidance of the faculty, as student branches of the American Society of Civil Engineers, the Society of Mechanical Engineers, and the Institute of Electrical Engineers. Musical interests among students were exceptionally strong, as evidenced by the Glee Club, the RPI Symphony Orchestra, and the RPI Band, which played at athletic events.

Further evidence of the growth of collegiate esprit de corps lay in the composition, collection, and publication of Rensselaer songs. In 1906 there appeared in the Transit what came to be regarded as the alma mater, "Here's to Old RPI," with words and music by Edmund Fales, a graduate and an
assistant on the faculty. At the start, the song did not command great enthusiasm, and some criticized it as unsuitable, but the song caught on, and no adequate substitute was ever found.

In one respect, Rensselaer under Ricketts experienced a change that indicated a desire to assimilate the customs of more traditional American colleges. The class of 1908 was the first to graduate in black academic caps and gowns — rather than suits; the faculty were robed as well. The time of commencement also changed from evening to a daytime hour, and in 1913, the ceremony moved to the new '87 Gym on the campus, breaking one more link with the City of Troy, where commencement had been held at the Market Block Hall or Music Hall for many years.

Management Style
Ricketts led the weekly faculty meetings like a schoolmaster presiding over unruly charges. No subject was too inconsequential for discussion at length. Ricketts's "hands-on" approach to management (some might term it intrusive) is indicated by two rather typical memos from this period. The first is to Miss Vernette H. Huntley, superintendent of dormitories and dining halls:
My Dear Miss Huntley,

Who hands out bulbs to students? The rule is that they must bring an old bulb in order to get a new one. Does the Electrical Engineering Department do it? . . . My understanding is that the Electrical Engineering Department does some of it, at least, and makes the students put up fifty cents, which is returned to them at the end of the year. Is this correct?

And this to a janitor:

Dear Sir,

Do not wash the blackboards every day. Rub them off with a dry cloth. At the end of the week on Saturday you may use a damp cloth or a damp sponge but not a wet cloth or a wet sponge. The blackboards are being ruined by the use of too much water on them.

Academic Expansion

In 1913, in response to demand, Ricketts was able to introduce still another new curriculum — this one in chemical engineering. And this was the year in which Rensselaer made an even more significant academic advance by offering for the first time graduate study in engineering. The costs were high, and tuition return small, but the indirect return was great. “Such courses,” Ricketts told the trustees, “have a beneficial effect on undergraduate instruction and tend to give the school a greater reputation and thus increase the number of its undergraduate students.”
Louis E. Laflin, Class of 1882

He endowed a chair in 1916 to support the learning of English by engineers. He also created a fund of $10,000 to pay the expenses of students and teachers doing research. However, Ricketts instructed the faculty that if they wished to be involved in research or consulting, they should do so only on weekends.

Ray Palmer Baker

Dr. Baker came to Rensselaer from Harvard in 1915. He was hired "on the spot" by Ricketts, with the assignment to add breadth to the curriculum. Baker's liberal influence was felt in such diverse areas as the humanities, social sciences, business studies, student life, research, and the Institute's relationships with industry.

Of course, graduate students, or "resident graduates," who stayed for an additional year after receiving their initial degrees, had already appeared at Rensselaer under Amos Eaton. And a similar practice of keeping students on as resident graduates who also served as "repeaters" in recitation sections had prevailed under B.F. Greene. But under Ricketts, Rensselaer installed graduate programs in their modern and systematic form.

In 1913, Margaret Olivia Slocum Sage donated $30,000 to establish two graduate fellowships. Ten years later, the trustees established ten more graduate fellowships to provide tuition and $600 per year, giving "further stimulus to a modestly expanding program of graduate study"; many young faculty instructors took advantage of this opportunity.

The Role of Research

Activity in scientific and technical research has had a long tradition at Rensselaer, dating back to Amos Eaton, whose geological surveys under the patronage of Stephen Van Rensselaer laid the foundation of early geology. But research at Rensselaer had always had a history of being upstaged by teaching.

In 1915 and after, a new awareness arose of research as a desirable activity to be supported and encouraged. Louis E. Laflin, of the class of 1882, donated $10,000 in bonds, the income from which was to "pay expenses incurred by students or teachers doing original research work in the laboratories of the Institute; for the purchase of materials, apparatus, or machinery in such research work." Research, however, as a faculty-wide activity, was not one of the priorities of the Ricketts administration. Ricketts's policy toward research has been summarized as follows: Faculty research is fine, so long as it is conducted on the faculty's own time and in the faculty's own home.

Academic diversification, on the other hand, was a Ricketts priority. In 1915, the Institute recruited a young Ph.D. from Harvard University named Ray Palmer Baker. Canadian by birth, but educated in the United States, Baker exercised a liberalizing influence on the Institute's curriculum. One of Baker's objectives was not only to expand and diversify the teaching of English to make it more useful to engineers, but to give it a status at Rensselaer equal to more technical subjects. It was a difficult undertaking, which had to overcome traditions, attitudes, and fixed practices of a century's duration. But Baker, who was able to win Ricketts's confidence and influence him, was given charge of a new department of arts, science, and business administration. He introduced courses in history and political science, economics, sociology, psychology, foreign language, and English.
Thus Rensselaer launched a new series of courses in the humanities and social sciences, as well as the natural sciences, and brought in additional faculty to teach them, including Archie W. Bray, in biology; Robert A. Patterson and Howard Carragan, in physics; Samuel Rezneck, in history; and W.F. Spafford, Darrell Moore, and E.H. Van Winkle, in economics. These men represented a humanistic approach to knowledge, and in due course their influence penetrated the engineering curriculum as well. As Ricketts envisioned it, the new emphasis would bring flexibility to a Rensselaer education, and make it possible for students to combine engineering and business degrees in five years of study.

**New Construction**

In 1915, under Ricketts's direction, a dormitory system of many units began to take shape on the campus. Completed in the next decade, this new phenomenon at Rensselaer provided housing and dining facilities for students on a substantial scale. These dormitories commemorated their donors, among them, an important and illustrious group of railroad executives and bridge builders: Roebling, Buck, Cooper, MacDonald, Cassatt, Matsimoto, Hirai, Roberts, and Waite.

To supplement these buildings, Mrs. Sage financed a dining hall with a gift of $100,000, in memory of her nephew, Russell Sage II. Altogether, these
developments acknowledged a growing student body, gave Rensselaer a more self-contained character, and accentuated the physical and social separation of the Institute from the City of Troy, which had figured so prominently in its earlier history.

**The World War**

World War I had a significant impact on Rensselaer and on American education generally. In 1918, the War Department established the Student Army Training Corps for the education and training of officers. The value of higher education — and particularly technical education — to the war effort was being weighed seriously for the first time. The Student Army Corps was a short-lived arrangement, since the Armistice of November 11, 1918, made it superfluous. For two months in the fall of 1918, however, Rensselaer, like many other colleges, became a military camp, with 550 student soldiers and 120 student sailors under military authority.

**The Centennial**

In 1920, Palmer Ricketts — always opportunistic — broached the possibility that Troy might establish a fund to finance a new building for civil engineering,
and dedicate it in honor of the approaching centennial of the founding of Rensselaer. This suggestion quickly materialized into an elaborate campaign, raising more than $160,000. It resulted in the construction of the Troy Building in 1924, as the Centennial Memorial.

The Centennial Anniversary was the first in the history of technological education in America. Ricketts was determined to make the most of this. Planning began as early as 1921, and by June 1923, a program had materialized for a gala celebration that would extend over two days. Ricketts sent out invitations widely in Europe and the Americas.

The celebration took place on October 3 and 4, 1924. Representatives of 250 educational and technical institutions and associations — 72 from 23 foreign countries — participated in the festivities. Secretary of Commerce Herbert Hoover, an engineer who had received an honorary degree from Rensselaer in 1920, represented the President of the United States and delivered the principal address. This was probably the crowning event of the Ricketts presidency, and he received many honorary titles, including Commander of the French Legion of Honor, and Knight Commander of the Order of the Crown of Italy.

Alumni participated prominently in the festivities, and several hundred came up the Hudson on the steamship "Berkshire," chartered for the occasion, and lived on board during their stay in Troy. The Alumni Association had continued to strengthen itself in the 1920s under the presidency of Ralph G. Packard, a graduate of the class of 1864, and an energetic secretary, Edward G. Dion, of the class of 1912.

Additional Construction

And Ricketts was not done building. By 1928, he began another structure, appropriately named for Amos Eaton, to contain a large assembly hall for some 1,500 students, as well as ample library facilities. In 1929, at the close of the postwar boom, Ricketts originated another of his long-planned projects, for a building to house the newly established department of architecture. The gift from Isaac Blandy, of the class of 1887, provided the impetus. The building, costing $357,000, was completed in 1931 and named after...
B.F. Greene. Ricketts then foresaw a "breathing spell for a while until we see how the revival of business affects us." This was an optimistic appraisal of the Depression then under way, prompted perhaps by the substantial operating surpluses Ricketts was able to report throughout this period.

As late as 1932, Ricketts, now 76 years old, again anticipated needs for the newly established departments of metallurgical and aeronautical engineering, and he started yet another building in 1934—the last year of his life. The building was completed at a cost of $400,000. For three decades, there had been scarcely a year without the appearance of a new building or other physical improvement at Rensselaer. The Ricketts campus was now virtually complete. It is entirely fitting that this last building was named the Ricketts Building, in honor of the greatest builder in Rensselaer's history.

An Original

By turns generous and domineering, grandiose and finicky, P.C. Ricketts was a Rensselaer original. He superintended the rebirth of Rensselaer on the only true campus it has ever possessed, and he presided over the growth of Rensselaer's resources, from less than $500,000 to more than $11 million. From Rensselaer's two degrees, civil engineering and bachelor of science in 1901, there had grown by 1934 a dozen varieties covering virtually all branches of engineering, together with advances into architecture, science, and business administration.

Among the numerous graduates the Ricketts era produced were Garnett Baltimore, Rensselaer's first African-American graduate, who designed Prospect Park in Troy; Sanford Cluett, who was awarded over 200 patents, including one for the processing of cloth to reduce shrinkage; and Allen DuMont, inventor of the cathode ray tube.

An argument could be made that only someone with a personality both conservative and visionary, and someone of total dedication, could have rescued this venerable institution from its outdated attitudes and planted it firmly in the 20th century.

Ricketts's widow wrote about her husband in a letter to the trustees on February 18, 1935: "His work for the Institute was always a pleasure and never a task. Even periods of stress did not discourage him. I think it is given to few to have derived so much joy from their work as he did."

As there were no children from his marriage to Vjera Conine Ricketts, upon her death in 1937, their joint estate, amounting to more than $300,000, was left to Rensselaer.
CHAPTER 4

Upheaval

The death of P.C. Ricketts in 1934 marked the end of an era. Through the force of his personality, Ricketts had put in motion the most ambitious building program in Rensselaer's history, enlarged the curriculum, and brought Rensselaer into the 20th century in the strongest financial condition it had ever enjoyed. On the other hand, the Ricketts style of management — essentially autocratic — belonged to an earlier time. The fact that Ricketts had spent all of his adult life at Rensselaer, as student, faculty member, director, and president, contributed to an insularity in Rensselaer's attitudes and procedures. The Institute had its own way of doing things — reinforced by its being the first school of its type in the country — and Ricketts discounted, if not disparaged, outside influences.

For a short time after Ricketts's death, Rensselaer's leadership was in the hands of Edwin S. Jarrett, an alumnus, trustee, and vice president of the Institute. A retired engineer and industrialist, Jarrett had a short and uneventful presidency. His main interest was in supervising completion of the Ricketts Building.

The country was in the middle of the Great Depression, and enrollment at Rensselaer had declined steadily due to a diminished demand for technically trained people. Since Rensselaer depended almost entirely on tuition for operating funds, the effect on its finances was alarming. This was a time that required strong and inspired leadership. Jarrett's tenure lasted barely a year; he was asked to resign, and a committee of five trustees searched for a new president.

The trustees were looking for someone from outside Rensselaer — in part, to counteract some of the inbred qualities that had characterized the Ricketts

THE RENSSELAER VICTORY

Launched in February 1945, the 455-foot, 10,500-ton "Rensselaer Victory" was an example of the type of ship that Clay Bedford '25 and his team were able to build in four-and-a-half days during World War II. The ship was one of 14 named for American colleges and universities.

TROY COLLAR SHOPS (opposite)

World War II and its aftermath brought the twilight of the industrial period in Troy, as the country's industrial base moved from the cities of the Northeast to the South and West. Troy's iron and steel mills were shut down, and these enormous collar shops along the Hudson River closed one by one, ending a grand chapter in the city's history.
administration. The world of technical education was changing profoundly. Rensselaer could lay claim to being the first school in the country dedicated to practical applications of science, but by 1934 it had numerous competitors. As the basis of the American economy shifted from agriculture to industry, and the demand for technically trained personnel grew accordingly, numerous engineering colleges, as well as technical colleges within technical universities, had sprung up all across the country. Many of them, by choice or by chance, were structuring themselves to take advantage of the growth opportunities that would result once the country emerged from the Depression and was fully industrialized. For example, Rensselaer's competitors were installing administrations that had broad perspectives and could adapt quickly to change. They were developing faculty committed not just to education but also to research.

_The Hotchkiss Years_

The trustees selected William Otis Hotchkiss, then president of Houghton School of Mines (today the Michigan College of Mining and Technology), as the Institute's tenth president. (The Houghton School of Mines was named for Douglas Houghton, an 1829 graduate of The Rensselaer School, who became Michigan's first state geologist.)

Hotchkiss was the first head of Rensselaer since Amos Eaton who was not a graduate. He held degrees from the University of Wisconsin, in both geology and civil engineering, and had earned his Ph.D. there as well. He had been Wisconsin's state geologist and chairman of the State Highway Commission. In his mid-50s at the time of his appointment as Rensselaer's president, with varied experience as teacher, public official, and academic administrator, Hotchkiss was expected to bring to the Institute an outsider's perspective, experience, and sophistication. The new president came to campus in September 1935 and was introduced to the alumni at their midwinter dinner in Washington in 1936.

By nature a friendly consensus-builder, lacking Ricketts's gruff, forceful, often peremptory manner, Hotchkiss led by persuasion rather than by fiat. He was also obliged to win the confidence of trustees and faculty during a time of straitened financial circumstances — difficult conditions for even a charismatic leader.

To remedy some of the economic problems, Hotchkiss initiated a tuition increase to $450 in 1939, and the increased revenue brought Rensselaer's budget above $1 million for the first time. Hotchkiss also recognized the
institution's need for more professional publicity, and he established a full-time publicity bureau to take care of press and public relations. He appointed a faculty committee to help improve the curriculum and student relations. The document this committee produced stressed not only educational aims, but also the Institute's responsibility for the civic, social, and personal development of the individual student — novel ideas for technological education at the time.

Another faculty committee took up the task of finding employment for seniors, a crucial issue in terms of this protracted and deep Depression. Generally speaking, Rensselaer faculty must have felt it a heady experience to immerse themselves in questions of Institute policy, especially after the relative trivia that had dominated most faculty meetings during the Ricketts era.

Even more urgent in Hotchkiss's mind was the need to upgrade faculty status at Rensselaer by providing more modern equipment and stimulating increased research activity. In the alumni letter of 1937, Hotchkiss compared Rensselaer unfavorably with other technical schools in terms of faculty salaries and the great number of Institute faculty holding low academic rank. He estimated that $150,000 in additional funds per year were needed to rectify the situation. Hotchkiss calculated the new endowment required for this and other purposes, such as annuities and research facilities, at more than $8 million. To this he added scholarship and construction needs, amounting altogether to nearly $11 million — virtually equal to all the Institute’s existing assets.

As a partial response, the trustees created additional professorships, naming them after donors and distinguished graduates. The first named chair had been the Hart professorship of rational and technical mechanics (1883); in 1938, new ones were added, such as the Robert W. Hunt professorship of metallurgical engineering, and the Russell Sage professorship of mechanical engineering.

By 1940, Rensselaer had established a separate department for physics (divorced from electrical engineering), and had
NAVY GUNNERS  Rensselaer Navy cadets get "hands-on" practice as they take aim with the naval gun placed in front of the Greene Building during World War II. During Hotchkiss's tenure, the campus became a military installation for the second time in less than 25 years.

removed mechanics from civil engineering. There was also a breakup of the catchall department of arts, science, and business administration — created in 1924 — into independent entities of biology, English, foreign languages, and economics and business administration.

World War II

In December 1941, World War II began for the United States. This, the second major conflict of the 20th century, would be the first thoroughly modern, technological war, one that would introduce sweeping changes to every aspect of American society.

The war produced a major upheaval on the campus at Rensselaer and at every other technological school in the country. In effect, the advent of World War II ended conventional civilian activity on the Rensselaer campus.
The increasingly technological nature of warfare translated into enormous demands by the government upon Rensselaer and other American engineering institutions for special training programs. For the next five years or more, Rensselaer became virtually an adjunct of the American government and military.

As president, Hotchkiss had the responsibility of converting Rensselaer’s role to a military and public one. In 1941, the Institute and the U.S. Navy established a unit of the Naval Reserve Officers Training Corps, and a Department of Naval Science and Tactics. This began a long and distinguished relationship between Rensselaer and the modern Navy that would see Rensselaer graduate a stream of naval officers, many of whom would rise to the rank of admiral.

As a first sign of change, the population of civilian undergraduates dropped quickly to under 300, while Navy V-12 students — comparable to the Student Army Training Corps of World War I — numbered 600. The faculty population dropped as well, from a prewar total of 160 to 100. Most of those who left withdrew to enter the military. Many remaining faculty transferred from their regular departments to various, specifically wartime, instruction roles.

In 1940, the N.Y.S. Department of Education, acting for the federal government, sponsored at the Institute various noncollege defense production courses, which, early in the war, enrolled 700 area industrial employees. This was a pioneer effort that continued through the war, with a total of over 3,100 taking vocational courses.

More directly related to the war was V-5, a Navy Flight Preparatory School for enlisted men, which supplied ground crew training under a sizable faculty drawn from various departments. In 1943, the Navy introduced V-12, a college training program for naval officer candidates. The government assigned Rensselaer a quota of 750 men. This, in fact, provided the principal employment for the regular faculty, since the aim of the program was to combine military training with engineering training in all departments.

The war turned almost all of Rensselaer’s previous educational patterns upside-down. A total of approximately 5,700 students were involved in war training programs that operated both during the day and evening. To meet war needs, Rensselaer established an accelerated academic year, with three terms of 16 weeks each, thus ending the traditional seven-week courses held at the Institute for generations. Rensselaer replaced the four-year curriculum with one of only two-and-two-thirds years, with new classes beginning three
After more than a century, the institution finally accepted Amos Eaton's position on the education of women, with the 1942 arrival on campus of these 100 employees of the Curtiss-Wright Corporation. They studied aeronautics and represented the first significant number of women to be educated at Rensselaer.

The Curtiss-Wright Cadettes were quite a novelty in the 1943 Transit. One picture of a group of women was simply labeled "Engineers?" It was not until the late 1970s that Rensselaer made real progress against such reluctance to accept women as full partners in engineering and scientific education.
times yearly, and with a resulting confusion of commencement dates and class designations. How successful this was in educational terms is difficult to assess, but there were predictable complaints from students and faculty of insufficient study time, poor study conditions, and an excessive emphasis on physical drill and other military activities.

Women on Campus

A traditional aspect of Rensselaer life that changed as a result of the war was the introduction of substantial numbers of women to the campus both as students and as instructors. A special group of 100 women, employed by Curtiss-Wright Corporation and known as Curtiss-Wright Cadettes, arrived in 1942 for training in aeronautics. Rensselaer also employed women as instructors in English and physics.

In 1942, a handful of women were the first to enroll in degree-granting programs. The first two women to receive their degrees, Lois Graham and Mary Ellen Rathbun Kolb, did so in 1946, two-and-two-thirds years after enrolling, reflecting the accelerated academic calendar. Graham continued her studies at Illinois Institute of Technology (ITT), eventually becoming professor of mechanical engineering and department chair at ITT.

Initially, there was no campus housing for women. They took rooms in private homes or in the YWCA. Some women were housed at Russell Sage College. But by the end of the 1940s — when there were 40 women on campus, compared to about 4,000 men — Rensselaer was able to provide a house for about a dozen women students.

Though Rensselaer had been founded for the education of both men and women, by 1950 a total of only 30 Rensselaer degrees had been awarded to women, and by the end of the next decade, the total had increased to only 33. By 1960, Rensselaer began to make a more concerted effort to recruit women. In 1966, the Institute opened the Burdett Avenue Residence Hall, with one wing assigned to women students. That year, 27 women entered Rensselaer in a class of 1,000. The number of women students would double in the early 1970s.

Faculty Research

Another by-product of the war for Rensselaer was the increased impetus for faculty research as a result of the availability of government funds for wartime projects. Research grants totaled nearly $100,000 in 1942-43. In 1944, this number rose to nearly $200,000, and the projects were sponsored
Soaring Over Obstacles

Nancy DeLoye Fitzroy '49 dreamed of surmounting the artificial barriers that stood in the way of women pursuing careers as engineers. Flying is a passion of hers, and Fitzroy qualified for a commercial pilot's license in helicopters, and then in single- and multi-engine fixed-wing aircraft.

With talent, dedication, and high achievement, she likewise soared to the top of her profession, and her example has led the way in opening up engineering to increasing numbers of women. In 1963, she was the first woman in the history of the American Society of Mechanical Engineering to be elected chair of a section. As a manager at General Electric, she was one of the first engineers to work on the design of heat transfer surfaces in nuclear reactor cores. In 1972, Fitzroy was the recipient of the Society of Women Engineers Achievement Award. In 1995, she was elected to the National Academy of Engineering.

by government as well as industry. While such figures are small compared to the level of wartime research funded by the government at other technological schools — MIT and CalTech, in particular — at an institution that had consistently emphasized teaching in preference to research, these numbers were not insignificant.

Altogether, the Institute was an extraordinarily busy place during the war, engaged in a diversity of war-related educational activities that proved that Rensselaer — like numerous other technological schools — could adapt quickly to a national emergency. Four thousand one-hundred fifty Rensselaer men and women served on active duty in World War II in theaters around the globe. They made enormous contributions to every aspect of the war effort — particularly in technical areas — and 113 of these individuals made the ultimate sacrifice for their country.

Hotchkiss's major contribution to the war effort was the idea of an Army Specialist Corps, which would replace military personnel with civilians in technical posts in the United States. Hotchkiss himself became deputy director-general of this corps, with the rank and uniform of a brigadier general. Though the corps did not materialize in any large-scale practical sense, administrative tasks kept Hotchkiss in Washington for long stretches in 1942, leaving him only a few days a month to discharge his Rensselaer responsibilities. He turned over the day-to-day operations of the executive office to Livingston W. Houston '13.

Long before the end of the war, it was clear to Hotchkiss that it was neither possible nor desirable for Rensselaer to return to its prewar mode of operation. The massive industries and work forces assembled to produce war materials for a worldwide conflict could be adapted, with some adjustments, to peacetime production. A government-academic research partnership produced many scientific inventions that were helping to win the war; government would continue to require and fund research.

Early in 1943, Hotchkiss appointed a faculty postwar planning committee to map out a future course for
Rensselaer in a profoundly changed world. The committee had barely begun its work, however, when the trustees announced in October 1943 that President Hotchkiss, having reached 65 years of age, was retiring.

An Abrupt Departure
The precise reason for Hotchkiss’s sudden departure was cloaked in mystery. The official explanation, the fact that he had reached retirement age, is only partially valid, since Palmer Ricketts had been allowed to serve the Institute long after he had passed the official retirement age. Perhaps Hotchkiss’s mild manner and conciliatory approach were deemed inadequate to the solution of the Institute’s problems. Perhaps his extended absences from the campus in connection with the Army Specialist Corps were seen as inappropriate.

Whatever his shortcomings, Hotchkiss had forced a reconsideration of Rensselaer’s directions and future development. He had afforded the faculty a far greater role in the operations of the Institute. And he had reasserted the importance of research in the faculty’s professional development.

Houston Succeeds
His successor, Livingston Waddell Houston, was a younger man who had graduated from Rensselaer in 1913 with a degree in mechanical engineering. Settled in Troy, for 40 years he had been affiliated with the Ludlow Valve Manufacturing Company, rising to the position of president and board chairman. Houston had made himself available early on for service to Rensselaer, and had become a trustee in 1925, and subsequently, secretary of the Board of Trustees and full-time treasurer of the Institute, in 1935. He became executive vice president of the Institute near the end of Hotchkiss’s tenure.

With a knowledge of Rensselaer affairs, Houston represented a return, in a sense, to the Rensselaer tradition of management by “insiders.” But Houston was also in possession of a unique advantage. As an experienced businessman, he appreciated and understood the problems of modern organizational structure and in particular the challenges of modern educational management.

Over the next 14 years, Rensselaer would undergo the physical and financial stresses associated with rapid growth; these would make the problems of the war years pale by comparison. The fact that Rensselaer had a businessman at the helm contributed in no small part to its successful survival of these postwar upheavals. At a time when administrative problems could have swamped the Institute, happily, it had a superb administrator as president.

One of Houston’s first official acts was to propose a reorganization of the
growing Institute to position it for what he foresaw as unprecedented demands for technical education. Upon taking office provisionally in October 1943, Houston issued a “Statement to the Faculty,” announcing the details of a tripartite reorganization of the Institute. Under the president there were to be three officers: an executive vice president, a dean of faculty, and a dean of students. Matthew A. Hunter, head of metallurgical engineering and senior member of the faculty (his service began in 1908), became dean of faculty; Ray Palmer Baker, professor of English since 1915 and then assistant director, was designated dean of students. Houston, the third officer, officially remained executive vice president.

This reorganization reflected the substantial political power of a growing student body, and the emergence of a modern professional college administration. Not an educational theorist by training or inclination, Houston understood that Rensselaer's educational mission was paramount, and he relied heavily on the advice and support of the new deans of faculty and student affairs.
A Postwar Explosion

The end of the war brought with it a period of explosive growth, as thousands of veterans — many of them married and with families — flooded the campus, intent upon starting or completing their education, aided by a liberal new “GI Bill of Rights.” Legislation passed by Congress in June 1944, the GI Bill offered generous educational support to all veterans.

The demand for education was particularly intense at technological institutions. In the first half of the 20th century, the ratio of engineers to workers in American industry multiplied tenfold, and this growth would accelerate. Under the demands of wartime, American industry had grown phenomenally. Now this industrial giant required streams of technically trained people to keep it operating and expanding.

At first, the increase in students at Rensselaer was relatively modest. In his letter of June 1945 to the alumni, Baker, the dean of students, foresaw that

"TIN TOWN" Returning veterans numbered over 2,800, and many had families. The $2 million village officially named "Rensselaerswick" and "Randel" mushroomed overnight on 40 acres east of Burdett Avenue. This emergency housing project accommodated 750 single students and 380 families. Two-bedroom units rented for $25 per month, plus utilities. Generations of students who were married during their Rensselaer years share fond memories of life in the "Wyck."
The age and maturity of the student body in the late 1940s led to Rensselaer's most family-oriented commencement. Instead of greeting parents, President Houston appears in the foreground with students' children.

It "may be necessary to provide temporarily for as many as 2,000 students." This number seemed large then, since there were only 932 students, including 240 civilians, on campus. But by 1946, there were 3,452 students at Rensselaer. Near its peak, in September 1948, enrollment was 4,485, of which 4,004 (including 2,895 veterans) were undergraduates. So, in rapid order, these students gathered on a campus built for one-third their number.

The strains this placed upon all of Rensselaer's human and physical resources were tremendous. To accommodate the influx, Rensselaer established special offices and systems, many of which have endured in some form to this day. The Institute set up a department of guidance and counseling in the Office of the Dean of Students, which also administered the local education advisement bureau of the Veterans Administration. The faculty expanded threefold, largely through the addition of new assistant professors and instructors.
Every aspect of the Institute experienced remarkable change. The graduate school grew from 33 to 292 students, and by 1949 there was an entirely new evening school, with 281 students. While all departments grew apace, differences in the rates of growth reflected the dominant areas of wartime research activity. Mechanical and electrical engineering at Rensselaer increased by more than three and four times, respectively, in a decade. More impressive perhaps was the spurt in physics, from 25 students to 187, while chemistry doubled.

Cooperative education — opportunities for students to alternate classroom activities with related work experience in industry — grew. The military assigned many officers to Rensselaer for graduate study. All of the military branches — Navy, Army, and Air Force — established ROTC programs.

It was not until January 1951 that Rensselaer graduated the last "irregular" class. Because of the extraordinary demands on technological education, wartime and postwar conditions prevailed at Rensselaer for several years after the end of hostilities. In September 1951 Rensselaer reinstated the two-semester year and the four traditional class years. "Normal" operations were now possible, with a student body reduced from postwar highs, but still double that of the prewar years.
Stretching Strained Facilities

The Korean War was now making itself felt. ROTC enrollment rose from 124 in 1946 to 1,085 in 1951, and to 1,205 in 1952.

The Rensselaer administration in these years concerned itself with an overwhelming agenda, and with providing educational facilities for the influx of students. Many measures were necessarily makeshift. Houston hurriedly converted Amos Eaton Hall, Winslow Laboratory, and North Hall, formerly an upperclass dormitory, to classroom use. Government assistance, both federal and state, became a major financial factor in providing emergency educational and housing facilities.

After World War II, veteran housing became a top priority, and the Houston administration responded by constructing Rensselaerwyck — married student apartments — on land east of 16th Street. Built with the aid of surplus war materials, Rensselaerwyck had the popular and unofficial name of “Tin Town.” From the start, it provided a natural community of young couples who mingled freely and built an impressive spirit and unity. Their community enterprises included a cooperative store, social affairs, and even a mimeographed newspaper.
With state aid, Rensselaer acquired an old Catholic orphanage, St. Vincent's, with its chapel given by the McCarthy family of Troy, and converted it first into emergency housing for new faculty members, and eventually into Mason Laboratory, to accommodate overflowing classrooms and offices. The immediate demand, and the shortage and rising costs of new buildings, dictated the conversion of other older structures. One was a Catholic high school, originally a post-Civil War hospital, renamed West Hall.

Another was St. Joseph's Convent and chapel, acquired in the early 1960s and located on 20 acres adjoining the campus to the south. Thus the Institute acquired the structure erected more than a century earlier as the short-lived Troy University, which it then renamed University Hall. Perceived to be of limited use because of its antiquity, it was scheduled for razing, but there was also a modern chapel on the grounds, which was made into a more spacious library to replace the library in Amos Eaton Hall.
INDUSTRIAL COUNCIL  In the early 1950s, under the leadership of Ray Palmer Baker, Rensselaer organized the Industrial Council. Its mission was to conduct an annual conference in which high school teachers and representatives of major industries could meet to discuss common concerns. Some of the council’s meals, served in Rensselaer’s new Field House, were among the largest events of this type ever held in Troy.

Outreach to Industry

In October 1949, Rensselaer celebrated its 125th anniversary with a three-day event, featuring a series of convocations and panel discussions. Leading industrialists introduced topics such as the role of technology in industry, the expectations of industry and society with regard to graduates of technological schools, and the modern corporation’s responsibilities to the future. In honor of the occasion, the American Society for Engineering Education held its annual convention for the first time on the Rensselaer campus.

The relation of American industry to education struck an early note in Rensselaer’s new awareness of its place in the postwar world. The relationship materialized a few years later, between 1952 and 1956, in the Industrial Council, headed by Baker. The mission of the council was to conduct annual conferences, at which a large number of high school teachers from all over the country met on campus with representatives of major industry to discuss common concerns, particularly about preparing qualified personnel. In successive years, the oil, chemical, automotive, drug, electrical, and securities industries assumed the costs of the meeting and presented their needs in the
public forum. The Industrial Council was a significant sign of the growing interdependence of American industry and education, and in 1957 Rensselaer won a citation from the Freedom Foundation for its work in organizing the council.

The postwar period was marked by the increasing application of automation and information processing to every aspect of industry, and was best represented by the growing use of computers and automatic controls. The American factory was no longer characterized by long lines of independently operating machines, but by interdependent and integrated systems of production.

Graduate Education and Research
The pressure toward greater sophistication in industrial methods inevitably prompted a greater emphasis on graduate education and research. In the reorganization of the Institute under Houston, graduate study became a division in 1953 and a separate school in 1957. Rapid growth ensued. The increasing availability of fellowships and assistantships was a contributing factor. In 1954, Rensselaer awarded 87 master's and 27 doctoral degrees.

Corporations now began sending representatives to the campus under the auspices of a special placement office; they competed against one another in recruiting personnel. Interviews and plant visits filled much of the spring term for seniors.

Indicative of growing links with industry, in 1956, Rensselaer extended its graduate facilities beyond the campus by entering into an agreement with the Knolls Atomic Power Laboratory, a government institution then under General Electric management — an agreement through which Knolls personnel would take courses offered by Rensselaer and receive Rensselaer degrees. This was accomplished largely through the efforts of V. Lawrence Parsegian, who came to Rensselaer in 1954 as professor of nuclear engineering and chairman of the engineering group. He became the first dean of the School of Engineering in 1957. In 1958, through Parsegian’s influence, the Atomic Energy

Creating a Rensselaer Family Tradition
The five Mow brothers come from a distinguished Chinese family. When their father, who served as a diplomat, fell from favor with the Communist takeover of the Chinese government, the brothers — Van, Bill, Maurice, Donald, Chao-Chow (nicknamed Harry) — and their mother, Ay-Jaen, found themselves in the U.S. with little English or knowledge of the American way of life. By opening a successful restaurant on Long Island, where all the brothers worked, they soon became acculturated. In time, all five brothers found their way to Rensselaer, where, among them, they accumulated 11 degrees, including three doctorates.

Today, Van Mow '62 is one of the country's most distinguished biomedical researchers; he taught at Rensselaer for years and is now affiliated with Columbia University. Harry Mow '53 is a successful scientist, entrepreneur, and real-estate developer. Bill Mow '59 patented the country's first large-scale integrated device for computer chips, and is president of Bugle Boy Industries. Donald Mow '56 is an award-winning architect. Maurice Mow '62 is a professor of civil engineering at California State University in Chico.
Commission sponsored installation of a $2.5 million linear accelerator for education and research, and a building to house it on the Rensselaer campus.

**Hartford Graduate Center**

In 1955, as a result of negotiations with United Aircraft Company of Hartford, Connecticut, Rensselaer agreed to establish the Hartford Graduate Center as a full-time activity, serving the employees of the company and others in the area. The lack of technological graduate facilities in central Connecticut was detrimental to United Aircraft in employing and keeping technical personnel. The company acquired and turned over to Rensselaer a building in South Windsor to be operated as a branch of the Institute under Connecticut law.

The Graduate Center began operations with 220 students, a director (later dean), Warren Stoker — formerly professor of electrical engineering — and faculty from Rensselaer, as well as adjunct professors drawn from local industry. The institution prospered, and by 1961 became, officially, Rensselaer Polytechnic Institute of Connecticut. This institution has provided graduate education to thousands of residents of central Connecticut and remains actively connected to Rensselaer.
Academic Restructuring
Under Livingston Houston, the academic reorganization of the Institute progressed systematically. In 1953, Rensselaer created four groups, each under a chairman, for the fields of engineering, science, architecture, and general studies. These educational divisions, which had equal stature, were responsible to the dean of the faculty. Prior to this, the departments had reported directly to the dean of the faculty.

The final step in the reorganization occurred in 1957, when Rensselaer converted the groups to schools and the chairs to deans, all under Paul Hemke, formerly dean of the faculty and now elevated to vice president and provost of the Institute, a new title. The Graduate Division, too, became a school with its own dean and graduate faculty, under Clayton O. Dohrenwend. The Office of Student Administration was directed by a vice president, Howell A. Jones. The Office of External Affairs was directed by Richard W. Schmelzer as general secretary; his responsibilities included public relations, development, and alumni activities.

Nineteen fifty-seven also marked the beginning of Project Reward, established to modernize science education by applying new visual aids. Project Reward had the encouragement and financial backing of trustee Clay Bedford, as well as industry support. With a technical staff of its own, Project Reward undertook experiments within various departments to develop new methods of facilitating instruction, including motion pictures and closed-circuit television. Project Reward was the precursor of Rensselaer's ambitious programs to apply technology to education that continue to this day.

Student Life
Houston also purchased a large war-surplus storage facility in Rhode Island, and then reassembled it in Troy on land adjacent to Rensselaerwyck. This was the Field House, which became the site of the large-scale Industrial Councils of the 1950s, expanded commencement exercises, and numerous cultural events, including concerts for the students and the community.

Houston was eager to strengthen the collegiate and extracurricular sides of student life. As a student who had been active in athletics, he wanted to balance the academic with a strong emphasis on athletic, social, and cultural interests. The Field House was a part of that program.

In fact, the most successful era in Rensselaer athletics occurred during the Houston years, beginning with the appointment of a colorful and energetic football coach, Walter C. (Duke) Nelson, before the war. In 1940,
Rensselaer won all but one football game, and 1941-42 was the best all-around year in Rensselaer athletic history, when all varsity teams won at least 75 percent of their games. In 1945, the varsity basketball team reached the finals in the NIT basketball tournament.

After the war came the appointment of another dynamic coach, Ned Harkness, who brought two sports — hockey and lacrosse — to their peak. In 1948, the Rensselaer lacrosse team had an undefeated season and went to England, where it won all of its exhibition matches and played an all-England
team to a tie before 65,000 people, as part of the Olympics. In 1952, Coach Harkness led the Engineers to the national lacrosse championship.

But hockey was the most successful sport, with Rensselaer winning its first national championship in 1954, and continuing to rank prominently among the top teams nationally. Over the years since the Harkness era, hockey has established itself as Rensselaer's premier sport, regularly drawing large crowds from the campus community and the surrounding region, producing entertainment for thousands of people.

Student publications also underwent expansion. To the Transit and the Poly, both of which dated from the 19th century, the students added the Engineer in 1947, a quarterly engineering student publication of articles on contemporary themes in technology. In 1961 appeared the Gorgon, a venture into literary journalism, with student poems, stories, and art.

LACROSSE TO ENGLAND  In 1948 Coach Harkness took his powerful Rensselaer lacrosse squad to England to compete against an English team in an exhibition game at the London Olympic Games. This publicity shot aboard their ship shows members of the team, with Harkness on the right. The woman in the photo is Susan Blanchard, daughter of lyricist Oscar Hammerstein II.

HOCKEY CHAMPS  In 1954 Rensselaer established itself as a power in intercollegiate men's hockey by winning the national title. Captains of the team were Frank Chiarelli and Jim Shildneck. The coach holding the championship trophy is the legendary Ned Harkness, a superb motivator of collegiate hockey and lacrosse players.
As campus life returned to normal in the ’50s, new traditions began to emerge. Here students arrive by bus to attend the forerunner of today’s summer student orientation. Frosh camp was held at the YMCA’s Silver Bay Conference Center on Lake George. New students learned about Rensselaer’s traditions and got to know the faculty and one another in a beautiful Adirondack setting not far from Rensselaer’s current Fresh Water Institute, a research facility in Bolton Landing.

“AH ME” Postwar hazing of new students, while not as aggressive as the rushes of the Ricketts era, included this traditional rendition of the song “Ah Me” sung by the kneeling new students. Red beanies emblazoned with a white “R,” also known as “dinks,” were standard garb for neophytes.
In 1958, a completely student-run and student-managed FM radio station, WRPI, dedicated primarily to music and other features for a student audience, went on the air. Since 1958, WRPI — the most powerful student-run FM radio station in the area — has provided alternative programming for Capital Region audiences, broadcast RPI hockey games to the region, and given many students the opportunity to become announcers, sportscasters, and disk jockeys. An earlier student-run radio station — WHAZ, established in 1922 — was among the first collegiate radio stations in the country. WHAZ transmitted worldwide.

Memorable Personalities
Rensselaer has always attracted its share of colorful and memorable individuals who achieve great popularity with the students and become fixtures of campus life. One of the most memorable was Emil Page (“Pagie”), who, as custodian and general factotum of the gymnasium between 1912 and 1959, became a friend and in some cases almost a foster parent to generations of Rensselaer students.

Then there was Dr. Joseph Pahl ’39, who established Rensselaer’s first permanent medical infirmary on campus, and for decades selflessly and cheerfully tended to the medical needs of thousands of Rensselaer students.
FRANK MCNEIL

McNeil came to Rensselaer during the Ricketts years. He managed a book rebate program that eventually became the bookstore, arranging to keep the profits to help finance the progress of the Rensselaer Union. He was the champion of the concept of a student-operated Union program. Under his guidance, a series of Union Executive Boards initiated and completed the plan for the current Union building. Today the Rensselaer Union's main dining room bears his name.

Frank McNeil also rendered loyal service to the campus community for many years as secretary of the Student Union. Under McNeil's leadership, the Rensselaer Union became more of a focal point than ever before for student activities and government. McNeil was particularly effective in efforts to build the current Rensselaer Union building, and its principal dining room is named in his honor. He is remembered for his warm and outgoing personality.

And Willie Stanton ("Mr. RPI") was another who left the stamp of his personality on the campus. Stanton was an orphan who worked in the Union kitchen and befriended countless students. He could be counted on to put in an appearance at most sporting events and at many campus social gatherings. Long before athletic scholarships were available, Stanton opened his apartment near campus to two or three Rensselaer hockey players each year, providing them with room and board. His will established a student scholarship fund.

Father Bill Slavin came to Rensselaer in 1936 as resident Catholic chaplin, and except for service as a chaplain in the Navy during the war years, served the Rensselaer community until 1959.

Alumni Involvement

With the increase in the student body, Rensselaer's alumni naturally also grew, from 4,000 living graduates in 1934, Ricketts's last year, to more than 20,000 at the end of the Houston era, in 1958. They had doubled since World War II, and were currently increasing at the rate of approximately 1,000 per year — alumni of undergraduate and graduate programs combined.

Along with this increase was the growing reliance on alumni for funds to provide for growth in the postwar period — a pattern that was repeating itself at most private American colleges and universities.

Rensselaer took two significant steps along these lines, as early as 1942. In that year, Rensselaer established the annual Alumni Fund. It also employed a full-time editor to produce an enlarged bimonthly Alumni News, a magazine that had appeared only occasionally since 1928. This was now to be an organ of regular communication with alumni.

Another policy adopted at this time was the establishment of the Demers Medals — with a gift from alumnus John Knickerbacker, in honor of his classmate, Albert Fox Demers, of the class of 1886. These awards were to be made at the annual June reunions to alumni who had made significant achievements on behalf of Rensselaer. Significantly, the first two medals were bestowed in 1943, one on Demers himself, who was still alive, and post-
humously, on Jack V. Newkirk, of the class of 1936, who had been the first Rensselaer casualty in World War II, while serving with the Flying Tigers in China.

Rensselaer also made more concerted efforts to integrate alumni into Institute activities. Thus, in 1949, the year of the 125th anniversary, the Institute created the Alumni Advisory Council — the predecessor of the Rensselaer Council — composed of a representative selection of graduates who met annually to review the Institute's major issues and to make recommendations.

In 1953, as part of its public relations organization, Rensselaer established an Office of Alumni Activities, under a full-time director. After the retirement of Eddie Dion '12 in 1958, the headquarters of the Rensselaer Alumni Association moved to Troy, although the new secretary, C.E. Davies, retained an office in New York City.

Fund-raising became an increasingly important priority of the Institute. Special recognition of donors was made possible at this time through creation of the Rensselaer Society of Patroons, an organization of major donors that has provided an extraordinary level of support to the Institute from then until now.

Houston Retires
In 1958, Livingston Houston was 67 years old, and his retirement was imminent. He received a testimonial dinner from the alumni at their midwinter meeting. In the same month, the Rensselaer faculty conducted a special convocation in honor of Houston's retirement. The trustees presented him with a silver plate, engraved with their signatures, and a scroll summarizing his achievements.

Houston had led Rensselaer successfully during the most tumultuous period in its history. Under his direction, Rensselaer had adapted quickly to a war

RECOGNITION OF VOLUNTEERISM AND STEWARDSHIP

These two awards are presented by the Rensselaer Alumni Association in recognition of service and stewardship. The Albert Fox Demers Medal is presented each year to four individuals whose leadership has demonstrated extraordinary commitment to their alma mater. The RAA's highest award, the Distinguished Service Award, is presented to people who have given a lifetime of service to the institution.

EDDIE DION '12
For almost 40 years prior to 1958, the Rensselaer Alumni Association was led by Eddie Dion in the role of alumni secretary. During these years, the offices of the RAA were located in New York City, and the activities of the organization were to a large degree independent of the Institute. Dion is warmly remembered by scores of graduates of the Depression years, many of whom found their first job through his connections.
GM WEEK IN THE EISENHOWER ERA
Student life was at its best during Grand Marshal Week each spring, as blocks of fraternities formed political parties to support candidates for grand marshal and president of the Rensselaer Union. With plenty of “pledges” to supply the manpower, fraternity leaders cut political deals in smoke-filled back rooms. The week-long extravaganza included plenty of beer, outrageous costumes, oratory between classes, and the forbidden delights of Grand Marshal Night.

SOPHOMORE SOIREE, 1952
This event may have been the prototype campus “big weekend.” One thousand couples danced at the new Field House to the music of Johnny Long and his orchestra. Jazz great Teddy Wilson filled in at the breaks. The theme was “On An Island With You.” The Queen of Soiree was Carolyn “Twinkle” Van Winkle, daughter of a Rensselaer professor. The “favor” given to dates for the dance was a “Slipstick-Lipstick.”
SNOW SCULPTURE  Winter Weekends featured snow sculptures that rivaled anything seen on the Ivy League campuses. However, this did not become established as a tradition, thanks to the uncertainty of snowfall in Troy.

GLEE CLUB TOUR  In the '50s and early '60s, student musical groups often went "on tour." Here the Rensselaer Glee Club, with its quartet, "The Four Horsemen," prepares to depart for the annual round of appearances before alumni groups and high school assemblies. Two leaders of the Institute's musical organizations, Joel Dolven and Olin Niles, earned the admiration of generations of campus musicians.

A "MOCHON" FRATERNITY  Donald Mochon, acting dean of Rensselaer's School of Architecture, drew this sketch of fraternity life to introduce the Greek section of the 1957 Transit. It is full of images of a segment of campus life that has been extremely important to Rensselaer students since 1864.
mode of operation. This was followed by more radical changes after peace returned. During his presidency, enrollment increased threefold, to 4,000, and assets tripled, to nearly $51 million. Graduate education advanced, as did faculty research.

Growth, however, intensified rather than alleviated Rensselaer's financial problems, for there was no way tuition could cover the increasing costs of providing a quality technological education. Houston recognized that industry would have to support private education more actively, since private education produced the personnel that industry needed. Upon Houston’s departure, Rensselaer had in place a modern administrative structure that could respond to these challenges.

**Folsom Arrives**

For Houston’s successor, the trustees for the second time looked outside the Institute to select an engineer without Rensselaer ties. Like Hotchkiss before him, Richard Gilman Folsom came to Troy from Michigan, where he had been director of the Engineering Research Institute at the University of Michigan. Educated at the California Institute of Technology, from which he had received all of his degrees, including the doctorate in mechanical engineering, Folsom had earlier been professor and head of the department of mechanical engineering at the University of California. With an academic background, experience in both teaching and administration, and a familiarity
with the problems associated with large-scale research, Folsom came to Rensselaer at an opportune time.

To Folsom fell the task of completing the transition from what had originally been a small and struggling undergraduate school to the demands and opportunities of modern technological education. Achieving this goal was not only a question of adequate fiscal resources and expanded physical facilities, but a question of developing a new academic, intellectual, and cultural attitude and atmosphere on campus.

The large and diverse industrial corporation was becoming dominant in American life, and increasing demands on its technical leaders extended far beyond narrow specialties. This, in turn, was placing new stresses on the institutions that prepared technical personnel. More specifically, Rensselaer had to address any lingering provincialism in its view of its mission.

What had begun to emerge was the idea of a “technological university” — a concept similar in the broadest sense to that proposed by B.F. Greene over a century earlier — similar in a way to the comprehensiveness of a general university, which would provide Rensselaer students with well-rounded preparation for professional and personal growth based on courses in science and technology, augmented with a strong humanities and social sciences component.

PRESIDENT FOLSOM GREETS THE STUDENTS  In 1959 the trustees named Rensselaer's 12th president. Richard Folsom had been director of the Engineering Research Institute at the University of Michigan. A mechanical engineer with teaching and administrative experience, he was ideally suited to lead the new Rensselaer. He brought a confident, strong, dynamic leadership style to the position. President Folsom and his wife, Carol, demonstrated a sincere desire to build a sense of community at Rensselaer, which made them popular with both students and faculty.
STUDYING, 1963 STYLE  Dealing with academic rigor at the Institute has always been a challenge. In the era before the computer and smoke-free environments, the "all nighter" needed a trusty slide rule, a pack of unfiltered Luckies, a pack of those new "healthful" menthol-filtered Salems, cough drops, and plenty of black coffee.

SPECIAL CAMPUS VISITORS  John F. Kennedy, symbol of the hope and tragedy of the '60s, visited the campus during the 1960-61 school year, as did two other icons of the era, the Kingston Trio, minstrels of the complacent '50s, and Richard Nixon, focus of the disenchantment of the '70s. Photos of all three appeared on the same page of that year's Transit.

In 1958 Rensselaer introduced four major new degree programs, in language and literature, philosophy, psychology, and economics. The Department of Language, Literature, and Communication offered the first degree in technical communication, or technical writing — a field of study pioneered at Rensselaer. In line with the trend to enlarge graduate study at Rensselaer, graduate degrees were added in many of these areas.

Rensselaer also continued to expand its programs to improve the quality of science and mathematics instruction in secondary schools. As early as 1952, the General Electric Company provided funds for a six-week summer course in mathematics for high school teachers. These efforts were intensified as a result of the success of Sputnik, which the Soviet Union put into orbit on October 4, 1957. That same year, the National Science Foundation selected Rensselaer as one of 95 colleges in the country to conduct an eight-week science education program for high school teachers, leading to a master's degree after four summers.

The key role of the sciences in education and society was underscored by the establishment of Rensselaer's School of Science after the war. Physics, along with the other sciences, underwent an extensive program of revision...
and improvement of basic courses. Professor Robert Resnick and his colleagues in the physics department produced textbooks and manuals that facilitated the teaching of physics and that won national recognition and acceptance. *Physics*, which Resnick co-authored, went through four editions, was translated into 30 languages, and was read by over 5 million students worldwide.

The faculty, besides being of a higher quality, was larger now; this made frequent meetings of the entire faculty cumbersome. After 1962, the faculty authorized formation of a Faculty Council, consisting of 15 elected members, who met biweekly with the provost and represented the entire faculty. That organization has continued to grow in influence. Its successor, the Faculty Senate, had its constitution ratified by the Board of Trustees in the fall of 1994. The Senate consists of representatives from the Institute's academic departments and library.

**Physical Expansion**

In 1964, ground was broken for a new Student Union at Rensselaer. Construction of the building was made possible by the students' decision to increase the student activities fee several years earlier. By 1964, the students had accumulated over a quarter of a million dollars, which enabled Rensselaer to acquire a 30-year mortgage to finance the building's $3 million cost. As a result of continuing student support, that mortgage was burned in 1994.

Begun in 1965, construction of the Materials Research Center and Engineering Science Research Building — the first building on the modern campus dedicated to research — was funded through grants from the National Aeronautics and Space Administration and the National Science Foundation. Stephen Wiberley, who headed Rensselaer’s Interdisciplinary Materials Research Program, was instrumental in obtaining the $1.5 million NASA grant. George Ansell ’54 and Robert Loewy ’47 were key members of the research effort, as was Dean of Science Walter Bauer. Engineering Dean Arthur A. Burr obtained the half-million-dollar commitment from NSF.

Also in 1965, still another former Catholic institution was purchased, when Rensselaer acquired the substantial land holdings and buildings of the Convent of the Good Shepherd, adjoining the Institute on the north. For years, these structures were used for the overflow of offices from the campus, some School of Humanities and Social Sciences departments, and the Rensselaer Model Railroad Society.

Rensselaer had also acquired in the 1950s a number of land parcels totaling approximately 1,200 acres in North Greenbush, to the south of Troy. The
Perhaps the most welcome building constructed during the Folsom era, it was begun in 1964 after over $1 million had been contributed from student activities fees. Among other notable building projects completed under President Folsom were the Jonsson-Roland Science Center, the Materials Research Center, Cogswell Laboratory, the freshman dormitory complex, and the Darrin Communications Center.

original idea was to provide a site, should the removal of the Institute from an increasingly crowded campus become desirable. This became less and less likely, as Rensselaer chose instead to invest in new and renovated buildings on the main campus, and acquired property to the north and south of the “green-roof” campus.

In October 1969, Rensselaer dedicated a new $5.75 million Communications Center, containing lecture halls, classrooms, and television studios.

Campus Dissent

Near the end of the Folsom presidency, a series of events occurred with far-reaching implications for Rensselaer in the years ahead. New upheavals — prompted by social and political changes — swept the campus. American involvement in the Vietnam War (circa 1962-75), and in particular, American bombing of North Vietnamese sanctuaries in Cambodia (1970), politicized students and faculties at universities across the country. Another factor was the growing Civil Rights movement among African-Americans for a stronger
voice in the political and economic life of the country. While the resulting turmoil was not as destructive or as long-lasting at Rensselaer as at other campuses, the effects were felt nevertheless.

Noontime vigils against the war took place on 15th Street, in front of the Union. Students staged overnight “sit-ins” in the Pittsburgh Building and the Union. And in February 1970, students presented a petition to Folsom titled “Requisites for a Technological University,” which included in its demands construction of a new library, an expanded budget for Humanities and Social Sciences, and voting participation by students and faculty on Board of Trustees committees. Over the next decade, these “Requisites for a Technological University” became reality. The Folsom Library, the Sage Laboratory renovation for the School of Humanities and Social Sciences, and student participation in trustee committees became fully accepted.

Advances Toward Diversity
It was also at this time, in part as a result of the Civil Rights movement, that pressures increased on campus for Rensselaer to enroll more African-American students. Initially, the resistance to such a move by many community members was strong. Engineering schools tend to be conservative in orientation, and Rensselaer had been a predominantly white male institution since the time

BYRON EVANS  “A man at the right place at the right time,” Evans was Rensselaer’s vice president for student affairs during the turbulent period of the late ’60s and early ’70s. His even temper, and his sense of fairness and dignity, enabled idealistic student leaders, concerned faculty, and frustrated administrators to discuss and move toward resolution of issues in a calm and rational manner.

PEACE VIGIL. The impact of the peace movement during the Vietnam War was first felt when silent vigils for peace occurred each week. Supported by a small number of faculty and students, they were largely ignored by the conservative and apolitical student body. However, as the war escalated and the draft became a reality, both passive and active expressions of protest began to increase.
of its founding. Historically, the study of engineering had offered the opportunity for financial success and upward mobility for highly motivated people, but minorities had not made significant inroads.

Vice President for Student Affairs Byron Evans was at the heart of the controversy, pushing for positive change. Fortunately, student leaders convinced their peers of the timeliness and appropriateness of opening Rensselaer's enrollment to a mix of races. Faculty members Isadore Traschen, Bernard Fleischman, and William Brower '50 applied pressure on the administration. Professors George Handelman, Edith Luchins, Robert Resnick, Bruce Carlson, Alan Meltzer, and Henry Hollinger provided guidance and support for the students. Paul Zuber, Rensselaer's first African-American professor, was a source of outstanding leadership. Trustees — in particular, Joseph DiStefano '61, John Horton '52, Sheldon Roberts '48, and Detlev Bronk, president of Rockefeller University — also made their voices heard in support. Folsom concurred that the time was right to open Rensselaer to a more diverse population, and greater efforts were initiated to attract and retain minority students. This marked the beginning of the gradual diversification of the Rensselaer student body.

**Folsom Departs**

Folsom retired from Rensselaer in 1971. The Folsom presidency, which had begun in relative tranquility, ended with the campus more or less polarized along the lines of major constituencies — students, faculty, alumni, administration, trustees.

As president, Folsom had raised Rensselaer's academic standards, promoted graduate education and research, expanded physical facilities, and enlarged the student population. He had hired a talented vice president for student affairs, Byron Evans, and a vice president for planning, Rogers Finch, and had given them broad powers. He strengthened Rensselaer's fund-raising efforts, and it was during the Folsom era that J. Erik Jonsson '22 — Rensselaer's greatest single benefactor — became deeply engaged in the affairs of the Institute. President Folsom and his wife, Carol, presided over many functions at their house to which students, faculty, and staff were invited.

But political divisions between students, faculty, administration, and trustees had become a fact of life on campus at colleges and universities across the country, and Rensselaer was no exception.
THE CHALLENGE OF CHANGE  The American college campus was transformed during the Vietnam era, and Rensselaer was no exception. Demands for a new library, elimination of ROTC, an improved environment for minorities, budget increases, and reductions of institutional rules and regulations outside the classroom fill the pages of The Poly. Today's more democratic and open campus culture reflects the impact of these times.

FOLSOM LATER IN HIS PRESIDENCY
His leadership had brought Rensselaer out of post-World War II stresses and placed the institution on the path toward becoming a "technological university." As national and international events began to impact college campuses across the nation, Folsom was confronted with the need to cope with student and faculty groups that demanded change not only in national policy, but in the way the Institute was administered. During these difficult times, his desire to be sensitive to those who believed change was necessary and to do what was best for Rensselaer was never questioned.
The last quarter-century was one of the most contentious in the history of the United States. An unpopular, decade-long war in Southeast Asia polarized the population, pitting many young people against authority figures, and influencing American foreign and domestic policy profoundly. A major government scandal — Watergate — forced an American president to resign his office. A growing minority population demanded a voice in political and economic decisions. American's postwar economic and political dominance of the world was challenged.

Inevitably, these forces for change made themselves felt on the Rensselaer campus. In the early 1960s, the campus was still a relatively isolated place. The college assumed an in loco parentis role toward students — setting and maintaining moral and behavioral standards. Freshmen wore “beanies” or some other identifying sign, and interactions between the sexes was monitored.

By the early 1970s, as a result of sweeping social change, students demanded to be, in effect, on their own. College faculties, administrations, and trustees resisted change for as long as they could, but finally were forced to cope with student demands. Gradually, as a result of overt student pressure and activism, most college-enforced rules and regulations affecting conduct were rescinded. With certain exceptions, the college learned to confine its role to academic matters. Men and women were housed in the same dormitories. Students set their own social agendas.

In brief, just a quarter-century ago, the Rensselaer campus was the equivalent of a small town in upstate New York: in effect run by white, Anglo-Saxon
males, divided into powerful camps (fraternities). Today, the campus is the equivalent of a modern city, displaying great ethnic diversity and consisting of powerful enclaves — representing many different nationalities — that wish to interact with other groups but also to preserve distinctive identities.

From a period in which most decision-making power had been concentrated in the hands of a strong and dominant president — a Palmer Ricketts or a Richard Folsom — power began to be distributed among all those with a stake in the institution — faculty, students, alumni, trustees, and administration — a distribution that undoubtedly makes governing more complicated.

The Grosh Years
As Folsom's successor, in 1971, the trustees selected Richard M. Grosh, who had been dean of the colleges of engineering at Purdue University. In spite of the trustees' efforts to include campus constituencies in the selection process, campus politics — and the confrontational spirit of the times — intruded. Grosh had not been the candidate favored by the Student Senate or the faculty, both of which were consulted in the final stages of the selection process.
President Grosh came to the Institute from Purdue University, where he had served as dean of engineering. His five-year presidency was marked by the development of "Engineering Initiatives," a comprehensive plan to strengthen the School of Engineering. His relations with the faculty were difficult, resulting in a serious effort by a number of faculty to form a union.
The trustees made little effort to address and smooth over the dissatisfaction of these groups before naming Grosh president. It is possible that Grosh himself did not know until actually arriving in Troy to take up his duties that he had not been the unanimous choice of all major campus constituencies. Because of this, friction between these groups was apparent from the start. Grosh’s presidency began “under a cloud.” Despite numerous visionary accomplishments during his five-year term, Grosh never quite escaped the negative atmosphere surrounding his appointment.

**Engineering Initiatives**

On his arrival, Grosh saw that Rensselaer’s engineering programs were in need of strengthening. While the Institute’s reputation for quality undergraduate education was intact, the undergraduate laboratories were outdated; a 1972 accreditation report referred to the creative use Rensselaer was making of pre-World War II surplus equipment in its instructional facilities.

Grosh formed a planning committee of engineering faculty and department heads to look into future directions for engineering at Rensselaer. Metallurgical engineering department head George S. Ansell ’54 played a prominent role in these deliberations. The committee put forward a strategic plan for the School of Engineering to expand and revitalize the undergraduate program, to build a major graduate program, and to develop necessary research funding. Specifically, the plan called for a 50 percent increase in undergraduate enrollment, to approximately 2,700, with a substantial improvement in the quality of education, a doubling of graduate enrollment, to 900, and a significant increase in research support.

All of this was to be achieved in a five-year period, under the Build Program, which called for hiring of new faculty and summer funding for faculty and students. This ambitious plan would vault Rensselaer into the ranks of the top technological research universities in the country. The plan called for unprecedented fiscal commitments from the Institute and the wholehearted backing of Rensselaer’s faculty, administration, and Board of Trustees.

Under the leadership of Grosh and Ansell — who was named dean of engineering in 1974, following V.L. Parsegian and A.A. Burr — the necessary support began to be assembled. It was agreed that a report would be issued to the board each year on the school’s progress toward strategic goals. Specific measures to be taken on the way to these objectives were detailed in the Engineering Initiatives Program Reports.
New Construction
In addition to these programmatic initiatives, Grosh saw that Rensselaer's ambitions required a first-rate engineering facility. (The school's offices and departments had been distributed among North Hall, Ricketts, Sage Laboratory, the Science Center, and other buildings.)

In 1974, Grosh presided over groundbreaking for a new, $17 million, seven-story engineering center which would consolidate faculty and students, would contain the most modern classrooms, instructional laboratories, and offices,

JONSSON ENGINEERING CENTER
Supported by, and named in honor of, Rensselaer's most generous patron, J. Erik Jonsson '22, this building helped move the School of Engineering to the forefront in research, as it preserved its heritage of excellence in undergraduate education. Designed by Peter Levatich '56, the facility allowed faculty to have offices near their laboratories and provided flexible space for major research projects.
and would change engineering education at Rensselaer for the next generation. Peter Levatich '56 was the architect.

The following year, a new library was completed on land overlooking the City of Troy, on the south side of the campus. It was named in honor of Richard Gilman Folsom, Rensselaer's 12th president — the first time in modern Rensselaer history that a building was named for a living person — a decision not without a touch of irony, since Folsom, for a time at least, had opposed the idea of a new library building.

**The Grosh Style**

Grosh's relations with the faculty were less than amicable. In a certain sense, the faculty had never gotten over the suspicions raised by the process of his selection as president. A talented and forceful man, Grosh was also something of an introvert and often seemed unapproachable. He was at times imperious, for example, in dismissing members of the administration who had been popular on campus. Faculty discontent grew, as disagreements and misunderstandings accumulated. One particular point of contention was institutional computing capabilities, in which the faculty believed Rensselaer had fallen behind other schools. Grosh did not feel that major Institute resources should be committed to computing.

Finally, under threat of the formation of a faculty union, and with increasing pressure from the Board of Trustees, Grosh announced his resignation in the winter of 1975-76. He left to become president and chief executive officer of Ranco, Inc., a multinational manufacturing firm in Columbus, Ohio.

In retrospect, the Grosh presidency can be seen as symptomatic of a disputatious period at RPI. He had to face the full impact of the social changes at work in society. In the last analysis, however, in a relatively short period of time, Richard Grosh had laid the foundation for Rensselaer's modern preeminence in engineering. With great skill and foresight, he had moved Rensselaer forward in a number of areas critical to its future.
The George Low Era
Grosh was succeeded by a born leader, one of the most memorable individuals to appear in the long history of an institution characterized by remarkable personalities.

George M. Low was born in Vienna, Austria, and came to the United States in 1940. He interrupted his education at Rensselaer to serve in the U.S. Army between 1944 and 1946, at which time he became a naturalized citizen. Low received his bachelor's degree in aeronautical engineering from RPI in 1948, and a master's degree in aeronautical engineering two years later.

He began his professional career in 1949 as a research scientist at the Lewis Research Center, in what was then called the National Advisory Committee for Aeronautics — predecessor of the National Aeronautics and Space Administration (NASA). He rose steadily in the organization.

After the tragic fire that killed three astronauts during a training exercise in January 1967, Low took over direction of the Apollo manned spacecraft...
program and eventually became deputy administrator of NASA. He was responsible for fulfilling President John F. Kennedy’s pledge to put humans on the moon before the end of the decade — a goal that was achieved on July 20, 1969. Low also directed the agency’s progress toward the practical application of space technology, and international cooperation in space, symbolized by the docking of Apollo and Russian Soyuz spacecraft in earth orbit in July 1975.

As his NASA career progressed, Low became more visibly involved with the Institute. He received an honorary doctor of engineering degree from Rensselaer in 1969, and was elected to the Board of Trustees in 1971.

A man of great drive and intellect, Low became Rensselaer’s 14th president in 1976. His manner and personality were reminiscent of other forceful, visionary Rensselaer leaders, such as P.C. Ricketts and B.F. Greene. Low was also a man of his times: a talented diplomat and consensus builder who forged strong relationships with Rensselaer’s major constituencies — students, alumni, faculty, trustees, and the general public. For example, to give students greater voice in the affairs of the Institute, Low opened up administrative committees to student representation and was successful in making students feel that their role in Institute decision-making could be participatory rather than adversarial.

At times Low was short-tempered, impatient, and prone to criticize colleagues who did not perform up to his standards, but he also inspired great loyalty. Who wouldn’t follow a man who had taken us to the moon?

Rensselaer 2000

Convinced of the value of strategic planning to the life and future of an educational institution, Low made one of his first priorities the development of the Rensselaer 2000 Plan — a projection of what Rensselaer should aspire to be by the year 2000. The Rensselaer 2000 process, which actually traced its roots back to Engineering Initiatives, was a compilation of the best ideas from both within and outside the campus. It stated as an overriding goal that Rensselaer would be a first-rank technological research university of international renown by the turn of the century.

Specifically, Rensselaer 2000 proposed that the Institute would maintain excellence in undergraduate education, and would place a much greater emphasis on graduate education and research. It predicted growth in the number of faculty and an increase in sponsored research, from $8.2 million annually in 1977 to $30 million in the year 2000. It cited as a goal a significant
increase in graduate enrollment. It pointed to the establishment of industry-academic research centers, greater outreach and involvement in the surrounding community and region, and additional colloquia, lectures, and seminars contributing to a more stimulating academic atmosphere on campus.

Rensselaer 2000 reflected and anticipated many important academic trends of the time: the decline in the number of students entering high school over the subsequent 15 or 20 years — hence a decline in the demand for undergraduate technical education; industry's decreasing commitment to long-term research; and the opportunities for universities to enter into mutually beneficial partnerships with industry to perform applied research.

The $38 million Rensselaer Campaign — the first major fund-raising effort since Rensselaer's 150th anniversary — was launched in fall 1978 with the goal of providing the funds to bring Rensselaer 2000 closer to fruition. The theme for the campaign was, "Rensselaer, Where Imagination Can Be Applied to Achieve the Impossible," a theme that epitomized Low's accomplishments in the Apollo program.

When completed in 1981, the campaign had raised $52 million. Just as important, the volunteers who emerged during the course of the campaign provided the Institute's leadership for the following decades. Rensselaer had...
VOORHEES COMPUTER CENTER
A computing center in the chapel of the old St. Joseph's Convent was a novel idea when it was first proposed. Made possible by a gift from Alan M. Voorhees '47, the building is proof that creative reuse of older structures can be a viable alternative to demolition.
also assembled for the first time a highly professional development staff. The campaign, organized by this staff, and inspired by George Low's magnetic personality, brought out a volunteer spirit and commitment in Rensselaer's alumni and friends that continues to this day.

Another of Low's strengths was that he promoted some of the best programs that had been in place when he arrived on campus. He did not feel he had to originate a project to espouse it. For example, he continued Grosh's strong support for Engineering Initiatives and a new Engineering Center. In 1977, the engineering building was completed and named in honor of two of Rensselaer's most distinguished benefactors — J. Erik Jonsson '22, and his wife, Margaret. The Board of Trustees — in particular, Board Chairman Carl J. "Tommy" Thomsen '38, with strong backing from Trustee Kenneth T. Lally — led the efforts to rally support for the construction.

**Leadership in Academic Computing**

In 1978, Low made the decision to purchase an IBM 3033 mainframe computer — the most advanced scientific computer available at the time. In 1979, the computer was installed in the Voorhees Computing Center, the former chapel of St. Joseph's Convent, transformed by an award-winning architectural design and a gift by Alan M. Voorhees '47. Public computer terminals were located in the building and across campus, for easy student and faculty access.

At the time Low arrived on campus, Rensselaer's main academic computer was an IBM 370, which filled most of a small room. By the end of the Low era, equivalent computing power could be contained in a desktop unit. Low's decisions, symbolizing the central importance of computing in a Rensselaer education, positioned RPI at the forefront of academic computing — a pre-eminence it maintains to this day.

**Industrial Partnerships**

For Rensselaer to be one of the world's premier technological universities, it had to become even more competitive in mainstream technological research critical to the current and future priorities of American industry. In addition,
Rensselaer would need to invite industrial representatives to become partners in developing centers of excellence that combined strong programs in education and research.

In 1977, Rensselaer established a Center for Interactive Computer Graphics (CICG) to integrate computer-aided design techniques across the engineering curriculum. The CICG became a national model in using the computer to help students visualize engineering problems and solutions; many schools patterned their computer-aided design facilities after Rensselaer's. Forty companies — including IBM, Grumman Aircraft, and Digital Equipment Corporation — involved themselves in the center, and gained an inside track in recruiting the outstanding students who assisted in research there. Electrical, Computer, and Systems Engineering Professor Michael Wozny directed the center's programs.

Two years later, Rensselaer established the Center for Manufacturing Productivity and Technology Transfer (CMPTT) — the second such center launched in the United States. CMPTT brought together university and industry researchers to develop and apply high-technology solutions to manufacturing problems. The center built an impressive roster of industry associates — leading companies that supported the center and shared in the benefits of its research. The CMPTT attracted a new generation of engineers to careers in manufacturing. The technology transfer function, an important part of the center's mission from the start, set a pattern that other universities have just begun to duplicate. ECSE Professor Lester Gerhardt served as founding director of CMPTT, and was followed by Leo Hanifin, who came to Rensselaer from a position at Chrysler Corporation, and led the center's growth for many years. General Motors, Boeing, GE, and IBM were early supporters of CMPTT.

IBM's donation of an E-beam lithography system in 1981 became the starting point for the third of Rensselaer's industrially oriented centers — the Center for Integrated Electronics (CIE). CIE's fabrication laboratory was situated in a facility donated by the Norton Company in Watervliet, a short distance from the campus. Trustee C. Sheldon Roberts '48 championed the CIE. Trustee Bob Evans was instrumental in developing strong ties between Rensselaer and IBM. Trustee Paul Low (no relation to George M. Low), Michael Duffy '62, and Trustee Nicholas Donofrio '67, among others, have helped maintain a strong continuing relationship.

In effect, all three original industrial centers provided a rationale for grouping faculty from a number of different departments according to research interests and achieving a "critical mass." These centers, and all the centers that followed,
greatly increased the impact of Rensselaer’s research talent. They also pro-
vided a mutually beneficial framework for closer interaction with industry.

The culmination of these industrial ties came in 1987, in a collaboration that
George Low had originally orchestrated with the State of New York before
he died. This yielded a nine-story Center for Industrial Innovation (CII) to
house the three industrial centers. He brought together a team, consisting of
the chief executive officers of IBM, Kodak, General Electric, and Colt Industries,
who approached Governor Hugh Carey and won his approval for the CII
concept. The cost was underwritten by a $30 million interest-free loan from
the state — an unprecedented level of public support to a private school.

A Regional Commitment
It was clear to Low that Rensselaer had little chance of achieving its ambi-
tious goals for the future if the surrounding region did not prosper. A school
that was aggressively forming bonds with industry had to be committed to

"ASTROCLASS" The challenge of space
exploration had enormous impact on
Rensselaer’s graduates of 1960. The first
Soviet satellite, Sputnik, was launched in the
fall of their junior year, causing science
education and technology to take a giant
leap forward.

RENSSELAER TECHNOLOGY PARK
George Low breaks ground for the park,
located on 1,200 acres of land owned by
Rensselaer in North Greenbush. The park,
which was created to nurture high-tech
enterprises, has become a model for other
universities and communities around the
country. It is, for example, the headquarters
of MapInfo — a successful company
developed at Rensselaer. Companies in the
park currently employ 1,600. The park has
built Rensselaer’s reputation as a catalyst for
the development of technical entrepreneur-
ship and has enhanced the Capital Region’s
standing as a center for technology.
ACHIEVING THE IMPOSSIBLE

Becoming World-Class Entrepreneurs

Rensselaer students John Haller '86, Laszlo Bardos '85, and Sean O'Sullivan '85 dreamed of becoming successful entrepreneurs. They met in Management Professor Pier Abetti's Principles of Entrepreneurship course, where they wrote a business plan for an electronic mapping and tracking system for personal computers. Joined by Andrew Dressel '84, they formed Mapping Information Systems, or MapInfo, in 1986 with $15,000 in capital.

The young company has grown rapidly into a multi-million-dollar, publicly traded organization that sits near the top of the desktop mapping industry, with products that are sold around the world and with headquarters located in the Rensselaer Technology Park. Pictured here, left to right, are O'Sullivan, Dressel, current chairman of the board of directors Michael Marvin, Bardos, and Haller.

Creating a favorable business climate in its own "back yard." With a precedent in mind that he had found at Stanford University, Low envisioned a technology park, located on approximately 1,200 acres of property Rensselaer had acquired in North Greenbush, which would nurture the development of high-tech enterprises and which would spark economic growth in the Capital Region. Developing the park demanded a major investment on Rensselaer's part. To study the feasibility of the undertaking, Low appointed a task force in late 1978 that was chaired by Trustee Samuel F. Heffner '56 and made up of trustees, faculty, students, and alumni.

At a task force meeting, Trustees Harry Apkarian and Kenneth Lally suggested that the best way to test the concept was to convert some university space on a trial basis into a university-supported business incubator — an environment where embryonic high-tech companies, some of them formed by Rensselaer students and faculty, could rent space and access services that would help their companies grow.

The idea was approved, and with $100,000 provided by Rensselaer and the Troy Economic Development Agency, the "H" Building — formerly part of the Convent of the Good Shepherd — became the Institute's first incubator, and the first academically affiliated incubator in the country. The experiment was an immediate success. The Sage Annex provided the next incubator. This space filled in just six months, and the incubator moved to the "J" Building, on Peoples Avenue — also part of the Good Shepherd Convent — which Rensselaer had been using for overflow office space. Spearheading the incubator program in addition to Low were Rensselaer Vice President Jay Morley '62, and RPI staff Jerry Mahone, Raymond Lancaster, and Michael Wacholder. The Incubator Center, under the direction, successively, of Mahone, Mark Rice '71, and Glenn Doell '82, has become a national model.

With the success of the incubator, the Rensselaer Board approved an investment of $3 million to develop the North Greenbush property into the Rensselaer Technology Park to serve as an engine for the region's economic growth. Here companies that had outgrown their space in
the incubator could find an attractive, supportive setting, creating jobs and sending out roots. Today, the Rensselaer Technology Park, directed by Wacholder, has approximately 45 tenant companies, employing 1,600 people, and is one of the most successful university-related technology parks in the country.

One of the outstanding companies in the park is Mapping Information Systems, or MapInfo, a desktop mapping software manufacturer that resulted from a business plan developed in Management Professor Pier Abetti’s Principles of Entrepreneurship course by Rensselaer students John Haller ’86, Laszlo Bardos ’85, and Sean O’Sullivan ’85. With Andrew Dressel ’84, they developed MapInfo into a multimillion-dollar, publicly traded enterprise.

RENSSLEAER'S FIRST SORORITY
Phi Sigma Sigma was recognized by the Institute in 1976. Since that time the number of similar organizations for women has expanded to five. These groups have enhanced the strong tradition of “Greek” life on the campus. The Panhellenic Council, which governs intersorority relationships, was established in 1980.

OPPORTUNITY AND SUPPORT FOR WOMEN AND MINORITIES Throughout his presidency, Low aggressively accelerated the Institute’s commitment to recruiting, employing, and retaining women and minorities at all levels. The programs that he built and enhanced have enabled Rensselaer to become a substantially more diverse institution.
An Advocate for the Underrepresented

Low pursued an aggressive policy in attracting minorities and women to the Rensselaer student body, faculty, and staff. This was an extension of policies he had pursued at NASA, where he actively recruited and promoted women and minorities and saw to it that a substantial number of NASA contracts were awarded to minority companies. At Rensselaer, the hiring of Eddie Knowles as assistant dean of students for minority affairs signaled the importance Low attached to recruiting and retaining increasing numbers of minorities.

In 1978, Rensselaer launched PREFACE, a two-week residential science program designed to provide an introduction to engineering for minorities, women, and disadvantaged students — groups historically underrepresented in the engineering professions. PREFACE participants ever since have been offered lectures and classes that help them develop connections between the sciences, engineering, and real-world problems. Eddie Knowles, Dean of Engineering George Ansell ’54, and Associate Dean of Engineering Paul M. DeRusso ’53 launched the PREFACE Program. As of 1994, 394 students had participated in PREFACE.

The Bridge Program provides two core curriculum courses over the summer to minority students who have been accepted at Rensselaer. The courses introduce the students to the campus and reduce the course load in their first semester. By 1994, 361 students had taken advantage of the Bridge Program.

Proof of Success

A 1982 study by the National Academy of Sciences ranked some of Rensselaer’s engineering departments among the best in the country. All of the goals established in the strategic planning process in 1977 had been met. Undergraduate and graduate enrollments were up by 50 percent and 100 percent, respectively; research funding had quadrupled, to over $11 million; the quality of undergraduate education had improved; and Rensselaer had joined the nation’s top rank of engineering graduate programs. The concerted efforts of Low, Ansell, engineering faculty, and trustees had been crowned with success.

The End of an Era

George Low died of cancer in 1984 — 16 years before the year 2000 cited in his strategic plan. The following year, his legacy was commemorated by naming the nine-story building dedicated to the academic-industrial partnerships he had pioneered the George M. Low Center for Industrial Innovation.
His impact went beyond landmark buildings, however. Low knew how to inspire and galvanize Rensselaer’s numerous constituencies on and off campus. He pioneered in developing unique relationships between industry, government, and academe. By the end of the Low presidency, Rensselaer had accelerated its progress toward becoming a leading research university. Low helped revolutionize the Rensselaer curriculum by bringing students closer to real-world engineering problem-solving through the industrial centers and the technology park. He was an excellent fund-raiser. From his NASA experience, he understood the positive use of publicity, and he orchestrated press coverage to Rensselaer’s advantage. He founded the Capital Region Technology Development Council, an organization that has been imitated in areas around the state.
If there is a criticism of Low, it is that his many initiatives and ambitious programs overextended the institution financially. Yet had he lived, he would probably have found the resources to support all his visions and dreams.

The Low presidency created another problem for Rensselaer. He accomplished so much in the short time granted him that every president who succeeded him has had to work, to one degree or another, in his shadow.

**Provost and President**

After Low's death, Daniel Berg, Rensselaer's vice president for academic affairs and provost, was named acting president. Berg came to RPI in October 1983 from Carnegie-Mellon University, where he had been provost and professor of science and technology. Prior to that, he had served for four years as dean of the Mellon College of Science, and before that had been associated for 24 years with Westinghouse Electric Corporation.

Berg had earned his bachelor's degree in physics and chemistry at City College of New York in 1950, and a master's and Ph.D. at Yale University in physical chemistry in 1951 and 1953, respectively.

In Berg, Rensselaer had an aggressive and talented provost with a sensitivity to academic issues and concerns. He wanted Rensselaer to be a faculty-driven institution.

Berg placed a high priority on science education and research. With the School of Engineering numbered among the best nationally, there was strong impetus to lift School of Science programs in the same dramatic manner. The Science Initiatives Program, which Berg championed, was to achieve that result.

In March 1985, the trustees appointed Berg Rensselaer's 15th president, recognizing the excellent job he had done during a difficult transition period.

As president, Berg's top priorities were scholarship, academic excellence, and the strengthening of industrial ties through the creation of "spires of excellence." He was instrumental in assigning a greater prominence to the Rensselaer Medal — a math and science award established in 1916 and presented to outstanding high school juniors from quality schools across the country — as a way of attracting the best students to apply to Rensselaer.

Berg initiated and led one of the most extensive and strategic planning processes in Rensselaer's history. In a series of retreats, faculty, staff, and students worked to analyze the school's strengths and weaknesses, determine comparative advantages of departments, offices, and schools, and chart a clear path to the future. The theme that emerged from these deliberations was "Education for Technological Leadership in a World Society." That
exhaustive planning process established a strategic pattern in Rensselaer's thinking, and aspects of the plan continue to guide the institution to this day.

Berg worked to build a consensus among Rensselaer's constituencies, emphasizing a "bottom-up" approach to institutional management and stressing the importance of participatory decision-making for the institution. Under his sponsorship, the interdisciplinary Department of Decision Sciences and Engineering Systems was formed and administered by the deans of engineering, science, and management. He also hired and promoted outstanding people for the Institute's academic and administrative management team. He established the Office of Vice President for Government Relations, formalizing the Institute's increasing interaction and close cooperation with both New York State and the federal governments.

But despite his efforts at consensus building, difficulties and misunderstandings arose between Berg and Rensselaer students — in particular with the grand marshal and president of the Union. Opportunities for dialogue were lost, and the pressure on Berg exerted by the trustees mounted. In March 1987, he left the presidency and returned to teaching and research as Institute Professor.

Landgraf Succeeds

To replace Berg, the board selected Trustee Stanley Landgraf as acting president. Landgraf had received his bachelor's degree in mechanical engineering and management engineering from Rensselaer in 1946.

He joined Mohawk Carpet Mills, Inc., in 1947, where he held various executive positions in engineering, manufacturing, marketing, and general management. In 1955, when Mohawk merged with Alexander Smith, Inc.,
to form Mohasco Industries, Landgraf became group vice president and then executive vice president and director. He retired as chairman of the board of Mohasco in 1985. His service to the RPI board began in 1977.

Landgraf, an outgoing man with a warm personality, performed an invaluable function as a "fence mender" and diplomat for a campus confused and demoralized by two abrupt changes in leadership in just three years. He transformed the Office of the President into a friendlier place. He was visible at campus events and made student concerns a priority of his administration. As president of the Capital Region Technology Development Council, Landgraf maintained Rensselaer’s strong commitment to the region.

A Noted Administrator

It was understood from the start that Landgraf's presidency would last only until the board found a permanent successor. In 1988, the board selected as that successor another long-time trustee, Roland Schmitt, as Rensselaer's 16th president. Schmitt held an undergraduate degree from the University of Texas at Austin, and a Ph.D. in physics from Rice University. He had retired as senior vice president for science and technology at General Electric and director of GE's Research and Development Center in Schenectady, the oldest industrial research laboratory in the country.

As chair of the National Science Board that sets policy for the National Science Foundation, Schmitt was well known in Washington and had testified frequently before congressional committees. He served as chairman of the board of governors of the American Institute of Physics, member of the executive committee of Scientific Society Presidents, member of the president's council and a fellow of the New York Academy of Science, and member of the Oak Ridge National Laboratory Advisory Board.

Even before Schmitt assumed the presidency, Rensselaer was facing serious financial problems. In brief, earlier periods of aggressive growth had assumed the strong possibility of an endlessly expanding economy. The economy, however, had contracted. Necessary cutbacks and painful economies had been delayed. Schmitt assumed as one of his main responsibilities the placing of the Institute's finances on a more businesslike foundation.

It was during the Schmitt presidency that Rensselaer formally named the Darrin Communications Center, in honor of Peggy and David Darrin '40, whose generous involvement in Rensselaer over many years has benefited numerous educational and research programs, including the Fresh Water Institute at Lake George, New York.
It was also at this time that the strategic planning process, begun during the Berg era, took definite shape and pointed to the need for another capital campaign. On September 1, 1989, with $73 million pledged to the Nucleus Fund, Rensselaer announced the $200 million New Century Campaign, under the chairmanship of Trustee Samuel F. Heffner '56 — the most ambitious fund-raising campaign in Rensselaer's history.

ROLAND SCHMITT  Named the Institute's 16th president in 1988, Schmitt was a distinguished scientist with an international reputation. He came to Rensselaer after retiring as head of the General Electric Company's research and development programs. A friendly Texan, he warmed to his new assignment and applied his high energy level to a university president's busy schedule of government, alumni, faculty, and student relations activities.

SAMUEL F. HEFFNER '56  Rensselaer's New Century Campaign, led by President Schmitt and Heffner, concluded in 1993 after raising $207 million. Over 32,000 alumni, friends, corporations, and foundations had contributed to its success.
FACULTY CHAIRS ENSURE EXCELLENCE
The New Century Campaign provided funds to increase the number of chaired faculty positions to 39. Patrick Quinn, Institute Professor of Architecture (center), joins President Roland Schmitt and Provost James Meindl at a 1993 ceremony held to honor all chaired faculty.

INTERACTIVE LEARNING "Applying science to the common purposes of life" begins at home, where Rensselaer students must master the increasingly complex world of technology. Applying the latest technology to the process of learning is the mission of Rensselaer's Anderson Center for Innovation in Undergraduate Education, led by Jack F. Wilson, dean of undergraduate and continuing education. Wilson is also in charge of Rensselaer's pioneering Satellite Video Program (RSVP). In both instances, the Institute continues its historic role first advanced by Amos Eaton.
The campaign was instrumental in funding new chairs and professorships and bringing many new programs to the campus, including the Anderson Center for Innovation in Undergraduate Education (CIUE), named for Trustee Harlan Anderson and Lois, his wife, and directed by Dean Jack Wilson. The CIUE and its emphasis on interactive learning led to the inauguration of an ambitious computer calculus program for all Rensselaer freshmen. Computer calculus was also the result of the bold leadership of the Department of Mathematical Sciences, and its chair, Joseph Ecker.

The New Century Campaign ended successfully in 1993, over a year earlier than projected, having raised $207 million. Just as important, it broadened the base of support for Rensselaer: more than 32,000 alumni and friends, corporations, and foundations contributed to making the campaign a success — a geometric progression on the number of people who had participated in the campaign during the Low era. As had been the case in that campaign, the New Century Campaign developed a large cadre of volunteers who have involved themselves in the life of the Institute in an unprecedented way.

It was also during this time that the campus infrastructure began to be retrofitted for the first time in years. With the help of his wife, Claire, Schmitt led a broad-based program to beautify the campus, a continuation of the beautification program funded by the late Margaret Jonsson in the 1970s.

Planning also continued under Schmitt and Provost James D. Meindl in the form of the Strategic Initiatives process. Gary Judd '63, then vice provost for academic affairs and now dean of the faculty, has provided continuity and insight during Rensselaer’s many years of planning and change.

Schmitt retired and became president emeritus in 1993. In the spring of that year, long-time Board Chairman Edward Hood announced the appointment of a new president, R. Byron Pipes. Former provost and Robert L. Spencer Professor of Engineering at the University of Delaware, Pipes, a distinguished educator and researcher, has established as one of his priorities the preservation of Rensselaer’s rich history.

The Pipes presidency has included a major restructuring or “re-engineering” of the Institute, with the goal of “accomplishing more with less.” The need for restructuring is a common imperative among American universities — the result of overly optimistic program expansion in the 1980s and the delaying of potentially painful financial decisions.

During the Pipes presidency, a new mission statement was developed that reflects both the circumstances of Rensselaer’s founding and the modern
imperatives facing the school. The mission statement asserts that “Rensselaer educates the leaders of tomorrow for technologically based careers. We celebrate discovery and the responsible application of technology to create knowledge and global prosperity.” Among Pipes’s highest priorities are the preservation of Rensselaer’s rich traditions and maintaining the beauty and centrality of the “green-roof” campus. He has led the school in setting goals that are both realistic and ambitious and has implemented an Institute-wide sense of fiscal responsibility that will serve Rensselaer well in the years ahead.

**A Strong and Diverse University**

In addition to maintaining its tradition of outstanding undergraduate education, Rensselaer today is a major research university. Sponsored research funding in 1994 amounted to $40.6 million.

All of Rensselaer’s schools have emerged as strong, distinctive entities.

Science Initiatives, a priority of Presidents Berg and Schmitt, helped lift Rensselaer’s School of Science to a status as worthy partner to the School of Engineering. Former Deans of Science Sydney Archer and Harold Raveche were instrumental in conceiving and implementing the Science Initiatives program, and current Dean Doyle Daves has provided strong leadership and presided over a significant increase in research. An example of Rensselaer’s new strength in science was the appointment of Nobel Laureate Ivar Giaever ’64 as Distinguished Research Professor in 1983.
The School of Architecture in the 1970s, under Dean Patrick Quinn, added to traditional strengths in technology and design (particularly urban design) a renewed focus on architectural history and theory. In the 1980s, under Dean David Haviland '64, the school's strong tradition of industry-supported architectural research was reinforced with the establishment of the Lighting Research Center. International programs for architecture students were also established to give them the opportunity to consider how context influences design.

The School of Humanities and Social Sciences, under the unprecedented 23-year leadership of Dean Thomas Phelan, has built a strong faculty and a national reputation for multidisciplinary programs appropriate to a technological university. These include technical communication, science and technology studies, and integrated electronic arts. During Phelan's tenure, the School of Humanities and Social Sciences was moved to a central location on the campus — the renovated Sage Laboratory building.

The School of Management grew out of Rensselaer's programs in management engineering and became a school in 1963. Trustee George A. Strichman '37 provided strong moral support for the formation of the school, which has consistently broadened its external outreach programs to

**COMPUTER IMAGES AID RENOVATION**

*Computer Aided Design (CAD), a technology that has been one of Rensselaer's strengths, enabled planners to examine the proposed improvements to the Walker Laboratory prior to construction. This computer image shows the new entrance on the east side of the building.*
EXECUTIVE MBA PROGRAMS
Rensselaer's School of Management is recognized for teaching the art of entrepreneurship and for its graduates' ability to manage emerging technology effectively. Its Executive MBA programs have also made significant contributions to upgrading the management quality of local firms. Here, Jeannie Lynch, Dean R. Wellington Teaching Professor of Management, challenges an MBA class.

LEADERSHIP IN ELECTRONIC ARTS
The application of modern technology is of special interest to the arts faculty at Rensselaer. Here Professor Neil Rolnick demonstrates the composing techniques that have earned him an international reputation in electronic music.
the surrounding business community. Management and technology has emerged as the school's theme. The MBA program was revamped and an executive MBA program was established under former Dean Robert Hawkins. Under Dean Joseph Marone, the school's programs in support of entrepreneurship have grown and been strengthened by the establishment of a Center for the Entrepreneurship of New Technological Ventures.

The Emergence of Women

Women attended classes during the earliest days of The Rensselaer School, but their numbers quickly diminished. Rensselaer made few inroads in attracting women to the school until the years during and immediately following the Second World War. Efforts to recruit women produced uneven results until the late 1960s; over the last few decades, as a result of concerted programs, the numbers of women on campus have improved.

In 1980, 756 women undergraduates and 306 women graduate students were enrolled at Rensselaer. By the fall of 1994 Rensselaer had 958 women undergraduates and 435 women graduate students — roughly a quarter of the total student population.
Women graduates of Rensselaer have distinguished themselves in numerous fields. Ruby Bendersky '73, for example, is an expert in heart disease; Dorothy Morse Hoffman '47 helped develop thin films and high-vacuum technology; and Nancy DeLoye Fitzroy '49 had a distinguished career at GE, was the first woman president of the American Society of Mechanical Engineers, and is a member of the National Academy of Engineering. Paula Loring Simon '68, an executive with Metropolitan Life Insurance Company, served as the 1994-95 president of the Rensselaer Alumni Association.

Minority Progress
Garnett Baltimore, the first African-American to attend Rensselaer, graduated in 1876. For the next 80 years, despite some progress in the 1960s, few followed in his footsteps. The last quarter-century has seen dramatic changes. In 1980, there were 352 minority undergraduates and 50 minority graduate students at Rensselaer. By the fall of 1994, Rensselaer had 966 minority undergraduates and 158 minority graduate students enrolled. Graduates include John Carr '77, a partner in the law firm of Simpson Thacher and Bartlett in New York City; Raymond Parker '77, assistant patent counsel for Rhone-Poulenc-Rorer; and Janet Rutledge '83, a professor of electrical engineering and computer science at Northwestern University and a member of the Rensselaer Board of Trustees.

Student Life
Major changes have occurred in student life in the modern era. Thirty years ago, student life was divided more or less evenly in two — one part was academic, centered in the classroom, and for the most part was an individual experience. The other half was social, focused on the fraternities, and characterized by an active schedule of parties and dances.

Today, in contrast, the two worlds — social and academic — do not divide as neatly. More and more Rensselaer classes include team assignments that encourage the development of leadership qualities. Rensselaer fraternities and sororities are actively involved in a growing number of community
service activities. The climate in the classroom, and in the fraternity house, is much more involved and team-oriented. Academic projects at Rensselaer incorporate more of the elements of "play"; social agendas incorporate work aspects.

Thirty years ago, fraternities were the "engines" that drove the social life of the school. Today, fraternities and sororities maintain a key role, but they are joined by international student organizations and clubs run by students through the Rensselaer Union. Today, there are 16 international student associations in the Union, and a sign of their influence is that the cricket club is growing. Richard Hartt '70, director of the Student Union, Frank McNeil's successor, coordinates the Union's diverse programs, which include over 50 clubs, and the Archer Center for Student Leadership Development.

Sports programs at Rensselaer have been led for many years by Athletic Director Robert Ducatte. During his tenure, women's sports have grown to the point where 11 of 33 varsity programs are for women. While Rensselaer's student enrollment consists of roughly 20 percent women, 40 percent of all varsity letters awarded in 1993-94 went to women athletes. Ducatte also has guided the steady growth and improvement of Rensselaer student athletic

DESIGN AS CRITICAL INQUIRY
This "design a birdhouse" competition resulted in some novel habitats for feathered friends in a process that was fun and had larger applications. If creativity and imagination can design and build a better birdhouse, it can also design a better airplane or computer chip.
TEAM APPROACHES TO PROBLEM SOLVING
Rensselaer's modern curriculum stresses teamwork, a concept important in a world society in which professionals must work together to solve problems of an international scale. Here a student team copes with an extracurricular problem of caloric overload at the ice cream shop in the Rensselaer Union.

STUDENTS AND COMMUNITY SERVICE
Doing for others is a growing concept in the modern university. Community service is embraced by fraternity and sorority groups such as these Tau Kappa Epsilon members rolling a barrel for charity. Large numbers of non-"Greek" students also volunteer for service projects to assist not-for-profit organizations in the Capital Region.
WOMEN'S ATHLETICS — GROWTH, EXCELLENCE, AND ACHIEVEMENT
The development of a varsity athletic program for women over the past two decades at Rensselaer has been a steady and deliberate effort to achieve excellence. The 1995 women's lacrosse team was undefeated, and today 11 varsity sports are offered for women. In 1995-96 the varsity women's hockey team will make its debut in Division I of the NCAA.

BACK TO THE FUTURE
The establishment of men's and women's crew at Rensselaer marks a return to a sport popular at the Institute in the 19th century. The number of club and varsity sports offered at the Institute has never been higher, reflecting the variety of tastes of a diverse student body.
"WE ARE THE CHAMPIONS"  George Servinis '86 scores the winning goal against Providence College, enabling the 1985 Rensselaer varsity men's hockey team to recapture the NCAA Division I National Championship for the first time since 1954. The event galvanized the campus, Troy, and the Capital Region. Here, exhausted senior captain Mike Saghabour meets the press after the championship game. The team produced many who went on to careers in the National Hockey League.

"BIG RED FREAKOUT"  The fans at Rensselaer's annual hockey happening don't behave in the "normal" manner. Red clothing, banners, noisemakers, and painted faces are part of this enthusiastic annual tradition. Old-timers have fond memories of the "freakout" that featured red plastic "stadium horns," when the Field House sounded like a swarm of bees 5,000 strong.
facilities, including an indoor swimming pool built through the generosity of Ellis and Doris Robison. The pool named in their honor symbolizes numerous aspects of Rensselaer campus life, athletic and otherwise, that the Robisons supported. The new Harkness artificial turf field and Anderson Field make outdoor facilities usable practically year-round.

Grand Marshal Week, the annual rite of spring conducted in connection with the election of student government officers, has slipped a bit in student popularity. The Hockey Line, which forms every fall, and the Big Red Freakout in February have replaced Saturnalia, Interfraternity Dances, and Military Balls and other big weekends of the '50s and '60s.

Music has remained an important part of student life since the 19th century. The Rensselaer Pep Band performs at all home hockey and football games, as well as selected "away" games. The Rensselaer Symphony Orchestra performs ambitious classical music programs featuring student soloists. The Rensselyrics, heir to the tradition of the RPI Glee Club, is another manifestation of the musical interests and talents of the Rensselaer student body.

With a more diverse student body, religious activities on campus have become more varied. The Rensselaer Newman Foundation Chapel and Cultural Center, constructed in 1968 on Burdett Avenue, is a focal point for social, cultural, and educational events, as well as religious services.

**HOCKEY LINE**  The line for student season hockey tickets has started as early as the last day of classes the previous year. It has featured elaborate temporary structures, supported fund-raising projects, and provided a great excuse for a party. Each year on the day tickets go on sale, the president, dean of students, hockey coach, and team members serve breakfast on the line. Here President Pipes and Dean Eddie Knowles maintain the tradition.

**GM WEEK '90S STYLE**  Over time, Grand Marshal Week at Rensselaer has reflected attitudes of society at large and of the Institute's leadership about the consumption of alcohol. Today, the carnival atmosphere is produced by a real carnival, complete with a smaller, but still impressive, version of Ferris's wheel. Student contests and competitions have replaced the long afternoon picnics with loud bands and beer that were the hallmark of the '70s. The real focus is the election of leaders who will carry on the Institute's long tradition of responsible student government.
Many organizations of the Rensselaer Union have made contributions to campus life. Shown here in its 1985 edition, the Pep Band has brought enormous enjoyment to Rensselaer sports fans of many years. It's hard to imagine an RPI home hockey game without their loud, raucous renditions of the fight song and the traditional "Rock Around the Clock" and "Louie, Louie."

Thus, though styles have changed radically in the last 30 years, Rensselaer students continue to display a healthy appreciation for the traditions of the past, even as they add new activities that embody changing priorities and interests.

**Alumni/ae Activism**

In the early 1970s, the Rensselaer Alumni Association settled into its new location back on campus. The leadership of the organization began to question its traditional role as Rensselaer's "loyal opposition." The association officers began to integrate the membership more fully into affairs of the school, taking a more active role not just in homecoming, reunion, regional club activities, and placement, but in fund-raising and admissions activities as well. Students and faculty joined alumni in the governance of the Association, making it more democratic and representative. In exchange, the administration made the RAA more of a partner in planning, and acquainted members with the major challenges, financial and otherwise, facing the school. Slowly but surely, moving away from what had been a somewhat adversarial role, the RAA became Rensselaer's ally.

This new activist role is epitomized by the Alumni House constructed on campus as a result of the leadership of Samuel F. Heffner '56, Michael Duffy '62, and former Director of Alumni Relations Carl Westerdahl. Groundbreaking for this impressive structure on Peoples Avenue, near 15th
HEFFNER ALUMNI HOUSE  

Opened in 1989, the building was designed, constructed, and financed by hundreds of alumni and friends. The house is named in honor of Samuel F. Heffner '56, a trustee whose dedication to the institution ranges from prudent guidance in the development of the Rensselaer Technology Park to vigorous leadership of two of the Institute's capital campaigns.

SIMPLE ELEGANCE  
The Great Room of the Heffner Alumni House is one of the most impressive spaces on the campus. Since its opening, the house has been the site of hundreds of special events for alumni and other elements of the Rensselaer and Capital Region community.
Achieving NHL Stardom

Like many Canadian youngsters, Adam Oates '91 dreamed for years of starring in the National Hockey League. But there were obstacles: a high school dropout, Oates had lost his amateur status by playing semi-professional hockey. But Oates knows how to overcome obstacles. He completed high school and had his amateur status restored. He enrolled at Rensselaer in 1982, and joined one of the most exciting and talented hockey squads in RPI history. Oates led Rensselaer's NCAA National Championship team in 1985, and then left a year before graduation to join the NHL.

Oates vowed to complete his Rensselaer degree, and did so by returning to campus over six consecutive summers, winning his Bachelor of Science in Management in 1991. Today, Adam Oates is a starter for the Boston Bruins, one of the highest-paid players in the NHL, and holds a position with a Boston investment firm in the off-season.

Street, took place in March 1988, and one year later, the Samuel F. Heffner '56 Alumni House was dedicated.

The involvement of Rensselaer alumniae as volunteers and donors is nowhere more evident than in the singular success of the Rensselaer Annual Fund. Indicative of their growing commitment: As recently as 1980, the fund raised $875,000, whereas in 1994, under the leadership of Vice President for Institute Relations William McGoldrick, that figure was close to $3.5 million. Rensselaer's entire fundraising effort totaled $6.5 million in 1980; the figure in 1994 was $27.8 million.

In Conclusion

As this book goes to press, the Walker Laboratory Building, which dates from the first decade of this century, is undergoing a complete renovation. The Approach, symbol of 19th-century ties between RPI and Troy, may be refurbished. The green-roofed “Ricketts Campus” remains as much the heart of the campus as when P.C. himself bustled along these walks and regarded, with a mixture of gruffness and good humor, the latest student irreverence.

Rensselaer has always been an amalgam of the old and the new. It rediscovers and reaffirms its past even as it pursues the frontiers of knowledge further into the future. Its long line of distinguished educators, from Amos Eaton to Greene, Low, and Pipes, have pioneered technological education in the United States.

Rensselaer is almost as old as the republic, as innovative as the latest scientific discovery, and as new as the sense of possibilities in the freshman who arrives for classes in August. That student enters a process that will make it possible for him or her to change the world for the better.

This is the tradition that we constantly reaffirm and celebrate. Rensselaer's destiny is, in the words of George Low '48, "achieving the impossible."
"HERE'S TO OLD RENSSELAER"

The Rensselaer School, The Rensselaer Institute, Rensselaer Polytechnic Institute, "Tute," or "Rensselaer." No matter what the institution has been called, it continues to educate women and men to apply science to the common purposes of life, as envisioned by Amos Eaton and Stephen Van Rensselaer, and to pursue a destiny to achieve the impossible, as envisioned by George Low.
This letter to the Reverend Samuel Blatchford from Stephen Van Rensselaer announced the establishment of The Rensselaer School, outlined its educational philosophy, and set up its organization.

Dear Sir:

I have established a school at the north end of Troy, in Rensselaer county, in the building usually called the Old Bank Place, for the purpose of instructing persons, who may choose to apply themselves, in the application of science to the common purposes of life. My principal object is, to qualify teachers for instructing the sons and daughters of farmers and mechanics, by lectures or otherwise, in the application of experimental chemistry, philosophy, and natural history, to agriculture, domestic economy, the arts, and manufactures.

From the trials which have been made by persons in my employment at Utica, Whitesborough, Rome, Auburn, and Geneva during the last summer, I am inclined to believe that competent instructors may be produced in the school at Troy, who will be highly useful to the community in the diffusion of a very useful kind of knowledge, and its application to the business of living. Apparatus for the necessary experiments has been so much simplified, and specimens in natural history have become subjects of such easy attainment, that but a small sum is now required as an outfit for an instructor in the proposed branch of science; consequently, every school district may have the benefit of such a course of instruction about once in two or three years, as soon as we can furnish a sufficient number of teachers. I prefer this plan to the endowment of a single public institution for the resort of those only whose parents are able and willing to send their children from home or to enter them for several years upon the Fellenberg plan. It seems to comport better with the habits of our citizens and the genius of our government to place the advantages of useful improvement equally within the reach of all.

THE RENSSELAER FLAG  This new Rensselaer flag first flew at the Institute’s 188th commencement in 1994. It combines historic and contemporary elements to represent Rensselaer’s origins and the present. The design, based on the coat of arms of Killian Van Rensselaer, forms the top of the current Institute shield. The flag was created in conjunction with the Class of ’94.
Whether my expectations will ever be realized or not, I am willing to hazard the necessary expense of making the trial. Having procured a suitable building advantageously located among farmers and mechanics, and having furnished funds which are deemed sufficient by my agent in this undertaking for procuring the necessary apparatus, etc., it now remains to establish a system of organization adapted to the object. You will excuse me if I attach too much consequence to the undertaking. But it appears to me that a board of trustees to decide upon the manner of granting certificates of qualifications, to regulate the government of students, etc., is essential. I, therefore, take the liberty to appoint you a member and president of a board of trustees for this purpose. I appoint the following gentlemen trustees of the same board: The Rev. Dr. Blatchford and Elias Parmalee, of Lansingburgh; Guert Van Schoonhoven and John Cramer, Esqs., of Waterford, Simeon DeWitt and T. Romeyn Beck, of Albany, John D. Dickinson and Jedediah Tracy, of Troy. And I appoint O.L. Holley, Esq., of Troy, and T. R. Beck, of Albany, first and second vice-presidents of said board.

As a few regulations are immediately necessary in order to present the school to the public, it seems necessary that I should make the following orders, subject to be altered by the trustees after the end of the first term.

ORDER 1. The board of trustees is to meet at times and places to be notified by the president, or by one of the vice presidents, in the absence or disability of the president. One-half of the members of the board are to form a quorum for doing business. A majority of the members present may fill any vacancy which happens in the board; so that there may be two members resident in Troy, two in Lansingburgh, two in Waterford, and two in Albany. The powers and duties of the trustees to be such as those exercised by all similar boards, the object of the school, being always kept in view.

ORDER 2. I appoint Dr. Moses Hale, of Troy, secretary, and Mr. H. N. Lockwood, treasurer.

ORDER 3. I appoint Amos Eaton, of Troy, professor of chemistry and experimental philosophy, and lecturer on geology, land surveying, and the laws regulating town officers and jurors. This office to be denominated the senior professorship.

ORDER 4. I appoint Lewis C. Beck, of Albany, professor of mineralogy, botany, and zoology, and lecturer on the social duties peculiar to farmers and mechanics. This office to be denominated the junior professorship.

ORDER 5. The first term is to commence on the first Monday in January
next, and to continue fifteen weeks. For admission to the course, including
the use of the library and reading-room, each student must pay for the chemi-
cal substances they consume and the damage they do to apparatus.

ORDER 6. All the pay thus received by the treasurer, as for parts of courses
of instruction, is to be paid over to said professors as the reward of their services.

ORDER 7. In giving the course in chemistry, the students are to be divided
into sections, not exceeding five in each section. These are not to be taught
by seeing experiments and hearing lectures, according to the usual method.
But they are to lecture and experiment by turns, under the immediate direc-
tion of a professor or a competent assistant. Thus by a term of labor, like
apprentices to a trade, they are to become operative chemists.

ORDER 8. At the close of the term each student is to give sufficient tests of
his skill and science before examiners, to be appointed by myself, or by the
trustees, if I do not appoint. The examination is not to be conducted by
question and answer, but the qualifications of students are to be estimated
by the facility with which they perform experiments and give the rationale;
and certificates or diplomas are to be awarded accordingly.

ORDER 9. One librarian, or more, to be appointed by the professors, will
be keeper of the reading-room. All who attend at the reading-room are to
respect and obey the orders of the librarian in regard to the library and con-
duct while in the room.

ORDER 10. Any student who shall be guilty of disorderly or ungentlemanly
conduct is to be tried and punished by the president or vice-president and
two trustees. The punishment may extend to expulsion and forfeiture of the
school privileges, without a release from the payment of fees. But a student
may appeal from such decision to the board of trustees.

This instrument, or a copy of it, is to be read to each student before he
becomes a member of the school; and he is to be made to understand that
his matriculation is to be considered as an assent to these regulations.

Stephen Van Rensselaer
Albany, Nov. 5, 1824.
Leaders and Honorees

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Teledyne Gurley
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The Deer River Group

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President
Nancy's Specialty Foods

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Assistant Professor
Northwestern University

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Rotex, Inc.

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President and Investment Counselor
H. L. Zeve Associates, Inc.

EX OFFICIO
Eugene Eaton
Mayor of Troy

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Shell Oil Co.

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Southern Pacific Co.

C. Sheldon Roberts '48
Former Consultant, Materials and Processes

Carl J. Thomsen '38
Former General Director
Texas Instruments, Inc.

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Alden Electronics

Eugene K. Bolton
Executive Vice President
Domestic Equities
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The University of Western Ontario

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General Electric Co.

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McCowan Associates Inc.

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Retired

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Associate Professor of Mechanical Engineering
President

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Professor of Biomedical Engineering
Vice President
Presidents
Since 1824

The Rev. Samuel Blatchford
1824-1828
The Rev. John Chester
1828-1829
The Rev. Eliphalet Nott
1829-1845
The Rev. Nathan S. S. Beman
1845-1865
The Hon. John F. Winslow
1865-1868
Thomas Brinsmade
1868
The Hon. James Forsyth
1868-1869
The Hon. John H. Peck
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1901-1934
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1935-1943
(also Chairman of the Board)
1935-1943
Livingston W. Houston '13
1943-1958
(also Chairman of the Board)
1943-1963

Academic Heads
Since 1824

Amos Eaton
1824-1842
George H. Cook
1842-1846
Benjamin Franklin Greene
1847-1859
Rev. Nathan S. S. Beman
1859-1860
Charles Drowne
1860-1876
William L. Adams
1876-1878
David M. Greene
1878-1891
Palmer C. Ricketts
1892-1934
Ray Palmer Baker
1931-1943
Matthew A. Hunter
1943-1949
Paul E. Hemke
1949-1958

Chairmen of
the Board
of Trustees
Since 1935

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1935-1943
(also President 1935-1943)
Livingston W. Houston '13
1943-1963
(also President 1943-1958)
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1963-1965
Detlev W. Bronk
1965-1971
Donald G. Sturgess '33
1971-1973
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1973-1981
George A. Strichman '37
1981-1985
Edward E. Hood, Jr.
1985-
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Royal George Finch '06
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Isadore M. Fixman '27
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Lawrence Blake Gibbs
Raymond A. Gibson '23
Mary L. Good '94
Horace Dobson Greenfield '16
Carl G. Grimm '29
Richard J. Grosch
Philip H. Grove '25
H. Erwin Hale '30
George L. Haller
Edward Parmelee Hamilton '07
Joseph M. Harrer '34
Raymond Harvey Hartigan '37
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Alexander Hassan '27
Samuel F. Heffner '56
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Federick Taylor Hepburn
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Edward E. Hood, Jr.
H. Mansfield Horner '48 (Hon.)
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Livingston Waddell Houston '13
Gregory N. Hughes '67
Howard P. Isermann '42
Stephen G. Jerritts '47
J. Erik Jonsson '22
Kenneth A. Jonsson
Neil William Kelleher
John Francis Kelly
Floyd H. Knapp '27
Theodore Ely Knowlton
Kenneth T Lally
Stanley L. Landgraf '46
Albert W. Lawrence
Edmond Harrison Leavely '22 (Hon.)
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George M. Low '48
Paul R. Low
Mackenzie MacIntyre '23
Martin G. Mahar
Edward H. Malone
Robin B. Martin '71
Augustine R. Marusi '36
Sanford E. McCormick
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Richard C. McCurdy
Jeremiah Dwight McKelvy
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Lawrence D. Meyer
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Glenn M. Mueller '64
Nancy S. Mueller
Newell Louis Nussbaum '19
William A. O'Neill
Jack S. Parker '87 (Hon.)
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John T. Potter
John Joseph Purcell
John J. Redfern, Jr. '33
John B. Reid '25
Paul Renshaw
Earl Deloss Rhodes '21
Joseph A. Rice '48
C. Sheldon Roberts '48
Ellis H. Robison '78 (Hon.)
Henry N. Rosenblatt '54
Janet C. Rutledge '83
Charles H. Rybolt '34
Robert E. Sageman '45
Percival Moseley Sax '90
Roland W. Schmitt
George Jenks Scantlon '37
Keeve M. Siegel '44
Sherrod Emerson Skinner '20
John B. Slaughter '81 (Hon.)
Arthur E. Smith
Leigh Edmund St.John '23
Gardner Seaver Staunton '23
Dale F. Stein '63
William Moore Stilwell, Jr. '24
Harry Stolar '33
Harold E. Strang '22
Reginald H. Stratton
George A. Strichman '37
Donald G. Sturges
Maurice L. Tainter '51 (Hon.)
Thomas R. Thomsen
Carl J. Thomsen '38
G. Robert Tod '61
G. Ware Travelstead '60
Paul Barringer Tulley
Alan M. Voorhees '47
Henry Belin Voorhees
James H. Walker
Robert B. Watkins '32
Nathan N. Werlin
Stephen C. Whitman '55
Harold C. Wiggers
Harry Alonzo Winne
Alexander C. Young '58
Harvey L. Zeve '52
Chaired Professorships

YEAR ESTABLISHED AND CURRENT HOLDER

Amos Eaton Professor of Computer Science (1991)
Joseph E. Flaherty

Andersen Consulting Associate Professor of Management (1990)
Joseph Morone

Warren H. Bruggeman '46 and Pauline Urban Bruggeman Distinguished Associate Professor in the School of Management (1995)
Sankaran Venkataraman

John A. Clark and Edward T. Crossan Professor of Engineering (1974)
Arthur E. Bergles

S. B. Crary Professor of Engineering (1970)
(vacant)
Margaret A. Darrin Distinguished Professor in Applied Mathematics (1981)
Julian D. Cole

Ford Foundation Professor of Mathematics (1967)
Joyce McLaughlin

Frank and Lillian Gilbreth Professor in the Technologies of Management (1969)
Albert S. Paulson

Alma and H. Erwin Hale '30 Teaching Professorship of Humanities and Social Sciences (1991)
Linda Layne

Edward P. Hamilton Distinguished Educator (1975)
William E. Boyce

William Howard Hart Professor of Rational and Technical Mechanics (1883)
George Dvorak

Richard T. Lahey, Jr.

John Tod Horton Professor of Materials Engineering (1971)
Martin E. Glicksman

Robert W. Hunt Professor of Metallurgical Engineering (1938)
Richard W. Siegel

Institute Professor of Aeronautical Engineering and Mechanics (1978)
(vacant)

Institute Professor (1994)
James W. Modestino

Institute Professor of Architecture (1981)
Patrick J. Quinn

Institute Professor of Nuclear Engineering (1981)
Don Steiner

Institute Professor of Science (1986)
Ivar Giaever '64

Institute Professor of Science and Engineering (1987)

Institute Professor of Science and Technology (1983)
Daniel Berg

Howard P. Isermann Assistant Professor of Chemical Engineering (1991)
Todd M. Przybycień

Howard P. Isermann Professor of Chemical Engineering (1986)
Steven M. Cramer

Howard P. Isermann Distinguished Chair in Chemical Engineering (1986)
(vacant)

Samuel A. Johnson '37 and Elisabeth C. Johnson Professor of Engineering (1990)
Mark S. Shephard

Kodak Chair in Engineering (1991)
(vacant)

Louis Ellsworth Laffin Professor of English (1917)
Merrill D. Whitburn

Clare Boothe Luce Professor of Mechanical Engineering (1992)
Antoinette Maniatty

New York State Science and Technology Foundation Professor of Glass and Ceramics Science (1967)
Robert H. Doremus

Niagara Mohawk Power Electronics Research Chair (1988)
David A. Torrey

(vacant)

Rosalind and John J. Redfern, Jr. '33, Professor of Engineering (1981)
Erhard Krempel

Eliza Ricketts Foundation Professor of Mathematics (1937)
Donald Drew '67

Patricia W. And C. Sheldon Roberts '48 Chaired Professor in Solid State Electronics (1991)
(vacant)

Russell Sage Professor of Chemical Engineering (1938)
William N. Gill

Philip Sporn Professor of Electric Power Engineering (1962)
Alan N. Greenwood

William Weightman Walker Professor of Chemistry (1905)
Arthur G. Schultz

William Weightman Walker Professor of Polymer Engineering (1905)
Sanford S. Sternstein '61

Cary L. Wellington Professor of Management of Technology (1988)
Walter Reitman

Dean R. Wellington Teaching Professor of Management (1990)
Jeanne Lynch
Alumni Association
Teaching Award
Recipients Since 1994
This award recognizes members of the Rensselaer Faculty for their outstanding teaching techniques, contributions to the campus experience and commitment to students.
1994 Michael M. Abbott '60
1995 Jorge Haddock '79

Alumni Association
Outstanding Faculty Award
Recipients Since 1983
This award recognizes members of the Rensselaer faculty for superior service to the Rensselaer Alumni Association and to the Institute.
1983 J. Lawrence Katz
1984 Frederick F. Ling
1985 William W. Shuster '39
1986 Alan S. Metzler
1987 Ernest F. Nipples, Jr. '38
1988 Samuel C. Wait, Jr. '53
1989 Stephen E. Wiberley '48
1990 Ronald J. Gutmann '62
1991 Edith H. Luchins
1992 Robert G. Hawkins
1993 Robert Resnick
1994 Ivar Giaever '64
1995 Jorge Haddock '79

Commencement Speakers and Honorary Degrees
Since 1864
1864 George Gould *
1869 William J. McAlpine *
1870 R. W. Raymond *
1877 Alfred P. Boller '61 *
1880 Francis Collingwood '55 *
1881 Clarkson N. Potter '43 *
1882 Luiz da R. Diaz '60 Charles H. Fisher '53 C. E. Patterson *
1884 James C. Booth '1831 William B. Cogswell '82 Charles Wood *
1886 Robert W. Hunt *
1887 Henry R. Pierson *
1888 B. F. Isherwood *
1889 Henry C. Potter *
1890 Chauncey M. Depew * Matthew Hale *
1891 Charles Macdonald '57 *
1892 William Metcalf '58 *
1893 Joseph H. Mullin '69 *
1894 Joseph M. Wilson '58 *
1895 Othnell E. Nichols '68 *
1896 Theodore Voorhees '69 *
1897 G. S. Morison *
1898 Alfred T. White '65 *
1899 Henry C. Taylor *
1900 Mordecai T. Endicott '68 *
1901 Henry G. Prout *
1902 Robert W. Hunt *
1903 George W. Plymont '46 *
1904 Foster Crowell *
1905 Nelson P. Lewis '79 *
1906 Charles Wood *
1907 Harvey W. Wiley *
1908 Walter C. Kerr *
1909 Onward Bates '71 *
1910 Frank C. Osborn '80 *
1911 Robert E. Peary *
1912 Henry W. Hodge '78 *
1913 John S. Deans *
1914 John H. Finley *
1915 Hiram F. Mills '56 *
1916 Robert W. Hunt Alfred T. White '65 *
1917 Charles W. Baker *
1920 Ransom H. Gillett * Herbert C. Hoover Joseph H. Odell * Leonard Wood
1921 Frederick B. Smith *
1922 Arthur M. Greene, Jr. Dallis L. Sharp *
1923 Harry H. Rousseau '91 *
1925 Henry Ford John Van W. Reynolds '85 *
1926 George S. Davison '77 Ralph Earle *
1927 Philip W. Henry '87*
1928 Percival M. Sax '90*
1929 Morris R. Sherrerd '86 *
1930 John N. Shannahan '94 *
1931 Charles Butler * William Leland Thompson '94
1932 Clarence F. Hirshfield * William L. Robb
1933 Leonor F. Loree * Charles P. Perin Daniel L. Turner '33
1966 Eugene G. Fubini
Michael L. Haider
Floyd D. Hall
John D. Harper
J. Herbert Hollomon *
Sol Speigelman
James E. Webb

1967 Louis H. Aricson '41
Emilio Q. Daddario *
Mark O. Hatfield
Charles G. Humphrey '19
Alexander C. Husband '39
Thomas L. Martin, Jr. '43

1968 William O. Taylor '33
Eugene Ormandy
John T. Potter '33
Philip Sporn
(No speaker at this Commencement; Nelson A. Rockefeller was scheduled to speak but did not attend because of the assassination of Robert F. Kennedy)

1969 James E. Allen, Jr.
John Bardeen
George M. Low '48
Nelson A. Rockefeller *

1970 Milton Brumer '23
Lee A. DuBridge *
Livingston W. Houston '13
Calhoun Norton '37
Eduard C. Pestel '39

1971 Issiac Asimov *
Clay P. Bedford '24
Royden C. Sanders, Jr. '38

1972 Ray Palmer Baker
Kenneth A. Gibson
Patrick E. Haggerty
Alvin Toffler *
Jerome B. Wiesner

1973 David M. Darrin '40
Richard G. Folsom
R. Buckminster Fuller
Walter J. Hickel *
Eugene McDermott
Rodolfo Patron '24
Casper W. Weinberger

1974 The Baron Bowden of Chesterfield
Ivar Giaever '64 *
Ralph B. Peck '34
Robert C. Seamans, Jr.

1975 Arthur M. Bauche
Edgar M. Corrington '47
Carl E. Sagan *
Arthur R. Taylor

1976 Nathan Cohn
Walter Cronkite *
Ruth Patrick

1977 Jaques-Yves Cousteau *
Courtland D. Perkins
Charles C. Price
Robert M. White

1978 Ioeh Ming Pei
Dixy Lee Ray *
Alan M. Voorhees '49

1979 Harry A. Blackmun *
Walter A. Fallon
Mark Sheppard, Jr.

1980 Theodore M. Hesburgh *
J. Christopher Jaffe '47
James Lighthill

1981 H. Joseph Gerber '47
Harrison H. Schmitt *
John B. Slaughter
Rosalyn S. Yallow

1982 Michael S. Brown
Edward E. David, Jr.
Joseph L. Goldstein
George A. Keyworth II *

CONVOCATION
Hugh L. Carey
John R. Opel
Frank H. T. Rodes
John F. Welch, Jr.

1983 J. Dyson Freeman
David McCullough
Daniel P. Moynihan *
John J. Redfern, Jr. '33

1984 James A. Abrahamson *
John C. Polanyi
Carl J. Thomsen '38

1985 Richard L. Garwin *
Percy A. Pierce
Roger B. Smith
Kenneth D. Snelson

1986 Daniel Bell
E. Margaret Burbidge
Leslie E. Robertson
Garry B. Trudeau *

1987 John F. Akers *
Elmer L. Gaden, Jr.
William J. Kennedy
Jack S. Parker
Howard E. Simmons

1988 James B. Hunt, Jr. *
Raymond Kurzweil
Wassily Leontief
C. Sheldon Roberts '48
An Wang

INAUGURATION
Norman R. Augustine
Paul E. Gray
Claudine C. Schneider

1989 Erich Bloch
Marian K. Chamberlain
Jerry R. Junkins
Walter Massey *

1990 D. Allan Bromley *
Nancy D. Fitzroy '49
Jack S. Kilby
Clai borne Pell
George W. Rickey

1991 Myles N. Brand '64
Elis J. Corey
Hanna H. Gray
Paul C. Lauterbur
Peter V. Ueberroth *

1992 Thomas L. Clancy, Jr. *
Gordon E. Moore
Arno A. Pen zias

1993 Ralph A. Alph er
Max E. Bleik '50
Arthur Eisenkraft
Robert Resnick *
(faculty member – no degree)
Richard Selzer

1994 Jewel Plummer Cobb
Mary L. Good
David T. Kearns
William C. W. Mow '59 *
(active Trustee member – no degree)
Guy W. Numann '53

HONORS CONVOCATION
Arthur E. Williams ’62

1995 Evelyn Fox Keller
G. David Low *
James W. Mitchell
Arati Prabhakar

*Speaker
Alumni Association Presidents Since 1869

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1874-78 William Gurley '39
1878-79 John G. Ambler '33
1879-80 James P. Wallace '37
1880-81 Francis Collingwood '55
1881-83 Charles Macdonald '57
1883-84 Charles C. Martin '56
1884-85 Joseph M. Wilson '58
1885-86 Joseph C. Platt '66
1886-87 David Reeves '72
1887-88 Theodore Voorhees '69
1888-89 T. Guilford Smith '61
1889-90 Christopher C. Waite '64
1890-91 John J. Albright '68
1891-92 Clark Fisher '58
1892-93 William B. Cogswell '51
1893-94 Theodore N. Ely '66
1894-95 William Metcalf '58
1895-96 William H. Doughty '58
1896-98 Joseph M. Knap '58
1898-99 Alexander J. Cassatt '59
1899-00 Frederick Grinnell '55
1900-01 Charles C. Martin '56
1901-02 Horace G. Young '77
1902-03 Washington A. Roebling '57
1903-04 Robert Forsyth '69
1904-05 Alfred H. Renshaw '83
1905-06 Alfred P. Boller '61
1906-07 Morris R. Sherrerd '86
1907-08 William B. Ridgely '79
1908-09 Philip W. Henry '87
1909-10 George S. Davison '78
1910-11 Calvin Pardee '60
1911-12 Thomas H. Walbridge '76
1912-13 Nelson P. Lewis '79
1913-14 Charles Soosmith '76
1914-15 Strickland L. Kneass '80
1915-16 Alfred T. White '65
1916-17 Louis E. Laffin '82
1917-18 George O. Knapp '76
1918-19 Charles G. Roebling '71
1919-21 Stewart Johnston '87
1921-28 Ralph G. Packard '64
1928-29 Daniel L. Turner '91
1929-30 Percival M. Sax '90
1930-31 George C. Diehl '94
1931-32 Edwin G. Adams '91
1932-33 Thomas Earle '87
1933-34 George T. Horton '93
1934-36 Safford K. Colby '94
1936-37 Henry B. Voorhees '96
1937-38 Julius W. Pfau '99
1938-39 Royal G. Finch '06
1939-40 Eduardo J. Chibas '89
1940-41 Jeremiah D. McKelvy '14
1941-43 James W. Frazier '94
1943-44 Burr R. Kulp '05
1944-45 Winfred E. Reynolds '03
1945-46 Edward P. Hamilton '07
1946-47 Fred Denig '18
1947-48 Edward P. Abbott '13
1948-49 John J. Manning '15
1949-50 Miguel Villa '08
1950-51 Earl A. Jung '23
1951-52 Robert Paxton '23
1952-53 Emid H. Praeger '15
1953-54 James C. Vosburgh '14
1954-55 Vernon D. Beehler '26
1955-56 Leverett C. Stone '14
1956-57 Laurence B. Kuhns '24
1957-58 Stanley P. Fisher '15
1958-59 Paul H. Conway '16
1959-60 Herbert W. Gaeckle '21
1960-62 Royce F. Ward '31
1962-64 Isadore M. Fixman '27
1964-66 Earl D. Rhodes '21
1966-68 Floyd H. Knapp '27
1968-70 Michael Masters '36
1970-72 H. Erwin Hale '30
1972-74 Craig W. Angell '35
1974-75 Andrew R. Ewing '53
1975-76 George C. Wheeler, Jr. '51
1976-77 Ivan N. Schatz '57
1977-78 Theodore A. Fithian '53
1978-79 David H. Bressen '56
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1986-87 John B. Flannery, Jr. '66
1987-88 Harvey L. Zeve '52
1988-89 Michael C. Duffy '62
1989-90 Alex C. Young '58
1990-91 W. Robert McIntosch '60
1991-92 Bruce W. Masland '56
1992-93 John A. Malitoris '78
1993-94 Jay J. Webb '61
1994-95 Paula L. Simon '68
1995-96 Mark R. Feinstein '77
Alumni Association Distinguished Service Award

Recipients Since 1967

The Association's highest honor, this award recognizes distinguished service by an individual, to a profession, to the nation or to humanity.

1967 J. Erik Jonsson '22
1968 Emil H. Praeger '15
1969 Clay P. Bedford '24
1970 Clarence E. Davies '14
1972 Milton Brumer '23
1973 Detlev W. Bronk
1975 Harold E. Strang '22
1976 Livingston W. Houston '13
1977 John J. Redfern, Jr. '33
1978 Fannabell S. Fixman
1979 Richard G. Folsom '73 (Hon.)
1980 Carl J. Thomsen '38
1981 Alexander Hassan '27
1982 Ellis H. Robison '78
1983 C. Sheldon Roberts '48
1984 Joseph E. Pahl '39
1985 George M. Low '48
1986 George A. Strichman '37
1987 Samuel F. Heffner '56
1988 Stanley I. Landgraf '46
1989 Kenneth T. Lally
1990 Harold M. Faigenbaum '23
1991 David M. Diltz '38
1992 Hugh M. Archer '37
1993 Roland W. Schmitt
1994 Howard P. Isermann '42
1995 Warren H. Bruggeman '46

Alumni Association Albert Fox Demers Medal

Recipients Since 1942

This award was established by John Knickerbocker of the class of 1866 to honor his classmate Albert Fox Demers to recognize service and stimulate interest in the welfare of the Institute.

1942 Albert Fox Demers '86
1942 John V. Newkirk '36
1943 Edward H. Dion '12
1943 Henry V. Macksey '86
1943 Walter E. Irving '95
1944 Edwin G. Adams '91
1944 James W. Frazier '94
1945 James M. Caird '97
1945 John J. Manning '15
1946 G.C. Deihl '94
1946 Julius W. Pfau '99
1947 Edward P. Abbott '13
1947 James E. Blackburn, Jr. '23
1948 James A. Ryan '13
1948 Olin J. Magary '13
1949 Donald H. Kinlock '14
1949 Edward D. Blackwell '74
1949 William M. Stilwell '24
1949 William P. Nial '99
1949 James C. Vosburgh '14
1950 Albert Maruri '15
1950 Jack V. Richards '20
1950 Leon C. Laub '15
1950 Manuel A. Coroalles '96
1950 Miguel Villa '08
1950 Philip H. Grove '25
1951 Herbert W. Gaeckle '21
1951 Horace D. Greenfield '16
1951 John M. Diven '13
1951 Paul H. Conway '16
1951 Vernon D. Beehler '26
1952 Anthony A. Divito '27
1952 Donald N. Becker '08
1952 Earl A. Jung '22
1952 Otto J. Swensson '08
1953 Carl J. Wright '13
1953 Charles E. Merritt '09
1953 Mackenzie MacIntyre '23
1953 Royce F. Ward '31
1953 Samuel P. Owen '28
1954 Earl D. Rhodes '21
1954 Laurence B. Kuhns '24
1954 William H. Cravens '16
1954 Donald E. Moat '24
1955 Gardner S. Staunton '23
1955 J. Leland Hodgkins '23
1955 Kenneth J. MacKenzie, Sr. '23
1956 C. Leonard Ager '21
1956 James A. Dawson '17
1956 Stanley P. Fisher '16
1956 William M. Thomas '22
1957 Isadore M. Fixman '27
1957 Lester C. Higbee '12
1957 Robert L. Sommerville '16
1957 Jerome H. Williams '13
1958 James F. Matthews '16
1958 Richard E. Burr '32
1958 Robert B. Watkins '32
1959 Clarence P. Frederickson '24
1959 Leigh E. St. John '23
1959 Paul B. Tully '23
1959 William P. Headden '29
1960 Alton W. Laird '22
1960 Augustus Miller '23
1960 Harry G. Laird '17
1960 Michael G. Masters '36
1961 Marvin H. Anderson '27
1961 Robert G. Deitrich '31
1961 Charles A. Shoecraft '46
1961 J. Halmer Hayner '24
1962 Alexander Hassan '27
1962 Edward A. Rudulph '18
1962 George J. Scranton '37
1962 Harold E. Strang '22
1962 Harmon G. Mornik '27
1963 Frank E. Shumann '23
1963 Raymond A. Gibson '23
1963 William H. Kemp, II '13
1963 Wallace C. Rudd '33
1964 Herbert W. Lindholm '24
1964 Herman M. Brown '14
1965 Carl L. Zamjohn '30
1965 Warren J. Allen, Jr. '49
1965 David Swan '40
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Board of Trustees, 1793/1795, oil on canvas, .915 x .715 cm (36 x 28 1/8 in); framed 1.146 x .936 (45 1/8 x 36 7/8 in)

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Charles C. Ingham, Engraver; Asher Durand, Artist, *DeWitt Clinton*, line engraving on paper. Gift of Miss Jane E. Rosell

E. L. Henry, *First Railway Train on the Mohawk and Hudson*, oil on canvas

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