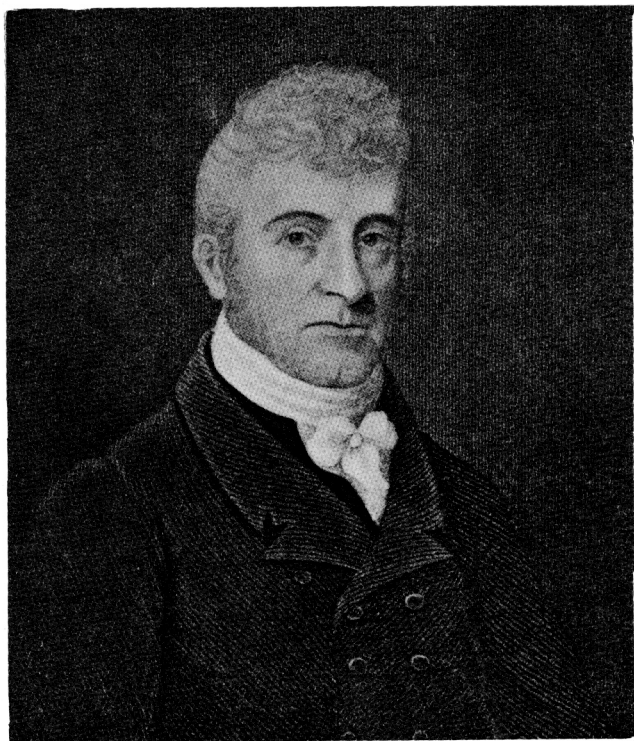


# EDUCATION FOR A TECHNOLOGICAL SOCIETY



*S. Van Nenselaes*

# *Education for a Technological Society*

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*A Sesquicentennial History of  
Rensselaer Polytechnic Institute*

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Professor Emeritus of History  
Rensselaer Polytechnic Institute

*This history has been made possible by generous  
contributions from the Rensselaer Alumni Association  
and the Class of 1933*

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*Dedicated to*  
*The Long Line of Generations*  
*Constituting the Living Rensselaer*



## Preface

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As the title indicates, this book has two distinct, though related, purposes. It is, in the first place, a history of Rensselaer Polytechnic Institute, whose beginnings date back to 1824. It is an analytical as well as a narrative account whose purpose is to trace the growth of a school of science and engineering in America through successive stages, each in its own context of conditions and circumstances affecting the direction of its development and responsible for its achievements. Here is the history of an American educational institution during nearly a century and a half, based on the examination and use of a considerable volume and variety of materials, both official and informal, originating in academic, administrative, and student sources. Here, it is hoped and believed, is a substantial and straightforward account that spares none of the difficulties and problems as it traces the course of Rensselaer's progression to this date.

Beyond this, however, there is a second but not at all secondary purpose. It is to reveal and relate something of the development of American education generally, particularly in the area of science and technology. In this connection Rensselaer has had a special place and function, for its history is to a considerable degree the record of scientific and technological education. Its experience and evolution over nearly a century and a half are virtually coterminous with technological education in general. Its foundation in 1824 introduced the very concept, and, more than almost any other institution, it has tended to confine itself closely and completely to this kind of education. Rensselaer's history thus constitutes a chapter of American education concerned primarily with the technological and scientific elements appropriate to a society increasingly technologi-

cal in character. The dichotomy dividing the practical and technical from the humanistic and social components is an amazing and perhaps incongruous aspect of American educational history. Rensselaer illustrates this division from the very outset.

Its recent efforts, along with those of other schools of its character, to liberalize the curriculum testify to recognition of the fact that it is time to rejoin the main stream of education and to reunite the two cultures whose separation has been a major concern of modern society. Both in what has happened in the area of technological education and in what is being done here Rensselaer's history affords an excellent example, covering, as it does, virtually the entire period of its development. This is of particular importance in a society like that of the United States, which has simultaneously acquired a technological character, and is therefore dependent on an adequate supply of men and women trained in these skills, but is also possessed of a well-integrated educational experience that combines the liberal and humanistic with the scientific and technological elements.

A book of this character could not have been written without the cooperation and encouragement of many people. In the first place, there was the incentive supplied by those who have had a personal as well as an official interest in such an undertaking. Among those to be named is the former president, Livingston W. Houston, who, with his secretary, Mrs. Frieda Gray, made available many of the original documents of the Institute. The current president, Dr. Richard G. Folsom, and the provost, Dr. Clayton O. Dohrenwend, have earned my thanks for their constant encouragement and concern with this work. To them in particular may be added Mr. I. M. Fixman, former president of the Rensselaer Alumni Association, whose own efforts in the pursuit of Stephen Van Rensselaer memorabilia have brought a touch of competition and an added stimulus, apart from his general enthusiasm over the project.

In a very practical sense Mr. Richard W. Schmelzer, Secretary of the Rensselaer Polytechnic Institute, has spent much time and has brought to bear his great knowledge of the Institute's past in critical judgment on the manuscript in process of preparation. In addition, with the cooperation of Mr. John A. Dunlop, Registrar, and



Mr. Kenneth J. Plant, Treasurer of Rensselaer, he has provided advice and statistics for the appendices.

The Rensselaer Librarian, Mr. Edward Chapman, made available the facilities and resources of the library and its archives, which facilitated my task. To the *Rensselaer Review* and its former editor, Mr. Daniel J. Priscu, thanks are due for providing a kind of try-out medium for certain portions of Rensselaer history and for his general and generous sympathy with history and the historical approach. Appreciation is also due to Mrs. Gertrude Meader and the girls of her typist pool for the skill with which they deciphered the writer's manuscript and translated it into an attractive and legible typescript. Recognition must be rendered to Mr. Elmer W. Siple, secretary to Director Ricketts, whose reminiscences have been helpful. My way had been partly prepared by Palmer C. Ricketts himself, who published his *History of Rensselaer Polytechnic Institute* in 1895 as one of his newly assumed duties as director.

Altogether, it is evident that many, including others not named, have contributed to the making of this volume. To me alone, however, belongs the responsibility for the order and organization and for the opinions expressed in this work. It may, indeed, be emphasized as a matter for praise that none has attempted to influence me in any way, either in the selection of material or in its interpretation. For this freedom I am particularly grateful, for it is through such independence and straightforwardness that this account is most likely to achieve the place it deserves in the history of American education.

Above all, I anticipate with a kind of pleasant trepidation the response and reaction of Rensselaer alumni and of those of the general public who may be led to read this history of nearly a century and a half of Rensselaer Polytechnic Institute and who will, hopefully, accept it as part of the record of American education, particularly in science and technology.

SAMUEL REZNECK

Troy, New York  
February 1968



# Contents

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PART I FOUNDATIONS AND BEGINNINGS OF THE RENSSELAER SCHOOL (1824-1842)	1
<i>Chapter 1. A New School Is Born in 1824</i>	3
The Founder, Stephen Van Rensselaer · Amos Eaton, an Innovator in Education · The Original Purpose of the Rensselaer School · The Propagation of New Ideas in Education · The Founding of the Rensselaer School	
<i>Chapter 2. Early Trials and Tribulations of a     New School and Its Founders</i>	23
Preparations for the New School · Hopes and Stresses of the New School · The New School in Operation · Extending the Scope and Function of the New School	
<i>Chapter 3. The Progress of the Rensselaer School     under Amos Eaton</i>	38
Eaton's Objectives and Methods · Efforts to Stabilize the New School · The Rensselaer Institute Offers Degrees in Science and Engineering in 1835 · Eaton Seeks to Perpetuate the Rensselaer Institute · Student Commentary upon Eaton's School · Amos Eaton as a Dedicated Teacher · The Measure of Eaton's Achievement at Rensselaer	
PART II REVIVAL AND REORGANIZATION OF THE RENSSELAER INSTITUTE (1842-1859)	61
<i>Chapter 4. Eaton's Last Years and the Crisis of Transition</i>	63
The Last Troubled Years of Amos Eaton · The Problem of a	

Successor to Amos Eaton • A New Senior Professor Takes Charge • George Cook's Direction of Rensselaer and Its Evaluation	
<i>Chapter 5. Benjamin Franklin Greene Assumes Direction in 1847</i>	78
Background and Preparation of B. F. Greene • Greene's Role as an Innovator in Education • The National Trend and Agitation for Scientific Education • The American Association for the Advancement of Science Meets at Rensselaer in 1851	
<i>Chapter 6. B. F. Greene Transforms the Rensselaer Institute into a Polytechnic</i>	93
Faculty and Students of Rensselaer under B. F. Greene • The Rensselaer Course of Instruction under B. F. Greene • Student Life and Customs under B. F. Greene • B. F. Greene's Concern with Student Performance	
<i>Chapter 7. B. F. Greene Projects and Envisions "The True Idea of a Polytechnic"</i>	111
Greene's Vision and the Reality of Rensselaer's Condition • The Agitation for Local Support • The Plan of a "True Polytechnic" • The Crisis Leading to Greene's Resignation • The Aftermath of Greene's Resignation	
<b>PART III A GENERATION OF STRUGGLE AND STANDSTILL AT RENSSELAER (1859-1892)</b>	133
<i>Chapter 8. The Institute Survives the Civil War, Fire, and Depression</i>	135
Leadership at Rensselaer after 1859 • The Trustees and Presidents of Rensselaer • The Impact of War and Depression • The Fiscal Problems of Rensselaer in War and Depression • War Services of Rensselaer Students and Alumni • Rebuilding the Institute after the Great Fire of 1862 • Plans for Expansion after the Civil War	

- Chapter 9. Rensselaer Contracts Its Scope and Program  
after 1870* 154
- Ambitious Plans for Rensselaer in the Eighteen Sixties · S. E. Warren's Proposal and Program of "A Polytechnic University" · The Report of the Holley Committee in 1870 · The Contraction to a Civil Engineering Course · A Solid Course of Civil Engineering
- Chapter 10. Students at Work and Play at Rensselaer* 167
- The College Pattern of Life and Custom · Cultural Activities of Rensselaer Students · The Beginnings of Fraternity Organization · The *Transit* as a Record of School and Student Life · The Fluctuating Pattern of Student Organization · The Student Body in 1874, the Semicentennial Year · The Informal Beginnings of Athletics · Hazing and Institutionalized Class Conflicts · Grand Marshal's Elections and Student Parades and Serenades · Town and Gown Relations · Student Publications Since the Civil War · A Profile of the Class of 1887
- Chapter 11. Rensselaer Graduates at Work* 198
- The Pragmatic Tests of Engineering Education · The Business Cycle and Engineering Employment · The Social Origins and Background of Rensselaer Graduates · Engineering Families with a Rensselaer Education · The Far Places of Rensselaer Graduates · Rensselaer Graduates as Teachers of Science and Engineering · Rensselaer Graduates as Engineers in the Field · Rensselaer Graduates as Writers on Engineering and Other Subjects · Rensselaer Graduates in Railroad Engineering · Rensselaer Engineers in Foreign Lands · The Business Activities of Rensselaer Graduates · Pittsburgh's Early and Long Association with Rensselaer · Spectacular Achievements of Rensselaer Engineers · Rensselaer Graduates and the United States Navy · The Broad Pattern of Achievement of Rensselaer Graduates

<i>Chapter 12. Students and Alumni Take a Hand in Rensselaer Affairs</i>	223
<p>Alumni Loyalty and Obligations to Their Alma Mater • The Formation of an Association of Graduates in 1869 • The Semacentennial Celebration of 1874 • Alumni Meetings and Interest in Rensselaer Affairs • Local and Regional Associations of Alumni • Student Opinion and Sentiment about Rensselaer</p>	
<b>PART IV GROWTH OF RENSSELAER UNDER P. C. RICKETTS (1892-1934)</b>	<b>243</b>
<i>Chapter 13. P. C. Ricketts Assumes the Direction of Rensselaer</i>	245
<p>The Role of Ricketts in Rensselaer History • Ricketts' Background and Preparation • The Election and Service of Ricketts as Director • Ricketts' Educational Doctrines • Changes at Rensselaer under Ricketts as Director • Ricketts' Election as President in 1901</p>	
<i>Chapter 14. Building Rensselaer Physically and Fiscally</i>	264
<p>The Fire of 1904 and the Problem of Reconstruction • The Sage Gift and New Directions of Growth • The Continued Expansion of the Rensselaer Campus • Fiscal Growth of Rensselaer under Ricketts</p>	
<i>Chapter 15. Academic Growth and Educational Diversification of Rensselaer</i>	280
<p>The Dilemma of Engineering Education • Academic Diversification and New Curricula at Rensselaer • Beginnings of Graduate Study and Research at Rensselaer • Faculty Diversification and Growth of Undergraduate Enrollment • The Changing Faculty Pattern at Rensselaer</p>	
<i>Chapter 16. Internal Relations and Tensions at Rensselaer</i>	300
<p>The American College Pattern of Student Relations • The Transition to a New Campus and Student Restraint • Student Activities and Organizations • Fraternities at</p>	

Rensselaer • Intercollegiate and Intramural Athletics • The Flux of Student Associations • Student Publications and Songs • Academic Problems and Issues at Rensselaer	
<i>Chapter 17. World War I, the Centennial, Depression, and the End of an Era</i>	318
The Impact of World War I • Postwar Growth of Rensselaer • The Centennial Celebration of 1924 • The Closing Years of Ricketts • Ricketts' Death and the End of an Era	
 PART V THE CONTEMPORARY RENSSELAER POLYTECHNIC INSTITUTE, SINCE 1935	 331
<i>Chapter 18. Depression, World War II, and the Interregnum of E. S. Jarrett and W. O. Hotchkiss</i>	333
A Time of Self-Examination and Review • The Regency of E. S. Jarrett • The New President, W. O. Hotchkiss • New Needs and Required Changes • Curricular Revision and Other Reforms in a Time of Depression • The Impact of World War II • Postwar Planning during the War	
<i>Chapter 19. The Postwar Acceleration of Education at Rensselaer, 1945-51</i>	350
Reconversion to Peace • A New Administration and New Problems of L. W. Houston • The Postwar Planning Committee • The Postwar Provision for and Growth of Education • New Programs and Trends at Rensselaer	
<i>Chapter 20. The Developing Shape and Direction of the Postwar Rensselaer</i>	361
The Multiple Postwar Pressures • New Activities for a Postwar Rensselaer • The Prospects and Problems of Growth • The Organization and Fiscal Operation of Postwar Rensselaer • Tuition Increase and the Growth of Scholarship Aids • The Growing Role of Placement as an Index of Academic Success • The Close of the Houston Period in 1958 • A New President, R. G. Folsom, Is Chosen	

<i>Chapter 21. Academic Trends and Developments since World War II</i>	381
<p>Revolutionary Fermentation in Postwar Education • The Core of Liberal Studies at Rensselaer • New Programs of Education at Rensselaer • New Ideas and Trends in Technological Education • The Growth of Graduate Education • The Growth of Research at Rensselaer • Faculty Expansion and Diversification</p>	
<i>Chapter 22. Student Affairs and Alumni Relations since World War II</i>	409
<p>Rensselaer as a Community and Social Institution • Postwar Housing and Community Relations • Elevating Social Standards • Student Publications • Communications, Dramatics, and Music • Religion and Religious Organizations • Freshman Orientation and Student-Faculty Relations • The Wide Range of Extracurricular Activity • Rensselaer Athletics • Multiple Student Organizations • The Development of Alumni Participation in Institute Affairs • Postwar Growth of Alumni Activity • Rensselaer Alumni and Middle-Class American Society</p>	
<i>Chapter 23. Epilogue: Perspectives and Prospects</i>	437
<p>The Five Stages of Rensselaer History • Financial and Physical Growth • Planning for the Future of Rensselaer • New Goals for Rensselaer and Technological Education • Rensselaer and the Continual Struggle for New Objectives</p>	
<i>Chapter 24. A Chapter of Bibliography</i>	455
<p>Introduction • Primary Materials • Secondary Materials</p>	
<i>Appendix 1. A Calendar of Important Dates and Events in Rensselaer History</i>	473
<i>Appendix 2. Administrative and Academic Leadership at Rensselaer Since 1824</i>	476
<i>Appendix 3. The Directors of Rensselaer Affairs</i>	478



<i>Contents</i>	<i>xvii</i>
<i>Appendix 4. Chronological List of Curricula and Degrees Introduced at Rensselaer Since 1824</i>	482
<i>Appendix 5. The Men of Rensselaer</i>	483
<i>Appendix 6. Scholastic Contribution of Each Academic Division by Percentages to Total Student Credit-Hours (1956-1965)</i>	489
<i>Appendix 7. Fiscal Growth of Rensselaer</i>	490
<i>Appendix 8. Scientific and Engineering Education as Conceived at Rensselaer Since the Nineteenth Century</i>	495
<i>Index</i>	511
<b>ILLUSTRATIONS</b>	<i>following 242</i>



# EDUCATION FOR A TECHNOLOGICAL SOCIETY



Part One

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*Foundations and  
First Beginnings of  
the Rensselaer School  
(1824-1842)*



# 1

## *A New School Is Born in 1824*

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### *The Founder, Stephen Van Rensselaer*

In February 1825, Stephen Van Rensselaer, as a member of the New York State congressional delegation, cast a decisive vote in the House of Representatives, which gave that state, as well as the Presidential election, to John Quincy Adams over Andrew Jackson. Illustrating his diverse interests, only a few weeks earlier, on November 5, 1824, Van Rensselaer addressed a letter to the Reverend Samuel Blatchford, English-born Presbyterian divine of Lansingburgh, New York, whom he designated as the president of a newly named board of trustees. In it he announced, in an authoritative style appropriate to the role of grand seigneur and large landowner that he played in the Upper Hudson Valley:

“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. . . .”

Relating his venture to education generally, Van Rensselaer continued: “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. . . . 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.”

More follows in great detail, including ten orders for the organization and operation of this new type of school, and appointing the trustees and various other officers. Named as head of the faculty was Amos Eaton, “Professor of Chemistry and Experimental Philosophy, and Lecturer on Geology, Land Surveying, and laws regulating Town officers and jurors. This office to be denominated the senior professorship.” Along with Eaton, Van Rensselaer also appointed Lewis C. Beck, one of three brothers, all physicians engaged in the pursuit of science in Albany, who was designated as “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.” Another brother, Dr. T. Romeyn Beck, was named a trustee from Albany, along with Simeon DeWitt, surveyor-general of New York State, and six others representing Troy and neighboring communities.

This primary document in the history of the Rensselaer School, presented in the form of a letter, was soon followed by another letter from the patron, Stephen Van Rensselaer. Written from Washington, D. C., and dated February 11, 1825, it offered five more by-laws to be approved by the trustees. Both letters were declared by them, on March 11, 1825, to “be the Constitution of the School



therein mentioned, for the government of all the future by-laws and transactions of said board of Trustees, and of all other persons concerned in said school." These documents, more than the subsequent act of incorporation by the Legislature of New York State in March of 1826, constituted the true inspiration and authority for this novel experimental venture in education; moreover, they outlined with remarkable clarity of purpose and profusion of detail the original objectives and scope of the school. They have never been formally abrogated, although, in its subsequent development over nearly a century and a half, with the sanction of numerous acts of the state legislature, the Van Rensselaer establishment has departed widely and naturally from its original character and intent, in accordance with changing conditions and needs.

But it is well and, indeed, essential to understand and to appreciate fully the circumstances, motives, and desires that gave birth to this school. In these lies, in fact, the originality of this pioneer venture in popular and practical education, and they distinguish it from other educational experiments during this period both in Europe and in America. Innovation and novelty are not necessarily achieved by single and solitary efforts, which may be only a form of eccentricity. Rather does creative innovation consist in providing a distinctive and successful solution among many possible answers to a problem of quite general concern in an age. This was certainly the case with popular and practical education in early America.

The Rensselaer School, thus established in 1824, was the joint creation of two men, utterly different in their backgrounds, occupations, and interests, yet drawn together into a partnership that lasted to the end of their lives. It was a fruitful, harmonious, and complementary relationship, in which Stephen Van Rensselaer was the patron and sponsor, both financially and morally, and the other partner, Amos Eaton, was the active promoter, combining many functions and bearing the actual brunt of foundation and operation. Rather significantly, this new enterprise, requiring great energy and exertion, was undertaken by both in the later years of their lives, Van Rensselaer already in his sixtieth year, and Eaton, at forty-eight, well into middle age. Partly because of this fact, but

more particularly because of their relevance to this commitment to scientific education, the earlier lives, activities, and interests of both men merit more than passing notice.

Stephen Van Rensselaer was the eighth patroon in a line descended from the early seventeenth century, when the family acquired from the Dutch West Indies Company a vast tract of land straddling both sides of the Upper Hudson Valley in the Albany area. Both the Van Rensselaers and their estates survived intact and unaffected by the drastic political changes from Dutch to British rule in the seventeenth century. Similarly, they rode out the American Revolution safely a century later. Stephen Van Rensselaer, born in 1764 and orphaned at five years of age, indeed grew up during these turbulent times and studied at Princeton (then the College of New Jersey) until it was closed by the war; he then completed his studies at Harvard, graduating in 1782. That he was not always the serious, rather solemn man he seemed to be in later life is shown by the degradation of six places in rank and the private admonition he received from the college authorities in May 1782. As noted in the Faculty Records of Harvard University, his offence was making "tumultuous and indecent noises at the chamber of Rensselaer before evening prayers, to the great disturbance and dishonor of the College."

Rensselaer came of age and took over the manor of Rensselaerwyck by 1786; in fact, he displayed a great capacity for enhancing the value of his estate in the period of dynamic expansion and migration that followed the Revolution. In a somewhat paradoxical fashion, after the Revolution, he fixed upon this part of New York State the elements of a kind of feudalism by means of his perpetual leases, which included payment of rentals in wheat, fowl, and labor, reservations of mineral and water rights, and the claim to a quarter-share in the sale price. Against all of these, there was to be a revolt of his tenants, in the form of anti-rent riots, after 1839, the year of his death and the end of his somewhat benevolent regime. In 1846 the constitution of New York State was amended to forbid such leases and tenures, and the near-feudal system came to an end.

During his lifetime, however, Stephen Van Rensselaer enjoyed

the social and financial benefits of a pre-eminent position as the patroon of some 400,000 acres, leased to more than 3000 tenants and occupied by thousands of people, from which his income, at least on paper, amounted to perhaps \$90,000 annually. Villages and towns, and even the city of Troy, grew up and prospered on his lands, deriving their titles from his original grants. But this exalted, aristocratic status, somewhat unusual in American democratic society, carried with it great responsibilities, which Stephen Van Rensselaer assumed and executed with genuine public spirit and concern. In this respect he distinguished himself among all the other members of his ancient family, performing the tasks of a leader to the manner born and achieving credit in many fields. By his first wife, he was the son-in-law of General Philip Schuyler and the brother-in-law of Alexander Hamilton. His second wife was Cornelia Paterson, daughter of a justice of the Supreme Court of the United States.

Van Rensselaer's activities were numerous and varied. He was a major-general of cavalry in the New York State Militia and even served briefly, with little success, in the War of 1812, in command of an attempted invasion of Canada. Logically enough, he was politically minded and oriented, occupying successively places in both houses of the New York State Legislature, and serving as lieutenant-governor of the state, under Governor John Jay, and as a member of the United States Congress, in the House of Representatives, during the 1820's. He was unsuccessful in two attempts at the governorship, but served both as a member and as president of the commission which built the Erie Canal, as president of the Board of Agriculture, and as a member and as chancellor of the New York Board of Regents to the day of his death.

Above all, Stephen Van Rensselaer lived up to the expectations of his high social position by sponsoring and supporting a great variety of cultural and religious activities, whether by assuming titular headship and/or by subscribing generously to many movements. He was, for example, the first president of the Albany Institute of Art and History, the Albany Academy, the Mohawk and Hudson Railroad Company, and the New York State Lyceum Association. He seemed, indeed, unable or reluctant to deny the sanction of his

name and prestige to almost any good cause, and his philanthropies were, for his time, outstanding and diversified. He was perhaps the first philanthropist of his time in the nation, as attested to by his first biographer, Daniel D. Barnard, in 1839: "And, taking the cause of learning in its various branches, the support and spread of Christianity, and the plans of benevolence and mercy . . . he was the largest contributor to them, of pecuniary means, during his lifetime, in the Union."

Particularly and quite naturally, Van Rensselaer was drawn into the agitation for public improvements which was then exceedingly active in New York State, especially in the Albany area. Governor De Witt Clinton was its political embodiment, and the Erie Canal, extending from the Hudson River at Albany to the Great Lakes in the west, its most significant manifestation. For Stephen Van Rensselaer this movement had practical utility as well as civic appeal. It was a means by which the resources and economic life of the area were to be developed, and as the principal landowner his own interests were directly involved and affected. Popular education, especially in the practical and applied arts, had, therefore, great appeal for him, as did also the survey and study of the geological and natural resources of the area as a whole.

### *Amos Eaton, an Innovator in Education*

Amos Eaton grew into his role as the chief instrument of Van Rensselaer's zeal for education in the practical arts and sciences by a long, painful, and circuitous process that illuminates both the times in general and the character of the man in particular. Born in 1776 in Chatham, New York, of New England farm stock, he graduated from Williams College in 1799, the product of a common mixture of school teaching alternated with conventional college studies. He read law in New York City in the same office as Washington Irving, was admitted to the bar, and embarked, after 1802, on what was apparently a rather commonplace career as a lawyer and land agent for a large estate in Catskill, New York. But Eaton already gave evidence of another kind of intellectual interest,

one related, however, to his professional activity. This was the publication in 1802 of a small pamphlet, written several years earlier and entitled paradoxically "Art without Science," which presented in simple practical language, "unshackled with the terms and science of mathematics," the essentials of surveying, then an almost universal and indispensable art. This was Eaton's first published work, "the production of his boyhood," which he subsequently and proudly revised and reissued in 1830 as an engineering textbook to serve as part of a practical plan of education for which this school (Rensselaer) was set up by its patron.

Eaton's quite conventional business career was interrupted drastically and tragically by an event which affected his life and work in a fundamental fashion. In 1810 he was suddenly charged with forgery of a land deed and, despite his protestation of innocence, was prosecuted by his former employer, Edward Livingston, a powerful landlord in the area. He was convicted and sentenced to prison. For nearly five years, until his release in 1815, Eaton was in jail in Greenwich Village, New York, a man approaching forty years of age, with his legal career blasted and with uncertain future prospects. This tragedy, however, not merely altered the course of his life, but also revealed the deep resources of his intellectual and moral character. Befriended by the jailer and his young son, John Torrey, who was to become an early leader in American botany, Eaton applied his leisure time, apart from his regular occupation as inventory clerk in the prison workshop, to a renewed interest in scientific study. Already in 1810, at Catskill, he had given popular lectures in botany and had won the praise of Dr. David Hosack, botanist and founder of a botanical garden in New York City: "You have adopted, in my opinion, the true system of education . . .," who expressed the hope that "the Botanical Institution in Catskill, under your direction, will be followed by other academies."

But now Eaton's scientific interest took on a more serious character as he prepared for a new career. In a letter he wrote from prison to his wife, Sally Eaton, on February 7, 1814, he mingled the self-pity of confinement with a hopeful account of his new labors: "I spend my evenings progressing with my botanical work which I

commenced in Catskill." He also occupied himself with a "system of practical surveying which I think may be somewhat popular, if I go through on my present plan. . . . My mind is ever actively employed in some pursuit of a religious or literary nature." He commented on the fact that among his fellow prisoners was "one of the greatest mathematicians in the state tho' but 24 years old," and he promised to "publish his system of trigonometry in my system of surveying." Eaton ended on a pathetic personal note by sending his "respects to your father and mother. I hope they will live to be convinced that the charge against me is totally false and that I never did an act in my life with a view to defraud."

Released from prison in 1815, Eaton continued to devote himself to preparation for a scientific career. He became, as it were, a graduate student, an early American specimen of that genre, and went to New Haven, Connecticut, to study for a year, "as a learner to become lecturer," under Professor Benjamin Silliman, soon to found the first scientific journal in America, *The American Journal of Science*, at Yale College. At Yale Eaton also studied with Professor Eli Ives, a botanist. His ties with Yale and Silliman were always very close thereafter, both by correspondence and by contributions to *The American Journal of Science*, and his grandson, Daniel Cady Eaton, was a professor of botany at Yale.

Eaton's peregrinations took him thereafter to his alma mater, Williams College, at Williamstown, Massachusetts, where he began to function as an itinerant lecturer on scientific subjects: botany, geology, and natural history. In 1817, he gave impetus to scientific study at Williams by delivering in one season a total of 117 lectures in botany, geology, and zoology. In a later publication, Eaton observed that "an uncontrollable enthusiasm for natural history took possession of every mind, and other departments of learning were, for a time, crowded out of the College." Many students were allowed to collect plants and minerals "in lieu of all other exercises." A group of his students there even sponsored the publication of a small volume, *A Manual of Botany for the Northern and Middle States*, the first of eight editions published until 1840, which was dedicated to President Z. S. Moore and two professors of Williams College, to whom he was indebted "for a passport into the scien-

tific world, after that protracted series of misfortunes, which sunk me to the lowest ebb of human misery." When Williams College awarded him the degree of Master of Arts, together with a "very flattering recommendation," Eaton's gratitude was expressed gratefully and frankly in a poem appended to the notes of his Williamstown lectures. Describing his fall into despair and disgrace, he concluded:

"Where then could I look for relief? . . . The men of science took me by the hand, and did not perceive any tarnish upon my garments. . . . The faculty of Yale ventured to receive me, and to add some of their best names to my passport into the literary world. How shall I now speak of the faculty and students here? At some future day, in a place where no restraints of delicacy cramp the emotions of my heart, my feeble powers shall be summoned to do them justice."

From Williamstown Eaton found his way in 1818 to Albany and Troy, near his place of birth, an area probably more suitably located for his newly projected career as an itinerant lecturer on scientific subjects, from geology and mineralogy to botany, zoology, and chemistry. These were growing cities in a region of great economic development, as exemplified by the Erie Canal, then under construction. Here Governor De Witt Clinton, Stephen Van Rensselaer, the three brothers Beck, and many others comprised a circle of men concerned with the promotion of science and public improvements. Amos Eaton fitted well into this new intellectual world, and he was drawn actively into it as lecturer and geological surveyor. At the behest of Governor Clinton, he addressed the legislature, and he served as the organizer and lecturer of the Lyceum of Natural History in Troy, which became his residence. From this center he extended his lecturing operations into Vermont and western Massachusetts as well as into New York State, to West Point in the south and westward into the Mohawk Valley.

Amos Eaton was drawn into the movement for public improvement and became associated with Stephen Van Rensselaer by 1820. For several years he made geological and agricultural surveys of the Erie Canal area and published reports about them, the first of their

kind in America, at Van Rensselaer's expense. He also gave practical and popular lectures on chemistry and natural history in the villages and towns along the route. The latest of these lectures was during the summer of 1824, just before the establishment of the Rensselaer School, and Amos Eaton then wrote to Van Rensselaer from Utica that the President of the local lyceum, Judge Nathan Williams, had observed that "you would in some way or other compel the people of this State to improve themselves in useful knowledge, whether they would consent to it or not." He also spoke enthusiastically "in favor of your various methods of benefiting the people of this state, and urged the people of Utica to benefit themselves by your munificence in improving the sciences, arts, agriculture, etc."

Altogether it was a busy and laborious, even exhausting, life to be an itinerant lecturer and, as it were, a scientific missionary in early America. Eaton gave many courses of lectures and covered thousands of miles on foot and by horse and wagon. To Professor Albert Hopkins of Williams College the outstanding qualities of Amos Eaton then were an "energy and courage which seemed to be indefatigable." He described Eaton at the outset of his scientific career as "in his prime. His person was quite striking—a large frame, at 41 somewhat portly and dignified. . . . His face was highly intellectual—the forehead high and somewhat retreating . . . , and the organs of observation and comparison well developed."

In 1841, worn and weary toward the end of his life, Eaton summarized his career. Since 1817 he had lectured almost daily, some 6000 times, "loud and long." He had given forty courses, averaging 300 experiments each, in chemistry, and all this with "'tistic and a cough" for the last sixteen of those years. To his lecturing labors, Eaton added the strenuous exertion of compilation and authorship, which began early and embraced many fields of science. Thus, in the years between 1817 and 1824, his published works included two editions of *Manual of Botany*, the first edition of *Index of Geology*, and *Geological and Agricultural Survey of the District Adjoining the Erie Canal, Part I*.

In *Chemical Instructor*, the first edition of which was dated 1822,



Eaton expressed as his objective "to bring down the sublime science of chemistry within the reach of the laboring agriculturalist, the industrious mechanic and the frugal housekeeper. . . . I have not intentionally omitted any principle which applies to the common purposes of life. . . ." Here was the first printed use by Eaton of the famous phrase defining the purposes of the Rensselaer School in Van Rensselaer's letter of 1824: "the application of science to the common purposes of life." The book was based, Eaton added, on seventeen experimental courses he had given before "mixed audiences of learned and unlearned, in small villages as well as in cities." It is little wonder that John Torrey, his friend and co-worker in botany, had commended him as early as 1819: "The people in your part of the country must take you for a wizzard . . . [*sic*] Never mind what the cynics say, you are doing more for science than any ten philosophers in the country."

Thus painfully and laboriously was Amos Eaton prepared for the last and most important enterprise in his scientific career, the establishment of the Rensselaer School in 1824, in close collaboration with his patron and employer, Stephen Van Rensselaer. Because of his social and political prominence, Van Rensselaer became, as it were, the public spokesman, as well as the moral and financial support of the venture, while Eaton supplied the original incentive and the basic ideas for it, not to mention its actual operation and direction. This is not to minimize the real contribution and significance of Van Rensselaer, especially to the public knowledge and acceptance of the school in its early years, as will become clear later on. Here was an unusual partnership between a man of ideas and a man of affairs.

### *The Original Purpose of the Rensselaer School*

The role of the Rensselaer School and its relation to education in the contemporary context which gave it birth were quite different from its place in and contribution to the subsequent development of American education. In the latter case, it evolved into a predominantly technological and engineering institution, especially after the mid-nineteenth century. Before this, and in its first stage,

it was primarily intended to be a school of applied science, for the diffusion of the new knowledge among the people by means of persons trained in Eaton's methods and concepts. This is the unmistakable meaning of the early documents of its foundation, including Van Rensselaer's famous letter of November 5, 1824.

This purpose was certainly generally understood at the time; for example, *New York Observer* reported on August 19, 1826: "Among the many plans for diffusion of useful knowledge in which the present age is so fertile, we do not remember any which promises to do so much good at a little expense as the one recently proposed by the Honorable Stephen Van Rensselaer." It proceeded to explain that Van Rensselaer proposed to send young men "properly trained in the school which he has recently established at Troy, to deliver popular experimental lectures on chemistry, and in the most useful branches of natural philosophy, in the principal villages and school districts throughout the State." It was, in fact, part of the plan that, wherever such lectures were given, several young men, selected in the community, would attend and assist in preparing the experiments, until they were sufficiently qualified to instruct others. In this fashion, for a trifling sum for equipment, any "village may derive the benefits of those departments of scientific knowledge which are most intimately concerned with the common concerns of life."

The originality of Eaton and the Rensselaer School thus lay, not so much in any chronological priority of their concern with science or technology, but rather in the manner by which they proposed to make science available to the common people generally. The school was to be a kind of seminary for a particular type of training of individuals imbued with Eaton's zeal for public education in practical science. According to James Hall, one of Eaton's early and most distinguished disciples, both as a practicing geologist in New York State and as Rensselaer professor of geology, "Professor Eaton taught us the manipulations in science with the simplest materials so that a student could go into the forest and construct a pneumatic trough or balance, and perform there his experiments in chemistry or physics." This approach may have lacked modern

sophistication, but it was peculiarly suited to a society still close to the frontier and yet alert to the benefits of science applied usefully. In this respect, Eaton and his school were perhaps better oriented toward the American scene than the contemporary conventional colleges and academies, modeled upon the European, and especially English, examples, with their emphasis on the classical and moralistic studies best suited for the ministry and the law.

Paradoxically, in 1874, at the semicentennial celebration of Rensselaer's foundation, President James Forsyth traced the original inspiration of the school to an English source. As told to a Rensselaer audience, it all began with a pamphlet published in London in 1799: "Proposals for a public institution for diffusing the knowledge and facilitating the general introduction of useful mechanical inventions and improvements, and for teaching by courses of philosophical lectures and experiments, the application of science to the common purposes of life." Its practical orientation had, however, an American source, since the author was Baron Rumford, originally Benjamin Thompson of Rumford, New Hampshire, a loyalist who went to England during the American Revolution. Becoming one of Europe's foremost scientists, he displayed a special zeal for applying science to the feeding and elevation of the poor.

Out of Rumford's proposal came, as an early intellectual manifestation of the Industrial Revolution in England, the Royal Institution, established in 1800 in London, at which Rumford himself lived and lectured, followed by some of England's most distinguished scientists: Humphrey Davy, Thomas Young, Michael Faraday, and John Tyndall. This was the admitted inspiration for Eaton's concept of his school. President Forsyth was, of course, careful to emphasize how different were the fortunes and developments of the two schools: the one richly endowed financially and intellectually, in the metropolitan capital of the modern industrial world; the other poor and struggling in an obscure part of the American scene. But he noted particularly the similarity of result emanating from the efforts of these two unusual Americans, Benjamin Thompson and Amos Eaton, as well as their respective sponsorship and support by the rich and well-born.

### *The Propagation of New Ideas in Education*

In actual fact, the times, in both Europe and America, were rife with a zeal and an agitation for improvement by the application of science and technology, and the Rensselaer School of 1824 was one rather special and ultimately successful and durable variation on this general theme. It became a matter for comment and criticism in America that the monarchist and despotic countries of Europe, such as France and the German states, were ahead of democratic America in the establishment and development of schools of agriculture and technology. In the United States, however, the creation of such schools was retarded by the very lack of a centralized political authority, and the agitation became part of the general movement for common school education. It was dissipated, however, among numerous private and public agencies and became local rather than national in scope. Amos Eaton, who was well aware of this situation, explained it logically: "We are indebted to Europe for our chief improvements in science and literature; but in the instruction of youth, our own peculiarities must be studied." He was familiar with and approved of Rousseau's scheme of education by "first awakening and then gratifying curiosity . . . as just," but he also condemned the "boyish routine of the European high schools."

Probably the most ambitious "Plan for an Educational System," on a state-wide basis, was proposed by Thomas Jefferson, who was, of course, well acquainted with European practices in education as in other respects. As early as 1814 he outlined a complete system, whose basis was to be "elementary schools," followed by "general schools," from which selected students would go on to "professional schools," embracing law, medicine, theology, fine arts, and one in "technical philosophy for . . . the mariner, . . . mechanist, . . . optician, metallurgist, . . . to learn as much as shall be necessary of the sciences of geometry, mechanics, statics, . . . physics, chemistry, natural history. . . ." They were to work at their crafts and attend school in the evening.

The only part of this program to be implemented under Jefferson's guidance was the University of Virginia, under construction between 1819 and 1824, and designed on a broad and modern plan, with eight schools, including ancient and modern languages, mathematics, natural philosophy and natural history, anatomy and medicine, moral philosophy and law. Although fulfillment fell far short of Jefferson's original intention, the plan commanded considerable contemporary public notice and praise. Edward Everett, a professor at Harvard College and subsequently its president in 1846, when he founded there the Lawrence Scientific School, wrote approvingly of Virginia's public spirit and purpose in the *North American Review* in 1820. He particularly commended the provision for professional training, now "left without aid, and young men must grope their way without system or organization through the most difficult and most momentous part of their preparation for life." Everett also pleaded for public support for such institutions and questioned the propriety and adequacy of private philanthropy: "But does it become a mighty nation, rising fast into an importance destined to throw a shade over the decaying greatness of Europe, does it become us to depend on charity?" To this Everett added another query: "Is it not a defect of our university system, as well as of the English, that no reference is had to the destination of the student, but that he is required to dip into the whole circle of science?"

Courses and professorships in science already existed in many colleges, some dating back to the preceding century, but these were academic in character. The significant difference in the early years of the nineteenth century was that numerous voices were being raised, and a number of ventures proposed or begun, in behalf of both popular and practical or technical education, quite apart from the classical tradition. First and most special in character was the West Point Military Academy, at which Amos Eaton lectured frequently, which was founded under Jefferson's inspiration in 1802 for the training of army officers in the arts of military and civil engineering.

The emphasis on technical education became noticeably marked especially under Sylvanus Thayer, its commandant after 1817.

Many of its graduates served in civil life as the first engineers in America, except for those who were self-taught or were trained as apprentices on the job, such as the Erie Canal. This was the greatest public engineering work constructed in the area and during the years of Eaton's activity as a lecturer and surveyor before 1825. As Robert Rogers wrote in 1831 to his brother, William Barton Rogers, who many years later became the founder and first president of Massachusetts Institute of Technology: "Engineering holds but very few inducements, for only those who have been educated at West Point stand in the way of promotion . . . ; they alone are sure of constant occupation in the profession."

Inspired by West Point and directly derived from it was the American Literary, Scientific, and Military Academy, founded in 1820 at Norwich, Vermont, his home state, by Captain Alden Partridge, who was himself a graduate and had been a professor of engineering and acting superintendent at West Point. A close imitation of West Point, even to the emphasis on a military regimen in a civilian institution, this school, as its very name indicates, was quite different in scope and purpose from Rensselaer during those early years. In 1826 it was removed to Middletown, Connecticut, where Stephen Van Rensselaer sent one of his sons. It was subsequently revived at Norwich, was chartered as Norwich University in 1834, and is still in existence at Northfield.

Also in the early 1820's, in an equally remote place at Gardiner, Maine, there was the Gardiner Lyceum, offering for a decade instruction in the practical applications of science under Benjamin Hale, later the president of Hobart College in western New York. But perhaps the most astonishing early proposal for a school of science and technology came from Ohio, where in 1819 Governor Ethan Allen Brown recommended to the Legislature the engagement of two persons, "one a mineralogist and chemist, and the other a civil engineer, to be employed upon the state establishment." He added: "It appears practicable, should the Legislature think proper to employ these two characters, to render them doubly useful by making them professors and principal instructors in a polytechnic school, under the immediate patronage and care of

the state; for instruction in the theoretical and scientific principles of the most useful arts." Governor Brown even proposed a tax "specifically applicable to these objects, and fairly graduated, on iron works, mills, canals and locks . . .," and he hoped thereby to elevate these occupations "by giving them the consideration justly their due in a republic, where the most useful ought to be considered the most honorable employments. This I presume would be effected in no small degree by causing them to be considered the objects of scientific as well as laborious pursuit."

At Harvard College, after 1817, the newly appointed professor under the Rumford bequest "for the application of Science to the art of living," Dr. Jacob Bigelow, whom Amos Eaton knew as the author of a botanical work, lectured on the "Elements of Technology"; these lectures were subsequently published and may have inspired a course of public lectures on technology given in Troy by Eaton in 1830. In the larger cities of the country, during the 1820's, schools or lecture courses of science and technology were established for mechanics as well as gentlemen and ladies. One of these was founded in New York City in 1825 by John Griscom, self-taught in science, whose activity as a lecturer and teacher of chemistry, geology, mineralogy, and natural philosophy went back to 1807. Another was the Franklin Institute of Philadelphia, established in 1824; two years later, in the same city, a related project, for a "Polytechnic and Scientific College," without the usual classical requirements, and to be adapted to the needs of "the agriculturist, the mechanic or manufacturer, the architect, the civil engineer, or other man of business," was announced but never materialized.

Two Rogers brothers, the geologists Henry Darwin and William Barton, sons of Dr. Patrick Rogers, professor of natural philosophy and chemistry at William and Mary College in Virginia, lectured during the 1820's at the Maryland Institute in Baltimore, one of the early popular schools of science. One of them, William Barton, later became the founder of M.I.T. In Derby, Connecticut, Josiah Holbrook experimented in 1824 with a seminary for agricultural education based on applied science. Out of it grew by 1826 his plan

for "Associations of Adults for Mutual Instruction," which developed into the American Lyceum Movement. Stephen Van Rensselaer was the first president of the New York State Association.

In New York there was also Fanny Wright's "Hall of Science," established in 1829, to bring both science and free thought to the people. Four years earlier the Reverend J. B. Yates had resigned as professor of mental and moral philosophy at Union College in Schenectady and founded, with the financial assistance of his brother Charles, a "Polytechny" at Chittenango, New York, as a "high school of a more elevated kind than any that had been previously in the United States." This and the near-by high school at Utica were, moreover, manned by Eaton-trained men, Professors Jonathan Ely and Fay Edgerton, and may be regarded as affiliated links with the Rensselaer system of education.

In 1829, a corporation with a capital of \$100,000 was formed for the establishment of a "Polytechnic Institute" at Shrewsbury, New Jersey, only thirty miles from New York City. Its stock was to be subscribed by the parents of students, and its divisions were to be literature, science, the liberal and useful arts, and agriculture, for which a large farm was to provide both labor and training for the students. There is no evidence that this venture ever went into operation.

### *The Founding of the Rensselaer School*

There was thus a considerable context of interest in science and technology in both Europe and America. A story preserved by word of mouth in the Kneass family of Philadelphia, three generations of which, beginning in 1839, attended Rensselaer, has it that William Kneass, founder of an engineering dynasty, was a friend of Stephen Van Rensselaer. On a voyage to Europe at this time, Kneass persuaded Van Rensselaer that a technical school was needed in America, and perhaps influenced the creation of the Rensselaer School in 1824.

More directly related to the Rensselaer School, as established by and under Amos Eaton in 1824, was undoubtedly the agitation for



a school of agriculture to be set up in and by New York State. Governor De Witt Clinton proposed such a school to the legislature in his message in 1818. In the following year his cousin, Simeon De Witt, surveyor-general of New York and a member of the first board of trustees chosen by Van Rensselaer for the Rensselaer School, published a pamphlet of "Considerations on the necessity of establishing an agricultural college . . .," in which he presented, in quite modern fashion, the plight of rich parents, who "without any determinate object in view . . . send [their sons] for four years to a college to obtain the reputation of having a graduate's diploma. . . . After that there are only three professions from which ordinarily they are to choose . . . law, medicine, and divinity," but in them "their prospects are truly dismal, and mechanical employment is considered degrading."

Governor De Witt Clinton repeatedly advocated practical education, urging, "The knowledge of most worth is science." By 1823, the matter finally reached the legislature, and Jesse Buel, later also a trustee of the Rensselaer School, reported eloquently for the legislative committee on agriculture on the merits and needs of an agricultural school. He indicated that Stephen Van Rensselaer, "as an evidence of the high expectations and public usefulness which he entertains from the proposed establishment, and in accordance with a spirit of liberality which has characterized his life," had pledged a farm for the school. Buel listed the advantages of such an institution to the people and to the state, including the fact that it was democratic, since "our danger arises, not from an excess, but from a want of knowledge in the great body of the people." He displayed great familiarity with and respect for the progress of agricultural and technical education in Europe, as did many other Americans in this period, and he argued that New York should take the lead in America by adding a school of agriculture to those we already have in "law, medicine, divinity. We have schools of oratory, music and of dancing. We have a national school for teaching the art of war. . . . Yet we have no school of agriculture, a business more complicated in its details, and requiring a greater diversity of knowledge than any art which is taught, and occupying five-sixths of our people."

Significantly, Amos Eaton addressed a letter at this time to Jesse Buel, pertaining to "a confidential concern." If such a school was established, he was applying "confidentially for some place under your [Buel's] direction, which requires much experimenting and practical application of scientific principles." Eaton then proceeded to enumerate his qualifications and doubted whether another such combination of practical farmer, surveyor, and chemist as he could be found anywhere. He was, in fact, willing to become an adjunct to some gentleman, such as Buel himself, who might take the professorship but "not wish to act." He would be "delighted . . . in bringing such a school to perfection. It comports precisely with my genius and taste. I know I am talking about unhatched chickens."

In the final event, the proposed state school of agriculture did not materialize. Instead, in the following year, Stephen Van Rensselaer, as if to fulfill his earlier interest, founded the Rensselaer School and designated Amos Eaton as its senior professor. Thus was a new school established expressly for Eaton, who was at last enabled to try out his novel ideas in education, for the "application of science to the common purposes of life."

## 2

# *Early Trials and Tribulations of a New School and Its Founders*

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### *Preparations for the New School*

On January 5, 1825, the Rensselaer School formally opened at the Old Bank Place in Troy, New York, with the reading of the Patron's letter of establishment to Dr. Blatchford in the presence of the trustees, faculty, students, and a number of visitors. Professor Eaton was then called upon to explain the purpose and methods of the school, and the opening "exercises of the day were then closed by the pathetic [feeling] remarks of the President, and his advise [*sic*] and directions to the students." In this fashion, according to a contemporary entry in the minutes of the Rensselaer board of trustees, was inaugurated a distinctive and what proved to be a durable experiment in American education.

Preparations for this opening, which had been in progress for some months, had entailed both physical and public activities. They began, indeed, with a broadside issued by Amos Eaton in his own name and dated August 21, 1824. Headed "Operative Chemists," it proceeded to explain that "applications for competent lecturers on chemistry are frequently received from the villages and country parishes in the interior of all the states." Such applications were often accompanied by "complaints of impositions, under the name

of chemical experiments, practiced by gas-peddlars, phosphorus squibbers, and other ignorant pretenders." The existing colleges did not make students "familiar with those manipulations which are essential to every successful experiment.

With a view to "qualify young gentlemen for giving experimental courses of lectures on chemistry," Professor Eaton now offered "a course of chemical exercises upon a peculiar plan." The principles were to be explained by the professor at least one day in advance, after which the students were to perform every experiment "under his immediate direction." Ladies who wished to prepare themselves for giving lectures in female academies and schools would also be accommodated "in a manner which shall be agreeable to them." In addition, experiments in natural philosophy as related to chemistry were to be presented, as well as "a gratuitous course on geology . . . , so as not to interfere with the chemical course." After the winter's course, a "public trial by experiment" was to be made, and "certificates of qualifications . . . given to those who are qualified." All this was available for \$25, plus the cost of the chemical substances used. Board and lodging were available at \$1.50 per week, and the total expense should not exceed \$60: "He [the student] may then earn double this sum with one course of lectures." This was but "a preparatory step toward a course of instruction for the general application of science to agriculture and the arts," but, as Eaton concluded, "want of operative chemists, who can work with cheap apparatus is, at present, an insuperable obstacle to those extensive views of general utility. . . ."

Here was, in all its essentials, the project later sponsored by Stephen Van Rensselaer in his letter of November 5, now undertaken by Amos Eaton on his own initiative. Eaton had already acquired in 1821 the Old Bank Place at a cost of \$2000, to be paid in nine annual installments, and this became the seat of the Rensselaer School. Quite evidently, the problem was one of adequate means for the enterprise, as is clear in a letter he addressed to Stephen Van Rensselaer with a copy of this circular. Thirty young men proposed to spend the winter with him, but this would "require considerable apparatus. As usual, I again turned my mind to the almost only patron of science in our country." If Van Rensselaer would furnish perhaps \$200 worth of equipment, which would re-

main his property, Eaton would pay himself with students' fees. There would be an "additional benefit in announcing the school as under your protection and patronage. This will be the first attempt of the kind in the world," and it should appropriately enjoy the patronage of one who "originated the most extensive geological survey in the world."

Thus the Rensselaer School stemmed from a strange mixture of personal modesty, descending almost to humility, and an aspiring ambition for broad innovation, which characterized Amos Eaton throughout his career as an educator. Having won Van Rensselaer's support, Eaton proceeded to convert a quite handsome Federal structure, built in 1801 as the office of the Farmers' Bank, on the northern border of Troy, into both school and home for his students and his sizable family, comprising his third and, later, fourth wife, and six or seven sons and daughters. Into this structure, as he informed his insurance agents, were fitted living quarters as well as schoolrooms, including a library, an assay room, a chemical laboratory, and natural history and natural philosophy rooms, suitable for small experimental and lecture sections in the various subjects, and even "an astronomical observatory five feet square and about nine feet high on the ridge of the roof."

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." In addition, an evening course of lectures on chemistry and philosophy by Professor Eaton was announced, to be held three times weekly, at \$5, which the day students could attend free. Room and board was available both in and outside the school at \$1.50 to \$2 per week; as a final evidence of complete arrangements, one year's credit could be given for school fees and for outfit and supplies by a neighboring drug store to "students . . . able to furnish good security."

With great enthusiasm, Eaton expressed to Van Rensselaer in January 1825 his satisfaction that the patroon's letter to Dr. Blatchford had "excited so much expectation and enkindled such zeal for such a course of instruction everywhere . . . I am almost frightened at the letters which I daily receive. . . ." He had induced

thirty young men to postpone attendance; and until more stands were made, he "really dared not venture with more than ten or twelve." Eaton then proceeded to prompt Van Rensselaer to instruct the trustees to adopt a code of laws for the school, and he enumerated the points to be incorporated, particularly urging a list of "well cultivated farms and workshops (with the consent of the proprietors), as places of scholastic exercises for students, where the application of the sciences may be most conveniently taught."

### *Hopes and Stresses of the New School*

Thus, at the very outset, was established a pattern which was to govern the external as well as internal relations of the Rensselaer School, thanks to the tremendous energy, enterprise, and effort of Amos Eaton. His start was an experimental venture in more than one sense. The experimental method, involving the student himself in lecture and demonstration, was Eaton's most original and significant contribution, which distinguished his school from all other similar enterprises in education. Eaton was, moreover, an experimental innovator, moving in different directions and proposing many variations on his major theme of scientific education. They included the admission of women and children, adults and mechanics, in stationary and traveling classes, as well as affiliated schools and courses in science and engineering.

Partly this diversity was motivated by Eaton's desire to explore and exploit every opportunity for expanding the scope of the new education. The Rensselaer School was never prosperous or even self-sustaining, and hence came the eager quest for new patronage. Its novelty required a constant resort to the method of trial and error. But Eaton's missionary zeal for scientific education, and his anxiety to advance and publicize it widely, were also motivating factors. As he wrote in 1831, after half a dozen years of experimentation: "It is not pretended that the Rensselaerean Plan will correct all the evils complained of, nor that the object proposed is wholly compassed by it. But unlike any other school which has come to our knowledge, this was not set up for the sake of the school it-

self. . . . This school is successful when it causes other schools to improve their mode of instruction, so that they may become more useful to community. The objects of its patron are affected by the successful application of its principles at any place on either continent. Its pupils are now applying its principles from Georgia to Canada; and as far as they succeed, so far this school is prospered in the object of its establishment.”

Amos Eaton was, it would appear, a tireless writer, with a wide range of correspondence, much of which has survived, and a prolific compiler of textbooks, brochures, and bulletins, in which his plans and projects for the Rensselaer School were recorded in all their many variations and alterations. The historian's problem involves, not a scarcity of materials, but rather tracing and reducing the logic and rationale of Eaton's many procedures and activities to some systematic order, which perhaps they did not always have. The makeshift, changeable character of his operations was influenced in part by great ingenuity and originality, but was dictated also by the financial stresses and hand-to-mouth existence with which both school and founder constantly coped. Eaton's moods alternated in almost manic-depressive fashion from high enthusiasm to deep despair and were particularly well communicated in his frequent letters to Stephen Van Rensselaer, whom he involved immediately and intimately in his affairs. As early as January 29, 1825, Eaton wrote, "The plan is a practical one. Students all become the most devoted enthusiasts as soon as they begin the alternating course of study and experiment. They make their notes from the authorities in the Library . . . and then enter upon the experiments by turn with great zeal." He added that "your plan for a school has aroused Massachusetts in a singular manner." Petitions were in circulation to have the state legislature there establish such a school, "since there are no Van Rensselaers among them."

On December 5, 1825, however, Eaton was more depressed, as he informed Van Rensselaer that he had hoped to start on a small scale, but the patron's name had raised great expectations, and "like a desperado, I resolved to plunge myself headlong into the undertaking, and trust to the future success of the school and your mercy . . . to get me out of the difficulties." Further improve-

ments had been made; two notes would soon be due at the bank, and he needed \$600 desperately: "With this we can remain out of jail till next spring, perhaps till the last of April." Apparently he received the money and was duly thankful in a letter dated January 6, 1826, adding with renewed zeal: "No school in our country is so well furnished with every convenience. No school has separated all the branches of science as we have. . . . No further changes will ever be wanted" until the class has grown to 60 or 70 students, a size that it never attained in his lifetime.

By November 1826, however, Eaton was again addressing a plaintive letter to Van Rensselaer: "How it is possible for you to endure your situation so cheerfully is beyond my conception. This consideration induces me to endure my own needs and miseries without harassing you with my private concerns, until destruction is at my door." He hated banks but necessity compelled him to resort to the Farmers' Bank, and he was "now just on the eve of absolute insolvency" unless he received an advance of money. He owned property and notes from his students; his five sons should soon be self-supporting; and he hoped to live from the fees in the future, if only he received present relief.

The financial relations between Van Rensselaer and Eaton continued in this vein of alternating compliment and complaint to the end of their lives. In 1831 Eaton referred to his guaranteed salary of \$30 per week, but he had never received more than \$800 in fees per year, and students owed him \$700. His family had been limited to the "coarsest fare," and their dress was scarcely "fit to appear in church and school, in order to effect an object which I held . . . as paramount to all other objects of my life." Even the "school library may be defiled by the rude hand of the bailiff," while the rich Trojans did nothing. In 1835 Eaton again pleaded with Van Rensselaer to take over a mortgage for \$2500 on the Old Bank Place, then no longer the seat of the Rensselaer School. He had surely earned this much in return for his long services.

To this Van Rensselaer replied, "The contents do not surprise me. We live in a world of sin. . . . You may rest in security. As long as I am able and blessed, you shall not be oppressed. I will cause the necessary arrangements to be made for you." In 1838,



however, Van Rensselaer's office notified Eaton that the patron was so sick that he "declines all business and does not consider himself as Patron of the school, as he gave notice to that effect last year." In 1839 Stephen Van Rensselaer died, leaving Eaton, aged and ailing, with only three more years of life, but still continuing his valiant efforts as senior professor and agent of the Rensselaer School.

### *The New School in Operation*

But Eaton's relations with Van Rensselaer were not merely financial, nor were they always those of patron and begging client. They constituted, in fact, a unique and significant example of two men, different in background and situation, but united in the pursuit of a common educational objective. Van Rensselaer, in the early years at least, kept close contact with Eaton, even from far-away Washington, where he was then serving as congressman, advising, encouraging, authorizing, and supporting one or another of Eaton's projects. On December 30, 1824, he wrote to Eaton from Washington: "Your letter has not discouraged me. When the school is in full tide of experiment, it will be successful, and I should not be surprised if it should be overflowing another year. Tell General Dunbar [his business agent] to settle your accounts as usual and advance what is due you. I have distributed the prospectus and it meets the views of all theoretical as well as practical men to a degree which may almost be called enthusiastic."

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 award of degrees. As early as October 25, 1826, for example, 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, [De Witt Clinton] I will convey him to Troy if he accepts. His presence would give some *éclat* to the exhibition." Eaton sent Van Rensselaer 170 copies of the school's first publication, "The Consti-

tution and Laws of Rensselaer School (1825),” to be distributed among members of the legislature, with the suggestion that it might be incorporated in the next session, as indeed it was, closing: “Even if you conclude to make it a branch of the Albany Institute, still it might be well to have your plan of instruction generally understood.”

In the organization of the school, between Stephen Van Rensselaer as the patron and Amos Eaton as the senior professor, stood a board of eight trustees, named from the four principal settlements of the area: Troy, Lansingburgh, Waterford, and Albany. These included Simeon De Witt, surveyor-general of New York State, and Dr. T. Romeyn Beck, distinguished physician, scientist, and principal of the Albany Academy, whose brother, Dr. Lewis C. Beck, was junior professor at the Rensselaer School. The rest were prominent local lawyers and merchants. Heading both board and school alike was the Reverend Dr. Samuel Blatchford, English-born Presbyterian minister in nearby Lansingburgh, who welcomed the act of incorporation of March 1826, as “an evidence of the sense entertained by the publick, as it respects the utility and importance of the institution.” Addressing Stephen Van Rensselaer, Blatchford wrote, “And truly, Sir, it merits it: it exceeds our most sanguine expectations.” He described the arrangements of the school and his active role in it at this early date. There were twenty-three students, and he attended weekly in order to receive a “report from the professors of the conduct, dilligence [*sic*] and improvement of the scholars and address them on all these topics at which time, too, they lecture before me and go through an examination limited to the studies of the previous week.” He anticipated that at the first commencement next April “there will be a development to the eye and ear of the Publick which I think must necessarily raise the intrinsic character of the institution to a very flattering degree, and afford an abundant satisfaction to its founder.”

Fortunately, an eyewitness account of this event, at which the first ten graduates received their Bachelor of Arts degrees (Rensselaer School style), is available in the manuscript diary of Asa Fitch, the seventeen-year-old son of a physician and farmer from Salem, New York, who was then arranging for his own admission to the

school, on April 26, 1826. The laboratory, reading room, and officer's room were thrown into one 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. This unprecedented ceremony opened with prayers by President Blatchford. The ten graduates, including two of Eaton's sons, 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." The junior professor, Dr. Lewis C. Beck, then read an address upon the origin and objective of the Rensselaer School, "after which the degrees were handed to the several candidates by the President, and the exercises were closed with prayer."

Ironically, it was not Stephen Van Rensselaer's original intent to become completely and almost inextricably involved in the affairs of the Rensselaer School. On November 4, 1826, Van Rensselaer wrote to Blatchford that it had been "my design, when I first instituted the school . . . to hazzard [*sic*] the necessary expenses of making a trial of the plan of education." A charter had now been obtained, and he believed that "a full conviction of its [the school's] efficacy is now extended throughout the Union. Schools are beginning in different places to imitate it generally." Moreover, he was drawing "near three score and ten [actually only 62 years old], and having numerous engagements and duties to perform, and having completed the proposed experiment and fulfilled my promise to the public, . . . I now consign to you the entire control of the School, reserving to myself the privilege of approving examiners, and a participation in the pleasure I shall derive from the progress of improvement among the rising generation."

Apparently such disengagement was not then possible, and a year later Stephen Van Rensselaer wrote again, suggesting "the propriety of offering the School . . . to the legislature, to educate teachers, as proposed by Governor Clinton in his message . . . perhaps an amendment to the charter, extending the power of the trustees to change the location of the school." Nothing came of this, although the trustees adopted a resolution to the effect sug-

gested; nor did the possibility of a merger with the Albany Institute of Art and History materialize. In fact, during the following year, in 1828, Van Rensselaer undertook what the legislature failed to do. Writing from Washington, he offered to defray the expenses of an eighteen-week course at the Rensselaer School for a student from each county in the state, who would then return to teach there. For ten years he had been financing the project "for improving the plan of education and for investigating the natural resources of the State of New York," both with the help of Amos Eaton. He must consider this his last offer and "the termination of my services in this cause." A year later, the trustees named Amos Eaton financial agent of the Rensselaer School, being donated by Van Rensselaer, who declined "any further care of this school and particularly that he shall no longer continue the gratuitous education of county students. . . ."

### *Extending the Scope and Function of the New School*

These early years, which witnessed Van Rensselaer's efforts at disengagement, also saw Eaton experiment with various ways of extending the services of his school, whether from a search for added patronage or from a desire to spread his educational ideas. Thus, in 1826 was added a "Preparation Branch," in response to "the frequent solicitations of many gentlemen in the Southern States, and of some in the Northern." Intended for boys of thirteen or fourteen years of age and upwards, its only requirement was that they have been "successfully taught in reading, writing, common arithmetic and English grammar." It was to be preparatory for the regular annual course and would include five divisions: "Botany and Etymology, geography and history, Elements of Practical Mathematics and Moral Philosophy, Logic and Rhetoric, and Elementary Principles of Government and Law and Parliamentary Rules," together with appropriate "amusements" in the collection of natural history specimens and experiments in natural philosophy. The latter, it was Eaton's repeated refrain in all his educational theorizing, would give "exercise to both body and mind. The muscular

powers of the body will be called into action, and their forces will be directed by mental ingenuity, until the student becomes most familiar with the most important scientific manipulations, and particularly with those which will be most useful in the common concerns of life."

With a worthy, if visionary, idealism, Amos Eaton commented at the same time upon the fact that "the experimental exercises of the school resemble the business of a workshop, in which professors must labor with students, and associate with them as one gentleman with another. Consequently, students cannot be subjected to that course of discipline, which is practicable at schools organized upon a different plan. No alternative is left for this school but to expel for disorderly or ungentlemanly conduct in a peremptory manner; however desirable it may be to bear with the waywardness of youth. . . ."

Eaton's mind constantly reverted to his major and serious objective of training teachers in science, who would then diffuse their influence in education generally. In 1827 he broached this subject to Van Rensselaer, expressing the belief that "its introduction to school districts is practicable and when extensively adopted, will totally revolutionize the course of education." His students were already involved in this goal. Besides giving lectures, they could set up in almost any school the more simple and less expensive parts of the Rensselaer plan; and a course of only nine weeks, requiring more costly apparatus available at the Rensselaer School, would suffice to complete the training, which should have appeal to teachers. Thus the Rensselaer School was envisioned as the center of a spreading system of district schools and "the most useful at a very cheap rate."

In 1828 Eaton addressed a circular to this purpose to "graduates of colleges and Teachers of Academies and Common Schools," offering such a nine weeks' course in experimental science. At the same time, he proposed a Ladies' Department, in which "a lady, well qualified for the duty, will take charge of two experimental courses in chemistry and natural philosophy" for ladies, who would hear the professor's lectures and then retire with their preceptress to their own room for experiments. He offered the further service

of conveyance, "daily, to and from their respective boarding houses or from the schools to which they may be attached . . . , in a plain convenient covered carriage." Courses in science were then actually given to the girls enrolled at the Troy Female Seminary; and Mrs. Emma Willard and Almira Lincoln, sisters and co-principals of this school, as well as Mary Lyon, founder of Mt. Holyoke Seminary, and Laura Johnson, Eaton's sister-in-law, received such instruction from Eaton privately.

A year later, in 1829, Eaton asked Van Rensselaer for permission to extend his plan "to the Buffalo Association, . . . to the Round Hill School in Northampton, to the Middletown School, to the Amherst School, . . . and a few other experimental schools. Nothing will be added to the expense. . . ." Van Rensselaer's prompt assent came from Washington: "I have no objection to extending your request. . . ." The most important of these interscholastic ties were with the Polytechny of Chittenango, the Cortland Branch, and the Utica High School, all of which were manned by Rensselaer graduates. Significantly, this plan of education was called the Rensselaerean, rather than the Eatonian, not only out of gratitude and flattery, but also for the exploitation of the widely known Patron's name and prestige. Probably for the same reason, in 1829, the Reverend Dr. Eliphalet Nott, already long the president of Union College and a leading educator in New York State and the nation, was elected president of the Rensselaer School and so served until 1845. He was expected to visit the school every third week from nearby Schenectady and to inspect its activities, for which he would receive one dollar per visit and all graduation fees.

Also in 1829, Eaton, as if still searching for a full measure of his venture and its proper limits, issued a circular entitled "Rensselaer School Extended." In it he announced the establishment of "accomodation [*sic*] departments" for children, to occupy a separate building on the school premises. A carriage would daily collect the children and transport them to the school in the morning and home again in the evening. One room would serve as the "reading-hall for female pupils, another will be used for their dissertation-room, . . . another will be the Pestalozzi-room for young children, where all the valuable parts of Pestalozzi's system will be

adopted." It is not always easy to tell which of Eaton's many and diverse schemes were actually fulfilled, and this may have remained a visionary project.

In the quite different field of adult education, Eaton's past experience and ingenious versatility also provided new facilities and opportunities. Thus, in 1828, a class of forty mechanics, members of the Troy Mechanics' Society, was devoting "the closing part of the day and evening, learning chemistry upon the Rensselaer plan," under the charge of Fay Edgerton, a former student and adjunct professor at the Rensselaer School. The year before, Eaton had received a request from H. G. Spafford, author of a *Gazetteer of New York State*, for the school bulletins, "to send to correspondents abroad." Spafford also offered a copy of his gazetteer "as a prize to be adjudged to the best scholar in Topographical mineralogy."

But perhaps the most original and venturesome educational enterprise was undertaken by Eaton first in 1826 and again in 1830. This was a kind of traveling school of science, using the newly opened Erie Canal. On March 25, 1826, he informed Van Rensselaer that the students had requested such a tour and that he would take "a portable kitchen on board a freight boat." Their object would be to collect enough "suits of specimens for you to distribute, and enough for sale to defray the expense of the expedition." Eaton even petitioned the state comptroller for exemption from tolls for this scientific group. Some twenty persons, including not only students but also interested outsiders, such as George Washington Clinton, the son of Governor Clinton and a graduate of Hamilton College, Joseph Henry, newly appointed professor of mathematics at the Albany Academy, Oscar Hanks, a scientific instrument maker, and Asa Fitch, later one of Eaton's students and the first state entomologist, embarked in May on the barge *Lafayette*. For six weeks they made a complete circuit of the canal, visiting settlements, exploring the geology of the region, and listening to Eaton's lectures. On the return trip, they picked up a kind of marine hitchhiker, the quite noted Professor Rafinesque, far-ranging naturalist of Europe and America, on his way east from Transylvania University in Kentucky. He was known to Eaton and

became a welcome addition for both his lore and his companionship. All of this was recorded in various journals of the excursion, which were required by Amos Eaton from his students.

In 1829 the trustees authorized another "summer term and traveling instruction," and an ambitious "Rensselaer School Flotilla for the Summer of 1830" was projected and publicized. Lasting ten weeks, it was to start in New York City and proceed by steamboat to Albany, going on from there by canal boats, one for every twenty persons. The tour was directed especially to teachers, "graduates of colleges . . . [who] may become candidates for the Rensselaer degree. . . . The profession of teachers now offering decidedly the surest means of support of any profession. . . ." Ladies could accompany the expedition if their number was equal to twenty, the capacity of a boat. Even a kind of air-conditioning was promised, in the form of wetting down boat decks to cool them. The food was "to be plain and nutritious, adapted to hardy exercise. . . . No ardent spirits, wines, nor strong beer will be allowed on board, unless sickness should require it in particular cases."

In his usual style, Eaton injected his basic objective, which dominated all his efforts: "The school risks a loss in this trial. But it was instituted for the purpose of making trials to aid the cause of instruction, without any expectation or wish for pecuniary remuneration. About \$20,000 have been expended in trials already by the Patron; which being attended with flattering success, another trial is now to be made." Even in the midst of announcing this practical plan, Eaton seemed again to indulge in a kind of wistful and wishful hope: "It is to be hoped that other schools may adopt similar summer courses, and that numerous steam-boats and tow-boats may become traveling seminaries of learning." The actual excursion executed during the summer of 1830 was on a much more moderate scale than originally envisioned, the group scarcely filling one canal boat, and was interrupted by Eaton's sickness and by other unhappy mishaps.

Somehow, despite the contrast between bold and broad projections and quite modest reality, the Rensselaer School survived its first difficult and experimental half-dozen years. It entered the dec-



ade of the 1830's with both Van Rensselaer and Eaton growing old and ailing. Eaton, however, persisted in his efforts, giving more limited but also more practical direction to the development of the Rensselaer School. He apparently withdrew from the peripheral and visionary trials and concentrated upon more immediate goals, in order to preserve and perpetuate the school itself.