William Robert Ware

and the Beginnings of Architectural Education

in the United States, 1861-1881

by

John Andrew Chewning

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Signature of the author _____
John Andrew Chewning
Department of Architecture
February 12, 1986

Certified by _____
Henry A. Millon
(Visiting) Professor of History and Architecture
Thesis Supervisor

Accepted by _____
Stanford Anderson
Professor of History and Architecture
Chairman, Departmental Committee on Graduate Studies

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ABSTRACT

William Robert Ware (1832-1915) planned and directed the first collegiate program in architectural education in the United States. He was educated in the liberal arts and civil engineering at Harvard University and received further training in architects' offices before entering into practice with Henry Van Brunt (1832-1903). In 1865 Ware was appointed to the newly established Massachusetts Institute of Technology. He remained on the faculty until 1881, when he was called to Columbia University to organize still another collegiate program in architecture. During 1866-67, Ware traveled in Europe, paying particular attention to the role of national schools and professional organizations in the teaching of architecture in Britain and France.

Formal instruction in architecture at M.I.T. began in the fall of 1868. Ware devised a curriculum, which he adjusted throughout the 1870s, including drawing and design, architectural history, and construction and practice (i.e., building materials and components, specifications, and contracts). In the spring of 1872, he recruited Eugene Letang (1842-1892), an alumnus of the Ecole des Beaux-Arts, to teach design. From this time on, the routine studio problems at M.I.T. began to emulate those of the Ecole, and the eclectic neoclassicism of the Beaux-Arts began to predominate in students' drawings.

The Department of Architecture at M.I.T. in these earliest years functioned best in providing a one- or two-year course of special study for persons who were graduates of four-year colleges or who had some experience in architects' offices. It also served to prepare Americans for the formal or informal study they intended to pursue in Paris. Ware's department offered, in effect, a postgraduate program, a program in continuing education, and a preparatory program for advanced study at the Ecole des Beaux-Arts.

By virtue of its location in cosmopolitan Boston, the M.I.T. Department of Architecture emerged in the 1870s as the preeminent American collegiate program, attracting more students from more diverse parts of the country than the other important early programs at Cornell University and the University of Illinois. Ware trained some 235 students at M.I.T., and many of them became the leaders in architecture and architectural education in the late nineteenth and early twentieth century.

Thesis Supervisor: Henry A. Millon
Title: (Visiting) Professor of History and Architecture

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Introduction

ARCHITECTURAL EDUCATION AND THE ARCHITECTURAL PROFESSION

This study of the origins of collegiate architectural education in the United States, centering on the Massachusetts Institute of Technology in the 1860s and 1870s, comes at a time when historians are directing their attention to any number of subjects besides notable buildings and noteworthy architects. A renewed interest in history within professional schools has given rise to an interest in the various ways in which history has been understood by earlier generations of architects and historians. The subjects of investigation are most often found within the late nineteenth and early twentieth centuries. With increasing self-consciousness, architects and historians have been concerned with establishing their own lineage within the schools of architecture that have arisen in the last century and among the educators who taught and wrote for these institutions.

At the same time that some architects and historians have been looking back to a relatively anonymous academic tradition of teachers and students, others have been looking back to a relatively anonymous professional tradition of lesser-known metropolitan architects and prominent regional architects. Local historical research in conjunction with preservation documentation, inventories of architectural records, biographical dictionaries, and academic theses all have generated a broader awareness of local architectural accomplishments and their links to the great cosmopolitan and international traditions of architecture. While this research is in some instances the perpetuation into recent times of antiquarian scholarship, it also lays the groundwork for an

understanding of the dynamics of local and regional architectural practice.

The history of architectural education remains incomplete if it is treated only as the history of schools and educators. The history of architectural education is indeed enriched by the findings of local documentation. Only with this added background can the interrelationships among schools, educators, local professional organizations, and local offices be understood. Only in this way can architectural education be seen as a series of experiences in which formal collegiate training is never isolated from the business of the profession and the interests of practicing professionals.

The Literature of Architectural Education in the United States

The earliest scholarly history of architectural education in the United States was conducted independently of institutional or anniversary connections. Weatherhead's 1942 Columbia dissertation on collegiate schools of architecture is a chronological survey of the distinctive characteristics of individual schools and professional societies, with some attention paid to dominant issues of curriculum and professional practice. His research was predominantly in architectural periodicals, in proceedings of professional societies, and in the published catalogs of universities, resulting in loosely comparative and developmental histories of various institutions. In spite of the unevenness of this gathering of information, Weatherhead's study does provide the most useful frame of reference for more concentrated institutional histories and suggests the magnitude of the systematic archival research that would be required to do

a thorough thematic intellectual history of architectural education in the United States.(1)

The combination of post-war and mid-century attitudes for reappraisal led the American Institute of Architects in 1949 to commission a Survey of Education and Registration.(2) The survey, published in 1954, was an extensive two-volume compilation of statistical and anecdotal information concerning current practice and education. One small part of this compilation was a concise history of architectural professionalism and education in Europe and the United States authored by Turpin Bannister.(3) Much of the historical material in the A.I.A. survey seems to have been drawn from Weatherhead's work. Being more readily available than the earlier work, Bannister's synoptic history stands as the definitive survey of architectural education.

The following year, the monographic investigation of architectural education was inaugurated by Noffsinger's Catholic University dissertation on Beaux-Arts influences on American architects.(4) The short narrative text contains some anecdotal material on teaching methods, quoted from architectural periodicals, but the author does not manage to link the intellectual history of the Ecole to the institutional histories of particular American schools and professional organizations. The Appendix contains sometimes-misleading lists of French design critics in American schools; Americans enrolled at the Ecole; Paris Prize winners; and Ecole-influenced architects serving as A.I.A. Presidents, members of exposition boards, and members of the D.C. Fine Arts Commission.(5)

Noffsinger's 1955 study of Beaux-Arts influences on American architects was a relatively specialized piece of research in comparison with the monographic studies of three American architecture schools,

appearing intermittently in the quarter century between 1954 and 1979. Rohdenburg's 1954 study of the School of Architecture at Columbia, founded by Ware after he left M.I.T. in 1881, was based upon research in academic catalogs, Columbia School of Mines publications, and to some extent, on archival material available at the Avery Library. The narrative format is similar to that used by Weatherhead in his 1942 survey, the result being an amalgam of documentation which constitutes an internal institutional history of the Columbia program, following a developmental approach. Among the most useful parts of this work are the biographical sketches in the text, as well as the Appendices giving excerpts from alumni reminiscences and listing fellowships won by Columbia students.(6)

The one hundredth anniversary of the chartering of M.I.T., with its projected "School of Design" in 1861, provided the occasion for Shillaber's booklet on the century-long history of the architecture and planning departments.(7) The text was based on a reading of academic catalogs and annual reports, as well as some manuscript material already in the Rotch Architectural Library and in the M.I.T. Institute Archives.(8) Shillaber's work was the first history of an American school of architecture to include numerous reproductions of student drawings, but with little analysis of the place of design projects in the curriculum.

Laing's 1973 pamphlet on Nathan Clifford Ricker was the first monograph on the career of an architectural educator, and was published to mark the centennial of Ricker's graduation from the University of Illinois as this country's first college-trained architect. This brief essay serves well to characterize the German and Russian polytechnic orientation of the program at Illinois, compared with the French fine arts and English applied arts orientation of the schools in the East.(9)

Three 1979 publications gave evidence of the new eagerness of historians and designers affiliated with schools of architecture to contribute to the history of their own endeavor, architectural education. One was a thesis on an educator. One was a special issue of the Journal of Architectural Education on educators and their programs. One was a dissertation on the teaching of architectural drawing.

Goodstein's 1979 thesis on Charles Babcock, founder of Cornell's College of Architecture, was the first concentrated academic investigation of the career of an American architectural educator. Because of the several dimensions of Babcock's training and of his service to Cornell, the chosen mode of intellectual biography is enriched as needed by institutional history and by even broader intellectual history. While a large portion of the thesis is devoted to a discussion of Babcock's training under Richard Upjohn, his father-in-law, to his parallel career as an upstate New York Episcopal clergyman, and to his limited built work on the Cornell campus, the discussion of Babcock's nearly three decades of teaching at Cornell contributes in many ways to our understanding of a curriculum markedly different from that at M.I.T. Unlike Ware, whose practice favored the Gothic tradition and whose teaching favored the classical, Babcock was responsible for perpetuating in the Cornell curriculum well into the 1880s the ecclesiological ideology of America in the 1850s and the Ruskinian sensibility of America in the 1860s.(10)

The entire November 1979 issue of the Journal of Architectural Education was devoted to "the history of architectural education through people." While the articles ranged from monographic studies of various educators to personal reminiscences of educators themselves, the overall theme was the relation between theory and curriculum, with an emphasis on

the internal institutional histories of schools and pedagogical ideologies.(11)

Lukens' 1979 dissertation on changing attitudes toward drawing and rendering in architecture schools from 1925 to 1975 represents a specialized form of institutional history, concentrating on drawing as a pedagogical means toward the pedagogical end of design instruction, each with an evolving theory of its own. Lukens chose M.I.T., the University of Pennsylvania, and Harvard University as case studies and made use of academic catalogs, architectural periodicals, and personal interviews with 140 faculty and alumni to gather anecdotal information about design instruction. The study does aspire to an intellectual history of training in spatial perception and representation, yet the cognitive issues remain embedded in the anecdotal material.(12)

The most recent documentation of American collegiate architectural education was carried out in conjunction with the centennial of Ware's founding of the Department of Architecture at Columbia in 1881. This internal institutional history, fully grounded in archival research, is subdivided into seven phases of curricular development during the hundred-year history of the program, with contextual and thematic interludes on American urbanism and modernism.(13)

As the research at Columbia was beginning in 1980, two studies of architectural educators were already in progress. Alofsin was investigating the career of Herbert Langford Warren, one of Ware's students at M.I.T. and founder of the School of Architecture (later the Graduate School of Design) at Harvard. A 1983 article in the Journal of Architectural Education gives a summary account of Warren's intellectual roots in the nineteenth-century English, French, and German traditions of

architectural history and theory.(14) Meanwhile, the present study was proceeding, from the general survey of Ware's career in the 1979 Journal of Architectural Education article, to a more concentrated documentation of Ware's earliest contributions in the teaching of architecture, in Boston during the 1860s and 1870s.(15)

Summary of This Study

Chapter 1 is the story of the preparations for the teaching of architecture at M.I.T. The first part of the chapter is largely biographical, surveying Ware's education and early professional work before his appointment to the M.I.T. faculty in 1865. The second part of the chapter is a brief history of the founding of M.I.T., America's first metropolitan polytechnic university, and within it, America's first collegiate department of architecture. The final section of the chapter is an account of Ware's European trip in 1866-67, during which he examined firsthand the various approaches to the teaching of architecture in London and Paris. Unpublished documents pertaining to the early years of M.I.T. and its administration and faculty are the key sources for the research in this chapter.

In Chapter 2, the curriculum in architecture during Ware's thirteen years of active teaching at M.I.T. is analyzed in detail, by means of a critical reading of academic catalogs and annual reports, as well as related unpublished documents pertaining to these early years in the history of M.I.T. A chronological approach is used in the first part of the chapter in order to show Ware's own evolving understanding of his curriculum in the context of the school as a whole and in the context of supplemental opportunities for architectural training in local firms. In

the second part of the chapter, the approach shifts to a thematic analysis of the major components of Ware's curriculum: construction and practice, architectural history, and drawing and design.

Chapter 3 is, in effect, an enlarged digression from Chapter 2 and is entirely concerned with the study of design at M.I.T. during the Ware years, with the aim of providing a more exact understanding of the extent of the impact of the Ecole des Beaux-Arts on design instruction at M.I.T. Student drawings, supplemented by verbal descriptions of programs for routine design problems and senior theses, are compared with contemporaneous Ecole drawings and programs.

Chapter 4 has three parts. The first is concerned with Ware's move from M.I.T. to Columbia and with the search for his successor in 1881. The second part is concerned with the directions taken in the teaching of architecture at M.I.T. after Ware's departure and with his own endeavors in guiding the development of the department at Columbia between 1881 and 1903. The final part of the chapter is concerned with alternatives in architectural education during these early years: other collegiate schools of architecture, non-collegiate polytechnic institutes, and local chapters of the A.I.A. An underlying theme of the entire chapter is the contemporary evaluation of Ware's program at M.I.T., through the explicit comments of colleagues and through the implicit comparisons between M.I.T. and other options in architectural education.

Chapter 5 involves another approach to evaluating Ware's curriculum, this time not by means of the recorded statements of the moment but by means of the extensive documentation of the subsequent careers of 234 architecture students who studied under Ware for some length of time between 1868 and 1881. Collective biography allows us to emphasize

patterns of relationships between student background, choice of studies at M.I.T., and immediate and eventual careers. Perhaps a quarter of these students have previously been partially documented in standard biographic or obituary sources. Now the career paths of four out of five of these early M.I.T. students have been documented, using alumni catalogs and city directories. The observations within this chapter concerning the dynamics of relationships between the M.I.T. architecture department, other colleges, professional firms in Boston and New York, and the Ecole in Paris stand as a conclusion to the institutional history of Ware's department in its widest professional context. Even more than the explicit evaluations of the early program at M.I.T., the accomplishments of Ware's students in a variety of areas of professional practice provide convincing evidence of the soundness of his pioneering curriculum in the time and place for which it was designed.

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Chapter 1

M.I.T. AND WILLIAM ROBERT WARE: PREPARATIONS FOR ARCHITECTURAL EDUCATION, 1860-67

Introduction

When William Robert Ware was appointed Professor of Architecture at M.I.T. in September 1865, he was just beginning his second year in architectural practice with his partner Henry Van Brunt, and the school was just beginning its first full year of operation. From the time of the first prospectus for the school in the fall of 1860 to the opening of the school five years later, educators had become convinced that architecture was a professional discipline worthy of a university department alongside those in engineering and applied sciences. During these same five years, Ware had emerged less as a practicing architect than as a potential teacher of architecture, worthy of consideration as the first head of a collegiate department of architecture in the country. Yet until the last six months leading up to the opening of the school and his appointment to the faculty, M.I.T. officials and Ware knew little of each other. He had not been active in the civic and professional groups promoting M.I.T. At 32, when first approached about the M.I.T. position, he had not yet done any architectural work to attract the attention of the Boston public. But he had been running his office for over a year already as a teaching studio for young architects. This activity, together with his strong educational background at Harvard in the liberal arts and engineering, must have persuaded M.I.T. officials that he was a person with the best of credentials and the best of intentions.

During the months leading up to his appointment, Ware and Van Brunt were also finishing their competition drawings for Harvard's Memorial Hall. Two weeks after his appointment to the faculty at M.I.T., Ware and Van Brunt were announced as the winners of this competition for one of the most important buildings of the decade. Ware's career seemed at an auspicious beginning, both as educator and as architect. Ironically, from this point on, his contributions as an educator would surpass his contributions as an architect. It would be as an educator that he would be remembered.

The convergence of the development of M.I.T. as a polytechnic university and the development of Ware as an architect-educator in the fall of 1865 can only be understood by following each story back in time, first through a brief institutional history of the founding of M.I.T., and second, through a brief biography of the education and apprenticeship of William Robert Ware. Proposals for the school as a whole and for the Department of Architecture (mostly by Ware himself during 1865-66) will then be examined in detail. The chapter concludes with an account of what is known of Ware's European trip of 1866-67 to introduce his plan for American architectural education to European professional societies and to learn from European schools of architecture what might be done in this country.

1. M.I.T.: Planning for a New Polytechnic University, 1860-65

As the 1850s drew to a close, influential Bostonians were preoccupied with distant developments and with the consequences of these events closer to home. Religious and political leaders were becoming increasingly concerned about slavery, the cotton trade, and westward expansion, while

industrial and educational leaders were becoming increasingly aware of the progress of European manufactures. Europe, the West, and the South were certainly on the minds of leaders in other East coast metropolitan cities at mid-century, and Bostonians were particularly sensitive to the steps New Yorkers were taking to secure their own position in national and international affairs. Observing the shipping boom in the port of New York, the opening of the first trunk-line railroad from New York to the Great Lakes in 1851, and the spectacle of an American Crystal Palace (which stood in New York from 1853 to 1858), some Boston leaders had begun to express concern about the place of their city in national and international economic and cultural life. One group of citizens concluded that Boston's best hope of retaining its position in national and international markets was to develop its own educational resources--a natural conclusion for a community "where material prosperity and intellectual advancement are felt to be inseparably associated."(1)

a. New Institutions for the Arts and Sciences

During 1858 and 1859, a group of Bostonians "interested in the professional applications of science, and in the practical and fine arts" began meeting to consider the institutional arrangements which might accommodate these interests. Their first efforts were directed toward creating a consortium of museums, including the existing collections of the Boston Society of Natural History (established 1831) and the Massachusetts Horticultural Society (established 1829), with proposed collections in industrial and fine arts. The anticipated result, "a comprehensive Museum, or Conservatory of Arts and Sciences," became the project of the "Committee of Associated Institutions of Science and

Arts."(2) Since the fall of 1857, Boston had been expanding westward beyond the Public Garden, into the filled land of the Back Bay. The Committee saw this as the ideal location for its museums. An 1859 petition to the Massachusetts Legislature for the grant of a site was, however, unsuccessful, and the Committee of Associated Institutions turned its efforts to improving the intellectual framework of its scheme for a Museum or Conservatory.(3)

For advice they called upon the former Professor of Natural Philosophy at the University of Virginia, then living and lecturing in Boston--William Barton Rogers.(4) His first contribution as consultant to the Committee was the preparation, early in 1860, of an expanded proposal to the Legislature, reaffirming the Committee's interest in securing a Back Bay site and broadening the institutional scheme to include a "Comprehensive Polytechnic College."(5) This effort also failed.

Rogers spent the summer and fall of 1860 restructuring the proposal, still working under the auspices of the Committee of Associated Institutions. What emerged was a scheme for an "Institute of Technology," comprised of three interrelated enterprises: the long-contemplated "Museum of Industrial Art and Science, or Conservatory of Arts," a "Society of Arts," and a "School of Industrial Science." Rogers' report, entitled Objects and Plan of an Institute of Technology, was adopted on October 5, 1860, by a group representing the Committee of Associated Institutions and was printed for immediate circulation to manufacturers, engineers, scientists, educators, and other leaders in the vicinity of Boston. About 200 persons endorsed the report in November and December of 1860. On January 11, 1861, a Committee of Twenty was directed to proceed, on behalf of the Committee of Associated Institutions, to secure a charter from the

Legislature incorporating the "Massachusetts Institute of Technology." The incorporation was approved by the Legislature on April 10, 1861.(6) Within the week, events distant from Boston and its new Institute of Technology cut across the deliberations of educators and civic leaders, as the country went to war. With compounded distractions and delays, planning nonetheless went ahead, guided by Rogers himself and by his report from the previous fall.

b. "Objects and Plan of an Institute of Technology" (1860)

The Objects and Plan of an Institute of Technology is motivated throughout by the urgency of the need for Massachusetts industry "to secure a steady prosperity in the midst of the busy inventions and rapidly expanding knowledge which mark these pursuits in the leading European nations..."(7) Rogers laid the groundwork for a series of Boston institutions that would, in various ways, provide for technical and art education, calling attention to the fact that "the most enlightened communities of Europe have endeavored to provide for the practical co-operation of Education and the Arts."(8) While other Bostonians were looking anxiously over their shoulders at New York, Rogers was looking straight to London and Paris as places where commercial competition was backed by institutions which did much to maintain superior performance in artistic and industrial manufactures. These were institutions worthy of emulation, and Rogers had not proceeded far in his report before he had occasion to mention the South Kensington Museum and Schools, the Ecole Centrale des Arts et Manufactures, and the Conservatoire des Arts et Metiers.(9)

The alliance of school and museum, in nearly equal balance, was Rogers' ideal in 1860. He had been commissioned to work on behalf of the Committee of Associated Institutions (all museums), and so was careful to point out in his report that the Museum of Industrial Science and Art would be "the central feature of our proposed Institute of Technology."(10) Yet with his own strong background as an educator, the balance began to shift toward the School of Industrial Science. While the plan for a museum of Industrial Art and Science within the framework of an Institute of Technology would never be realized, Rogers' outline of the organization of this institution remains one of the earliest and most comprehensive schemes for a permanent American museum of science and industry.(11) Meanwhile, the Boston Society of Natural History ended its loose association with the Horticultural Society and began to move in tandem with the Massachusetts Institute of Technology in seeking a grant of land in the Back Bay.(12)

It should be remembered that the Massachusetts Institute of Technology in the earliest years did comprise the School of Industrial Science and the Society of Arts. The former soon became synonymous with "M.I.T." the university; the latter was reorganized in 1870 as a learned society, legally separated from but still affiliated with M.I.T., and continued in existence until 1962. The Society of Arts, as envisioned in 1860 by William Barton Rogers, was to be the Boston counterpart of Philadelphia's Franklin Institute--an association of scientists, engineers, and manufacturers interested in the latest developments in applied science.(13) The Society of Arts would be the membership body of the Massachusetts Institute of Technology, meeting regularly as a group to hear professional and scholarly papers and meeting in committees to direct

the several activities of the Institute.(14) Throughout the 1860s, the two monthly meetings of the Society of Arts provided the occasions for discussions of technical education. In December 1865, for instance, the Society was the audience for the lecture by William Robert Ware, newly appointed Professor of Building and Architecture, concerning the proposed course of architectural instruction in the School of the Massachusetts Institute of Technology.(15)

Rogers' 1860 outline of the School of Industrial Science is of particular interest for the indications it gives of his early thinking on the teaching of architecture as one of the arts of design. Again, it should be emphasized that his larger concern was to provide for "systematic training in the applied sciences," insisting that "such a training, forming what may be called the intellectual element of production, has, we believe, become indispensable to fit us for successful competition with other nations in the race of industrial activity."(16) Rogers envisioned that the School of Industrial Science would comprise at least five distinct schools: Design, Mathematics, Physics, Chemistry, and Geology.

The School of Design, which heads his list, was to be a comprehensive school of industrial design, like those in London and Paris. The M.I.T. School of Design should provide instruction

> ... not only in geometrical, architectural, and free[hand] drawing, and the delineation of the apparatus and machinery of the arts, but [also] in the copying and designing of figures and patterns for textile and other fabrics; in the making of patterns and models for fictile and metallic wares; in the principles of regulating the arrangement and combination of colors, applied to these and other products; and in the scientific basis and leading operations of the arts of engraving and photography.(17)

It is evident that the principal mission of the M.I.T. School of Design would be the preparation of students "for efficient service in the ornamental branches of manufactures," and only incidentally for careers as engineers, architects, and machinists.(18) Rogers' rhetoric is that of one persuaded of the need for the improvement of "taste, invention, and artistic ability"--one convinced that successful competition in the world market "is often largely dependent on the extent of art-culture which can be brought to bear on what may be termed the aesthetic branch of the manufacture."(19)

The transformation of this 1860 scheme and the convictions behind it into the departmental organization of M.I.T., as it would open in 1865, is a complicated story which can, however, be reduced to a few conclusions.(20) As deliberations progressed, doubts must have arisen concerning the suitability of including industrial arts training within an institution of higher education, at least as such was understood in Boston.(21) Meanwhile, those components of the School of Design which had received less attention in the 1860 scheme must have been acknowledged by interested professionals as legitimate subjects within a system of higher education dedicated to the applied sciences. So it happened that mechanical engineering, civil engineering, and architecture--all of them fields involved in a local and national process of professionalization--became differentiated from the hypothetical School of Design and emerged as separate departments at M.I.T. These were all professions concerned more with the existing national demand for their services than with the potential international demand for goods produced as American design and production skills improved. The long-standing American political and professional concern for internal improvements, dependent on well-trained

engineers and architects, was reinforced during the war years for two reasons. Looking at the immediate needs for mobilizing engineers for service in the military and in industry, educators no doubt had to concur that more technical education was needed to prepare men for the recognized fields of civil and mechanical engineering. Looking ahead, with present apprehensions reassured by an old faith in manifest destiny, educators had to concur also that rural and urban development would eventually enter a new phase, more expansive and extensive than anything seen before the war. The demand for agriculturalists, civil engineers, and architects would, for years to come, certainly be great enough to encourage educators to take immediate steps to provide for professional training in these fields.

Even in the midst of the war, Congress was looking at the future of the country in much the same way, seeing the stronger union between the East and the West of the American continent as a means of compensating for the severed Union of the North and South.(22) In 1862 two pieces of legislation were enacted which would have a major impact on the westward movement of population and the popularization of higher education in the post-war years: the Homestead Act and the Morrill Land-Grant College Act. The Morrill Act provided for the establishment in every state of at least one college "to teach such branches of learning as are related to agriculture and the mechanic arts without excluding other scientific and classical studies."(23) Massachusetts made an ingenious division of its revenues from the Morrill Act, with two-thirds being allocated to establish the Massachusetts Agricultural College in Amherst (later, the University of Massachusetts) and one-third to the Massachusetts Institute of Technology. In accordance with its legislative charter of April 10,

1861, the Massachusetts Institute of Technology proceeded on April 8, 1862 to organize its administration and start its campaign for a private endowment. Its one-third share of the Land-Grant revenue was confirmed by an act of the Massachusetts Legislature on April 27, 1863.(24) The existence of an educational institution, still in its formative stages, but seeming to hold the promise of fulfilling the intentions of the Morrill Act, made it possible for M.I.T. to preempt the field of education in the "mechanic arts" in Massachusetts, excluding the possibility that the legislature might award funds to Harvard's Lawrence Scientific School.(25) As early as 1860, William Barton Rogers had hazarded a definition of the educational market which his school would serve, stating that it would be the aim of the Massachusetts Institute of Technology "to supply the industrial classes with a knowledge and training of which they are specially in need, and which it would be incompatible with the purpose and organization of the [established] universities and colleges to attempt to provide."(26) But to keep the M.I.T. program from being misconstrued, Rogers emphasized that the instruction at M.I.T. would be fully consistent with the standard of higher education. The teaching would have "no affinity with that instruction in mere empirical routine which has sometimes been vaunted as the proper education for the industrial classes." M.I.T. would offer a kind of learning "founded on a thorough knowledge of scientific laws and principles, and which unites with habits of close observation and exact reasoning a large general cultivation."(27)

So in April 1863, a fortuitous merger occurred between the civic interest of the Massachusetts Institute of Technology, concerned about the future of technical education in metropolitan Boston, and national interests, promulgated through the Massachusetts legislature, which acted

in turn to give support to M.I.T. as the most promising endeavor in technical education within the state. During the following year, therefore, Rogers turned all his efforts as Chairman of the Committee on Instruction (i.e., Committee on the School of Industrial Science) to developing the prospectus for the school.(28) On May 30, 1864, the Government of the Massachusetts Institute of Technology adopted Rogers' report, entitled Scope and Plan of the School of Industrial Science.(29)

c. "Scope and Plan of the School of Industrial Science" (1864)

One of the central arguments of the report was that the school would have to be prepared to give appropriate instruction to students with a variety of educational goals. Rogers had first addressed the problem of pluralism in his 1860 report, but now in 1864 he saw the organization of the school taking shape around two categories of students: part-time students who would attend M.I.T. "in hours not occupied by business," and full-time "systematic students of applied sciences." Rogers and the Committee on Instruction proposed that the course of study for part-time and full-time students should be different, with the first group following a General or Popular curriculum, and the second group following a Special or Professional curriculum. Part-time students would include "persons engaged in mechanical, manufacturing, and mercantile pursuits," teachers and student teachers, and others "whose taste and leisure lead them to avail themselves of such instruction." These students would attend only the lectures or drawing classes, mostly scheduled for evenings. Full-time students seeking "a continuous and thorough training" in a professional field would also attend lectures, and these would be supplemented by classroom, laboratory, and studio exercises.(30)

The General or Popular course would offer lectures in several fields: Mathematics (including descriptive geometry and perspective); Physics and Mechanics; Chemistry and Its Applications; Geology and Mining; Botany and Zoology; and possibly Special Technology (including textiles, paper, printing, and engraving). The drawing classes would offer "systematic exercises in elementary and free-hand drawing" and "artistic design and modelling, as applied to manufactures."(31) A separate General or Popular course did not actually develop, though a program of free evening lectures was endowed in 1865. It was a program substantially less organized than the General or Popular course but substantially more rigorous than the prevailing practice of informal popular lectures.(32)

The Special and Professional course would be offered by the five departments which initially comprised the school. These departments, as defined by Rogers in 1864, were: Mechanical Construction and Engineering; Civil and Topographical Engineering; Building and Architecture; Practical and Industrial Chemistry; and Practical Geology and Mining.(33) Physics and Mathematics, which has constituted separate departments in the 1860 report (and which would eventually emerge as such at M.I.T.), were in the early years of the school subsumed in the preparatory courses required of all students.(34) Meanwhile, Mechanical Engineering, Civil Engineering, and Architecture, which had been compressed into one School of Design in 1860 were now fully differentiated, and what was left of industrial design had been relegated to the "drawing school" of the General or Popular course. Professional studies in one's chosen field occupied the third and fourth years of the full-time collegiate program.(35)

The separate program in Building and Architecture in the forth and final year still included, according to Rogers' prospectus, considerable

training in engineering. Carpentry, structural framing, and roof and bridge trusses, which would be studied in the third year, would be followed in the fourth year by the study of masonry for arches and bridges and the study of structural ironwork. Utilities and mechanical systems and building materials would be considered as specific studies culminating earlier introductory work in physics, chemistry, and geology. "Lectures on Architecture as a Fine Art," covering the three principal periods--Ancient, Medieval, Modern (i.e., Renaissance)--would be given in the fourth year. Construction would be studied with reference to such building types as "Dwellings, Schoolhouses, Halls, Courts of Justice, Prisons, Manufactories." And projects in architectural drawing would also be concerned with such types as "Dwelling, Schoolhouses, Churches."(36) This sum of topics, then, was Rogers' concept of the preparation required for professional architectural practice. It is likely that they conferred with some of the architects and engineers who had subscribed to the Objects and Plan in 1860-61, and possibly with other members of these professions in Boston.(37) In any case, the prospectus for instruction in architecture as described in Rogers' 1864 Scope and Plan would have amounted to the job description for the professorship in Building and Architecture. Within a year of the adoption of the Scope and Plan, a 32 year-old architect named William Robert Ware would emerge as the prime candidate.

2. The Education of William Robert Ware, 1848-65

William Robert Ware was born on May 27, 1832, in Cambridge, Massachusetts, where his father, Rev. Henry Ware, Jr., was on the faculty of the Harvard Divinity School.(38) William was born into a

family of two grown children, ages 12 and 14, from his father's first marriage, and one young child, age 2, from his father's remarriage to Mary Lovell Pickard in 1827.(39) In 1842, Rev. Henry Ware left his chair in the Harvard Divinity School and moved with his family to Framingham, west of Boston. The next year, he died. His widow then settled south of Boston in the town of Milton, with her five children. William was then 11, and he spent the next four or five years in the college preparatory course at Milton Academy.(40)

In the fall of 1848, William Robert Ware, age 16, entered Harvard College, where his older brother, father, uncle, and grandfather had all graduated, and where his cousin was a classmate. At Harvard he devoted most of his time to languages and the humanities, taking four years of Latin and three of Greek, and a variety of courses in history, philosophy, and rhetoric. As an undergraduate, he did relatively little work in mathematics or science--only one course in five, but he was a member of the Harvard Natural History Society. His record was a good one. During his junior and senior years, he stayed just within the top twenty percent of his class, graduating in July of 1852, thirteenth out of a class of 67. He was a member of Phi Beta Kappa.(41) Two years behind Ware at Harvard, in the Class of 1854, were two men who would begin their study of architecture with him in the late 1850s and remain close to him throughout the 1860s and 70s--one as a professional colleague in New York, Charles D. Gambrill; the other as his professional partner in Boston, Henry Van Brunt.(42)

For the next two years, Ware lived in New York, teaching or tutoring, but little is known about his activities or acquaintances during this period.(43) He was, though, beginning to take notice of the architecture

of the city, being particularly impressed by the new Crystal Palace in the spring of 1853.(44) Then in June of 1854, he was sensing the need "to select a permanent occupation." To clarify his thoughts and to seek advice, he wrote to an unidentified person, perhaps an architect, not living in New York, declaring his lifelong interest in architecture, which he distinctly identified as a profession:

> The only profession to which I have ever felt myself attracted is Architecture. It took my fancy as a child and I have always maintained my interest in it. I always however considered it quite out of the question that I could pursue it as a profession, and had not the presumption to suppose that I had the ability to succeed in it. It is only after looking in vain for some other congenial employment that I have allowed myself to turn a wistful eye in that direction. My own wishes and the representations of some of my friends have gone far to persuade me that I had taken a wrong view of the subject. I have thought that it was in fact quite as much a useful as a fine art, and as such offered to any intelligent person a career in which success would be proportionate to his learning & diligence.(45)

Here, for the first time, he mentioned the opposition between architecture as an art and architecture as a science--a dichotomy he would be concerned with for the rest of his career:

> Yet I cannot escape from the feeling that Architecture is after all an Art and not a science, and that only an artist can succeed in it. In this difficulty I have felt the want of someone from whom I could learn whether my scruples were just, and I have wished that you were where I could have the benefit of your counsel.... If I succeed in convincing myself that at the present day the profession only demands knowledge and good taste, both which will come through conscientious study, I will begin my education as an Architect with alacrity and not much fear for the result.... And even if I should find that the more exalted paths of the Art were shut to me, I might still [four words unreadable] achieve a satisfactory success in the inferior departments of the same occupation. I take it that Architecture forms the

> connecting link between the Useful and the Fine Arts, and that the Artist and the Engineer may alike find it a successful field of labor.(46)

Several points are of interest here, in his thinking at the age of 22. It would be important to his own preparation during the next decade (and to his eventual mission as an educator) to believe that the "knowledge and good taste" required in the profession could be gained "through conscientious study," through "learning & diligence." He would also maintain, throughout his career, that the "higher" accomplishments in architecture required an artistic gift, but that much important work remained "for any intelligent person" with sound training in other aspects of the profession. He may have been ambivalent about viewing the "Useful Arts" as inferior to the "Fine Arts," but at least among the useful arts, such as engineering, there was an established course of study by which one could achieve professional competence and acceptance. With this letter of June 1854, Ware had talked himself into the most likely plan of action to prepare for a career in architecture. Reluctant to presume that he could enter the profession by way of the fine arts, and knowing his own gift of diligence in academic work, he resolved to return to Harvard and enter the two-year course in Civil Engineering at the Lawrence Scientific School. Between the fall of 1854 and the summer of 1856, he made up for the minimal preparation he had had in quantitative subjects as an undergraduate. Ware's courses included calculus, analytical and descriptive geometry; drawing (outline, shaded, tinted, isometric, topographical); shades and shadows and perspective; stereotomy; surveying; mechanics; building materials; and the construction of engineering works (canals, railroads, bridges).(47) For the first semester only, Charles D. Gambrill was a fellow student at the Lawrence Scientific School. Gambrill

left the school in the spring of 1855 to join his undergraduate classmate Henry Van Brunt as an apprentice in the office of George Snell, an English-trained architect in practice in Boston since 1850.(48)

Ware graduated summa cum laude in July of 1856 with a Bachelor of Science in engineering, to complement his Bachelor of Arts in the liberal arts. His next step was to enter an office, and he chose the one office in Boston where the artistic and intellectual side of the profession seemed most to flourish. For the next two and half years, he worked with Edward Clarke Cabot, then in partnership with his brother James Elliot Cabot, trained in the law, philosophy, and literature.(49) During the 1850s, Cabot was also occasionally associated with the architect and critic Arthur Gilman. Little is known about the work of the Cabot office during the time that Ware was there. It is known that Ware worked on some modest projects of his own during these years.(50)

Ware had been with Cabot for about a year when his two colleagues, Van Brunt and Gambrill, left the Boston office of George Snell to seek out Richard Morris Hunt in New York, who began accepting young men for architectural training in his studio in the winter of 1857-58. They were joined in the spring of 1858 by George B. Post, who had just graduated in engineering from New York University. Almost a year passed before William Robert Ware and Frank Furness joined the group in the spring of 1859. Edmund Quincy, Jr. probably also arrived in 1859.(51)

All of these men looked to Hunt as their first, indeed their lifelong, mentor in architecture. Though only five to twelve years older than his pupils, Hunt had the authority of having immersed himself for nearly a decade in the methods of the Ecole des Beaux-Arts.(52) He had a collection of some two thousand architectural books and five thousand

photographs. He insisted that his pupils take every opportunity to practice sketching and to study in his collections, and saw to it that they learned thoroughly the classical orders of architecture. He gave them monthly design problems based on those he himself had been exposed to at the Ecole.(53) Hunt also spent time with his pupils in the evenings, joining them for dinner and talking informally of his years in Paris. Ware later recalled one such occasion:

> One night I remember particularly..., I got him to expound the whole scheme of the Ecole, we had it in fragments before, but I wanted to know all about it.(54)

As important as Ware's work in Hunt's studio must have been to sharpening his sensibility as a designer, his wider explorations around the city of New York helped to reinforce his commitment to the profession of architecture. He joined the A.I.A. that year, no doubt attended the monthly meetings, and read the summaries of these sessions in The Crayon, a magazine of literature and the arts with strong allegiances to Ruskin and the High Victorian Gothic.(55) Ware also took note of important new buildings, especially two works by Jacob Wrey Mould: Second Unitarian Church, Brooklyn, and All Souls' Unitarian Church, Manhattan.(56) While his experiences in the Hunt studio helped Ware to become firmly grounded in the disciplines of the Classical orders and Beaux-Arts composition, his awareness of architectural design and ideology in New York in the late 1850s helped confirm his taste for the High Victorian Gothic. In his architectural work in partnership with Henry Van Brunt during the 1860s and 1870s, the Gothic would predominate. In his teaching at M.I.T., the lessons of the Gothic and the Classical would stand side by side, until the Classical displaced the Gothic in student work in the late 1870s.(57)

Ware remained in the Hunt studio for a shorter time than any of his colleagues--only eight or nine months.(58) By late 1859 or early 1860, he was back in Boston--not to work again in the Cabot office, but to join Edward S. Philbrick, civil engineer, in an engineering and architectural practice.(59) Little is known about the nature of their collaboration. Philbrick maintained a second engineering office at the Boston and Worcester Railroad Station, and Ware during these early years did undertake independent architectural commissions. Ware and Philbrick would continue in partnership until sometime in 1863, when Ware set up his own architectural practice (prior to forming his partnership with Henry Van Brunt in the summer of 1864).(60)

Robert Swain Peabody spoke forty years later of this earliest work of his teacher and colleague:

> I remember the buildings that he designed before he was Mr. Van Brunt's partner, all his own and uniformly a scholar's work; well studied and well carried out, at a time when people did not have skilled assistants.(61)

Further evidence that Ware was operating virtually independently of Philbrick by 1863 comes from George Thomas Tilden, who also recalled forty years later that Ware was working with the assistance of only one man, John Goddard Stearns, later the partner of Robert Swain Peabody.(62) Henry Van Brunt, who had been serving in the Navy since November 1861, resigned from the service on February 15, 1864, and by July 1864 was in Boston in partnership with Ware.(63)

Within their first year together, Ware and Van Brunt began taking in students and putting them through exercises modeled on the ones they themselves had done in Hunt's studio in 1858 and 1859. Ware and Van Brunt

were both only 32 when they began their architectural and educational work--a year or two older than Hunt when he began teaching in his New York studio. And their own first assistants and students, Stearns and Tilden, were 20 and 18, respectively (about the age of Post and Furness when they started with Hunt, but younger than Ware, Van Brunt, and Gambrill, who entered the New York studio in their mid-twenties).(64)

3. The Office Teaching of Ware and Van Brunt

It is clear that Ware's efforts at providing some systematic teaching through his architectural office had, within the year, come to the attention of the officials working to organize the Massachusetts Institute of Technology. In the early spring of 1865, when Ware and Van Brunt had been together for at most a year, Ware's contacts with M.I.T. officials were well enough advanced that on April 27, 1865, he could address a forty-page letter to John D. Runkle, describing at length his ideas about the teaching of architecture in a school of technology.(65) It was a letter that showed considerable deliberation and considerable conviction. By the time it was sealed, the funeral train carrying President Lincoln was halfway along its journey from Washington to Springfield. Ware, like so many other Boston intellectuals, had placed four years of faith in the vindication of the Union. With the Union saved, but with its future clouded, he and they could only continue to prepare for an educational enterprise that would, quite literally, assist in the reconstruction of this Union with a distinctly American architecture. To appreciate the importance of what Ware was proposing in the April 1865 letter, we need to account for what Ware and Van Brunt were teaching in their office in 1864-65.

In order to equip his students with a systematic understanding of current architectural practice, Ware had been giving occasional shop talks in his office based on his readings in the available American and European literature on professional practice:

> I have undertaken to give our own young men a series of lectures of this sort and have been astonished to find how little aid I got from books, and how difficult and laborious was the process of getting it from the mechanics. The American treatises are very imperfect, and upon many points, especially of professional practice, there is great diversity of opinion.(66)

Ware had been attempting to supplement what he could derive from his readings with information gathered by his pupils and assistants, and he recommended making such directed research part of the curriculum at M.I.T.(67)

In teaching the historical basis of architectural design, Ware used the pedagogic device of setting a problem in archaeological reconstruction, either from documented physical remains or from literary evidence. George Thomas Tilden later recalled one such exercise:

> When Mr. Ware had partially inspired us with an interest in Classic work, he set us to reconstruct Pliny's Villa, and for weeks we were upheaving and absorbing the whole Roman civilization, from Romulus all through the Caesars, and while we were kept at this indefatigable research you must not suppose that he was idle. He was at work for us all the time. He did not limit himself to office hours.(68)

Ware also seized upon an occasional design problem presented in whatever form it came to his attention. Again we have an anecdote from Tilden:

> Nothing escaped Mr. Ware's notice which he could bring to the interest of his boys. An enterprising agricultural journal offered a prize for the best design for a farm-barn of unusual dimensions, for 200 horses, 300 cows and 1,200 sheep, and Mr. Ware set me at it, and suggested that I look up, at the Public Library, such books as would help me.(69)

Beyond these several accounts, we have no specific documentation of what Ware was teaching in his office in the Studio Building. But we do know that many of the ideas on architectural education which Ware set down in his April 1865 letter had first been tried in--or developed with reference to--his office teaching of 1863-65, and before that, Richard M. Hunt's office teaching of 1858-60.(70)

The office teaching continued even after the opening of M.I.T. in the fall of 1865, at least until Ware's departure for Europe in August 1866, and perhaps, in his absence, under the direction of Van Brunt. This private teaching may have resumed in some form after Ware's return in December 1867 and before the official opening of the M.I.T. architecture department in the fall of 1868. The office of Ware and Van Brunt, quite naturally would continue through the 1870s to be one of the most receptive in Boston to providing opportunities for current and recent M.I.T. students to learn more of architectural practice and design by working as draftsmen and assistants.(71)

4. The Selection of Ware to Head the Department

The idea of considering Ware for the professorship of architecture might not have occurred to M.I.T. officials in the spring of 1865 had it not been for his unusual commitment to teaching, demonstrated in the way he had run his office since the fall of 1863. While M.I.T. could hardly

have chosen for the rank of full professor one of the accomplished senior architects or master builders of Boston, there were certainly other college-educated men with more experience in building who might have been considered.

The architect-builders were probably the first to be ruled out. Jonathan Preston, age 64 in 1865, had been commissioned to design M.I.T.'s new building in the Back Bay, but the range of his background was probably too limited to equip him to organize and run an academic department.(72) Gridley J.F. Bryant, age 49, was an active and prolific builder, engaged in a productive partnership with the more theoretical Arthur D. Gilman, but Bryant himself was too involved in his large practice to consider a teaching position.(73) Edward Clarke Cabot, age 47, had distinguished himself early in his career as architect of the Boston Athenaeum, and during the construction of that building, was even being considered for a professorship in architecture at Harvard's newly established Lawrence Scientific School. But by the mid-1860s, it was clear to most people in architectural and educational circles that Cabot was really an architect in the gentleman-amateur tradition, relying on others for solutions to structural problems.(74) Hammatt Billings, also age 47, was working during the 1850s and 1860s as a design consultant for Gridley Bryant and other Boston architects, but had relatively little visibility as an architect in his own right.(75) Nathaniel J. Bradlee, age 36, had an increasingly important commercial practice, but he, too, had been trained only through a period of apprenticeship in the office of the engineer-architect George Minot Dexter, Cabot's collaborator on the Boston Athenaeum.(76)

If collegiate training was a prerequisite for such a major academic appointment as the professorship of architecture at M.I.T., then school officials had an even wider field of candidates from which to make a selection. George Snell, age 45, had been trained in architecture and engineering at King's College, London, and subsequently in the London office of Harvey Lonsdale Elmes, but during his fifteen years in Boston, he had carried on only a modest and reclusive practice.(77) If Snell was not likely to be a particularly engaging figure as a teacher, then Arthur Gilman, age 43, was perhaps thought to be too precocious, too eclectic. While he had been an advocate of more urbane Anglo-Italian Renaissance styles already for twenty years, and for the past six years the artistic partner of Gridley Bryant, Gilman's collegiate background was abbreviated and lacking in any training in engineering.(78)

Finally, there were three other younger men besides Ware with respectable academic and professional credentials, who might have been briefly considered. Charles Amos Cummings, age 32, had been trained in civil engineering at Rensselaer Polytechnic Institute and had worked in the office of Gridley Bryant.(79) John Hubbard Sturgis, age 31, had been educated in German and Belgian schools and had been trained in the London office of James K. Colling. Since 1861, he, too, had been working for Gridley Bryant.(80) And Edmund Quincy, Jr., age 31, had graduated in civil engineering from the Lawrence Scientific School, in the same class as Ware, after which he had worked with Gridley Bryant, practiced engineering, and studied with Richard M. Hunt. Yet Quincy had gone to Paris about 1862 to continue his studies in architecture and lacked the advantage of recent visibility in Boston.(81)

In comparison with these other hypothetical candidates, Ware's background indeed looked good. He had a combination of qualifications well-fitted to the abstract ideal of a professorship--in a field hitherto served by opportune apprenticeships outside the academic realm. Ware had the best attainable formal training, a diligent record of informal training, and what no other candidate had--a theoretical and practical commitment to exploring the problem of partly informal, partly formal architectural education. He had a distinguished record as an undergraduate at Harvard, a year of teaching experience as a tutor in New York, a distinguished record in civil engineering studies at the Lawrence Scientific School, an apprenticeship with E.C. and J.E. Cabot, a year of training in architectural design with Richard M. Hunt, several years of architectural-engineering work with Edward S. Philbrick, and a promising year of architectural practice and educational experiment with Henry Van Brunt.(82) This last enterprise distinguished Ware from all the rest and must have been sufficient to counterbalance his lack of exposure to contemporary European architecture and his limited experience in the business and design aspects of architectural practice. M.I.T. officials must have regarded Ware's determined efforts at teaching in the midst of establishing his professional practice as evidence of a mind generous enough to recreate, in Boston, the experience he and Van Brunt had had in Hunt's New York studio, and perhaps more than that, as evidence of a mind disciplined enough to think through the requirements of a systematic architectural education. Considering his determination to teach, could Ware be persuaded to devote almost his entire time to teaching at M.I.T.? The question must have crossed the minds of M.I.T. officials in the early months of 1865. Ware's concluding words in his April 27, 1865 letter to

John D. Runkle gave a courteous and tentative answer to the questions M.I.T. officials might not yet have formally asked:

> I have protracted this letter beyond all limits, but for that I will not apologize. I will only add in regard to myself, since you have suggested that my cooperation may be of service to the Institute, that if it should adopt any scheme of architectural instruction as I have sketched out, or any other in which I could cordially cooperate, and should think my personal services of value in carrying it out, the work would be one in many respects congenial to my tastes and so far as I thought myself qualified to engage in it, I should be glad to do so.(83)

But this is just one page out of forty, in a letter which, in its lengthy exposition of the problem of architectural education, was page by page answering the lingering question: Would Ware be capable of heading the new Department of Architecture? The letter impressively established Ware's credibility, not only as a prospective teacher, but also as an educational thinker who could join as an equal the other educators associated with M.I.T.

A full analysis of the text of this letter is not necessary, because in the fall of 1865, after his appointment as Professor of Architecture, Ware would closely rework his copy of it and produce An Outline of a Course of Architectural Instruction, which he would read to a meeting of the M.I.T. Society of Arts in December and publish in pamphlet form the following February. That text will be considered in detail in Section 6 of this chapter, and the revisions implicit in the fall Outline, as compared to the spring letter, will be taken into account for what they show of Ware's approach to composing a fully reasoned educational proposal.

The broadest summary of the April letter does tell us something, though, about Ware's earliest documented thinking about architectural education. He understood that what the profession most needed was a work force of assistants capable of doing construction superintendence and detail drafting. He saw the curriculum as divided into two necessary parts: the first dealing with architectural construction and practice, the second with architectural composition and design, and he had already thought out most of the subdivisions of both parts of the curriculum. He was already well-informed about the system of teaching at the Ecole des Beaux-Arts, and he had heard of (but had been able to find little information on) the South Kensington Schools of Design, the Royal Institute of British Architects classes for the voluntary examinations, and the Architectural Association's classes.(84) And he was already convinced that "a tour of study and observation in Europe" would give him the wider understanding of current architectural practice and education essential for formulating a workable American curriculum.(85) The principle of learning from contemporary experience--whether considered as a part of Ware's own preparation for teaching or as a part of his pedagogical method--was one of the guiding themes of the entire argument. His own formative ideas about architectural education would receive the comment of others in the profession during 1865 and 1866, and his European reconnaissance during 1866-67 would bring him in contact with a still wider range of professionals and with a number of exemplary schools. Eventually, when he began active teaching in 1868, his own class preparations and his assignments to students would be charged throughout with the idea of finding information, comparing authorities, and deciding what works best.

5. Ware and Van Brunt: New Commissions as M.I.T. Opens

There is no record of any further exchanges between Ware and the M.I.T. authorities during the five months following his letter to Runkle. While Ware was no doubt proceeding to talk with Runkle and Rogers in greater detail about the organization of the Department of Building and Architecture, he was also getting busy in the work of his firm, not yet two years old. It was during the spring and summer of 1865 that Ware and Van Brunt secured their first major commissions. They were among the eleven firms contacted by Charles Eliot Norton on May 29, 1865, concerning the proposed program for a multipurpose building at Harvard, to contain an alumni war memorial and a large dining and reunion hall. On June 10, 1865, the competition program for Alumni Memorial Hall was officially issued, calling for designs to be submitted by mid-July.(86) By August 2, Ware could write to his sister that the Harvard alumni's Committee of Fifty had responded favorably to the design he and Van Brunt had prepared.(87) A six-man subcommittee decided on Saturday, September 23, 1865, to recommend the Ware and Van Brunt design to the Committee of Fifty overseeing the project.(88) Meanwhile, the First Church (Unitarian) had been moving ahead since May 1865 with plans for building a new church in the Back Bay area of Boston. The site at the corner of Marlborough and Berkeley Streets was acquired in September, and Ware and Van Brunt were among the firms submitting designs in competition.(89)

The records of the M.I.T. Corporation show that on Friday, September 15, 1865, eleven professorships were established and that William Robert Ware was the person named to head the Department of Building and Architecture.(90) Ware's letter of September 25, conveying this news to his sister, states that he had already concluded in discussions with

Runkle and Rogers that the "work will be light for a couple of years." His main concern would be to find someone to offer instruction in freehand and mechanical drawing to M.I.T. students generally, and to meet with department heads in Mathematics, Physics, and Chemistry to "make sure that everything is brought into these courses which the Architectural neophyte requires." As soon as arrangements at the school were in order, Ware hoped that he could make plans "to spend a large part of these two years abroad." He knew, however, that the two new projects for Memorial Hall and the First Church would require considerable attention and conceded that his European study trip would probably have to be deferred.(91) Here at the beginning of the fall of 1865, it seemed that Ware's opportunities to accomplish something as an architect were as promising as his opportunities to take charge of the first architectural department in an American university. With any of these projects by itself, Ware would have enough to do in making and revising plans to keep him fully occupied for several years. With the work in the firm as busy as it must have been in the summer and fall of 1865, it is fortunate that Ware had already taken time in April, in the letter to Runkle, to think through his ideas concerning architectural education.

6. "An Outline of a Course of Architectural Instruction" (1865-66)

The events of the fall and winter of 1865-66, as they concerned Ware the architect and Ware the educator cannot be documented in detail. In following Ware's emergence as an educator, however, no event could have had more importance than his address to the Society of Arts of the Massachusetts Institute of Technology on Thursday evening, December 21, 1865. This talk, which he titled "An Outline of a Course of Architectural

Instruction," was then published in February 1866 and circulated to friends of M.I.T., as well as architects in Boston and New York and elsewhere.(92)

What transformed the April 1865 letter to Runkle into the Outline, as published, was Ware's thoughtful integration of a unifying argument concerning the relation of architectural education to both technical and liberal education. The constituent parts of this argument contain many assumptions about the role of the school in the community and about the organization of knowledge. While some of these assumptions are unique to the Outline, others reflect the commonplace views of architecture, education, and society heard throughout the 1860s and 1870s, whenever the progress and prospects of architectural education were being discussed.

While revising the text of the April letter into the address he would deliver in December, Ware gave considerable thought to the role of M.I.T. in the community and particularly, the role of the proposed Department of Architecture. He seized upon the guiding idea that the school serves as a labor-saving instrumentality in society. The aim of all inquiry in a school of technology would be to determine "the best methods of attaining in each of the useful arts the best possible result."(93) Architecture, considered as one of these "useful arts," was as amenable to this kind of research as any other field:

> Here, if anywhere, is there need of having the simplest, cheapest, and most enduring ways of doing things found out, and when proved made public, and of having workmen trained to skill in those methods.(94)

Ware envisioned that the architecture department at M.I.T. would serve as an agency for the thorough and efficient training of draftsmen, and that further, it would "act through them as a sort of professional exchange for

builders and architects."(95) The ways in which this diffusion of knowledge would take place are not made clear, but it should be emphasized that the architectural profession still had no national forum for an exchange of information. The A.I.A. would not begin meeting in annual conventions until 1867, and the regular publication of a semi-official architectural periodical would not begin until 1876.(96)

For the prevailing inefficient diffusion of architectural knowledge, Ware had both a sociological and an epistemological explanation. In both cases, a failure of system was to blame. The breakdown of the socioeconomic system of apprenticeship left practicing and aspiring architects to figure out their own means of teaching and learning. And the isolation of members of the profession meant that a multiplicity of practices and methods would continue to be laboriously discovered and rediscovered, haphazardly applied and misapplied. Architectural knowledge in America was deficient, in terms of access and consensus. The founding of an architectural school would result in extensive saving of effort throughout the profession:

> To the architect and to the builder it [the school] promises a superior class of assistants and coadjutors; relieving them, meanwhile, of a good deal of the labor and responsibility of training their young men themselves; and affords a source from which temporary assistance can at any time be obtained. It moreover proposes by and by, to give them the benefit of an invaluable accumulation of useful information,-- precedents, statistics, examples, and methods,-- classified and arranged in an accessible and available shape....(97)

Ware envisioned that the architecture department at M.I.T. would become a repository of the knowledge "handed down from generation to generation by personal tradition."(98) This oral, vernacular tradition

would be brought into an academic context and systematized by the students themselves, who would have the responsibility of "conversing with mechanics" in the building trades concerning particular techniques, then reporting on these topics. A central tenet of Ware's pedagogic philosophy was that neither the instructor nor the student could be responsible for investigating every pertinent subject, and the opening of a program of architectural instruction could hardly be postponed until a certain body of knowledge had been assembled. Redundant effort in a vast field of endeavor was being displaced in every part of Ware's scheme by cooperative effort in a well-defined field of inquiry. Ware had the faith of the nineteenth-century taxonomic mind--that to give order was almost to know:

> All the School need do is to separate and classify the topics that occur in the practice of the art, and give them out, to the classes, as subjects of study and investigation.... The regular pupils within its walls would proceed to collect, under the guidance of its officers, the best information that can be obtained from the accredited sources; while the pupils attached to the offices in the town would lay them under contribution for the fund of special study and personal experience peculiar to each.(99)

Much of the students' time would be spent on directed "systematic study" (meaning the orderly study of the pervasive and discoverable orderliness of things):

> In this [systematic study], ... it is intended that they shall rely mainly upon their own and each other's observation and research for their information; and a purely didactic method will be adopted only upon topics whose subject-matter is beyond their reach.(100)

A course of instruction founded on coordinated pragmatic inquiry seemed essential in preparing to cover a field not previously included in American schools.

Ware went further, though, justifying the adoption of new pedagogic methods for a new academic field by arguing that architecture held a special place among the disciplines. In the institutional context of M.I.T., architecture, or the art of building, was simply one of the Useful Arts, the Industrial Arts, the Arts of Design, used more or less interchangeably (though each with a narrower sense than the one preceding). As with the other technical studies at the school, the concentrated study of architecture would begin after an introductory two-year "Course of General Culture, founded not upon a classical and literary, but upon a scientific basis."(101) Ware's problem was to reconcile this necessary institutional linking of architecture and technology with competing views linking architecture with the fine arts or the liberal arts. One of the ingenious new ideas that entered into Ware's argument as the April letter evolved into the Outline was the analogy between architecture and literature. Both fields were hierarchical:

> Architecture is indeed very much like literature, not only because it has the same curiously ambiguous character as language, being partly a matter of history, partly of natural history; half a natural product, half a product of human will.... Both writing and building range all the way from mere work of necessity, the satisfaction of every-day requirements, up to the pure expression of abstract sentiment, where the form, not the function, is all in all.... But they differ from the other fine arts, and they differ from the merely useful arts, in this, that there is in each an intermediate region, above the reign of mere utility, though still mainly utilitarian; and below the realm of poetry, though still thoroughly artistic. This middle ground is in literature the field of liberal education, and in architecture the field that we propose to occupy. It

> is the region of good sense and good taste, of knowledge and skill, of intelligence and refinement, and of talent, perhaps, rather than genius. The fruit of its cultivation is in literature a prose style, clear, graceful, and intellectual; and a style in building, simple, elegant, and rational, suited to the best requirements of every-day life.(102)

Ware's entire curriculum would henceforth be directed to the liberal education of the architect--not the genius, but the man of serviceable talent, ready for an education that goes beyond mere technical training. By emphasizing both the dignity of and the demand for work in the "middle ground," Ware was able to relegate the higher ground (including all of poetry, painting, and sculpture, and the masterworks of architecture) to the fine arts and to genius. By this categorical maneuver, Ware reserved for the domain of education all of "the prose aspect of Architecture."(103) Furthermore, the teaching of architecture as a didactic subject in its own right was seen as an idea well suited to the modern, post-humanist university:

> For the last four hundred years, literature has been the only avenue to a liberal culture: but before the revival of learning architecture served, to a great extent, to fill this office; and it would be hard to find a study now, in the modern re-action against an exclusively literary training, better adapted to the wants of those who wish to try experiments in education.(104)

If a large part of the practice of architecture is analogous to a large part of the practice of literature, and if an age of architecture both precedes and follows an age of literature, then architecture has, by these associations, special claims to distinction among the nineteenth-century disciplines. By means of analogy and historical reasoning, architecture becomes an important--even potentially dominant--means of access to

liberal education, which stood, for Ware, as the ultimate pedagogic and social good. His elaborate argument at least enabled him to claim a preeminent status for architecture within the scientific and technical course of study at M.I.T.

This was Ware's view in 1865 of the organization of knowledge. Within the decade he would reexamine the somewhat arbitrary notion of qualitative differences between "mere building," "the prose aspect of Architecture," and the "poetic" works of architecture worthy as creations of fine arts. His wider involvement with the Lowell Evening Lecture series, the Massachusetts State Normal Art School, and the School of the Museum of Fine Arts brought him in close contact with both artisans and artists and led him to modify his hierarchical notion of architecture. Building would no longer be left behind as a field requiring only mechanical aptitude, and the fine arts would no longer be left unreachably in the distance as a field accessible only to genius. Ware's teaching would soon extend into both of these realms. The threefold division of building, architecture, and fine arts would collapse into a twofold division, as Ware, like other writers and educators, chose to concentrate on maintaining the distance between architecture and building, and on developing the closeness between architecture and the fine arts. Ware's early theory of a broad "middle ground" of liberally educated architects would become less and less persuasive.

The idea of the school as a labor-saving instrumentality and the idea of architecture as a means of liberal education were, at best, only implicit in Ware's April 1865 letter. These ideas took shape during the summer and fall, and are a measure of Ware's growing pedagogic and promotional sophistication. In their fully-elaborated form, these ideas

give An Outline of a Course of Architectural Instruction an intellectual grounding which makes it more than a mere proposal for a specific curriculum. The first idea, of an economy of cooperative effort, would continue to guide Ware's classroom teaching throughout his career. And the second idea, of a liberal education through architecture, would continue to guide his choices of emphasis in architectural education, in spite of the competing claims of the fine arts and the building trades.

Ware's diagnosis of the state of the architectural profession in 1865 convinced him that the shortage of "competent assistants and well-informed and trustworthy draughtsmen" was everywhere holding back the productive work of architectural offices.(105) As long as the architect had to be responsible for training and watching over student draftsmen and for personally superintending construction work, then he would be distracted from "his own proper work, ... that elaboration and perfection of design which no one else can do for him."(106) The architecture department at M.I.T. would enter the market to relieve the architect of such unproductive tasks and to meet the demand for drafting room and construction site assistants. Ware envisioned a curriculum flexible enough to allow "draughtsmen already at work to avail themselves of partial courses."(107) A series of graduated diplomas or certificates would be awarded to students who passed examinations testing several levels of proficiency. To attract the best students from the widest possible area of the country, Ware proposed establishing, at the very beginning of the department's operation, a prize "for attainments in the highest walks of architectural design, for absolutely reaching a given standard"--a prize that would carry an award making it possible for the student to have "two or three years of European travel and study."(108)

The teaching of architectural practice and architectural design would be kept separate, and there is some ambiguity in the Outline whether this separation would involve sequential stages or parallel paths of study. In one passage, Ware suggests that students who completed their training in architectural practice would have the option of staying on to study design:

> It would be for them to determine, whether, having gone so far, they would go a step farther and complete their work, and, remaining in the School, add an artistic and professional education to this practical training.(109)

In the next paragraph of the Outline, however, Ware admits the possibility of progressive stages in the study of architectural design:

> ... I think it is important, that, from the beginning, a high tone should be maintained, recognizing at the start all the possibilities of ultimate attainment, and giving at each stage of progress the aesthetic and artistic training suited to it. I would make it a liberal culture, as far as it went, in every case; and would not cut any one off from future progress, by withholding the beginnings of the best things, however humble his abilities or modest his aspirations.(110)

The special curriculum in architectural construction and practice would commence where the introductory M.I.T. curriculum in physics, chemistry, geology, and engineering left off. Topics to be investigated, using the cooperative research method, would be:

> ... the principles and processes of the various mechanical arts employed in building, the estimating and surveying of work, and the organization and superintendence of workmen, the keeping of accounts and regulation of payments, the drawing-up of specifications and contracts, and the customs which regulate the intercourse of architects with their clients and with the mechanics they employ, and the

> laws upon which these customs ultimately rest. The more strictly scientific subjects of lighting, heating, ventilation, and acoustics would, or course, be included.(111)

Students would learn from lectures given by experts, from interviews with people in the building trades,

> ... from the systematic study of buildings actually in progress, from laboratory manipulations, which should be made to embrace as great a variety of work as possible, and especially from the collections of illustrative drawings and models which must form an essential part of the equipment of the School.(112)

In the April 1865 letter, Ware had gone even further, proposing

> ... to give the class at an early stage of their studies a sort of apprenticeship in the building trades partly perhaps by setting them to work upon buildings actually in progress, as journeymen....(113)

Conversations with architects and builders during the intervening months must have convinced Ware of the advisability of deferring this apprenticeship, for he argued in the Outline that the experience needed "to transform the student into the man of business" should come after M.I.T.--including the axiom that "the more complete his previous theoretical knowledge of his subject, the more rapid will be his progress in this practical schooling."(114)

In the Outline, two lengthy passages on the cooperative, labor-saving work of studies within a school of architecture and on the analogy between the "middle ground" of architecture and literature intervene between the discussion of the teaching of architectural construction and practice and the discussion of the teaching of architectural composition and design. This latter discussion was already fully developed as a sophisticated

pedagogic argument in the April letter, and the time spent in reworking the proposals of the letter into those of the Outline helped Ware to give philosophical justification to the idea of a fully integrated course of pragmatic liberal studies, in which design was indeed coequal with practice, not the culmination of the curriculum. He was careful to delete in the second half of the Outline the suggestion that design had any claim to supremacy in the curriculum. For in the April letter, he had, in fact, called design "the main thing to which all the rest is but auxiliary," and "the principal object of study, to which all the rest is merely accessory."(115)

Ware formulated an approach to the teaching of design that would recognize the authority of historical precedent, while emphasizing the study of historic forms to derive the enduring principles of design:

> These principles have an independent existence and an abstract value; they are unchanged through all the changes of the past; and it is by their light, not by following the precedents of bygone ages, that we must hope to find, for the new and strange problems of the future, the simple, truthful, and characteristic solution they demand.(116)

The primacy of history as a means of achieving intelligent contemporary design was an ideal held by Ware throughout his career. But to ensure that students, whenever they needed to refer to history, would do so in the proper spirit, Ware proposed a complementary course of studies which would emphasize design principles in their "independent existence" outside of time. He envisioned a twofold curriculum in design, alternating between aesthetic and historical training--labeling the first as 'a priori', 'inventive', 'subjective', 'deductive', 'synthetic', devoted to the study of 'nature'; and labeling the second as 'a posteriori',

'acquisitive', 'objective', 'inductive', 'analytical', devoted to the study of 'historic art'.(117) The aesthetic course would concentrate on "the laws of harmony and proportion, the study of natural forms and their conventional adaption to design, of the contrast and gradation of color and form, and the expression and composition of abstract lines."(118) In the M.I.T. curriculum which actually developed, much of this work would be merged with the preliminary training in drawing and rendering techniques. The full aesthetic implications of these tasks would not be realized in any of the curricula devised by Ware or his contemporaries, because the manipulation of form was always confined to exercises in the denotation of form through a limited range of media: pencil, charcoal, ink, and watercolor.(119)

In setting forth his ideas for a curriculum in the Outline, Ware saw the importance, though, of giving students in the aesthetic course the opportunity to apply their understanding of principles by working on design problems chosen from the smaller building types of the period: "barns, sheds, cottages, country-houses, railroad stations, markets, &c." He believed that the "temptation to indulge in the styles of the past" would be further avoided by insisting that the drawings themselves be kept to the small scale of the sketch, "relying for effect only upon outlines, masses, light and shadow, or such other means of ornament and aesthetic expression as their a priori studies might suggest."(120) Ware concluded that studies of this sort would do much to counterbalance the historicizing tendencies of students whose fascination with precedent might mislead them:

> I think that by keeping to a small scale in the drawings, and not paying more attention to details than the state of progress warrants, something might

> thus be done to encourage a habit of simplicity and frankness in the treatment of architectural problems,--a habit of working up from the requirements of the problem to the ensemble, and thence to the detail, and not vice versa, which, if it could obtain, would put new character and expression into our building, and could not fail to produce the only originality of style that is possible or desirable.(121)

Just as the purely formal, preliminary lessons of the aesthetic course would be merged in the actual M.I.T. curriculum with the training in drawing and rendering, the application of these lessons to simple design problems would soon be merged with other aspects of the design teaching. The familiar "Anglo-American" elementary design problems envisioned by Ware would be overwhelmed in the 1870s by the design problems imported by Eugene Letang from the Ecole des Beaux-Arts--problems which, however simple as to building type and however contemporary in the context of French architecture, depended on a knowledge of unfamiliar built and unbuilt prototypes in which past and present were already confusingly and seductively comingled.(122)

Ware's historical course, intended to be offered at every level of study concurrently with the aesthetic course, was itself twofold and informed by two philosophies of history. One part of this course would have an explicit reciprocal relation to the aesthetic course, examining the various historical styles "to see what they have to contribute in illustration of permanent and universal principles." While this half of the historical course would be concerned with deriving design principles--the operative parts of precedent, the other half of the historical course would be concerned with a combination of cultural history and the history of form. Styles would be "studied as an expression of the age which produced them." Ware maintained that this

dual understanding of history was essential for the training of the architect, especially as the study of architecture was, beyond itself, one of the best contemporary means of attaining a liberal education. In teaching history, he was prepared to make use of "whatever assistance literature and scholarship and aesthetic and philosophical criticism can give in understanding the age."(123) In addition to making complete sets of drawings of historic monuments, students would apply their knowledge of various periods and styles by doing problems in archaeological reconstruction or in historical design--"not a modern building in the ancient style, that is mere masquerading, but an ancient building, such as the ancients might themselves have built if they had chosen."(124) Ware hoped that the exercises in reconstruction, in addition to their inherent pedagogic value, would have the added benefit of preventing archaeological copying in student work, for "the natural and inevitable impulse to copy would find a legitimate channel in the prescribed task of restoration, and there would spend its force."(125) As the design problems on smaller modern building types, auxiliary to the aesthetic course, gave way to the design problems on larger modern building types (e.g., "markets and warehouses"), Ware believed that the student would develop a fully integrated sense of design principles, program analysis, and historical precedent

> ... so that his public buildings, when he comes to them, may reasonably show a mind at once full and free, and a method learned without being pedantic, eclectic without patchwork, simple and original without meagerness or caprice.(126)

Ware's Outline of a Course of Architectural Instruction answered several needs simultaneously. In the most practical sense, it was his

studied response to the call from M.I.T. officials to prepare a plan for a curriculum in architecture. As his lengthy letter of April 1865 evolved into the full text of his public address of December 1865 and published pamphlet of February 1866, his hypothetical proposal came to stand as the prospectus for the M.I.T. Department of Architecture. At the same time, the Outline was an exhaustively argued demonstration of educational theory, concerned as much with universal questions of educational innovation as with current questions of the definition of fields of study. Finally, the Outline addressed the current concerns and expectations of practicing architects--their self-conscious sense of professionalism and their self-critical sense of the possibility of a disciplined eclecticism appropriate for the nineteenth century in America.

7. Reactions to Ware's Proposal

Like so many well-reasoned pamphlets prepared for a specific audience and a specific purpose, Ware's Outline had a brief and limited impact. He himself made no later references to it, and there is no evidence that it was consulted by educators associated with the founding of later schools of architecture or by educators interested in the empirical study of visual form or the pragmatic preparation for professional life. Little is known about immediate reactions to Ware's Outline. Whatever discussion may have ensued during the winter of 1865-66 among M.I.T. people and Boston architects, there is no record of it, either in surviving correspondence or in the press.

One curious commentary does survive, sent to Ware in March 1866 by Charles Dexter Gambrill, a former colleague in Hunt's New York studio and soon to be the partner of H.H. Richardson.(127) Gambrill composed a

sardonic "pamphlet" enumerating the supposed reactions of New York A.I.A. members to Ware's published Outline. The fictional criticisms are so plausible they probably have considerable basis in fact. Gambrill declared his "opposition" to Ware's scheme, convinced it would be "a disservice to provide inducements to entering the profession of architecture." He cynically argued that, regardless of the artistic and scientific education received, the architect "will still be less esteemed than the 'practical plumber', the 'practical gas fitter', and the 'practical Builder'," and that if any group was in need of architectural education, it was the mass of potential clients. Gambrill probably aptly characterized the anxieties of established architects:

> I repeat, you are teaching too much--your system of training assistants would over-reach itself--for it would soon produce a brood of young experts superior to the present practitioners--they would not be content to remain draftsmen.(128)

As a postscript to the satiric "pamphlet," Gambrill reported what he claimed were the actual reactions of New York professionals:

> Mr. Richardson made some suggestions in regard to the examinations which I presume he will communicate to you himself. All the architects here are delighted with your project--we will try to elicit something practically useful to you from a discussion in the Institute [A.I.A.].... To me it seems perfect--and if you were in New York or I in Boston I would put myself under your tuition. One man expressed the fear that so much science would drown the artist--an absurdity I could easily refute by pointing to the author of the outline and to my partner--not to mention Leonardo da Vinci....(129)

Gambrill's fictional criticisms were certainly more specific and direct than this summary endorsement. The extent to which the "pamphlet"

reflected an ambivalence among New York professionals concerning architectural education can only be surmised.(130)

The topic did remain enough on their minds that a proposal was introduced, at the first annual national A.I.A. convention in October 1867, to establish a Polytechnic School for architecture in upper Manhattan or in Westchester County, to be conducted under the auspices of the A.I.A. independent of any established academic institution.(131) Keeping architectural education as the prerogative of the profession itself was consistent with the British view of architectural education, as reflected in the parallel emergence in London of classes sponsored by the Architectural Association and the Royal Institute of British Architects. Yet events unfolded in such a way that Ware's academic curriculum for M.I.T. would be put into operation before the A.I.A. could make any serious plans for an independent school of architecture. In December 1867 Ware would return from his European tour of schools and professional societies, and in October 1868 he would officially open the Department of Architecture at M.I.T. The A.I.A. plan for an independent school would not be reintroduced at the second national convention, held in New York in December 1868.(132) In New York, the national center of A.I.A. membership, professional and academic contributions to architectural education would remain unsubstantial until the creation in 1881 of a Department of Architecture within the Columbia School of Mines. A notable event in the longstanding rivalry between New York and Boston in educational and professional matters would be the appointment that year of William Robert Ware as the first Professor of Architecture at Columbia and his resignation as the first Professor of Architecture at M.I.T.

8. Ware's First Year at M.I.T., 1865-66

As design work on Memorial Hall and the First Church progressed, Ware also began his teaching duties in a very limited way. No full-time drawing instructor for M.I.T. had yet been found, so Ware himself took responsibility during 1865-66 for teaching both freehand and mechanical drawing to regular first-year science and engineering students, and to the few special advanced students who came to M.I.T. in its first year of operation.(133) Although this teaching gave Ware little time to develop any of the specifically architectural aspects of the curriculum he envisioned, the experience did prove worthwhile. First, he became convinced that freehand and mechanical drawing could be taught better as separate courses than as concurrent parts of a single course. Second, he came to believe more strongly than ever that a single person should be hired to supervise this work, and when in Europe the following year, he would begin to make inquiries to find such a person--not necessarily an architectural draftsman, but someone who could serve M.I.T.'s general needs in drawing, descriptive geometry, and perspective. Finally, Ware's experience with teaching drawing excited his pedagogical curiosity, and led him to spend some time in London and Paris not only looking for an instructor, but also studying the methods used in the various drawing schools.(134) Though the details are lacking, there is evidence that Ware also delivered some lectures at M.I.T. during 1865-66--what he recalled the next year as "my five talks with my boys." It remains to be seen whether these were lectures on specifically architectural topics, or lectures on descriptive geometry or perspective to accompany his general drawing lessons.(135)

In April 1866, Ware reiterated an idea first stated a year before, in that initial letter to John D. Runkle setting forth his ideas about teaching. Once more, Ware suggested that the organization of the architectural course at M.I.T. should be preceded by a survey of architectural education in Europe. Ware wrote to President Rogers on April 24, 1866, outlining his reasons for requesting a leave of absence for the 1866-67 academic year. He proposed to combine his visits to foreign architectural schools with a search for "collections and apparatus" (books, photographs, drawings, casts, material samples) which could be purchased for M.I.T. He also looked forward to "learning from architects themselves the most approved methods of work and gaining from them also the most intelligent criticisms of the received methods of instruction," adding that he thought that "a tour among the architects would be something quite new, and as serviceable to the school as to myself." Ware pointed out that the study tour would "greatly add to the eclat of the Department and of the School of which it forms a part. It would show that we are in earnest in undertaking to afford the best things."(136)

He does not disguise the fact that such a trip, taken by him as a representative of the university, would have benefits for him as a practicing architect, saying, "My professional studies are not complete until I have been abroad."(137) Ware felt that the time was right to go in 1866, anticipating that he would be gone until the summer of 1867. Harvard had begun its fundraising campaign for Memorial Hall in February 1866, and the commission had just been awarded to Ware and Van Brunt in April for the First Church.(138) The two partners had no doubt discussed the probable schedules for both jobs and concluded that to delay any

longer would obligate Van Brunt to supervise these projects singlehanded once construction began and perhaps force Ware to cut short his trip.(139) Furthermore, there were matters concerning the decorative work in both jobs which Ware could attend to while in Europe.(140)

Ware's correspondence with President Rogers suggests there was some reluctance on the part of M.I.T. to supply funds for the purchase of collections for the department. Ware conceded that, with European contacts and reliable lists of what was available, items could be acquired through the years as future funds might allow. But he had also been advised that donations of books and photographs would be more likely if prospective benefactors saw that the nucleus of a collection had already been formed.(141) So it happened that, during the early summer of 1866, Ware persuaded some of his friends and neighbors in Milton, Massachusetts, to create a special fund for him to use as a purchase account on his European tour. The understanding of the donors was that, in recognition of the collective gift, M.I.T. would award a free scholarship annually to a graduate of Milton High School. By the time of Ware's departure for Europe in August 1866, $3000 had been raised, and there was the expectation that an additional $2000 would soon be raised, allowing Ware to make commitments up to the amount of $5000 while in Europe.(142)

9. Ware's European Trip, 1866-67

During the summer of 1866, Ware arranged for Boston architect W.P.P. Longfellow to take over the supervision of the freehand and mechanical drawing classes at M.I.T.(143) In early August he sailed for England, and he would remain abroad for about the next sixteen months. Of that time, he would spend a total of almost three months in London and almost five

months in Paris, meeting architects, visiting schools, and collecting materials for the M.I.T. architectural library. The remainder of his time, about seven months excluding transatlantic passage, would be spent traveling in Scotland, England, France, Italy, and Germany. (An approximate reconstruction of his itinerary is given in Appendix A.) In reviewing the events of this trip, our main interest will be to establish the nature of the contacts Ware made with various institutions and individuals. His extended stays in London and Paris were the times when he most actively pursued his educational contacts within the professional milieus of both cities.(144)

a. London

Ware's ship arrived in Liverpool by August 12. During the next three months, he traveled extensively around England, visiting cathedrals and doing some genealogical research on his mother's family. The month before Christmas he spent in Edinburgh and Glasgow, finally arriving in London in the last week of December 1866.(145)

Ware had several objectives for his London visit. First, he wanted to establish official contact with the Royal Institute of British Architects (R.I.B.A.), both in his capacity as Professor of Architecture at M.I.T. and as an emissary of the American Institute of Architects (A.I.A.). Second, he wanted to study what was being done in professional education by the R.I.B.A., by University and King's Colleges, by the Architectural Association (A.A.), and by the Royal Academy (R.A.). Third, he wanted to study the methods of art education being used at the South Kensington Schools of Design and at the workingmen's colleges around London. Finally, he wanted to collect "Photographs, casts, prints, books,

business documents, drawings, and sketches" for the architecture department at M.I.T.(146)

Establishing official contact with the R.I.B.A. was a manifestation of the growing corporate self-consciousness of the A.I.A. When Ware departed for Europe in the summer of 1866, the A.I.A. was still an essentially parochial New York organization. Not until October 1867 would the A.I.A. hold its first annual national convention, at which the chapter system would be introduced as a way of encouraging the more active participation of members from other locales. Before leaving for England, Ware called upon Richard Upjohn, A.I.A. President, and suggested that he carry with him a set of photographic copies of drawings by American architects for donation to the R.I.B.A.(147) After receiving this gift, the R.I.B.A. responded by electing Upjohn an Honorary and Corresponding Member, promising sets of the R.I.B.A. Transactions to both the A.I.A. and M.I.T., and urging Ware to gather and send additional sets of photographs of current American work.(148) Upon presenting his gift from the A.I.A., Ware was invited to address the R.I.B.A. at their next meeting, to comment at greater length on the work of the A.I.A. and its members and the plans for his department at M.I.T. In answer to this request, he came to the January 28 meeting prepared to speak "On the Condition of Architecture and of Architectural Education in the United States."(149)

Ware began with a conventional review of eighteenth-century classicism and nineteenth-century eclecticism, noting the dependence of American architecture on books (Vignola, Stuart and Revett, Pugin) and on "the Italian school," "the German school," and "the French school." Ware noted that the A.I.A., "a society, professedly modelled upon your own," had already shown a way out of "a state of transition" by endeavoring "'to

promote the artistic, scientific and practical perfection of its members ... and to combine the efforts of those engaged in the practice of architecture for the general advancement of the art.'" He characterized the "professionals" by their minority standing in comparison with "men who look upon architecture not as a profession, but only as a business," and he proceeded to feature the recent work of A.I.A. members represented in the photographs displayed along the walls of the lecture room.(150) Ware's remarks then shifted to construction techniques, with a brief account of the recently completed Capitol dome and a more detailed account of mortise-and-tenon construction and the cladding of frame buildings (with no mention of balloon frame techniques).(151)

Finding that he had already been speaking for an hour, Ware cut short his remarks on architectural education in the United States. He did speak of George Snell's apprenticeship opportunities in Boston, Richard M. Hunt's atelier in New York, and Ware and Van Brunt's own office teaching.(152) His synopsis of the course in architecture planned for M.I.T. emphasized that "the architecture classes are part of a general school of applied science--the only part which touches the domain of fine art." He mentioned his views on the proper division between his department and the others and between the study of architecture in the school and in the office. Design would be taught "not only as an exercise in modern architectural composition, but as an auxiliary to the study of the history of the art, just as boys compose Greek and Latin to perfect their acquaintance with those tongues." While the teaching of design would be competitive, involving "real or nominal prizes," the teaching of construction and professional practice would be cooperative, obliging each student "to pursue a course of independent study and individual

investigation; each contributing to the common stock the result of his labors." Already Ware had found a model in London for this approach to teaching: the Class of Construction at the A.A.(153)

In the discussion which followed Ware's remarks, many commonplaces were heard about the relation between design and necessity in America.(154) Substantive discussion of his talk was limited to the mention of points on which members of the audience would like to hear more.(155) Considering the amorphous character of Ware's remarks, these comments from the audience could hardly be blamed for being digressive. Only two speakers from the floor returned to the subject of architectural education.(156)

Ware's talk at the R.I.B.A. came a month after his arrival in London. During that time he had made the acquaintance of many of the people who were in the audience the evening of his presentation. The R.I.B.A. meeting of January 28 represented the culmination and convergence of many of his associations in London, and two days later, he wrote to Van Brunt, "There was quite an array, sixty or seventy, more than usual they said, of unusual quality." He had felt himself "on easy and familiar ground," and "had found the atmosphere of the R.I.B.A. stimulating and cordial."(157) As we recapitulate some of Ware's activities in London during the first six weeks of the year 1867, we find that some of the people who were most important to his mission were recorded in the transcript as having spoken or were noted in Ware's January 30 letter as having been present.(158)

Ware was pleased to report that "the three professors" were in the audience: Thomas Leverton Donaldson, Thomas Hayter Lewis, and Robert Kerr--the most distinguished architectural educators in London at the time. Donaldson had taught as the first Professor of Architecture at

University College, from 1841 to 1865.(159) Lewis succeeded him in 1865 and would teach until 1881.(160) Kerr was Professor of the Arts of Construction in the Department of Applied Sciences (Engineering) at King's College, from 1861 until 1890.(161) Ware attended some of Lewis' lectures in January and February of 1867 and described the professor as "one of my best friends." In February, Ware also attended one of Kerr's lectures and had the opportunity to study a set of his exercises.(162) The courses of lectures at the two London colleges were Ware's first exposure anywhere to a systematic program of architectural instruction. These experiences would give him a basis to consider the kinds of teaching which could best be undertaken in the classroom, using the lecture method, and the kinds of teaching which depended on supplemental exercises, whether worked out in a classroom, an atelier, or an architect's office. In contemplating the role of the London colleges in preparing students for the newly-established R.I.B.A. Voluntary Examinations, as well as for their own internal examinations, Ware must have given some thought to the various ways of certifying professional competency.(163)

Two active R.I.B.A. members, Arthur Ashpitel and Roger Smith, introduced Ware to R. Phene Spiers, six years his junior, but someone who, like Ware, would play an important role in mediating between the methods of the Ecole des Beaux-Arts and the needs of architectural students in his own country. Spiers was, no doubt, remembered by Ashpitel and Smith as one of the nineteen candidates for the first R.I.B.A. Voluntary Examinations in 1863 and one of the three who passed in the Class of Distinction the following year. Spiers introduced Ware to much of what he had yet to see and learn during his stay in Europe. Spiers had studied for three years at the Ecole des Beaux-Arts and had traveled extensively

on the continent and through the Near East. After their first encounter, Ware wrote home that Spiers had "promised to tell me about the German and new French schools."(164) In London, Spiers served as Ware's link to various institutions and individuals aside from those he had learned about through the R.I.B.A.(165) Spiers accompanied Ware to the conversazzioni of the A.A. As a student of the Royal Academy Schools, Spiers was probably helpful in explaining the work of that institution.(166)

In 1870, Spiers would begin his own career in architectural education, becoming Master of the Royal Academy Architectural School.(167) He continued to assist Ware during the next several years in obtaining items for the M.I.T. architectural library, and in 1872, Ware would acknowledge these gifts in his annual departmental report, calling Spiers "one of our constant friends." After more than three decades of teaching, Ware would retire from Columbia in 1903, Spiers from the R.A. in 1906. Their contributions to the literature auxiliary to architectural education show them responding to similar needs in the profession in England and the United States.(168)

During the months that Ware was in London, there would have been little architectural activity at the R.A. Ordinarily, the Professor of Architecture would have been delivering his series of six lectures in January and February. But George Gilbert Scott, newly named to that position in 1866, had, according to R.A. regulations, two years to prepare his first lectures.(169) Ware could have learned from Spiers, however, of the R.A.'s instruction in drawing from antique models and from life and of the bearing of such work upon the study of architecture.(170) And he could have learned the details concerning the R.A.'s biennial competition in architecture.(171)

Ware's introduction to the South Kensington Schools could have come from Digby Wyatt, who was a longtime acquaintance of the Director, Henry Cole, or from Alexander J. Beresford-Hope, President of the R.I.B.A. and of the Architectural Museum at South Kensington.(172) Ware reported only that he had spent several long days at South Kensington, looking at drawings and reading in the library:

> It is very slow and unsatisfactory work and I half repent having undertaken it, but the opportunity offered by the finest collection of art-books in the world for seeing what is what seems too valuable to be thrown away.(173)

In addition to preparing for his duties as Professor of Architecture at M.I.T., Ware was also studying methods of drawing instruction, with the immediate aim of assisting M.I.T. in organizing that branch of instruction more effectively.(174) But his interests in art education were quite broad, and he observed in London and Paris far more than he could hope to utilize at M.I.T. What he learned about art education during 1867 would, in fact, make him one of the more well-informed advocates of the teaching of drawing in the Massachusetts public schools. His understanding of European systems of art education would be brought to bear during the 1870s on two enterprises outside M.I.T.: the Massachusetts State Normal Art School and the School of Drawing and Painting at the Boston Museum of Fine Arts.(175) Besides visiting South Kensington, Ware reported visiting the Workingmen's College in Great Ormond Street "to see the drawing classes organized by Mr. Ruskin. It was very curious and interesting, but not admirable, I thought. They admitted that it wouldn't work with boys."(176) The West London School of Art made a more favorable impression on Ware, who wrote home:

> ... I found, for the first time in England, a real class of ornamental design, conducted on just the principles I had been discussing with Mr. Papworth, and in the teeth of the Kensington people who have taken up the dogma that design cannot be taught.(177)

Ware also met at least once with Matthew Arnold. This was not a meeting between a precocious, liberally educated American and an eminent literary figure. It was a conversation between two investigators of education, for Arnold was, in the winter of 1866-67, completing his official government report on European secondary schools. The interview with Arnold was, however, not particularly fruitful, according to Ware:

> He was very pleasant, but a little preoccupied, and as it turned out that he had nothing to say specially to my purpose, and I was unusually stupid, it wasn't a great success.(178)

Much of Ware's time in London was devoted to visiting offices in hopes of obtaining drawings, specifications, and publications for M.I.T. Among his acquisitions were substantial sets of books and periodicals. In making the acquaintance of John Woody Papworth and his brother, Wyatt A.V. Papworth, Ware was able to obtain a set of the available volumes of the Dictionary of the Architectural Publication Society. In his conversations with the two brothers, Ware could also have learned about their father's role in the founding of the Government Schools of Design at Somerset House and about their own continuing interests in architectural education.(179) Other interviews led to other gifts. James Fergusson offered Ware ten copies of his Illustrated Handbook of Architecture (1855), and J.C. Hoadley presented him with a set of The Builder.(180) Ware used his M.I.T. purchase account to order the volumes of two new publications: the

Architectural Association Sketch-Book and the Spring Gardens Sketch-Book.(181)

Ware's efforts at obtaining drawings, by gift or purchase, from individual offices must have been reasonably successful. The 1875 inventory of the M.I.T. architectural library would list 196 copies or tracings of English working drawings and 127 photographs of "Modern Buildings" or of the drawings for them.(182) Certainly the most influential set of drawings which Ware acquired during his London visit was the group of student drawings from the Ecole des Beaux-Arts made available by Ernst Benzon, a Boston iron and steel merchant living in London.(183) Ware had been introduced to Benzon on January 9 at a party given by Charles Francis Adams, American Ambassador to Britain, and during the evening, he no doubt had the occasion to talk about his plans for M.I.T.(184) Included in this set of 60 drawings were esquisse projects, projets rendus, projets d'ordre, projets de construction, Grand Prix projects, and Envois de Rome.(185) While Ware's own experience in Paris in the spring and summer of 1867 would prove that there was much to be learned about French architectural education outside the Ecole des Beaux-Arts, the Benzon set of Ecole drawings became a compelling souvenir of French teaching--particularly as Ware found himself in need of examples of design and rendering.

b. Paris

Before leaving London in late February 1867, Ware called one more time on R. Phene Spiers, Thomas L. Donaldson, and Digby Wyatt "to get notes to Paris people."(186) In early March, he stopped in Paris for about a week. While there, he spent time with three Americans with

interests in the arts: Edmund Quincy, whom he had met in Hunt's studio in 1859; John Ames Mitchell, whom he had employed as a student draftsman in 1863--both Quincy and Mitchell now studying architecture in the atelier Andre; and Charles Callahan Perkins, painter and art historian, now continuing his study of painting and beginning to take an interest, like Ware, in methods of art education.(187)

Ware's first encounter with French educators was with Emile Trelat, Director of the Ecole Centrale d'Architecture, then in only its second year of operation. Ware carried letters of introduction from Donaldson and Wyatt, and he must have already known something of the Ecole Centrale from Spiers, who had kept up with developments in Paris since his own years at the Ecole des Beaux-Arts, 1858-61.(188) The Ecole Centrale had opened November 1865, just a month after M.I.T., and would have suggested much to Ware that would help him plan his curriculum on returning to Boston. As at M.I.T., architecture at the Ecole Centrale was to be taught with a thorough grounding in the applied sciences, and many of the directors of the new Paris school, like those interested in the new Boston school, were engineers and industrialists. In the earliest years of his teaching at M.I.T.--and again in his years of starting the Department of Architecture at Columbia, Ware would find the Ecole Centrale a more useful model in many ways than the Ecole des Beaux-Arts, because the new school offered a finite three-year course of study leading to a final project and diploma, rather than a virtually open-ended system of accumulating credits for concours in design and construction toward the end of entering the annual competitions for the Grand Prix. The Ecole Centrale, unlike the Ecole des Beaux-Arts, offered concentrated technical instruction in its own drawing rooms, and founded its entire curriculum upon a series of

required lecture courses covering every aspect of construction, materials, professional practice, theory, and history.(189)

During this brief stop in Paris in early March, Ware tried without success to meet with the Director of the Ecole des Beaux-Arts, but walked through the school anyway on his own. Later in the year, when Ware returned to Paris for a stay of four or five months, he would have the occasion to meet with officials of the Ecole des Beaux-Arts and to visit various ateliers associated with that school.(190)

Ware went on from Paris to travel through Italy, where he would spend the next three months visiting museums, buildings, and ruins. By mid-June, he was traveling north again, across the Alps, through Germany. (See Appendix A.) He returned to London, where he spent the first half of July. By the middle of the month, he was back in Paris, where he would stay until returning to Boston in mid-November. He took an apartment in the rue de Fleurus, overlooking the Jardin de Luxembourg, sharing it with Robert S. Peabody, who had worked as a student in his office.(191)

Within his first week in Paris, Ware called again on Emile Trelat, and also managed to meet with Eugene Guillaume, Director of the Ecole des Beaux-Arts.(192) He also met Cesar Daly, Editor of the Revue generale de l'architecture, who took him to a meeting of the Societe Centrale des Architectes Francais.(193) And he began to frequent the shop of A. Morel, publisher and bookseller, from whom he would buy various works that would further document the teaching at the Ecole des Beaux-Arts and the Ecole Centrale.(194) These contacts would be kept up, at least for the next month, and probably for the remainder of his time in Paris. In early August, Ware accompanied Daly to a major banquet of the Societe Centrale, at which a number of other foreign architects were guests.(195) About the

same time he visited the annual exhibition of the Grand Prix drawings at the Ecole des Beaux-Arts, and it is likely that he also visited any exhibitions associated with the close of the second academic year at the Ecole Centrale.(196) During August, R. Phene Spiers came to Paris for two weeks, and with Ware, visited the Ecole Centrale. About this time, Ware also made a call, "civil but pointless upon Viollet-le-Duc."(197) He met with Victor Duruy, Minister of Public Instruction, who helped him identify drawing schools worth visiting and who arranged for a gift of various books to M.I.T.(198)

Throughout the late summer, Ware made repeated visits with American and European friends to the Exposition Universelle, and by late August was meeting fairly regularly with President William Barton Rogers of M.I.T., in Paris as one of the United States Commissioners to the Exposition, and eager to learn of Ware's activities during the past year. Rogers conveyed to him the concern of the M.I.T. Committee on Instruction that Ware should plan to conclude his business in Paris and return to Boston for the start of the 1867-68 academic year, not so much to begin his courses in architecture as to resume responsibility for the classes in freehand and mechanical drawing. Ware was able to persuade Rogers and the Committee that the work he was doing would, in fact, be for the benefit of drawing instruction at M.I.T.:

> The loss to the drawing classes is trifling, and will I hope be more than made good, as it is the study of the unrivalled drawing schools of Paris that chiefly prolongs my stay in this place.(199)

One more activity occupied Ware during these months in Paris between August and November 1867. He was surprisingly laconic in his letters home during 1867 as well as in his recollections in later years about the fact

that he himself had studied drawing in a Paris atelier. In an offhand way he mentioned in a letter of 1891 that he had attempted in Paris to sharpen the skills he had first learned while in Hunt's studio in 1859:

> When they asked me to go to the Institute [to teach], being 34, with nothing behind me but six months in Richard Hunt's studio by way of school experience, I felt this so keenly that when I got to Paris I doubted greatly whether I ought not go into an Atelier for six months and be chastised, instead of going the grand tour and posing for a swell. I went every day for a couple of months to learn rendering, and was just beginning to see a probability of becoming a good draughtsman when the time was up.(200)

While there is misleading evidence that he might have been associated with the atelier Vaudremer, it is more likely that he was associated with the atelier Daumet, where his friends, Francis W. Chandler, Charles F. McKim, and Robert S. Peabody were studying.(201) It is worth noting that in this reminiscence, Ware emphasized rendering and draftsmanship, not design, so that one wonders whether the "atelier" was even one of the ateliers associated with the Ecole des Beaux-Arts, or perhaps an atelier associated with the Ecole Centrale or merely one of the Paris drawing schools.

In any case, Ware did have ample opportunity to visit ateliers associated with the Ecole des Beaux-Arts and to consider how this discipline of design training might fit into an architectural education with a technical emphasis, such as that already offered by the Ecole Centrale and projected for M.I.T. In early March, Ware had visited the atelier Andre, where his friend Edward D. Lindsey had studied and where his friends Edmund Quincy and John Ames Mitchell were studying at the time. In mid-July, he visited the atelier Questel with Emmanuel Brune, 1863 Grand Prix winner whom he had met in Rome in April 1867.(202)

Ware's reactions to all of these institutions to which he was exposed in London and Paris are too brief and matter of fact to allow us to weigh the influence of various institutions on the curriculum that he would begin to implement at M.I.T. in 1868-69. Because he envisioned a comprehensive program of training in architecture, it seems likely that the Ecole Centrale would have held a particularly strong attraction for him. But at no time in his career does he ever acknowledge any debt to this institution. The aura of the Ecole des Beaux-Arts remained in the back of his mind, and as he came to believe, during his first four years of teaching, that a comprehensive curriculum with particular emphasis on design was what was needed at M.I.T., he naturally turned again to the Ecole des Beaux-Arts to recruit a design instructor to join his department in Boston.

Chapter 2

M.I.T.: AN EVOLVING CURRICULUM IN ARCHITECTURE, 1868-1881

Introduction

Ware's experience in Europe in 1866-67 helped him to think beyond the endeavor of rationalizing an approach to collegiate architectural education toward the task of realizing a workable curriculum. One year after returning to Boston (and three years after delivering An Outline of a Course of Architectural Instruction, his prolegomenon to architectural education), Ware was drafting a prospectus for what he would actually teach at M.I.T. Three years after that, he began submitting a series of annual departmental reports and curriculum outlines. For the next ten years, these brief items would constitute the only record of his own evolving understanding of the role of a professional curriculum in a polytechnic university. From prolegomenon to prospectus to departmental reports and curricula, his observations as an educator become more and more laconic. Yet by documenting the significant changes in his curricula from year to year during his first dozen years of active teaching, we can reconstruct much of his implicit thinking about what was worth incorporating in a collegiate course of professional study.

The first two-thirds of this chapter follows a chronological approach, concentrating on the evolution of Ware's ideal curriculum, documented through such official M.I.T. publications as the Annual Catalogues and President's Reports. The remainder of the chapter follows a thematic approach, concentrating on the major branches of Ware's curriculum: construction and practice, architectural history, and drawing and design. Such a major emphasis came to be placed on design that a full

consideration of that branch of the curriculum will be the subject of Chapter 3.

1. An Evolving Curriculum

a. Ware Returns and Publishes His Curriculum, 1868

By the middle of May 1867, Ware had been gone from Boston for more than nine months. On May 15, 1867, eight of the younger architects of Boston, led by his partner, Henry Van Brunt, gathered in the Pemberton Square office of Nathaniel J. Bradlee to organize a local professional organization. By mid-summer, the newly-organized Boston Society of Architects (B.S.A.) would have about thirty charter members. But regular attendance at meetings, even in these earliest optimistic months, consisted mainly of the dozen or so younger members of the profession who had started in practice since the early 1860s.(1)

In October of 1867, a subcommittee was named to communicate with the American Institute of Architects (A.I.A.) in New York concerning cooperation between the two professional bodies, yet the B.S.A. would remain independent until November of 1870, when it became the Boston Chapter of the A.I.A.(2)

Through all of these events, Ware remained in Europe. In his absence, some of the members of the profession had suggested that the B.S.A. "might have a share in controlling the Department of Architecture at the Massachusetts Institute of Technology."(3) The B.S.A. Executive Committee, consisting of Edward C. Cabot (President), Henry Van Brunt (Vice President), Samuel J.F. Thayer (Secretary), and Nathaniel J. Bradlee (Treasurer), met with President Rogers of M.I.T. but was advised by him "that any action looking toward a partial control of the new department of

architecture be deferred until the return from Europe of Professor Ware."(4)

It seems that Ware was finally back in Boston, after sixteen months abroad, by sometime in December of 1867. He was elected a member of the B.S.A. on December 3, 1867, and was definitely present at the first meeting of the new year, on January 7, 1868. At that time he graciously invited the B.S.A. membership to meet at M.I.T., and on March 3, 1868, they did join him at the school for his presentation of the new architectural collections he had gathered in Europe.(5) Nothing further came of the suggestion of the formal involvement of the B.S.A. in the management of the Department of Architecture, though the B.S.A. soon created a pair of annual prizes to encourage student work.(6)

By mid-July of 1868, Ware was giving considerable attention to preparations for the opening of his department in the coming academic year.(7) He had been receiving inquiries from prospective students and was working on the draft of a circular which would outline the program in architecture. He was eager to meet with President Rogers to discuss the curriculum and to get authorization to proceed with various arrangements.(8) Within the month, Ware and Rogers had conferred, and the President was able to report to the Government of M.I.T. concerning Ware's faculty status and salary and the Department of Architecture's budget for the coming year.(9)

Ware and Rogers had also discussed plans to print a detailed prospectus of the Department of Architecture. This announcement, published as A Supplement to the Third Annual Catalogue of the Massachusetts Institute of Technology, was subtitled The Programme of the Course of Instruction in the Department of Architecture.(10) It was

Ware's first official outline of his curriculum, and he would continue to update it every three or four years until he left M.I.T. in 1881. The Programme put into categorical form many of the basic ideas first proposed in his Outline of a Course of Architectural Instruction of three years earlier, and in more subtle ways incorporated much of what he had learned in his subsequent contacts with architects in Boston, New York, London, Paris, and other cities of Europe. The 1865 Outline had proposed a broad division between one branch of study, Construction and Practice, and another, Composition and Design. This division was retained in the 1868 Programme, and to this fundamental structure were added auxiliary studies in three areas: Exercises in Drawing; Exercises in Original Design; and Scientific and Literary Studies (the ever-present liberal education component of Ware's curricula).(11) Ware had really had no opportunity in the tentative 1865-66 academic year to experiment with the organization of architectural studies within the framework of the larger M.I.T. curriculum, and European precedents would prove to be of more use to him in matters of course content than in matters of curriculum arrangement. His 1868 Programme, therefore, shows some untried and awkward notions about the sequence of third- and fourth-year studies in architecture. The entire first month of the school year (October) would be devoted to the auxiliary subject, Exercises in Drawing. Six months (November through April) would be devoted to concurrent work in the two major branches of the curriculum, with Composition and Design being taught on Monday afternoon, and Construction and Practice being taught on Wednesday afternoon. The Exercises in Original Design would be given out monthly, as supplements to the regular lessons in Composition and Design. Scientific and Literary Studies would be taught through the entire

academic year--some subjects within the architecture department, some in other departments. No work was specifically assigned to the final month of May, and it is likely that this time was reserved for examinations, thesis projects, and perhaps a major design problem. June through September was a period of time in which students were advised to gain some experience in architects' offices.

The course content of the two major and three auxiliary divisions shows a considerable conceptual advance over the previous formulations of the curriculum in architecture, by Ware in his 1865 Outline and by Rogers in his 1864 Scope and Plan of the School of Industrial Science.(12) The curriculum in Composition and Design was subdivided into the elements of design (geometrical and conventionalized natural form); the elements of composition ("Symmetry and Balance; Contrast and Gradation; Unity and Variety; Size and Proportion; Subordination; Emphasis; Effect; Expression"); the history of architecture; the other "Arts of Design" (painting, sculpture, decorative arts); and the study of built works.(13) The curriculum in Construction and Practice was subdivided into specifications; contracts; estimating and measuring; superintendence; building materials and processes; trades and manufactures related to the building industry; the history of construction technology; and the study of works in progress.(14) Scientific and Literary Studies were subdivided into calculus; descriptive geometry; shades and shadows; perspective and other projections; measurement and computation of earthwork and masonry (including stereotomy); mechanics; strength of materials; structures (stone, wood, iron); physical sciences applied to mechanical systems (heating, ventilation, lighting, water supply, acoustics); geology and natural sciences; and various work in the humanities and languages.(15)

The auxiliary (or preliminary) Exercises in Drawing were subdivided according to the medium employed rather than according to the graded problems in both media and visual form which would become a feature of Ware's later teaching of drawing at M.I.T., as well as at the Boston Museum of Fine Arts and the Massachusetts State Normal Art School.(16) The Exercises in Original Design were to be given in both Architecture and Ornamentation, but no more than that was said. Ware was concerned, though, that students would have to take extra time before coming to M.I.T.--during the summer or during the regular academic year--to gain sufficient practice in such exercises in original design "to which, indeed, all the rest of their labor is properly subservient."(17) This was his first intimation that a two-year course of architectural studies might not be long enough to allow for adequate work in design. He went so far as to insist in the 1868 Programme that students would only be allowed to undertake problems in original design when "sufficiently advanced in their elementary studies of Drawing and Design to take part in them with profit."(18) He even seemed prepared to force the issue of an open-ended period of study by insisting further that students would be admitted as candidates for the Diploma in Architecture only upon submitting a portfolio of "a proper number of original designs of a suitable degree of merit." And to earn the Diploma (available only to regular four-year M.I.T. students) a student would have to pass a series of examinations and "present Original Designs, upon a prescribed subject."(19)

b. The Teaching of Architecture at M.I.T., 1868-71

The M.I.T. fall semester opened on October 5, 1868, and Ware's class in design began four weeks later, on November 2.(20) In attendance this

first year were four special students who spent all their time at the school--in the lectures and in the drawing rooms--and twelve draftsmen from Boston offices who attended only the lectures.(21) Ware's own account of this earliest formal teaching in architecture shows that, considering the practical experience of many of his students, he chose to emphasize in the classroom what could least be accomplished under a regimen of office work:

> During this year the lectures were mostly historical and critical, as a part of the Course of Design, the Course of Construction not being undertaken. A course of lectures upon Perspective, however, was given in the course of the winter, which was attended by the whole of the Third Year's class. The work of the year, after some preliminary exercises in the use of india-ink and color, consisted of a series of problems in design, of gradually increasing difficulty, originated and worked out by the students under my advice and supervision....(22)

In the following year, the number of draftsmen from Boston offices attending only the lectures remained the same--twelve, but the number of special students devoting themselves to full-time studies increased from four to ten.(23) The increased numbers of students needing supervision in design led Ware to hire an assistant at the beginning of the 1869-70 academic year. This was Francis W. Chandler, then 25 years of age, just returned from two years in Paris in the atelier Daumet, and known to Ware before that as a student-draftsman in the firm, Ware and Van Brunt.(24) Chandler was able to serve as an instructor for only part of 1869-70 and part of 1870-71, but Ware immediately recognized the importance of his contribution:

> The marked improvement made by the class under this arrangement convinced me, of what indeed hardly to my mind needed this proof, that the only way to secure

> rapid progress in this work is to have personal instruction from a highly accomplished teacher constantly at hand to save the students from the loss of time and trouble, which, in the beginnings of so difficult and complicated study must otherwise be very great.(25)

These early years in which Chandler was associated with Ware, and his subsequent professional work with the Supervising Architect of the Treasury Department and with Ware's own mentor, Edward C. Cabot, gave him that particular outlook and competence which distinguished him from other candidates in 1888, when M.I.T. was again searching for someone to head the Department of Architecture.(26)

During this second year of full-time teaching, in 1869-70, Ware himself reached more widely, to develop the lectures in Construction (omitted the year before), "in which the ordinary detail of office work was gone over in connection with specifications and working drawings."(27) The emergence of a curriculum centering around Design and Construction was soon acknowledged by the profession at large. In the spring of 1869-70, the Boston Society of Architects awarded a pair of prizes to M.I.T. students--one "for the best work in the class of Design;" the other "for the best work in the class of Construction."(28)

c. Letang Hired to Teach Design, 1871-72

During 1870-71, Ware counted fourteen full-time special students in the department, about half returned from the year before, and only two or three student-draftsmen who came to M.I.T. for a part of the day.(29) As the potential for continuity and full-time study seemed to be increasing among the students, Ware had growing reason to be concerned about the quality of teaching he could manage to offer in the coming years.

Furthermore, the recognition brought by the B.S.A. Prizes, both to the architecture department and to its best students, must have added to Ware's anxieties about the soundness of his program. A prize in design meant that the profession expected genuine distinction in design, and the same could have been said of the prize in construction. The intermittent teaching of Frank Chandler had helped Ware considerably, but the discontinuous and temporary nature of Chandler's work led Ware during the third year of the department's operation to start looking for a person who could give more sustained and permanent instruction in design. If Ware could find a respected architect to whom he could delegate the design work, then he himself could devote more time to strengthening the program as a whole, with particular attention to architectural history, construction and professional practice.(30)

Several years later, Ware would recall his initial frustrations in finding such a person in the United States, "very few young men in this country having the sort of training that fits them for school-work, and those few being in great demand for other work."(31) He had two options: to contact one of the British architects with whom he had become acquainted in 1866-67, or to contact someone associated with the Ecole des Beaux-Arts, an institution whose methods of design instruction Ware unquestioningly respected during these years. Twenty years later, even when his reservations about the subsequent proliferation of Ecole composition and rendering techniques in American architectural education had grown quite strong, Ware recalled this period of decision in 1871:

> My own brief studies with Mr. Hunt a dozen years before [i.e., 1859], and what I had seen in Paris some years later [i.e., 1867] had sufficed, not indeed to make me well-versed in the methods of the Ecole des Beaux-Arts but to convince me of their value, and I

> now, naturally, turned to Paris for the assistance I needed.(32)

Ware did write to London but got no results there.(33) In Paris, the person he found most helpful and to whom he entrusted the search was Alfred Greenough, an American student in the atelier Vaudremer.(34) Ware later remembered that the Franco-Prussian War and the Commune had just ended and that in looking for candidates with Beaux-Arts training, "it might not be impossible to find some young man, just returned from the field and not yet established again in work."(35)

By the fall of 1871, the search had been narrowed to one man: Eugene Letang, age 29, also an _eleve_ of Emile Vaudremer. Letang had served in the Franco-Prussian War during 1870-71, and had returned briefly to the atelier Vaudremer and the Ecole. Writing to Ware in November, Greenough described Letang as "one of the most _ancien_ and most serious in the atelier, ... and perhaps the first to whom I should myself have gone for advice and upon whom one could best rely for sound practical views."(36) According to the account given years later by William Rotch Ware, Professor Ware's nephew and a special student at M.I.T. during 1871-72 and the following year,

> M. Letang was the only man who had been found willing to entertain the mere thought of migrating to America... [the only man] willing to expatriate himself and forgo, even for a few years, the joys of impecunious existence in Paris....(37)

Letang sailed for Boston on December 3, 1871 and began his teaching duties at M.I.T. early in the second semester.(38) For the next twenty years, until his death in 1892, he would be the only native French, Ecole-trained architect teaching design in an American university.(39)

His contributions as a teacher were fourfold. First, he stood as a product and exemplar of the contemporary teaching methods of the Ecole des Beaux-Arts. Second, as an eleve of Vaudremer, Letang was prepared to take a particularly analytic approach to design. Third, he brought with him a generous collection of original Ecole student drawings which he gave to M.I.T. to be studied by his own students. And fourth, he exercised an informal but steady discipline in the design studios, particularly in the early stages of the study of any given problem.

Concerning the first matter, the study of design at M.I.T. began, with Letang, to emulate more explicitly the study of design at the Ecole, as will be seen in Chapter 3. Suffice it to say for now that Letang arrived with the credentials, in terms of five years of experience in the Ecole and a respectable list of medals and mentions, which gave him authority as an instructor, in spite of his age and his limited experience with actual building.(40) The exercises at M.I.T. in Ecole-related design problems under the direction of an Ecole master enabled American students to enter the architectural profession with the higher status that came from knowing something about design. M.I.T. also became a practical preparatory school for the Ecole itself, allowing Americans to present themselves for the entrance exams with less time spent in Paris in remedial study. The Paris experience--for the discipline it gave and the prestige it represented--would, by the 1880s, become the most attractive means known to American students for securing those unquestionable credentials which would give them authority and status as young architects. All of these possibilities opened up with the arrival of Letang. Architectural education could now be perceived by the American student as a sequence of stages, each leading on to the next, or out onto

a level of professional practice--each with its own way of life. Under Letang, a student could get a synoptic view of professional training, and could choose to see the curriculum as a vicarious experience of the Ecole or as a preview of what the Ecole itself would be like.

The second kind of impact which Letang had at M.I.T. concerns his own design sensibility, as developed in the atelier Vaudremer. Yet relations of influence, from Vaudremer to Letang to M.I.T. students, are difficult to ascertain, because of the incongruence and incompleteness of the elements in the linkage: Vaudremer's buildings and projects (not fully documented); Vaudremer's teaching dicta and examples (unknown); Letang's student drawings (lost); Letang's teaching dicta and examples (unknown); M.I.T. student design programs and drawings (few and far between). It is possible only to locate Vaudremer as a secondary figure of some interest in the history of French architecture from the 1860s through the 1890s. Joseph-Auguste-Emile Vaudremer (1829-1914), trained in the early 1850s, had been strongly influenced by the programmatic, constructional, non-Gothic rationalism of Abel Blouet (1795-1853) and Emile Gilbert (1793-1874).(41) In Vaudremer's best work, the programmatic generation of spaces remained recognizable, even as the components of the building were pulled together in a unified whole. From plans, he derived not elevations, but massing. There was an analytic, if not didactic quality about his work which made it comprehensible and useful to students.(42) With the appointment of Letang to M.I.T., Vaudremer became, in retrospect, the teacher's teacher. The most lucid description of his method came in the obituary tribute of Loys Brachet, one of his students:

> In his architecture Vaudremer has a certain sincerity, often to the point of ingenuousness, a loyalty to his point of view which has the coldness of a demonstrated

> theorem, or of a constructive syllogism where the premises and the conclusions are absolutely clear. But in this architecture is apparent a forceful truth of expression as between the exterior and the interior of his buildings, between the plan and its elevations, which is insisted upon minutely and rigorously, without motives introduced for effect only.(43)

That Letang managed to convey some of this point of view the students of M.I.T. is suggested by the methodical quality of what survives of student work. Some of the projects are labored to the point of being merely obvious; others are studied enough to appear both adequate and intelligent as solutions.

One other characteristic of Vaudremer's potential influence was his avoidance of the doctrinaire enthusiasms of either the prevailing academic classicists or the deposed academic Gothicists. Again, Loys Brachet, contrasting the work of Vaudremer with what followed:

> His architecture makes one think, and that is rare today [1914], when skillfulness in classic plagiarism hides a total want of conscience, of composition and of logic.(44)

Vaudremer, a contemporary of Hunt and Ware, had even more than they had an interest in the full sweep of history and the ability to remain free of predispositions for archaeological recreations of Medieval or Renaissance forms. While the transmission of this sensibility into American architecture through Letang was indirect and diffuse, some American students (mostly M.I.T. men) determined to go to Paris to work in the atelier Vaudremer and learn the lessons directly.(45)

The third aspect of Letang's impact on M.I.T.--the ample collection of Ecole student drawings he brought with him to M.I.T.--relates to the two previous points. The drawings themselves, hung around the studio

walls, became exemplars of specific techniques and solutions to specific programs, as well as tokens of the Ecole itself.(46) As a sample of Ecole work carried out in the ateliers, the drawings represented Letang's portfolio and his link with Vaudremer, while reinforcing the idea that the M.I.T. design programs prescribed by Ware and Letang were the first steps toward that kind of proficiency.

The fourth manifestation of Letang's influence was the most direct--his daily teaching in the studio. His entire career in America would be that of a reclusive, but effective pedagogue. With no work of his own as an architect, he had an opportunity for teaching at M.I.T. he would never have had in Paris, where most atelier patrons were conspicuous architect-personalities, or in Boston, where the offices recognized as teaching offices were headed by architects with a record of acclaimed recent work.

Scattered anecdotal accounts are all we have to rely on to get some idea of Letang's style as a teacher. Francis Amasa Walker, who succeeded William Barton Rogers as President of M.I.T., wrote in 1892 in tribute to Letang:

> Shy, incapable of or altogether averse to lecturing, his chosen field was the drawing room, where, bending over each student in succession, he brought into play his rare powers of criticism, correction, and instruction.(47)

William Rotch Ware, a special student in 1871-72 and the following year, was one who remembered the difference Letang made in the spring of 1872:

> The students quickly felt the new impulse and responded to it noticeably. The constant presence in the drawing-room of an instructor ever on the alert to warn them away from the false god of American designers--over-elaboration--whose warning

> exhortation, "Oh simplifiez ca," was so often heard, had a most beneficial tendency.(48)

It was also William Rotch Ware, writing as editor of the American Architect and Building News in 1892, on the death of Letang, who made note of the significance of the encounter between Letang and a generation of American students:

> ... the common, the national failing of almost all the pupils who came under his care was a tendency to exuberance and fantasticality both in plan and design, which they fondly defended under the name of "picturesqueness."(49)

And according to William Rotch Ware, Letang managed "to chasten and refine" this picturesqueness, by insisting always

> ... that nothing should be done that could not be logically defended, and that simplicity and a regard for proportion were the prime elements in good designing.(50)

Letang was diffident about learning English, and students who were willing to try their French had a better rapport with him than most. Cass Gilbert--who did not speak French during his year at M.I.T. in 1878-79, and who had a mind of his own about design and about people--occasionally clashed with Letang. Gilbert was just getting started on his design for a "billiard room and belvedere" when Letang made a stop at his drafting table:

> ... Letang and I had a regular fight, as usual. He sat down on everything and makes a sketch of approximately this shape. [Letter shows tiny elevation and plan.] I am thoroughly disgusted with Letang. I think there is no hope for him. He got very mad and we had an exceedingly lively talk. I am going to carry out my design.(51)

Letang's effectiveness as a design instructor, if not recognized in a volatile moment by Gilbert, was indeed recognized years later in a reflective moment by Charles McKim. Finding "evidence of defective grounding in the elementary principles" in some Columbia student work, McKim felt that the problem was that Ware, who had since gone on to head the New York school, had relied too much on former M.I.T. students in staffing his faculty. "Mr. Ware," he confided in a letter to Richard Morris Hunt, "badly needs a man like Letang."(52)

The arrival of Letang in the second term of 1871-72 brought an immediate shift in the conception and supervision of the routine design problems at M.I.T. This shift toward programs more explicitly patterned after ones used at the Ecole des Beaux-Arts will be examined in Chapter 3. It remains for us here to trace the development of a mature architectural curriculum over the nearly ten years in which Ware and Letang taught together.

d. New Projections for the Curriculum, 1872

As soon as Ware had Letang to assist him, he was able to put into effect the curriculum he had long envisioned--a curriculum which would represent, as well as could be expected in a school, the full scope of architectural practice.(53) Ware could also begin to make more appropriate provision for the various categories of students who came to study architecture at M.I.T. The fact that all of the major revisions in the curriculum would be accomplished by the start of the 1874-75 academic year--within three years of Letang's arrival--is some measure of the latency and readiness of Ware's plans for the department. His first departmental report, in the late summer of 1872, reviewed the meager

results of the three-and-a-half years before Letang, and optimistically projected a course of studies which could meet a diversity of student and professional needs.(54)

In this report, Ware noted that, in the fall of 1872, two regular students would begin their fourth year and by the following spring would be eligible for the first diplomas to be granted in architecture. And he expected that two other students would complete their second year of general studies and declare themselves to be working toward a degree in architecture. The anticipated progress of these four students through the full four-year course was, in one sense, a vindication of Ware's belief that an architectural student would be best served by two years of preparatory scientific and literary studies. He was, however, beginning to realize that these regular students, on entering their third or fourth year, had not done as much work in architecture per se as the special students who were independent of the general M.I.T. requirements for freshmen and sophomores. At about the same time that he was preparing his 1872 departmental report, Ware was writing his department's entry for the 1872-73 Annual Catalogue. There he introduced a strong assertion, which would be carried in each catalog until 1875-76. He did not want any students or practicing architects to overestimate the value of the diploma in architecture:

> ... the training of such students cannot be such as to entitle them to call themselves Architects. It is, however, complete in itself, and not only includes the scientific basis of professional work, giving all that an architect [needs to] know of Mathematics, Chemistry, Physics, Geology, and Engineering, but gives also as much of more strictly technical knowledge and artistic skill as can properly be attempted in a school of science. It puts such students in a position to pursue their further studies, either in offices or in this Department, and

> ultimately to enter upon the practice of their profession, to the best advantage.(55)

This disclaimer did not stand as an isolated statement, nor was its intent to deflate the value of the degree after four years of regular study or the worthiness of two years of concentrated special study in architecture. Ware actually hoped to find some way of extending the amount of time spent on specifically architectural studies from two years to at least three, perhaps by creating an advanced postgraduate course in the department.

His 1872 report proposed "the extension of the period of study for an indefinite term after the regular course is finished."(56) In effect, he was contemplating at least a fifth year in the curriculum. The postgraduate course, as he described it, would be "chiefly occupied with advanced work of composition or design, in continuation of that begun in the Third and Fourth Years. This work is perhaps more germane to a school of Art than to a school of Science."(57) While the numbers of M.I.T. students seeking to complete their training at the Ecole des Beaux-Arts were still small, it seems that Ware was looking forward to the creation of a complete American school of architecture, competitive, even in matters identified with the fine arts, with the preeminent schools of Europe. The image of "Architecture as a branch of the Fine Arts" still dominated Ware's thinking:

> Architecture in this aspect is not an exact science, and the methods appropriate to a school of science are less pertinent to this part of the work than those of a school of art. Still it may be possible, without attempting to set any limit of time, nor to fix upon any course of study as in itself sufficient, to prescribe certain tests of attainment, as is done at the Ecole des Beaux Arts, by which the further honors of the school shall be governed.(58)

Although the language declaring a postgraduate course did continue to be carried in the Annual Catalogues and to recur in Ware's published remarks about the program at M.I.T., no advanced course in the art of design actually developed as a fifth-year option during his years as department chairman.(59) The postgraduate course, rather confusingly, became synonymous with the fourth year of the regular undergraduate course, because in 1874-75 Ware got his expanded curriculum by arranging to have the study of architecture begin in the sophomore year. The differentiation and specialization of courses which accompanied this shift from a two-year to a three-year program will be considered momentarily. Another way in which a postgraduate curriculum was, in effect, being offered at M.I.T. was in the special architectural course being pursued by graduates of four-year colleges. Already by 1871-72, there had been eleven such "graduate students." Between 1872-73 and 1880-81, there would be twenty-three more. All but a few of these had been educated in a liberal arts rather than a science or engineering curriculum. Their work as special students at M.I.T. and their subsequent careers, as compared with the four-year regular students and a miscellany of non-baccalaureate special students at M.I.T., will be considered further in Chapter 5.

It should be emphasized, however, that Ware's 1872 scheme for advanced study in architecture was frustrated by a number of circumstances. First, the idea was premature. Not enough students were convinced of the advantages of remaining in school, even for two or three years. Second, more and more of the students who did opt for more time in school left M.I.T. to complete their architectural education at the Ecole. Third, the necessity of an orderly progress through the curriculum was not regarded as particularly compelling, even by Ware, who went out of

his way to devise special courses of study for students of widely varying qualifications and professional goals. Fourth, the respective values of school work and office work were just beginning to be understood by students and professionals, as more and more M.I.T. men were finding responsible positions in Boston offices. Finally, the proper focus of advanced study was by no means agreed upon, with some architects and educators insisting that more work in school was needed in design, other insisting that more work was needed in the basics of office practice.

e. Revising the Curriculum, 1872-77

During the five academic years between 1872-73 and 1876-77, the architectural curriculum underwent three major changes. The first change, in 1873-74, was an instance of the process of specialization and involved the creation of a fully elaborated system of specifically architectural courses. The second change, in 1874-75, was an instance of the process of academic expansion and involved the replacement of a two-year curriculum in architecture with a three-year curriculum. The third change, in 1876-77, was an instance of the process of consolidation, in which the inadequacies and redundancies created in those earlier years of restructuring were adjusted in such a way as to allow the curriculum to remain stable for the next four years. Table 2.1 (page 118) shows a summary of the evolving curriculum during the mid-1870s.

In the discussion which follows, several things should be kept in mind as the details of course offerings are laid out from year to year. First, the changes made in the course listings in the Annual Catalogues from year to year have an internal logic which, when understood, reveals Ware's evolving ideal curriculum and his thoughts about architectural

education. What was actually taught in any year did not always correspond to what was published in the Annual Catalogues. Second, the separation of the curriculum into second-, third-, and fourth-year studies matters more as we look at those students who completed (or who had intended to complete) the regular four-year course of study, than at those special students who took classes at several levels simultaneously. More important for the special students was the total range of offerings available in any given year.

(1) 1872-73: An Interim Year

As much as Ware was contemplating major redefinitions in the curriculum in his departmental report in the summer of 1872, he made very few changes in the course listings which appeared in the 1872-73 catalog. The 1872-73 weekly schedules are virtually identical to the 1871-72 schedules, and indeed, to the schedules for several years before that.(60) There are two explanations for what was happening, both of which are probably true, to some extent. It is likely that the ideal curriculum which Ware set down at the opening of the department in 1868-69 had never been fully implemented during those years when Ware was teaching alone, with only intermittent assistance. The arrival of Letang in the middle of the 1871-72 academic year would have allowed Ware to start doing more of what he had originally planned. It is also possible that Ware simply let the 1872-73 schedules be printed without changes, because he had not yet developed a coherent new scheme and would be content with making the needed changes off the record during the year. So the curriculum for 1872-73 was probably fuller than it ever had been and was probably being modified throughout the year.

Taking the 1872-73 catalog at face value, we can see at least what had been promised. Departmental studies in architecture, as in all other departments, were reserved for the third and fourth years. Regular M.I.T. students began their professional studies after completing a two-year common course in drawing, mathematics, the sciences, and the humanities. Special students were admitted to third- and fourth-year architecture courses, provided that they had had comparable preparation to allow them to do the professional course work. During the academic year, third-year students were ideally expected to take 63 hours of classroom work: 21 hours (or one-third of their time) in architectural drawing and design; 4 hours in professional practice; 25 hours (more than a third of their time) in auxiliary studies in calculus, mechanics, engineering, stereotomy, perspective, physical lab, geology, and natural history; and 13 hours in humanities and languages. Included under architectural drawing were: "Plans, Elevations, Sections and Details. Ornament. Sketching from Buildings;" and under architectural design: "The Elements of Design. The Principles of Composition. Exercises. The Study of Executed Works." Included under professional practice were "Building Materials and Processes. The Study of Works in Progress."(61)

Ideally, fourth-year studies were expected to take 64 hours of classroom work: 33 hours (half of their time) in architectural drawing ("Architecture, Landscape, and the Human Figure. Lithography and Etching. Modelling. Drawing from Memory") and design ("Exercises in Composition. History of Architecture. The other Arts of Design"). They were to take 4 hours in professional practice ("Specifications. Contracts. Estimating and Measuring. Superintendence"); 14 hours in auxiliary studies in engineering, stereotomy, materials, and natural

history; and 13 hours in humanities and languages. What was actually taught in the specifically architectural classes will be reviewed at the end of this chapter. At this point, it should be emphasized that in both the third and fourth years, original design and architectural history were in the early 1870s still minor components of the work in architectural drawing and design.(62)

(2) 1873-74: A Specialized Curriculum

The first major change in departmental offerings in architecture after 1868-69 was recorded in the 1873-74 Annual Catalogue. Ware's curriculum this year became more specialized, as history courses were officially differentiated from the general design course, and as structures and materials courses were officially differentiated from general M.I.T. engineering courses. Still, it was a curriculum contained within the two upper years of undergraduate education.

Third-year students during the course of the year were ideally scheduled to take 58 hours of work: 26 hours in graphic work alone--architectural drawing and design, and 6 hours in architectural history. They would take 16 hours in auxiliary technical studies in calculus, mechanics, stereotomy, physical lab, and geology; and 10 hours in humanities and languages.(63) The reduction in technical studies in the third year would be more than made up by the increase in these studies in the fourth year. Ideally, fourth-year students were scheduled to take a bulging 71 hours of classroom work in the course of the year. They would take 20 hours in architectural drawing and 8 in history and theory. They would take only 8 hours of work in humanities and languages but 35 hours (almost half their work) in the following courses: applied

physics, building materials, strength of materials, structures of stone, structures of wood, structures of metal, stability of structures. It is worth noting that 1873-74 was the first year when architectural history emerged, as a three-semester sequence from Greek and Roman, to Medieval, to Renaissance and Modern.

While only a third of the students from that tentative 1872-73 year returned in 1873-74, two-thirds of the students who went through the newly-defined curriculum in 1873-74 would return in 1874-75.(64) They would find that year a curriculum overhauled again, as the two-year program was expanded to a three-year program--not forward into a fifth year, but backward into the second.

(3) 1874-75: An Expanded Curriculum

The redistribution of courses in 1874-75 was to be accomplished without further affecting the curriculum of the fourth year. All changes specified in the 1874-75 Annual Catalogue were to be shared between the second and third years, as the nature of introductory and intermediate work in architecture was redefined. Room for architecture courses in the second year was created by reducing the hours devoted to general studies.

What remained was a preparatory curriculum of 20 hours of auxiliary studies: analytic geometry, calculus, descriptive geometry, and physics; and 8 hours in humanities and languages. Work in mechanical drawing would be reduced from 14 hours to 4. To this structure of second-year general studies still thought useful for architects, a block of architectural studies lifted out of the third year was to be added: 4 hours in architectural history and 2 in stereotomy. So ideally, the total number

of hours for the year would stand at 38--a substantial reduction from the 53 hours of the year before.(65)

The hole left in the third-year course of studies would be partially filled by the augmentation of a few units here and there in architectural theory and in specifications and working drawings. But there would be a net reduction in course work, from 58 hours in 1873-74 to 51 hours in 1874-75.(66) Slight reductions in architectural history and humanities in the fourth year would cut the course load by 4 hours in 1874-75 to a total of 67.(67)

(4) 1876-77: A Consolidated Curriculum

Virtually no changes were made in the curriculum in 1875-76.(68) Two months into the fall term, however, the first Visiting Committee of M.I.T. Corporation members was appointed to evaluate the Department of Architecture. No report is known to survive, of this, the only Visiting Committee for Architecture constituted during the years Ware was at M.I.T. Yet their reactions to the results of four years of curricular change must have guided Ware during the summer of 1876 as he prepared still another major revision in the architectural curriculum for the upcoming year.(69)

His main objective was to correct some of the thinness in offerings which had developed since 1874-75, when the two-year professional curriculum had been distributed over three, when reductions had been made in the number of hours devoted to architectural history, and when many humanities courses had been deleted. In all three years of professional study, architectural history courses were to be augmented from 2 hours to 4. In the second year, a drawing course of 10 hours would be

introduced. In the second and third years, humanities courses were reintroduced. Second-year work would ideally come to a total of 50 hours in 1876-77, with a net gain, compared with 1874-75, of 12 hours.(70) Third-year work in 1876-77 would come to a total of 63 hours, with a net gain over 1874-75 of 12 hours.(71) The fourth-year curriculum, which had apparently gone untouched for at least four years, was listed in the 1876-77 Annual Catalogue with some major changes in nomenclature. The spring-term courses in stone, wood, and metal construction were dropped, and courses in "Scientific Construction" and "Architectural Research" were listed for the first time, signifying a shift away from the conventional Beaux-Arts division of topics toward a more integrated and experimental approach involving mathematical and mechanical analysis.(72) The net loss in technical subjects in the fourth year was almost balanced by the net gain in units attached to historical subjects, and the ideal course load stood at 66 hours, nearly the same as the previous two years.(73) The year 1876-77 marked a shift in the curriculum away from the specialized but diffuse program created by the revisions of 1873-74 and 1874-75. Architectural history and drawing would receive slightly more emphasis, and the humanities would be reinstated in proportion as certain technical studies were dropped.

The changes appearing in the 1876-77 Annual Catalogue would be maintained with few modifications through 1880-81, Ware's last year at M.I.T. There is incomplete evidence in the Annual Catalogues that some additional minor changes were contemplated for 1878-79, as Ware may have been seeking to strengthen departmental offerings in construction. In the third year, new courses were listed in statics, kinematics, and dynamics; stresses in frames; strength of materials; and bridge and roof trusses.

In the fourth year, stability of structures was reintroduced, and it became possible for architecture students to study the flow of gases and do exercises in shop work. At the same time, the listings for courses in architectural history and theory were expanded in 1878-79 to include decorative arts and theory of decoration (third year) and history of ornament (fourth year).(74)

(5) The Lessons of Ware's Curricular Revisions at M.I.T.

Ware's extensive exposition of his ideas as an educator ceased right at the time he began active teaching in the fall of 1868. Yet he was so fastidious about incremental adjustments to his curriculum during the remainder of his time at M.I.T. that the sum of these changes really says more than the speculations and projections of his formative years. The compulsiveness of his changes during the 1870s is one of the paradoxes of his character. He made annual refinements in the semester-by-semester requirements for his students, knowing well enough that these details mattered little to the majority of architecture students who stayed at M.I.T. for only one or two years. Of all the M.I.T. professors of the 1870s, Ware was regarded by the administration as the one most inclined to make exceptions and waive requirements for special students, allowing them to make the most out of their brief exposure to formal professional education.(75) Ware continued, nonetheless, to labor on his ideal curriculum, responding in part to administrative pressure for a more rigorous course of study, and in part to his own wish to be able to attract more students for a more sustained period of professional studies.

In several important ways, the extraordinary care he took with his paper curriculum at M.I.T. was not wasted. First, the effort gave him the

intellectual satisfaction of being able to continue revising, now in a more urgent context, the pedagogic assumptions of his years as professor-designate. Second, and more important, the effort gave him an opportunity to establish a structure from which he could responsibly diverge in making allowances for students with strong academic backgrounds or evidence of professional experience. Third, and most important, the entire cycle of curricular specialization, expansion, and consolidation which he rehearsed at M.I.T. during the 1870s would be repeated in earnest at Columbia during the 1880s, as Ware responded to the strong mandate to create a department of architecture committed to a complete course of undergraduate study. The transfer of the lessons of M.I.T. to Columbia is considered at length in Chapter 4. The rest of this present chapter is concerned with the major fields of study which constituted Ware's curriculum and actual teaching at M.I.T., and later at Columbia: construction and practice, architectural history, and drawing and design.

2. Components of the Curriculum

a. Construction and Practice

As early as his April 1865 letter to Runkle and his Outline of a Course of Architectural Instruction, Ware had thought of construction and practice as one of the two major divisions of the architectural curriculum--composition and design being the other.(76) His 1868 departmental prospectus, the Programme of the Course of Instruction, listed the topics to be included in the study of construction and practice.(77) Formal instruction in construction and practice did not begin until Ware's second year of teaching, in 1869-70. Titling his series of two dozen weekly lectures "Specifications and Working Drawings,"

Ware gave a methodical survey of building elements and materials in the approximate order in which these would be encountered in actual construction work. Diagrams and details were drawn on the chalkboard and transcribed by students into their notebooks.(78) After seven lectures, Ware assigned a problem to design a small frame cottage, with a sketch to be done within the first week and the design to be completed within two weeks. Working drawings, details, and specifications for this same cottage were also prepared, but probably in subsequent weeks, as these topics were being presented in the lectures.(79) By the spring of 1871-72, with Letang taking over most of the design work, Ware gave some additional lectures on carpentry and joinery and detail drawings, intended to prepare students for summer jobs in architects' offices.(80)

In 1872-73, with the work in design securely in the hands of Letang, Ware began to turn his attention to improving the construction and practice side of the curriculum. At the conclusion of this year he could report that construction and practice had achieved the status of "an advanced or Post-graduate course of study," virtually independent of the work in applied science being pursued elsewhere at M.I.T. This specialization of the curriculum in architecture had been accomplished, Ware noted, "by separating from the undergraduate work the subjects of practical construction, specifications, and working drawings which the undergraduates have no time to pursue to advantage."(81) Special students, therefore, had the advantage of being able to do course work more closely connected with the daily considerations of architectural practice than regular students, who were still obliged to study the science of architecture in the context of the overall M.I.T. curriculum, as an extension of general studies in the physical sciences.

By 1874-75, Ware had systematized the work in professional practice into an ambitious two-year sequence of lectures and exercises. Specifications and working drawings were taught in a weekly lecture course attended by third- and fourth-year students together, for four semesters (totaling, though, only 4 hours and 60 exercises over the two-year period). Carpentry would constitute the subject matter of these lectures for one year, and masonry would constitute the subject matter for the next. Thus, regular students and special students who stayed at M.I.T. for two years could cover the entire sequence of applied work on specifications and contracts.(82) Ware's rationalization of the relatively minor weight of these courses in the curriculum shows his ambivalence concerning the proper sphere of architectural education:

> This subject [professional practice] is necessarily treated in a somewhat superficial manner, since it is the object of the department to give the instruction that cannot be obtained in architects' offices, leaving students to learn what can there best be learned during their term of service as draughtsmen. But the rapid survey these lectures afford is found to be worth the small amount of time it consumes, serving as a sort of review of the subject to those who are already familiar with it, and as a serviceable preparation for office work to others. To both it is useful, as giving a more comprehensive view of the subject than office experience is apt to afford.(83)

It should be emphasized that, as the curriculum developed, the term "construction" came less and less to connote the contractor's pragmatic knowledge of building techniques--(that knowledge came to be covered by the term "practice")--and more and more connote the engineer's scientific knowledge of building materials and their behavior in structures. Ware's special students continued throughout the 1870s to attend his lectures on building elements and systems and on professional practice, but little is

known about the scientific studies in construction offered to the few regular students in architecture.

In 1873-74, the Annual Catalogue listed, in confirmation of what had been developed the preceding year, seven new fourth-year courses in building construction, totaling 35 hours of work and 130 exercises through the thirty-week academic year. Structures of stone, wood, and iron, (recognized as three separate construction fields in the Second Class at the Ecole des Beaux-Arts) would occupy 18 of these hours and 45 exercises for the next three academic years. Then in 1876-77, the Beaux-Arts construction courses would be consolidated into one "Scientific Construction" course of 6 hours and 90 exercises.(84)

The evaluation of the construction and practice part of the curriculum must remain incomplete until more anecdotal accounts, student notebooks, and student drawings are found. Several observations by M.I.T. President John D. Runkle do give us a view of how the construction and practice work of the architecture department was regarded by a key member of the administration.(85) He had less conviction than Professor Ware about the benefits that special students could gain from concentrating on design and practice, compared to the benefits that regular students could gain from pursuing the full polytechnic curriculum. In his annual report for 1872-73, Runkle reviewed the progress of the architecture department in attracting better students:

> At first the department seemed to attract only those students who had, or fancied they had, some taste for art, and judged this field the one most likely to gratify the taste, and at the same time yield a reasonable prospect of support. But these students were seldom prepared by early and suitable mathematical training to take the engineering side of the course. They remained a longer or shorter time, pursuing such portions of the course as they were

> qualified to take.... We are happy to say that this early and not entirely satisfactory phase of the department is gradually, but surely, passing away. Regular students of thorough preparation and recognized ability are beginning to enroll themselves....(86)

Runkle, the mathematician, continued to stress the importance of quantitative grounding for all professional studies, taking the occasion of his 1877 annual report to commend the analytic work appearing in the texts accompanying the thesis drawings of graduating architecture students:

> ... it is noteworthy that in all the theses of graduates, the engineering side of the problem selected for discussion is treated with care and completeness.(87)

Runkle, as President, had a vested interest in justifying a full and orderly curriculum--as strong as Ware's vested interest in justifying the flexibility of the course of study for special students. Pedagogic biases aside, no simple comparison of the two courses of study can really be made, because special students had no opportunity, such as the thesis, to demonstrate the adequacy of their training in construction.(88)

Continuing his remarks in his 1877 report, Runkle came close to challenging still another of Ware's assumptions--that schools are for learning design, offices for learning construction. Runkle attributed his observation to student opinion:

> There is a growing feeling among this class of [regular] students that any deficiencies on the side of design can be more readily made up after graduation than on the side of construction.(89)

In preparing his report at the end of the 1876-77 academic year, Runkle may have also recalled a discussion which had taken place in the Committee on Instruction in February of 1877. At that time, James Elliot Cabot (who had been a member of the Visiting Committee for Architecture in 1875-76)

> ... spoke of the ignorance of construction in the great body of Architects, and thought it was a great mistake that no attention was paid to construction in the class of special students at the Institute.(90)

Runkle's response showed that his assessment of the department and its students in the early 1870s had not substantially changed:

> The President replied that construction formed a part of the regular course in Architecture; but that the special students in this branch, most of whom could not pass the regular entrance examinations, were entirely unable to take up this part of the course, and practically pursued simply Architectural Drawing and Design.(91)

It may be some measure of Ware's inclination to answer the criticisms of Runkle and Cabot and others that in 1879 he moved most of the architectural casts out of the M.I.T. architectural museum, incorporating them in the architectural collections of the recently-opened Boston Museum of Fine Arts.(92) In the vacated space, he began to assemble a "museum of sanitary and building appliances," consisting of "specimens of metal-work, tile-work, glass-work, and wood-work, partly purchased, but mostly deposited with the department by manufacturers."(93) Whether he made significant modifications in the curriculum or in his teaching is doubtful. The issue of the proper balance between the arts of design, the practicalities of construction, and the science of construction continued to trouble partisans in all three areas. It would be the subject of

prolonged deliberations at M.I.T. and in the Boston architectural profession when Ware resigned his professorship in 1881.(94)

b. Architectural History

In the earliest years of the department, the study of history consisted of a series of unconnected topical lectures. By 1872-73, the lectures became more numerous and were organized according to major historical periods. With the creation of a comprehensive and specialized curriculum in architecture in 1873-74, history was organized into a sequence of courses which would be retained for the duration of Ware's time at M.I.T.(95)

The sequence regularly began with an introduction to the orders, during the first half of the first term, followed in the second half by a brief survey of Greek and Roman architecture. This course was offered year after year to students beginning their concentrated study of architecture (i.e., second-year regular students, or special students with third-year standing). In the second term, Medieval or Renaissance history was offered (in alternate years) to a combined class of all students in architecture.(96)

The initial course on the orders began with an elementary account of the parts of a generalized column and entablature. Ware's explanation, recorded in the fall of 1872 by Louis Sullivan, was in one sense evolutionary and in another sense mnemonic, but in either case, guided by a functionalist point of view. The explanation supposed a historical process in which successive refinements were introduced into the apparatus of the generalized order for pragmatic reasons--either visual or structural. But the prevailing sense which Ware conveyed was that the

terminology of the elements of an order could be fixed in the memory once and for all, because the elements themselves had become fixed in their relations to one another in a thoroughly rational, even inevitable way.(97) Probably similar introductory remarks were given for each particular order, and before long, students were busy copying various plates from French editions of Vignola.(98)

The lectures in Greek and Roman architecture, which concluded the first term, and the lectures in Medieval and Renaissance architecture, which occupied the second term in alternate years, would have given all regular students and those special students who stayed for two years, a reasonably complete survey of the history of western architecture from the fifth century B.C. through the sixteenth.(99) These lectures would have been carried on with reference to the standard histories and folio volumes of plates in the M.I.T. architectural library.(100) Another course, called "Theory of Architecture," was offered every year in the first term. It was essentially a course in the allied arts, covering such miscellaneous topics as color, theory, ornament, stained glass, carving, and mosaic.(101) If Ware addressed some of the major issues of the time, such as the adaptation of natural forms to ornament or the relation between ornament and construction, he appears to have done so incidentally or by means of platitudes dutifully recorded in student notebooks.(102)

c. Drawing and Design

In looking at the curriculum in the earliest years of the department, before the arrival of Letang in 1872, one can sometimes find in the hurried, undifferentiated lectures and problems suggestions of a versatile, integrated view of architecture. While teaching alone and

attempting to touch on every aspect of the field, Ware scarcely had time or reason to think of design as a discipline in itself. So, for better or for worse, he interspersed design problems illustrating the application of architectural elements or the vocabulary of historical styles in the midst of his lectures on construction and history and perspective.(103)

(1) Auxiliary vs. Preparatory Studies

Ware and other educators of the time maintained a separation between work in drawing which was a preparatory to later work in design (whether decorative design or architecture) and work in drawing which was auxiliary to design. While this amounted to more than the distinction between freehand and mechanical drawing, the preparatory work often included considerable practice in visual observation as well as technique, while the auxiliary work often involved such analytic subjects as descriptive geometry, stereotomy, and perspective. Throughout the 1870s, Ware took an active interest in drawing pedagogy--in both the preparatory work and the auxiliary work for students of architecture.

Ware had urged in the 1871-72 Annual Catalogue that prospective students should have spent some time on certain prerequisite subjects, including descriptive geometry and freehand and mechanical drawing (the latter learned, preferably, during "a few months in an architect's office, copying and tracing.") (104) Just at the time when Ware might have been tempted to take responsibility within his own department for remedial and intermediate instruction in these auxiliary subjects, M.I.T. as a whole made provision, beginning in 1872-73, for a more thorough coverage of these topics. Samuel Edward Warren was brought from Rensselaer Polytechnic Institute, where he had taught since 1851, to head a new

auxiliary Department of Descriptive Geometry, Stereotomy and Drawing for the benefit of all the academic departments at M.I.T. This arrangement lasted only three years.(105) For the rest of the 1870s, stereotomy and descriptive geometry tended to be taught at M.I.T. by Assistants or Instructors in Civil Engineering or Mathematics or by other M.I.T. appointees at-large, in Freehand and Mechanical Drawing.(106) Perspective and shades and shadows were certainly auxiliary subjects of particular interest to Professor Ware, who featured them in occasional courses of extramural lectures, and who published a series of articles (1878) and later a book (1883) on perspective.(107)

Returning to the summer of 1871, we find that Ware's interests in drawing pedagogy were concentrated on finding someone to help him teach design, thereby freeing him to devote more of his own time to preparatory instruction in drawing. Ware turned to the Ecole des Beaux-Arts and hired Eugene Letang to come to M.I.T. For drawing, Ware adapted at M.I.T. the pedagogy of the South Kensington Schools of Design, while taking an informed interest in the promotion of art education in the public schools of the City of Boston and the Commonwealth of Massachusetts. At the same time that Ware was recruiting Letang, educators acting on behalf of the City and the Commonwealth were recruiting Walter Smith, a South Kensington alumnus, to come to Boston as Director of Drawing for the Boston Public Schools and as State Director of Art Education. Smith took up his duties in October 1871, Letang in January 1872. With the arrival of these two men, the two strains of design education Ware had observed in London and Paris in 1866-67 were about to become established in the United States, in Boston, in appropriate institutional settings.(108)

In mid-November 1871, the A.I.A. held its fifth annual meeting in Boston, at M.I.T. The results of Ware's initial years of teaching were there for all to see. In the closing address of the convention, Ware heard a new and promising expression of ideas he himself had put forward five years earlier in his Outline of a Course of Architectural Instruction, concerning the connection between professional and general education. Now in November 1871, the speaker was Walter Smith, who had been in Boston for less than a month:

> Already in the Institute of Technology you have the subject of architecture as part and parcel of the general scheme of education, and now you have come to the conclusion ... that to educate the masses of the people to appreciate works of art and good taste, and to appreciate that which gives to architects their profession, there ought to be a general education in art for the masses of the people.(109)

Ware's interest in art education was partly pragmatic and partly idealistic. In either case, he knew the benefits would be some years off in being realized. He could at least believe that, in future years, students from the Massachusetts schools would come to M.I.T. better prepared in drawing. And he could believe that the improved visual literacy of patrons and clients would, in future years, somehow result in a greater public appreciation of architectural design. For the present, he would do his best to implement English art education methods in the preparatory drawing work at M.I.T., while assisting Walter Smith in educating future drawing teachers and devising course materials on architectural drawing for use in schools at all levels. To understand the relation between drawing instruction at M.I.T. and drawing instruction throughout the Massachusetts school system, we need to look briefly at the educational work of Walter Smith during the 1870s.

(2) Art Education in the Massachusetts Public Schools

In accordance with the Art Education Act of 1870, Smith proceeded to introduce art instruction in a variety of settings. He and four assistants provided training in drawing for teachers in the Boston Public Schools. Drawing became a regular subject in the five State Normal Schools, and in the weeklong Teachers' Institutes offered about eight times a year across the state. To provide drawing instruction to adults who could make use of this skill in their occupations, Free Evening Industrial Drawing Classes were established in the two-dozen Massachusetts cities having populations over 10,000. After a year of elementary instruction in drawing, evening students could take a second year of instruction, concentrating on freehand drawing, machine drawing, building construction, or ship drafting.(110)

Such an ambitious program of art education created an immediate need for thoroughly trained art teachers--for the Normal Schools, the Teachers' Institutes, and the Evening Drawing Classes. (Smith believed that in the primary and secondary schools, drawing should be taught by the regular classroom teachers, but instructors would clearly be needed to provide the supplemental teacher training to make this system work.) After two years of hard work and persuasion, Smith was authorized to open a special State Normal Art School in Boston. The school began operation in November 1873, with Smith feeling obligated to accept 130 of the 190 applicants, though there was space for only 70. For the nine-year duration of his directorship, enrollments in the three-year, then four-year course of study averaged 220.(111) Students proceeded through the same sequential curriculum they themselves would promulgate in their own teaching: object drawing, enlarging and reducing, drawing from dictation, drawing from

memory, invention and adaptation based on historical and natural forms. Ware lectured regularly on the fundamentals of architectural drawing, beginning in 1873-74.(112) To furnish students with appropriate architectural subjects for copying, he published a portfolio of unbound lithographic plates of working drawings and details for a frame house. Examples of Building Construction, published in 1876, was designed for the use of students at all levels in art education. It is clear that Ware also found numerous uses for these plates in the preparatory drawing classes at M.I.T. and in his classes in construction and practice, in which working drawings were introduced.(113)

(3) Drawing Instruction at M.I.T.

Meanwhile at M.I.T., the graded exercises in drawing from the English system of art education would have to be compressed into preparatory courses for second- and third- year undergraduate students. Even Letang would share in offering preparatory instruction in drawing techniques, alongside his more advanced instruction in original design. Starting in the spring of 1872, he gave lessons in pencil and charcoal drawing.(114) Although it is not clear who was responsible for training in watercolor, the subject was certainly studied, and the letters of Cass Gilbert, written in the spring of 1879, are vivid reminders of the regard which some students had for finesse in rendering.(115)

While M.I.T. students were practicing techniques in various drawing media, they were also being introduced to architectural subject matter through a methodical sequence of exercises:

> The practice in architectural drawing begins with elementary exercises in india ink, with the pen and with the brush, followed by exercises in the use of india ink and color, beginning with architectural details or fragments on a large scale, and going on to plans, elevations and details, first copied from books, and, the next year, drawn from actual measurements of buildings in the neighborhood of the school.(116)

Copy work was part of a discipline, which students would need to learn well in order to function efficiently in an office, making the numerous tracings and detail drawings produced during a project. But more basic than this justification was the pedagogic theory which saw tracing, full-size copying, proportional scaling, shading and coloring, as a series of necessary progressive steps in art education.

After some initial practice with copying plates from Examples of Building Construction and similar works, students turned their attention to the large set of Ecole des Beaux-Arts drawings in the M.I.T. architectural library. These were used by second- and third-year students as objects for facsimile copies.(117) The lessons learned were both technical and ideological, inextricably linked, as the students learned to view the entire indivisible content of these Ecole drawings as worthy of replication. While M.I.T. also possessed original drawings from British and American architects and these were also probably used for making copies, it is significant that each of the half-dozen copy drawings exhibited by the M.I.T. Department of Architecture at the Philadelphia Centennial to illustrate this stage in drawing instruction was a facsimile of an Ecole drawing.(118)

The next stage in drawing instruction involved the enlargement, shading and coloring of plates and figures from books, and required more judgement in the selection and interpretation of prototypes. Such work

was carried on in conjunction with lectures in architectural history, which gave some context to the effort.(119)

Students were expected to apply and practice their skills in drawing by keeping a sketchbook. Ware reported in 1872 that he "required the class every morning to bring in their sketch books a pencil-sketch of some building, a plan or an architectural detail."(120) As Ware explained, the purpose of the exercise "was to show how complete and serviceable memoranda can be made without any other apparatus than a traveller's note-book."(121) Such work obliged students to look around Boston, following the progress of buildings under construction and discovering behind the picturesque accretions in the older districts vestiges of seventeenth- and eighteenth-century structures.(122) The routine of making regular entries in a sketchbook was also a means of assuring that students would take at least an incidental interest--if not a critical interest--in the current work going up all around them, as the building sites of the Back Bay were taken up for townhouses and churches; as the part of the central business district destroyed in the 1872 fire was rebuilt; and as the residential suburbs and outlying towns came to be fully furnished with country houses, churches, libraries, town halls, and small railroad stations.(123)

Cass Gilbert was one student who used the discipline of the sketchbook as a point of departure for his own determined study of current work. Although his accounts of his activity begin in January 1879, it is likely that he had already set a routine for himself in the fall of 1878, early in his first term at M.I.T. Gilbert and another student were excused from the early-morning class in mechanical drawing in order to spend the time doing sketch work around Boston.(124) In his spare time,

Gilbert called upon the architectural offices in Boston, visiting with the draftsmen, who were often M.I.T. alumni, and showing his sketchbook, if the occasion permitted, to the principals of the firm. He would ask permission to make tracings or sketches from working drawings, with particular attention to the details and sections that would tell him more about the construction than he could figure out by mere on-site sketching. Occasionally, he would be invited to accompany one of the principals as he went out to inspect a job under construction.(125) Gilbert was, of course, a rare student, who had the advantage of two years' office experience before coming to M.I.T.(126) Drawing had become a matter of habit with him, and his facility with pencil and pen made it possible to devote more time than other students to the careful analysis of built work and studio design problems.

While sketching practice would benefit students in their design work, practice in measured drawings would benefit them in reading and in making the working drawings associated with their work in construction and practice. When introduced in 1873-74, the field work in measured drawing was reserved for fourth-year students, who where concurrently attending lectures and doing exercises in construction. While M.I.T. students did prepare and publish drawings of colonial buildings, there is no evidence that Ware mobilized his students to do any systematic or emergency recording. When the buildings drawn were contemporary ones, it seems likely that students would have been shown the actual working drawings at the end of the exercise, to verify and correct their own work.(127)

(4) The Role of Drawing at M.I.T. and in the Schools

Drawing education in Massachusetts--the efforts of Walter Smith, William Robert Ware, and others--achieved public visibility through the annual exhibitions sponsored by the State Board of Education at Horticultural Hall on Tremont Street. Starting in the spring of 1872, work from the Evening Drawing Schools across the state was exhibited and judged. The following year, drawings from the architectural and industrial design departments at M.I.T. began to be exhibited (but not officially judged), and in 1874, drawings from the State Normal Art School began to be exhibited. Ware returned year after year, along with Charles Callahan Perkins and Walter Smith, to judge and critique the work displayed.(128)

With both Ware and Smith contributing to the annual reports on these exhibitions, there was an opportunity for both men to come to terms with the strengths and weaknesses and proper roles of M.I.T. and the Evening Drawing Classes. The judges jointly wrote that the M.I.T. architectural drawings exhibited in May 1873

> ... showed care, thoughtfulness and originality in the designing, and great nicety of execution.... A still greater success would doubtless have been achieved by those classes if their students could have had the advantages of elementary training which the day and evening schools now offer.(129)

Two years later, the judges commented in turn on the architectural drawings from the Evening Drawing Classes in Boston, Lowell, and Taunton. The voice of Ware, ever alert to justify architecture as a higher calling, can almost be heard in the following remarks:

> The art of architecture being so complicated, and requiring such an ample reserve of scientific, technical and historical knowledge, and such large resources of experience and observation, the Committee have necessarily been limited to a low standard in awarding marks of distinction for original work.... The true object of such schools is not to teach the art of architecture, but to give the pupils practice in the use of instruments, to cultivate delicacy and precision of manipulation, to teach habits of observation and nice distinction, how to make and understand working drawings, and, in general, to lift them to a higher plane of intelligence with regard to that portion of the art with which they are most likely to come in contact. It must be left to the more technical schools, in long courses of exclusive study and practice, to create architects.(130)

In his 1880 annual report on adult education in the Evening Drawing Schools, Walter Smith continued to remind himself, and Ware, and potential critics, of the necessary distinction between "professional" and "practical" education:

> The city should neither attempt to give a purely artistic education, such as may be obtained at the school of the Museum of Fine Arts, not a strictly scientific one, like that offered to students at the Institute of Technology. Its legitimate province lies between the two, and touches the confines of each. Thus, what is learned in the city schools ... will be found useful to students, whether they enter the artistic or the scientific schools on leaving the city schools, or if, instead of entering either, they become woodcarvers, builders, mechanics, or handicraftsmen of any sort.(131)

The important difference between drawing instruction in the schools and drawing instruction at M.I.T. was that in a professional school of architecture, drawing would always be a secondary subject--first preparatory to, then accessory to, exercises in original design. As early as 1872, heartened by the recent arrival of Letang to teach design, Ware expressed his belief that so much of drawing skill could be acquired

incidentally, through the more engaging work of solving hypothetical building problems:

> It is only by such incessant practice of original design, under proper guidance and criticism, that the creative and imaginative faculty can be exercised and developed. Moreover, it is through the varied manipulations which exercises of this sort exact, that artistic draftsmanship is best acquired. Drawing thus becomes to the student not a mere mechanical exercise of hand and eye, but a means of expression,--a language by which to convey the architectural idea he has conceived in his mind.(132)

As much as the preparatory work in drawing at M.I.T. relied on the same drawing pedagogy promoted in the state school system, what distinguished M.I.T. was the work in original design, which by the mid-1870s was receiving more emphasis than any other subject in the architectural curriculum.

Table 2.1

Changes in the M.I.T. Architecture Curriculum, 1868-77*

Year	Fields of Study	2nd Year (hours)	3rd Year (hours)	4th Year (hours)
1868-69	Drawing and Design	13	16	33
	Architectural History	0	0	0
	Construction and Practice	0	4	4
	Auxiliary Technical Studies	36	34	21
	Humanities and Languages	15	14	10
	TOTAL hours for year	64	68	68
1872-73	Drawing and Design	8	21	33
	Architectural History	0	0	0
	Construction and Practice	0	4	4
	Auxiliary Technical Studies	32	25	14
	Humanities and Languages	24	13	13
	TOTAL hours for year	64	63	64
1873-74	Drawing and Design	14	26	20
	Architectural History	0	6	8
	Construction and Practice	0	0	0
	Auxiliary Technical Studies	25	16	35
	Humanities and Languages	14	10	8
	TOTAL hours for year	53	58	71
1874-75	Drawing and Design	4	26	20
	Architectural History	4	3	4
	Construction and Practice	0	2	2
	Auxiliary Technical Studies	22	12	35
	Humanities and Languages	8	8	6
	TOTAL hours for year	38	51	67
1876-77	Drawing and Design	14	28	20
	Architectural History	8	7	7
	Construction and Practice	0	2	17
	Auxiliary Technical Studies	19	17	16
	Humanities and Languages	9	9	6
	TOTAL hours for year	50	63	66

*Source: M.I.T. Annual Catalogues... (1868-69 through 1876-77).

Chapter 3

THE TEACHING OF ARCHITECTURAL DESIGN AT M.I.T., 1868-81

Introduction

The dependence of the early architecture curriculum at M.I.T. upon the Ecole des Beaux-Arts has frequently been noted but has not yet been critically examined.(1) In spite of the recent interest in the most advanced stage of work at the Ecole--the annual Grand Prix projects for extensive monumental buildings, the more modest monthly design problems for Ecole students have been largely ignored.(2) The Ecole was an institution which had as one of its main functions the supervision of routine exercises in architectural design. The M.I.T. Department of Architecture, as it was planned by William Robert Ware with the Ecole as his foremost model, also promoted routine exercises in design as a part of a wider architectural curriculum. The training in architectural design at M.I.T. was reserved for the third and fourth years of the regular undergraduate curriculum or for special students who joined the school for one or two years of advanced study. By the mid-1870s, design had come to dominate over a miscellany of other courses, occupying one-third of the time spent by the advanced architectural students each week.

Following a brief account of the design curriculum at the Ecole during the 1860s and 1870s, the coincidences between the design programs used at M.I.T. from 1868 to 1881 and those previously used at the Ecole will be examined. What is known of design teaching at M.I.T. before 1872 will be reviewed in order to understand the shift in emphasis in that year toward more Ecole-related problems. A more detailed look at the demonstrable points of contact between M.I.T. and the Ecole will follow,

in order to show what Ware and his students knew about Ecole programs and design presentations--and exactly when they had access to this knowledge. It will then be possible to show how Ware modified specific Ecole programs and how he modified the Ecole system of architectural rendering to suit the needs of architectural education in the United States. Finally, there is the issue of architectural style, as the classically-grounded discipline of the Ecole, promoted in the M.I.T. studio projects had to be reconciled with the background of American architectural work of the 1870s, still with strong affinities to the High Victorian Gothic.

1. The Course of Study at the Ecole and M.I.T.

Students were admitted to the Ecole des Beaux-Arts after passing examinations in mathematics, history, sketching and design. They attached themselves to an atelier directed by a noted Ecole alumnus of an earlier generation, and enrolled in the Second Class of the Ecole. Students earned credits by submitting projects in accordance with programs issued in mathematics; descriptive geometry; perspective; stereotomy; construction in stone, wood and iron; and in architectural design. The monthly programs in design alternated between simpler esquisse projects, which were worked out at a drafting table in the Ecole within twelve hours, and more extensive projets rendus, which were studied at a drafting table in the Ecole, then taken back to the atelier to be fully developed and rendered. After earning a requisite number of credits in the Second Class, the student would be promoted to the First Class, where all effort was directed toward monthly esquisses and rendus in architectural design. Each month, a jury of Ecole faculty and patrons of the ateliers judged the recent work of the Second Class or the First Class, in closed

deliberations, with awards posted prior to the exhibition of the drawings.(3)

At M.I.T., regular students were prepared for the advanced problems in architectural design by course work in descriptive geometry, perspective, construction, history, and a two-and-a-half-year sequence of exercises in drawing. Special students took a selection of the auxiliary course work, concurrent with their work in design. At M.I.T. design problems were issued more intermittently than at the Ecole. Two- to six-day sketch problems worked out in the M.I.T. studio took the place of the twelve-hour esquisse projects worked out at the drafting tables of the Ecole. One- to three-month problems at M.I.T. corresponded to the Ecole projets rendus, with sketches due a week or two after the issuance of the program. Thesis programs were issued in April. Thesis drawings and explanatory texts were submitted in May. M.I.T. projects, small and large, were not judged and merely displayed; they were critiqued by Ware and Letang with the students present.

Considering that what Ware found most transferable from the Ecole was the work of the Second Class, it is necessary to look briefly at the types of design programs issued for that Class. The esquisse programs of the Second Class from 1866 to 1875 tended to return most frequently to the subjects of accessory buildings for public parks and gardens or private estates--architectural embellishments where one would pause during a semi-private afternoon promenade. Almost as prevalent were programs for parts of larger buildings--portes-cocheres, doorways, vestibules, staircases--the significant spaces in the procession through buildings of significance. Other esquisse programs featured small civil or religious monuments, some small free-standing government or religious buildings, and

a very few buildings in rural areas. The Second Class programs for projets rendus during the same period showed a decisive emphasis on the small to medium-sized government or religious buildings--the major architecture of lesser places, the lesser monumental architecture of Paris. The accessory buildings of parks, gardens and estates, as well as the parts of larger buildings, received less attention in the First Class than in the Second Class esquisse projects. Some consideration was given in the projets rendus to urban dwellings for persons of stature and culture.

2. The Coincidence between Ecole and M.I.T. Design Programs

At M.I.T., programs were reused even more frequently than at the Ecole, so that between 1868 and 1881, only 75 different subjects for architectural programs can be identified. These subjects can be divided into three main groups, according to their relation to the subject of prior Ecole programs between 1865 (the year Ware was appointed as Professor of Architecture and the year Letang enrolled at the Ecole) and 1876 (the last year of thorough published documentation of Ecole programs).(4)

Group I consists of M.I.T. programs that have no identifiable relation to Ecole programs. Group II consists of programs in the manner of those issued by the Ecole--programs for building types and components and other structures comparable to those which were of interest to the Ecole. Group III consists of M.I.T. programs directly or indirectly derived from Ecole programs and has two parts. Group IIIA consists of M.I.T. programs that have a strong affinity to specific Ecole programs--many of them paraphrased directly from Ecole programs. Group

IIIB consists of M.I.T. programs that are adapted or synthesized from Ecole programs, though the specific sources may be scattered among several Ecole programs. Table 3.1 (page 143) gives a summary of the various categories, and Appendix I lists the actual subjects and possible sources of M.I.T. design problems.

Group I (the non-Ecole programs) contains mostly problems for church buildings and the small civic buildings typical of New England suburban towns during the years after the Civil War. These could be called Anglo-American building types. Of the eighteen subjects in this category, over half were used as routine design problems, before the arrival of Letang in 1872, or toward the end of the decade, as thesis projects. In both the routine and thesis exercises involving non-Ecole programs, Ware was directing the attention of his students to building problems they would soon encounter in actual practice.

Group II contains twenty-three subjects for building types and components and other structures that could just as well have been promoted by the Ecole as by Anglo-American architects. While specific Ecole sources for these programs cannot be documented, both the subject matter and the rhetoric of the M.I.T. programs can be considered analogous to Ecole programs. Half of these were given as problems before the arrival of Letang or as thesis problems.

In Group III (M.I.T. programs derived from Ecole programs), there is a distinct emphasis on Ecole material in the weekly studio work from 1872 on. Nearly three-quarters of these Ecole-derived programs are for the routine problems issued during the years when Letang was design instructor. Group IIIA contains seventeen subjects that are virtually paraphrased from Ecole programs. Only three of these pre-date Letang.

None was used as the subject of a thesis project. Group IIIB contains seventeen subjects that appear to be adapted or synthesized from Ecole programs. Only a third of these are pre-Letang or thesis problems. The subjects in Group III are almost entirely derived from or related to Ecole projects in the Second Class, either esquisses or rendus. Furthermore, twenty-six out of the thirty-four subjects traceable to the Ecole had been given out at least once between 1865 and 1869, when Letang himself was a student at the Ecole.

These studies of architectural components, accessory structures, and small recreational and cultural buildings were considered by some to be unnecessarily exotic. Ware defended his choice of subjects in his first departmental report submitted after the spring 1872 arrival of Letang:

> This sort of subject, though remote from daily use and experience, is for that very reason best suited to this stage of advancement, as it necessitates the close study of the best masters, stimulates the fancy and imagination, and does not involve the numberless considerations of practical detail, which it would not do to slight, and yet which the class are not yet prepared to entertain. A more practical problem would require for its solution a more extended experience than such a class can possibly have had. Work of this kind, on the other hand, while it taxes their powers to the utmost, both in the design and in the execution of the drawings, does not demand for its satisfactory performance any greater resources, either of knowledge or skill, than they have at command.(5)

In reviewing the actual esquisse and rendu programs in the Second Class of the Ecole, Ware could hardly have failed to notice that many subjects were included which were not remote from the "daily use and experience" of French students--such as markets, gatehouses, courthouses, district city halls, townhouses, farmhouses, chapels, and altars. Yet from 1872 on, the analogous simple modern American building types would be

conspicuous by their absence in the repertory of regular M.I.T. design problems. And the "best masters" to be studied? Were they not most likely to be merely the Ecole students whose work on comparable programs could be seen hanging on the walls of the studio at M.I.T. or in the published plates of the Croquis d'Architecture?(6) "Fancy and imagination", while discouraged in the handling of proportions and elements in composition, nonetheless seemed to be desirable in developing a parti, or design solution. The exclusion of practical details, or rather their displacement to courses in construction and practice, would during the 1870s create an increasingly divided curriculum.

3. Design Teaching at M.I.T. before 1872

The division between design and construction was not so noticeable in the curriculum which Ware developed in the first three-and-a-half years of his teaching at M.I.T., when he was working alone. If he was not able during these year to give as much sustained guidance as he might have liked in the teaching of design, he was at least able to use intermittent design problems as exercises in some aspect of architectural history or construction practice. Several issues need to be considered in order to establish clearly the nature of design teaching before 1872 and the reasons for such a distinct shift of emphasis beginning in that year. First, what programs did Ware use during these early years, and how strong was his reliance on Ecole subjects? Second, how were the design problems integrated with his teaching on other aspects of architecture? And finally, what were Ware's probable pedagogic conclusions, in light of his practical experience from the fall of 1868 through the fall of 1871, and

in light of his theoretical arguments first set forth in the 1865 Outline of a Course of Architectural Instruction?

In the seven semesters that Ware taught alone, he is known to have used at least twenty different design programs. (See Table 3.1.) Only six were based in any way on identifiable programs used at the Ecole up to that time (Group III = 30 percent). Four were clearly non-Ecole subjects (Group I = 20 percent). Ten were problems loosely analogous either in subject matter or rhetoric to Ecole programs, but not known to be directly derived from French sources (Group II = 50 percent). After the arrival of Letang, it is worth noting that the percentage of non-Ecole programs used as routine design problems remains about the same (Group I = 18 percent). The significant change is that the percentage of explicitly derived Ecole programs nearly doubles (Group III = 57 percent), while the percentage of loosely analogous programs is cut in half (Group II = 25 percent). Ware clearly knew enough of actual Ecole programs from his time in the studio of Richard M. Hunt in 1859 and from his time Paris in 1867 to have made use of them during his first years of teaching. But his eclectic approach as architect and educator found a greater challenge in setting problems on building types that could have been equally of interest in Paris, London, or Boston, formulated in language quite similar to that used by the program writers at the Ecole. After the arrival of Letang, who knew only the recent pedagogic repertory of the Ecole, genuine Ecole programs came more and more to replace the freely conceived programs loosely analogous to those used in Paris.

The enumeration of program subjects for 1868-71 tells us only about the balance of Ware's design sensibility. His pedagogic sensibility concerning the role of design problems in the curriculum is best

illustrated though a unique pair of manuscript student notebooks covering Ware's lectures during 1869-70 and 1870-71.(7) In November 1869, he began a series of weekly lectures on building construction, proceeding in the sequence of topics commonly found in specifications. After seven lectures on framing, he assigned a problem for a small cottage, of frame construction. In November 1870, Ware began a series of twice-weekly lectures on architectural composition (emphasizing roofs, moldings, the orders) and on architectural history. At the end of the fifth week, he assigned a problem for a small flower stand, of iron construction, to be done in the Corinthian order. The next week he assigned two more elaborate problems, to be studied over the next three weeks: a studio and billiard room in a garden, of brick construction; and a fountain pavilion in a garden, of stone construction, to be done in the Ionic order. Several months later, while lecturing on Roman architecture in March 1871, Ware assigned two problems on the use of decorative motifs in a ventilating panel for a hallway and in an iron fence gate between stone posts. While lecturing on the Renaissance during April, he assigned a problem for a royal memorial chapel in a church. For lack of comparable notebooks for the later 1870s, we have no way of knowing how Letang's studio problems were coordinated with Ware's lectures on architectural practice and history. No doubt some of the problems continued to be used as exercises on construction in a particular material, order, or period style. But the design programs published in the annual departmental reports to the President, and anecdotal accounts in student letters of the late 1870s suggest that design was becoming a more autonomous part of the curriculum. Reinforced by a series of conventions on sheet format, composition, and rendering, a strong internal logic developed within the

design teaching, stronger than any logic linking design to other parts of the curriculum.

Not all the routine design problems during the later 1870s were derived from the Ecole. Yet the lessons in planning which students learned from exotic programs were apparently not being fully integrated with what they simply knew from daily observation. As the third-year students in May 1877 worked on their designs for a country house with a large stair hall, A.W. Longfellow realized "how hard it is to arrange the rooms and stairs just right" and reported Ware's remark in the studio: "I should think you fellows had never lived in a house in your lives."(8)

Even in his 1865 Outline of Course of Architectural Instruction, Ware had been ambivalent about the pedagogic autonomy of design. There he left open the possibility of studies in design and history accompanying studies in construction and practice, as each subject was taken from its most elementary to its most sophisticated levels. Already by 1871, he was probably feeling frustrated about the irregular intervals in his teaching when the occasion was right for making connections between design and other topics. Then, too, the design problems that suggested themselves during these early years were of differing magnitudes and complexities, and the time he could devote to providing sustained instruction in design while preparing lectures on other topics was limited. Ware's early 1865 speculations on the preparation of students to design the building types required in nineteenth century America were, however, vindicated as M.I.T. students began submitting thesis projects in the spring of 1873, Letang's second year as design instructor. Now that he could delegate the routine design teaching to Letang, Ware was apparently satisfied to defer any

explicit reintegration of construction and design and American architectural needs until the senior thesis.

Yet few students chose to proceed to this point of final synthesis. Only fourteen out of the 234 students who came to M.I.T. during the Ware years submitted a thesis project. Most of these, both in their text and in their drawings, show a culminating naivete that at least remains disguised in the less ambitious routine M.I.T. design projects. The fact that six out of the eleven thesis subjects during the Ware years were for more or less non-Ecole building types also suggests that Ware wanted to stop short of allowing the entire M.I.T. design curriculum to be governed by the Ecole's programmatic concepts of architecture and society. As part of their preliminary studies of the building type with which they were concerned, thesis students often took the opportunity to go out and look at built examples in the Boston area and to comment on functional and stylistic issues associated with the building type. The vast majority of M.I.T. students, however, enrolled for only one or two years in the special course, merely learned the rhetoric of Ecole programs and the rhetoric of the drawings that satisfied such programs. For them, the first experience they would have in drafting details or calculating quantities for a current American building type came after they left M.I.T. to work in an office.

4. Available Sources of Ecole Programs

Considering that Ware had received his only architectural design training during 1859 in the New York studio of Richard M. Hunt, how much did Ware know of Ecole design programs, even before his appointment as Professor of Architecture at M.I.T.? Years later, in 1902, Ware recalled

that "Mr. Hunt had just returned from Paris, and was eager to impart to younger men, though we were not much his junior, what he had learned in the Ecole des Beaux-Arts...."(9) Frank Furness, who also had studied with Hunt during these earlier years, later remembered the nature of exercises they had done: "... we were given each month a problem, which we first sketched and then worked up."(10) The approach seems to have been based on the Ecole practice of issuing, in alternate months, programs for esquisse and rendu projects. Did Hunt use actual or adapted Ecole programs as design exercises for his studio pupils? A set of sixty-one Ecole programs for late 1840s and early 1850s is preserved among the Hunt papers at the A.I.A. Only nine of these have any relation to design problems eventually developed for M.I.T., and every one had been repeated at the Ecole by the time that an analogous M.I.T. program was issued by Ware in the late 1870s. At most, Hunt's collection of Ecole programs would have introduced Ware to the formulation of design problems that was characteristic of the Paris school.

Ware was in Paris during the summer and fall of 1867, gathering ideas and materials for use in his teaching. He would have been able to view both the July and August exhibitions of the Ecole student drawings. More importantly, he did attach himself to an atelier, where he could practice design according to the French method.(11) He returned from Europe in the late fall of 1867 with what he described as "a complete set of drawings illustrating the course of architectural instruction in the Ecole Imperiale des Beaux-Arts in Paris."(12) This entire collection, which in 1875 was listed as having sixty items, is now lost. However, it did include examples of monthly projects in construction, and esquisse and rendu projects, in addition to the more ambitious Grand Prix projects and

Envois from Grand Prix winners working at the French Academy in Rome.(13) It is impossible to know what programs from the monthly concours were represented in this set of drawings. Ware also returned with ten volumes of the Revue generale de l'architecture, presented to him personally by its editor Cesar Daly. This journal reported once a year the titles of programs for esquisse and rendu projects in the First Class, but not the Second.(14) Equipped with these and probably other items gathered during his stay in Paris, Ware virtually alone guided the teaching of design for the first seven semesters in which architecture was taught at M.I.T. During part of 1869-70 and part of 1870-71, he had the assistance of Francis W. Chandler, one of Ware and Van Brunt's early draftsmen who had also gone to Paris in the summer of 1867, then stayed on for two years in the atelier Daumet. Chandler's arrival as a drawing instructor at M.I.T. did not, however, result in the introduction of further Ecole programs as design problems.(15)

The strong assertion of Ecole methods would not occur until the spring term of 1871-72, immediately upon the arrival of Eugene Letang. Not only did Letang come to M.I.T. with at least three-and-a-half years of experience as a student in the Second Class at the Ecole, he also brought with him twelve sets of his own Ecole drawings and about fifteen full or partial sets of drawings by four of his Ecole contemporaries. While these drawings are now lost, they were itemized in 1875 along with the rest of M.I.T.'s architectural collections.(16) There is only a weak coincidence between the M.I.T. design problems between 1872 and 1876 and the titles of these sets of Ecole drawings--which represent the more elaborate types of Second Class projets rendus--suggesting that Letang used his own portfolio

and souvenirs of friends' work as examples of rendering, not as prototypes for M.I.T. student projects.

Ware's confidence in promoting Ecole ideas in the design studio was certainly strengthened by his collaboration with Letang. Although it is possible that Letang also brought from Paris an ample set of the lithographed single-sheet concours programs from his student days, it is equally possible that he simply recalled many Ecole programs and was able to reconstruct and adapt them with the help of Ware. The rhetorical parallels between certain Ecole and M.I.T. programs suggest, however, that Letang and Ware did have copies of actual texts.(17)

In the 1875 inventory of the M.I.T. architectural collections, one item appears, that in absence of any other source, would be sufficient to provide a source for all but a few of the program texts: a set of volumes of the Croquis d'Architecture, documenting student work at the Ecole from 1866 through 1875. Gustave Raulin, editor of the Croquis, occasionally provided a commentary on the published designs which had received medals or mentions. Year by year, the Croquis included more and more work from outside the realm of the Ecole: public competitions for actual provincial buildings, archaeological sketches, and renderings of work by noted Paris architects. By far the most frequently published architect in this category was Emile Vaudremer, the patron of the atelier in which Letang had studied while at the Ecole. The sympathy between Raulin and Vaudremer was such that when Vaudremer gave up the direction of his atelier in 1880, he was succeeded by Raulin. Raulin also began in 1876 to write regular commentaries of routine Ecole work for Daly's Revue generale.(18) It is not clear when the copies of the Croquis d'Architecture were first received at M.I.T. They are not mentioned in Ware's rather vague

itemization of 1868. If they were present in Boston in the first years of teaching in the department, they were not fully appreciated or utilized. To Letang, though, each volume of the Croquis would have stood as a yearbook recording the work he had seen produced month by month at the Ecole, the programs he himself had worked through. The Croquis further enhanced his own authority as design instructor by so generously showing the work of his patron Vaudremer.

5. Adaptations of Programs and Drawing Formats at M.I.T.

The adaptation of Ecole programs for M.I.T. purposes rarely involved significant changes in the section of the text in which the type and setting of the building are described and the components of the design are set forth. The exotic character of the programs was retained, with only occasional gloss. A few examples of Ware's adaptation of Ecole programs will illustrate his more inventive ways of thinking about American architecture in relation to French.

The 1866 Second Class esquisse program for a bridge in a pleasure garden specified the locale as the confluence of two small rivers. From an open pavilion at the center of the bridge, ramps would lead down to a landing to be used during promenades for gondolas. The 1876 M.I.T. program for a bridge in a park specified the locale as a reservoir in a large city. The bridge was to commemorate the completion of the water works. This idea of a commemorative program for a bridge was borrowed from a second standard Ecole program, the bridge on a frontier, most recently issued as a First Class rendu problem in 1870. This Ecole program also gave rise to Ware's 1874 program for a monumental bridge,

more grandiose in its elements than the 1876 program for a bridge in a park.(19)

M.I.T. programs did differ from Ecole programs in terms of what was required. The latter specified the size of the building and the graphic scale, and the resulting drawings varied widely in size. The M.I.T. programs regularly specified that the drawings should be on sheets of a specific size. Ware adjusted the size and scale of the buildings accordingly. While the Ecole students focused on the design and trimmed the sheet to fit, the M.I.T. student had the additional problem of composing a presentable sheet, using a format that has more similarities to the Anglo-American architectural publications of the 1860s and 1870s than to the working or presentation drawings of practicing architects. It was as if a well-composed sheet said more about the legitimacy of the architectural accomplishment than a professional presentation drawing or working drawing.

Editorials in the American Architect and Building News in 1876 and 1877 drew attention to the merits of the Ecole system of presenting a design in plan, section, and geometric (i.e., orthographic) elevation:

> The French drawings are frankly conventional; and they are none the worse for that perhaps, since it is quite impossible to give a complete explanation of any architectural design without conventional drawing.(20)

For pedagogic purposes, Ecole conventions had particular interest, because the French system, it was argued, "is not only the most consistent, but on the whole the most serviceable and instructive, that has yet been developed."(21) The editor proceeded, however, to an observation also made by a few French critics of dessin geometral during the 1850s and 1860s:

> The weak point in the French system is its neglect of perspective, by which it emphatically needs to be supplemented. It may be remembered, however, that the use of perspective, essential as it is, lies in studying the massing of a design or else in such sketching of detail as must necessarily be done mainly by the eye ... that the use of perspective is illustrative, in fact, while that of 'geometrical' drawing is, so to speak, exegetical....(22)

Perspectives were never specifically required in M.I.T. programs. Occasionally one finds the phrase "... and any other drawings as may seem necessary." It was apparently the unwritten convention of the studio that a perspective should at least be used to study the massing of the design developed from a sketched ground plan, the first object of study. This process is described again and again in the texts of thesis projects and takes on the quality of a platitude.(23) The neat perspectives often included in the sets of thesis drawings have the appearance of justifying that the process of study had been dutifully followed. The coexistence of French and Anglo-American drawing systems did not extend beyond Ware's period of teaching at M.I.T. Not one perspective is included in the thesis drawings of the 1880s following Ware's departure in 1881.

6. Gothic vs. Classic in M.I.T. Student Work

The increasingly insistent arguments of the late nineteenth century, in favor of classical styles over Gothic, were as much pedagogic as they were polemical. Ware in 1902 looked back upon his early architectural studies with Hunt in 1859: "... those were the days when the Gothic Revival was at its height, and Mr. Hunt found most of us unfamiliar with Classical details and quite unskilled in their use."(24) Frank Furness recalled more specifically what Hunt had repeatedly urged: "No matter if

you never practice classical architecture, you acquire a certain idea or instinct of proportion that will never leave you, and that is essential to good designing in any of the different schools."(25)

By the late 1870s it had become a commonplace in the Boston architectural journal, the American Architect and Building News, to speak of the discipline of classicism, which in turn, according to Ware's partner Van Brunt, instilled "a greater reserve and modesty in the use of precedent."(26) A commentator in the American Architect wrote in 1877 that:

> ... a form or style which has become academic, and, by the accumulation of thought which has been bestowed upon it by successive generations of artists, has crystallized into types, standards or orders, is better fitted for the training of the architectural student than one which has been given to us by the archaeologists.(27)

He was full of praise for the teaching at the Ecole des Beaux-Arts, and concluded:

> The curriculum of such architectural schools as that of the Massachusetts Institute of Technology promises results at least equally good.(28)

The acceptance of the classical point of view into all aspects of the M.I.T. curriculum was slow and erratic. In reporting on the work produced according to the design problems for 1869-70--his second full year of teaching--Ware noted that "much of the work was in the Gothic style."(29) This is not surprising, considering the programs that were issued: a set of church furniture; a half-timbered house; a school and library building with passage to a church beneath.(30) The only subjects allowing a

non-Gothic presentation were a campanile, a summer house, and a hospital and almshouse.

During the 1870s, the stylistic biases in the programs and in the resulting student work were reversed. The Gothic was excluded, first from the routine design problems, and eventually from the thesis projects. In the 1875 program for the fourth-year problem to design a memorial library, Ware had to stipulate: "pointed arches and mediaeval details are not to be used."(31) (See Figure 9.) Those few students who completed four years of regular studies, including the two years of work under Letang on Ecole-related design problems, received in April of their senior year the programs for their thesis projects. These programs were for distinctly American functional types, most of them familiar in Boston suburban towns or small New England cities. These thesis programs included a steam fire engine house, a town hall, a railroad station, a scientific academy, a public library, and a bank building. (See Figures 8,10,11,12,13.) To many students, the coincidence between these programs and the types of buildings that were being published in the weekly issues of the American Architect would have suggested that they were now free to venture beyond the manner of the Ecole exercises and try their hand at design in the prevailing Anglo-American High Victorian Gothic manner.

All four of the thesis designs for 1877 were Gothic. George Walter Capen, in the text which accompanied his drawings for a town hall, went so far as to justify his choice of style, saying, "... as the spirit of Gothic architecture prevails with the majority of the citizens, it is to be built in the Gothic style after the most approved design."(32) (See Figure 10.) But 1877 would be the last year when the Gothic was seen in thesis projects. Perhaps Ware and Letang were finally convinced, on

reviewing the 1877 projects, that it was unwise to allow the culminating work of the design curriculum to be carried out in a style that did not proceed in some appreciable way from the style in which the students had been practicing throughout their work in the studio. So we find Charles Sumner Eaton reiterating on the first page of the text accompanying his 1878 project for a scientific academy, "Prof. Ware desired that we use a style bordering on the Classic rather than on the Gothic."(33) The design itself has the massing typical of High Victorian Gothic school buildings of the 1870s, yet it does have shallow corner pavilions with pedimented roofs. Eaton was innocent enough to report in the thesis text that he had initially wanted to use a low-pitched classical pediment at the top of the central tower. (See Figure 13.)

With the resolution of this secondary matter of style, the Ecole had become firmly established at M.I.T. Just as Letang in 1872 had helped Ware to understand and effectively use the programs of the Ecole des Beaux-Arts, he helped him five years later to understand that a pedagogic commitment to classicism, for the sake of teaching the elements of architecture and architectural composition, eventually had to imply an unswerving commitment to designing whole buildings in which a classical discipline governed all design relationships.

Yet for one reason or other, some students persisted in their admiration and application of the Gothic. Many must have realized the discrepancy between Ware's pedagogic advocacy of classicism at M.I.T. and his use, in buildings designed with his partner Van Brunt, of institutional Gothic styles, as well as an idiosyncratic style of theirs: picturesque Dutch Renaissance Revival. A weekly glance at the plates in the American Architect, well into the late 1870s, would have shown a heavy

selection of Gothic designs. Provincial tastes favoring the Gothic were hardly yet shaken. So it is not surprising to find Cass Gilbert writing home to St. Paul in 1879, to his friend Clarence Johnston, who had completed only one semester at M.I.T.: "Your Gothic has not suffered by a trip to Boston, nor will it hurt St. Paul to have a taste of it."(34) Later in the same letter, Gilbert informed his friend that the porte-cochere project Johnston left behind for judging was well-regarded by the students--until Ware delivered his critique and "sat on the design ... on account of its medieval propensities, which he criticized severely."(35)

In some instances, a fascination with the Gothic seems to have been a part of a counter-cultural spirit among architectural students, in reaction to the prevailing academic point of view. The death of Viollet-le-Duc on September 17, 1879 no doubt reminded many students in Paris, including the Americans, of the brief vindication of the Gothic and constructional point of view during the Ecole reforms of 1863.(36) A.W. Longfellow, one American student who had become engaged in the polemics of the moment, wrote home concerning the favorable disposition in the atelier Vaudremer concerning the "constructive and logical":

> ... I am delighted to find such a healthy influence among these Parisian architects who swear only by the classic influence, by a decorative rehash of worn out Italian models and who start ateliers where everyone considers middle age arch't as barbarous and where on entry you must swear eternal hatred and warfare against Viollet-le-Duc....(37)

The continuing attention to the English architectural press in the American Architect, with frequent excerpts and reproductions from the Builder and Building News, created a durable sympathy for the work of the

later nineteenth century Gothicists in Britain. By the end of his first year at M.I.T., Cass Gilbert had made up his mind not to return to school in Boston, but to go to London and enter an office as a draftsman, maintaining that:

> There are architects in London now, such as we may never see grouped in another generation of men. Street, Seddon, Waterhouse, Norman Shaw, Burges are names which will belong as well to posterity as to the present age; and still live the tradition which Sir Gilbert Scott lived in, and still his work is standard.(38)

7. Extending the Lessons of the 1870s

Throughout the 1880s, the issues which Ware and Letang had attempted to resolve during their ten years of teaching together, concerning the relation of design to the rest of the curriculum, the relation of academic design study to the design work of the professional office, and the relation of pedagogic theory to stylistic ideology, would continue to preoccupy many of those involved with the M.I.T. Department of Architecture. At critical points of transition, such as the appointment of Theodore M. Clark to succeed Ware in 1881, and the appointment of Francis W. Chandler to succeed Clark in 1888, the entire rationale for the teaching of design was reconsidered by students, faculty, administrators, alumni, and interested members of the profession. The beginning of the next chapter is devoted to the explicit and implicit appraisal of Ware's work at M.I.T. during the course of the search for his successor. To a large extent, the gap between construction science and the art of design was widened as Clark was named to head the department, with Letang staying on to teach design. With the appointment, seven years later, of Chandler, who had studied in Paris and taught briefly at M.I.T. in the late 1860s, a

large circle was closed, and ideas about design, latent through the 1870s and into the 1880s, finally emerged as dominant.

Coinciding with the appointment of Chandler was the inauguration of the Technology Architectural Review, an M.I.T. student publication consciously modeled on the Croquis d'Architecture, and created in order "to call attention to and emphasize the resources of classic architecture, and its usefulness as a basis for all design."(39) The student editors of the Review, which would feature programs and projects from the M.I.T. studio, carried forward the arguments first advanced by Ware, in favor of the pedagogic value of design study in the tradition of the Ecole:

> We may hope that the pupils, instead of being occupied with the design of simple modern and utilitarian buildings (the every-day work of a modern office), will rather be led to concentrate their studies on proportion, scale, historical precedent, and those principles which underlie all design in every style.(40)

This enunciation of principle had a conviction approaching dogma. The programmatic discipline of the Ecole, which Ware had discussed with considerable circumlocution between 1865 and 1872, was by 1888 an accepted fact, without the straining logic of those earlier years. Ware's former partner Van Brunt, who was starting to persuade himself and others in the late 1870s of the pedagogic value of an essentially classical discipline, sounded thoroughly persuaded in his 1888 endorsement of the intentions behind the Technology Architecture Review:

> It is of no earthly consequence whether classic compositions are fashionable or not in actual practice. Indeed, it is quite possible that most of the problems to which the architectural students of the Institute of Technology devote themselves, and which appear in your publication, will never be repeated in the professional experience of any one of

> them. On the other hand, the training gained by the study of such problems, the knowledge of the purest forms of art and of the history of their growth, and the respect for absolute formulas of proportion, which are most conveniently inculcated by practice in classic or academical art, are of the utmost importance to the student.(41)

By the 1880s, the long effort of belief in a workable discipline for American architectural education had relaxed into an acceptance of an academic system in which the remoteness of design problems was seen as their greatest claim to universality. The self-conscious Technology Architectural Review would be short-lived.(42) But would the long alliance between American architectural education and the Ecole be a measure of the validity (or the serviceability) of the Paris method--or a measure of the impressionable, virtuoso nature of American design?

Table 3.1

Types of Design Problems Issued at M.I.T., 1868-81*

	Total	Routine Design Problems		Thesis Projects
		Pre-Letang (1868-71)	Letang Period (1872-81)	(1873-81)
Group I (Non-Ecole programs)	18	4	8	6
Group II (Ecole-analogous programs)	23	10	11	2
Group IIIA (Ecole-paraphrased programs)	17	3	14	0
Group IIIB (Ecole-synthesized programs)	17	3	11	3
Totals	75	20	44	11

*This table is a summary of the enumeration of design problems given in Appendix I.

Chapter 4

OPTIONS IN ARCHITECTURAL EDUCATION, THE 1870s AND 1880s

Introduction

By the time of Ware's resignation in 1881 as head of the M.I.T. Department of Architecture, the design curriculum he had established with Letang was recognized by supporters and critics alike as the strongest feature of the department. Applicants who may have been insufficiently prepared to concentrate on the constructional aspects of architecture enrolled as special students and apparently thrived on studio problems in the manner of the Ecole des Beaux-Arts. Over the decade, design problems and the drawings they generated became the most visible product of the teaching of architecture at M.I.T., as these items were published and exhibited in Boston and nationwide.(1) It was by these works, for lack of more detailed knowledge of the rest of the curriculum, that Ware's program was generally known and judged. No wonder that the perception that M.I.T. emphasized the artistic (rather than constructional) side of architecture, which had been an undercurrent in M.I.T.'s internal administrative discussions throughout the 1870s, emerged as a major theme in the search for his successor, in which M.I.T. authorities, Boston architects, and Ware himself all played a role.

The first part of this chapter is concerned with events surrounding Ware's decision to leave M.I.T. for Columbia. We begin with a brief account of the creation of a department of architecture at Columbia, which drew Ware away from M.I.T. We then proceed to a detailed coverage of the 1881 search for Ware's successor, Theodore Minot Clark. In the second part of the chapter, we look briefly at the revised curriculum shaped by

Clark during his short seven-year tenure at M.I.T., and at the new faculty and curriculum organized by Ware at Columbia. The process of the M.I.T. search, as well as the reformulation of the principles of architectural education at M.I.T. and Columbia during the 1880s, all stand as implicit critiques of what Ware had accomplished at M.I.T. during the 1870s. The third part of the chapter takes us back into this decade, as we consider the number of alternatives in architectural education available in the 1870s besides Ware's collegiate curriculum at M.I.T. The story of the other collegiate schools of architecture is well enough documented that our emphasis will be on the roles of M.I.T.'s most formidable competitors in formal architectural education--Cornell University and the University of Illinois. We then look at two other agents of architectural training--non-collegiate polytechnic and design schools, and the local chapters of the American Institute of Architects. The chapter concludes with some of Ware's own evaluations of the merits of these diverse approaches to architectural education.

1. Two Searches for Department Heads: Columbia and M.I.T., 1881

a. Columbia Attracts Ware to Head New Department

In April 1879, Ware received an inquiry from one of the Trustees of Columbia College concerning the teaching of architecture at M.I.T. The trustee, Frederick Augustus Schermerhorn, had recently begun urging that Columbia establish a course in architecture and sanitary engineering within the School of Mines and was gathering information for an official report to the Board of Trustees.(2)

Schermerhorn was impressed by Ware's account of the diversity among the architecture students at M.I.T.--college graduates, men who had

already worked in offices, men associated with the building trades--and knew that the School of Mines would have to serve a comparable range of students in New York City. The most persuasive feature of Schermerhorn's report was that much of the instruction of use to architecture students could be assumed by the other professors in the School of Mines:

> To establish a sufficient and even an excellent course on architecture, we have now to our hands, in the School of Mines, facilities that it seems a pity to neglect. With but slight additions we might establish such a school that would become a credit to our college and to our city and a great benefit to the community....(3)

Schermerhorn's conception of the curriculum was that the principal professor of architecture would teach only those aspects of design and practice not otherwise represented in the engineering and applied science curriculum of the School of Mines.

In gathering information about M.I.T. for his report, Schermerhorn had heard much praise for Letang:

> ... to whose knowledge, previous education, and steady attention, as was learned outside, much of the excellence and success of the school is due.(4)

Schermerhorn knew enough of the nature of Letang's training at the Ecole des Beaux-Arts to be able to weigh the merits of the Ecole as a model for the proposed Columbia program:

> The full course in Paris is much what is proposed to establish here, but consists also, perhaps too largely, in a series of projects, of different kinds and extent, which are given out through the course; and as, it would seem, is usually the case in French institutions of learning, the students are not brought frequently and constantly enough in contact with the professors and instructors, but are dependent on each other for assistance, or obliged to employ private

> tutors. Still the school at Paris, it is believed, is considered the best in existence.(5)

While maintaining his strong commitment to and emphasis on the engineering aspects of architecture, Schermerhorn did suppose in 1879 that Columbia could hire a young French alumnus of the Ecole to serve as the principal professor. In teaching "points of practice and procedure," the French designer could be assisted in the early years by a practicing New York architect or an alumnus of the School of Mines.(6)

Nothing came of Schermerhorn's proposal for a year and a half. Although the creation of a course in architecture was not finally approved by the Board of Trustees until February 7, 1881, some of the trustees approached Richard Morris Hunt in November 1880 to invite him to accept the professorship:

> The idea of training young men again appealed to him, but he realized that it would be impossible for him to give the necessary time, without injury to his private practice. They then asked him if he would select or recommend someone, and he suggested the name of William R. Ware, then at the head of the Massachusetts Institute of Technology, who would bring with him experience and scholastic ability.(7)

Sometime during February 1881, Ware came down to New York to discuss the Columbia position with Hunt. As a result of this meeting or some more official contact with Columbia officials, Ware wrote to the Board of Trustees on March 5, explaining his views on architectural education. He received the Columbia appointment on April 4.(8) On April 1, even before the appointment was official, Ware appeared before the M.I.T. Committee on the School, to announce his intention to resign and to discuss the condition of the department.(9)

Ware's receptiveness to the initial suggestion of moving to Columbia and his eventual acceptance of the offer must have depended in large part on the prospect of doubling his salary, and of leaving behind the prolonged frustrations concerning the budget and staffing needs of the M.I.T. Department of Architecture.(10) His letter of resignation, dated May 11, was read by President Rogers at a meeting on that same date of the M.I.T. Corporation, which adopted this perfunctory resolution:

> The Pres. was requested to announce to Prof. W. the acceptance of his resig with an expression of the earnest regrets of the Corporation at losing the services which he has so long & faithfully rendered to the Inst.(11)

b. The Search for Ware's Successor at M.I.T.

The search for Ware's successor can be divided into three phases:

(1) From the first of April to the first of August, the focus was on the future relations between the M.I.T. Department of Architecture and Boston organizations with allied interests (the Museum of Fine Arts School of Drawing and Painting, and the Boston Society of Architects).

(2) During the month of August, the focus was on the merits of particular candidates.

(3) During the first two weeks of September, the focus was on outlining the curriculum and selecting adjunct faculty.

Throughout the spring and summer, the correspondence and interviews were handled by President William Barton Rogers--probably his last major effort on behalf of M.I.T. before his retirement in October 1881.(12)

The deliberations of the six months following the first news of Ware's impending resignation are of interest for the implicit evaluations they carry concerning the M.I.T. curriculum under Ware and of possible curricula to be tried in the years to come. Very early in the proceedings, the theme emerged for all the ensuing discussions. How would M.I.T. reconcile the perceived polarity of emphasis in architectural instruction, balancing practical and technical concerns against artistic concerns? This rhetorical opposition entered the deliberations within the first week and was heard throughout this half year of transition and revision. Time after time, the idea of a polarity was invoked, to aid in characterizing Ware's curriculum, alternative curricula, actual candidates, and the new curriculum finally agreed upon.

(1) Organizational and Professional Interests

Ware received notification of his Columbia appointment on April 14, 1881. Probably on or shortly after that date, he handed to President Rogers a letter written by Edward C. Cabot to the M.I.T. Committee on the School on April 8, just a week after Ware's first announcement of his proposed resignation.(13) What Cabot proposed, writing on behalf of the School of Drawing and Painting of the Museum of Fine Arts, was a merger of that school with the Department of Architecture at M.I.T.(14) Cabot's letter was written in reaction to the rumor "that the Institute might be disposed to give a larger development than it has hitherto done to the practical and scientific side of the subject" of architecture.(15) While

it is not known what discussions among members of the M.F.A. School Committee lay behind Cabot's letter, it became clear in the course of the summer that this letter reflected some pervasive opinions about a division between the fine arts and technical aspects of architectural education. Assuming that M.I.T. would continue to provide "practical and scientific instruction in architecture," Cabot proposed "to erect an independent School of Fine Arts, on a scale, and of a kind, suitable to the importance of the city and to its eminence in the arts."(16) Students would choose to enroll at M.I.T. or at the new "Academy, or School of Fine Arts" according to their inclinations to follow a technical or artistic course of study. There would be a mutual exchange of students and fees, and "each institution would have in charge the work which it was best qualified to perform."(17) Even if Cabot or Ware had taken the time to explain this scheme to M.I.T. officials, Cabot's letter still must have sounded a bit presumptuous when presented to the M.I.T. Committee on the School on May 17. The Committee's response was that the M.F.A. scheme was "not consistent with the plan and course of instruction in the Institute."(18)

Nothing further was done about the M.F.A. proposal. Instead, the outside interest in M.I.T.'s architecture program shifted from the M.F.A. School Committee to the Boston Society of Architects. Conveniently, Cabot was the head of both groups. The fine arts vs. technology issue would, however, remain a subject on which most of the candidates for Ware's position would express an opinion.(19)

The B.S.A., in a letter of June 9 written by Henry Van Brunt, officially offered to confer with the M.I.T. administration in the search for Ware's replacement.(20) This letter was relayed to President Rogers

by Edward S. Philbrick, a member of the search committee and, incidentally, Ware's partner in architectural and engineering practice from 1860 to 1862. Philbrick, in a cover note, remarked on the architects' anxiety over any weakening of "the artistic element in our course of instruction":

> They feel that it is to this development given to the school by Prof. Ware, that its popularity & its usefulness has been largely due, & they fear lest we should make the deptm't merely a school of building.(21)

Philbrick went on to express his own opinion that "we have sufficient teachers of the art of building, in its mechanical relations...," but that M.I.T. needed a "more full appreciation of the importance of teaching the details of construction, on the part of our profession of architecture than Prof. Ware has shown...."(22) The distinction intended here is between the descriptive survey of building materials and components already provided by Ware and the analytic study of structures and properties of materials missing from the curriculum. Philbrick was one of the few among all those concerned to get behind the rhetorical opposition of fine arts vs. technology, to concentrate on the deficiencies within the technical curriculum itself.

The B.S.A. clung to the broader rhetoric, though, and on August 1, Charles A. Cummings took his turn, in writing to Rogers on behalf of the Society, that M.I.T. should ideally have two professors of architecture: one representing "the historical and artistic side of his subject,--the side on which it is allied to the fine arts" and one representing "the constructive and mathematical side,--the side on which it is allied to the sciences."(23) If this formulation did little to advance the search,

Cummings' inclusion of the names of two possible candidates--W.P.P. Longfellow and Theodore M. Clark--was a major step forward.(24)

(2) The Candidates

The deliberations of August 1881 focused on Longfellow and Clark as potential candidates, with the fine arts vs. technology issue recurring throughout the correspondence and the interviews. First, a synopsis of the steps toward the final selection: Longfellow withdrew his name from consideration on August 19, and the search turned to Clark, who was reluctant to give up his lucrative practice.(25) On August 25, Clark also withdrew, recommending that M.I.T. might still turn to Longfellow, or if not him, then Alfred Greenough or John Pickering Putnam of Boston, or Robert F. Hatfield or George Fletcher Babb of New York.(26) Clark himself wrote to Babb about the position, but Babb declined.(27) During the first few days of September, President Rogers asked Clark to reconsider. Clark did, perhaps with the persuasion of Ware, and on September 3, Ware met with Clark to help outline the curriculum and adjunct faculty appointments for 1881-82.(28)

If we were to place the several candidates along a hypothetical fine arts vs. technology continuum, the order would read as follows: Greenough, Longfellow, Babb, Clark, Hatfield, Putnam--with only Greenough very far beyond the midpoint in the direction of the fine arts. Alfred Greenough, age 37, had the most extensive foreign training and travel of probably any American architect since Hunt, but he had little background in construction. His return to Boston after 15 years abroad was awaited by several of the people connected with the M.I.T. search. Ware himself had written to Greenough, and by the first of September had received the reply

that he did not wish to be considered "for any substantial service."(29) W.P.P. Longfellow, age 45, had served as Assistant Architect in the office of the Supervising Architect of the Treasury Department (1869-71) and was the first Editor of the American Architect and Building News (1876-80).(30) George Fletcher Babb, age 38, had been associated with Russell Sturgis from about 1867 to 1879. In 1880 he opened an office with Walter Cook. (31) Theodore Minot Clark, age 36, graduated from Harvard in 1866 and began to work as a draftsman in Richardson's New York Office in 1869. From 1873 until 1877, Clark worked as Richardson's construction superintendent on Trinity Church, the Winn Memorial Library (Woburn) and the Cheney Building (Hartford). From mid-1877 until at least 1878 he was in partnership with Longfellow, and was a frequent contributor to the American Architect on technical subjects during the late 1870s.(32) Robert F. Hatfield was the son of Robert Griffith Hatfield and the nephew of Oliver Perry Hatfield, two prominent New York contractors and authorities on building technology.(33) John Pickering Putnam, age 34, had been trained at the Berlin Bauakademie (1870-72). He was an expert on heating and ventilating and sanitation systems, and concentrated in his practice on apartment hotels and other multiple dwellings.(34)

Only the remarks of Theodore M. Clark on some of the other candidates have been found. In his letter of August 25, in which he withdrew his own name from consideration but suggested others, Clark wrote that "Longfellow seems the best of all." He thought Greenough "ought to be very good" but "with perhaps a few lectures on practical points to supplement his work." Clark recommended Babb for his experience as "a longtime partner of Mr. Russell Sturgis." Clark also mentioned that Harvard had considered appointing Babb as Charles Moore's successor as instructor in Fine Art at

Cambridge and probably would have done so if they had continued the course in Mr. Moore's absence." Clark described the Hatfields as "the most distinguished constructors in the country for a long time." Putnam he described as "well-trained and experienced and naturally of a scientific turn of mind."(35) As President Rogers and the search committee weighed the strengths and weaknesses of the various candidates, the issue was not simply to find the best person to represent the constructional aspects of architecture, but to find someone as capable as possible in construction who also had an appreciation for the fine arts aspects of architecture. It was assumed that, once the principal professor of architecture was chosen, several adjunct professors with complementary strengths would be chosen as well.

In his consultations during August with prospective candidates and with members of the M.I.T. Committee on the School, President Rogers was continually reminded of the fine arts vs. technology dichotomy. His initial impressions of Longfellow were framed in the familiar rhetoric:

> The impression I received was that Mr. L. has much culture, refinement & ability especially on the Art-side--but that he may be lacking in energy [crossed out] & and the practical turn of mind & the working force which we should like to secure. [underlining in original] (36)

Former President Runkle, who had been one of those most critical throughout the 1870s of the neglect of the scientific study of building, seems to have modified his views under the circumstances of the search, placing a higher value on continuity than on curricular revision. Either Runkle had not yet heard of Longfellow's withdrawal of August 19 or Longfellow was being urged to reconsider, for Runkle wrote to Rogers on August 22:

> From what I know of Longfellow I am inclined to think him the best man we are likely to find. He will carry on the Dept. much in the same spirit & and from the same direction as Prof. Ware has done, which to my mind is desirable. It is much easier to strengthen the engineering or building side than the art or designing side. A department strong in construction but weak in design would not do much towards elevating the standard of the profession, which is now doing so much to make Boston the leading city in America in the matter of architectural taste--while we are by no means deficient in building skill.(37)

Longfellow, even though not an active candidate by the end of August, continued to take an interest in the future direction of the teaching of architecture at M.I.T., addressing a long note to Rogers, in which he proposed two alternative approaches for the department. He began with the premise that the architecture program, to date "has amounted to little on what I may call the technological side, while it is still incomplete on the purely architectural side." The first alternative would be to "fill out the architectural course to completeness, and add an adequate technological course"--a decision which would require a doubling of the size of the department faculty. The second alternative would be for M.I.T. to make the most of its institutional strength and "to furnish a complete technological course for architects, with so much of purely architectural instruction as should be necessary to give consistency and point to the other."(38) Longfellow dismissed the first alternative as beyond the present means of M.I.T., leaving only the second alternative. Ironically, Longfellow concluded in favor of emphasizing the technological side of architecture, while technologically minded Runkle had concluded in favor of hiring Longfellow for his presumed strength in the fine arts. The mutual reversals of position resulted from each man's pragmatic assessment of different aspects of the status quo. Runkle concentrated

his view on the department itself, with its acknowledged strength in design, and resigned himself to the conclusion that after hiring Longfellow as principal professor, the smallest effective change would involve hiring an assistant in construction. Longfellow, unlike his colleagues in the B.S.A., concentrated his view on M.I.T. as a whole, with its acknowledged strength and mission in technology, and resigned himself to the conclusion that, with Letang continuing as design instructor, the smallest effective change would involve hiring a principal professor whose technical approach would be compatible with the rest of M.I.T.

By early September, the choice of Ware's successor was narrowed to Theodore M. Clark, respected for his emphasis on "the practical." The advice which Runkle and Longfellow had been offering Rogers during the most trying days of the search resolved itself into a secondary question: how to shape the curriculum and what expertise to seek in Clark's assistants. As a result of Ware's interest in accommodating the fine arts constituency in the M.F.A. and the B.S.A., and the technological constituency within M.I.T., the new curriculum, though nominally "more practical and scientific, as is natural and proper in a school of applied science," managed to be all things to all people.(39)

(3) The Curriculum and Adjunct Faculty

Although Ware seems to have remained in the background during the five months of deliberations since April 1881, he became quite influential as soon as Clark expressed a willingness to accept the professorship. Ware was involved not merely in briefing Clark, but in actually helping to plan the entire new curriculum. They met all day on Saturday, September 3, and again on Monday, before Clark had what was his first official

interview with Rogers on Tuesday, September 6. Ware's influence on Clark's decision to accept the appointment is likely; his influence on the curriculum is openly declared: "... the main features of the plan are of course my own and not his." Ware confirmed to Rogers on September 4 that Clark would be responsible for "the general direction of the department, assuming for himself the special control of the practical and scientific work, thus giving to the professorship a markedly technological character."(40)

Clark's appointment was recommended by the M.I.T. Committee on the School on September 6 and approved by the M.I.T. Corporation on September 9. On September 10, Ware wrote a circular letter to be sent to former and continuing students, outlining the proposed modifications in the architecture curriculum. The September 17 issue of the American Architect and Building News carried a lead editorial announcing the new curriculum at M.I.T. The 1881-82 academic year opened on Monday, September 26.(41)

The 1881-82 curriculum was a collage of compromises. Longfellow would be appointed as Adjunct Professor of Architectural Design, to supervise the work in the studio, having the responsibility for devising the drawing exercises and design programs and for leading the critiques. Letang, under the new arrangement, would report directly to Longfellow.(42) Certain courses would be dropped, such as the lectures given by Ware on aesthetics and the theory of form. A new series of topical courses, each taught by a practicing Boston architect, would be introduced to assure a fuller coverage of the allied arts. By the middle of September, these adjunct faculty appointments were decided:

Henry Van Brunt: Theory of Ornament
Charles A. Cummings: Interior Design
Arthur Rotch: Decorative Painting
W.P.P. Longfellow: Stained Glass and Mosaic (43)

M.I.T. students would also continue to have access to the fine arts courses offered at the M.F.A. School of Drawing and Painting.(44) The lectures in architectural history would be given by Clark, perhaps with some assistance from Longfellow.(45) The introductory course on the orders (preliminary to both the ancient history course and the exercises in design) would be taught by Henry Daggett Hooker, still a student, who had worked for Ware as a departmental assistant during the 1880-81 academic year.(46) With such ample provision for architecture students to do work in the decorative and fine arts, one has to ask what provisions--aside from the hiring of Clark himself--were made for work in the "practical and scientific" aspects of architecture.

Ware's answer was to provide for the organization of an Architectural Laboratory "where the properties of materials will be studied by means of actual tests, and the theory of construction illustrated by practical experiments."(47) The Laboratory was to be directed by Frank Eugene Kidder, who would also give a course in "architectural arithmetic and algebra." It is doubtful, however, that an autonomous Architectural Laboratory ever fully developed or that it lasted beyond the 1881-82 academic year.(48)

After setting out the details of the 1881-82 curriculum in his September 4 letter to President Rogers, Ware was satisfied that the scheme "meets the just wishes of the Committee [on the School] and the [M.I.T.] Corporation in giving the practical side of architecture the development for which means have hitherto been lacking, and giving precedence to those

interests by putting their representative at the head of the department."(49) The Department of Architecture would have $2,000 more to spend on adjunct faculty in 1881-82 than the year before. This was the equivalent of the salary of one professor, but instead of hiring two principal professors representing the artistic and constructional aspects of architecture (as had been suggested at several points during the summer), the money was divided among seven individuals--practicing professionals and recent students. Yet it is worth noting that only $200 out of this $2,000 was allocated for non-artistic, technical instruction (i.e., Kidder's Architectural Laboratory). If we take the entire personnel budget of the department (Clark at $2,500, Letang at $2,000, seven others totaling $2,000), we see that the amount provided for instruction in design, drawing, the decorative and fine arts, and history was $3,800, or 58 percent of the $6,500 total--even before making allowance for the fact that some of Clark's time, too, would be devoted to these aspects of teaching.

Ware anticipated that "the future development of the new studies will naturally lead to the still further curtailment of the purely artistic side of the subject" but was reconciled to an emphasis on the technological, believing "that the legitimate field of usefulness of the department lies in this direction."(50) He could concede this, because he himself had not yet given up the idea first advanced in Cabot's April letter, that the M.F.A. might eventually provide "advanced classes in architectural design and composition, supplementary to the Institute work, and covering ground the Institute did not attempt."(51)

In his letter to Rogers, Ware tended to rationalize the inertia into which the department had slipped in recent years and to dramatize the

break in that inertia by asserting that "the occasion of my going away, however, seemed to offer just the desired opportunity to put the work on a more tenable footing."(52) He once more acknowledged the emphasis on design at the expense of construction:

> ... I have never doubted that though the students we had came mainly for design, other students would have come for the other thing [i.e., construction], if we had been able to offer it. Indeed, many of the students we have had would have been better pleased, and would have stayed longer with us if we had had the means to branch out in that direction.(53)

2. M.I.T. and Columbia in the 1880s

a. The Clark Years at M.I.T., 1881-88

Virtually all that we know of the transition from Ware to Clark in 1881-82 is contained in the records of the deliberations just reviewed. Ware's zealous last-minute interest in the resolution of the search left M.I.T. with a paper curriculum and a coalition of faculty who would have to put it into effect. Evidence of what was actually tried and what was actually accomplished during 1881-82 is meager. The listing of courses in architecture in the 1881-82 Annual Catalogue remained almost identical to the listings which had first appeared with the curricular revisions of 1876-77.(54) The report of the 1882 Visiting Committee for Architecture is merely descriptive, giving a brief account of the Architectural Laboratory, the visits to construction sites, and the training in "architectural sketching and landscape work [i.e., drawing]."(55) Students and prospective students appear to have been more sensitive to (and uncertain about) changes in the direction of the department, for enrollments in architecture dropped noticeably in 1881-82. In Ware's last

year, there had been about 9 Regular Students and 37 Special Students. The number of returning students was about the same in both years: 20 in 1880-81 and 17 in 1881-82. But in 1880-81, 26 new students had ventured to come to M.I.T. In 1881-82, only 2 new students enrolled.(56)

We have to look beyond the transitional 1881-82 academic year to see what changes emerged in the department after Ware. Already by April 1882, the new M.I.T. President, Francis A. Walker, had determined "that the Department of Architecture would be reorganized next year so as to obtain greater efficiency with less outlay."(57) The $2,000 budget item for adjunct faculty was not renewed, and it is unlikely that there were any adjunct lecturers or student assistants in 1882-83. This retrenchment probably proved too restricting. In 1883-84, John G. Ely was hired as an Instructor, to do what Hooker had done in 1881-82: teach the courses on the orders, shades and shadows, and perspective. Work in the allied arts was also reintroduced in 1883-84, with Arthur Rotch and E.P. Treadwell teaching, respectively, Theory and Practice of Decorative Painting.(58)

One of the important developments of the early 1880s was the introduction of a prescribed two-year curriculum for Special Students. By 1883-84, this curriculum was displayed as a separate item in the Annual Catalogue as the only option for an abbreviated course of study, "no other special students in architectural subjects being admitted." The first year of the Special Course parallelled the second year of the Regular Course, being in either case the initial year of professional studies in architecture. Special Students in their first year were required to take all the specifically architectural courses, bypassing only the science, humanities, and language courses taken by Regular Students. Special Students were given introductory work in mechanical drawing, projections,

and mechanics. In the second and final year of the Special Course, students took a selection of architecture courses from the third- and fourth-year curriculum, omitting, again, the science, humanities, and language course and the courses in theoretical and applied mechanics. The Special Course, as codified in 1883-84, offered a professional preparation almost as thorough as that available to Regular Students, except that Special Students had two semesters less of design and no work in architectural engineering. They could, if their time and qualifications permitted, take courses beyond the prescribed curriculum.(59)

In spite of the efforts of Clark and his faculty to strengthen the curriculum for both categories of students, the 1884 Visiting Committee drafted a thoroughly unfavorable, though opinionated, report on the Department of Architecture. The most immoderate portions were apparently suppressed, but the summary statement was allowed to stand:

> The architectural department has acquired a more practical character under Professor Clark, who devotes much time to materials and building superintendence, but we still think that this course should be made far more practical and not concentrate its efforts upon the study of Greek architecture and the different kinds of columns.(60)

The adjunct faculty hired by Clark during the remainder of his time at time at M.I.T. did little to strengthen the "practical" side of the curriculum. C. Howard Walker served as Lecturer on Decoration, beginning in 1884-85. Emil Carlsen, Lecturer on Watercolor and Sketching in 1885-86, was succeeded by Ross Turner in 1886-87. David A. Gregg, an architectural renderer for the American Architect, was added in 1887-88. Perhaps the only assistance which Clark had in construction and practice came from a series of M.I.T. architecture alumni who returned to teach in

the department: Herbert G. King in 1885-86, Thomas O'Grady in 1886-87, and Eleazer B. Homer and Dwight H. Perkins in 1887-88.(61)

In spite of concerns which Visiting Committees and practicing architects may have expressed about the continuing emphasis on the fine arts aspects of architecture, some M.I.T. students were indeed eager to get more work in design problems than they were getting even with Letang. At the beginning of the 1886-87 academic year, three students joined to form a sketch club, and the Architectural Society of the Massachusetts Institute of Technology, as it was called, met for the first time on November 13. By Christmas, about a third of the M.I.T. architecture students were members. During 1887, the Architectural Society met every other week, to do a short sketch problem; to hear papers by students, special lectures by the faculty, and "smoke talks" by practicing architects; and to trace plates to produce blueprints for sale.(62) The most lasting contribution of the Architectural Society would be the publication of the Technology Architecture Review--a portfolio of M.I.T. student work modeled on the publication of Ecole students, the Croquis d'Architecture.(63) Yet this new student enthusiasm about design education in the manner of the Ecole des Beaux-Arts had other results at M.I.T. During the 1887-88 academic year, Boston architects again became actively involved with the studio work of the department, serving as visiting critics.(64)

In July 1888, Theodore M. Clark resigned as head of the Department of Architecture to return to private practice. Francis Ward Chandler was hired as his successor. He had studied in the atelier Daumet (1867-70), taught briefly at M.I.T. (1870-71), worked as head draftsman in the office of the Supervising Architect (1872-75), and had been in practice, as the

more active partner, with Edward C. Cabot (since 1875). Chandler brought a broader range of professional experience to the teaching of architecture than either Ware or Clark, as well as a more substantial direct exposure to the atelier work associated with the Ecole than either of his predecessors.(65)

b. Ware Begins Again at Columbia

(1) Curriculum Proposals and Reactions, 1881-83

During the summer of 1881, as M.I.T. continued its search for Ware's successor, Richard Morris Hunt visited Henry Van Brunt in Cambridge. Ware joined them for an evening, and the three of them talked further about plans for starting the Department of Architecture at Columbia. Shortly afterward, Ware wrote to Hunt:

> As to the Columbia work, I have very good courage about it. They are in no hurry about organizing the work, and I shall begin with one class only, and that for only a few hours a week. This will give me time during the coming winter to prepare for the serious work of the year following, a little time for reading and study, a thing I haven't done since I was with you in 10th St.(66)

Ware had first met with Hunt concerning the Columbia position in February of 1881. Perhaps that conversation had the effect of concentrating Ware's cumulative understanding of architectural education into the well-reasoned letter he wrote to the Columbia trustees on March 5. This letter, published by the American Architect and Building News on August 6, 1881, stands as a clear statement of what Ware believed was necessary and possible in a course of architectural instruction attached to a school of science and engineering. Virtually all that Ware eventually accomplished

in the Columbia program was anticipated in this letter, written at the pivotal point of his teaching career.

A decade and a half of experience at M.I.T. had convinced him that no collegiate program, however long or full, could provide a complete education for young architects: "The time spent at school is then not more than a third or a half of their term of professional preparation," the rest of their preparation, up to about the age of thirty, being gained through office work, travel, and further study.(67) The underlying theme of Ware's letter is that the architectural training proper to a university consists of three areas of study--the artistic, the scientific, and the practical--and that "the problem before us in this country is to devise a course of study so carefully adjusted that the practical, scientific, and artistic studies may receive equal consideration."(68)

Ware welcomed the opportunity ahead of him at Columbia to create another curriculum in architecture within a school of science and engineering, as he had done at M.I.T. in 1865. In considering the essential aspects of architecture, he wrote:

> Two out of its three branches are certainly more germane to scientific pursuits than to painting and sculpture, and it is easier and cheaper to add the apparatus needed for the study of elementary design to a school of science, than to bring the work-rooms and laboratories of a school of science into a school of art.(69)

He looked upon the teaching of design and history as the most manageable part of the curriculum:

> The experiments we have here been trying [at M.I.T.], partly founded upon the example of the School of Fine Arts in Paris, very well indicate, both in their successes and through their failures, how the elements of architecture, as an art of design, may be

> systematically taught, and with what illustration, of theory and of historical examples, they may conveniently be accompanied.(70)

His only caution was that even this much attention to artistic subjects would make a course of architecture something of an anomaly in a school of science and engineering:

> Still, it needs to be distinctly recognized that the atmosphere of exact science is unfavorable to the growth of the artistic sentiment; and that in temper and methods a school of architecture must always be, so far as relates to design, at least, not quite at one with the purely practical schools with which it is associated. It must accordingly require special pains to create for it an atmosphere of its own, favorable to the harmonious development of its own student.(71)

Ware believed that the best way to protect his students, while giving them just what they needed of science and engineering, was to take full responsibility in his own department for the instruction in these subjects:

> The principles of scientific construction are, of course, the same for the architect and for the engineer. But the student of architecture is at a disadvantage, compared with the student of engineering, both in understanding them and in applying them.... What is needed in a course of architectural education is, that the scientific studies necessary to an architect shall be pursued, throughout, from an architectural point of view....(72)

By practical instruction, Ware meant an understanding of "the arts of the plumber, painter, mason, plasterer, etc." He proposed that Columbia establish "a properly organized laboratory, in which the principles of these arts can be learned by handling the tools," and asserted that "such

a workshop ... would do more than anything I can think of to strengthen the profession in what is now its weakest point...."(73)

Within his first decade of teaching at Columbia, Ware did succeed in creating a simpler and more relevant course of studies in science and engineering for architecture students. A laboratory or workshop did not develop, as hoped, at Columbia, but Ware did send advanced students to work at the New York Trade School, established in 1880 by Schermerhorn's brother-in-law, Richard T. Auchmuty.(74) Ironically, the part of the architectural curriculum Ware felt most confident about in 1881 would be the part that by the 1890s was receiving the strongest criticism. The attention which Ware and his faculty gave to design was just not enough to satisfy the increasing number of alumni of the Ecole des Beaux-Arts, who believed that a more conscious emulation of the Paris model would be good for Columbia.(75)

During the 1881-82 academic year, Ware lectured twice a week to a handful of second-year students enrolled in the new course in architecture.(76) Not until the following year did he publish an actual curriculum. As in the other departments in the School of Mines, professional studies occupied the second, third, and fourth years, with a common science and humanities curriculum in the first year. The specifically architectural courses in the second year included "architectural Greek and Roman history, and the elements of Greek and Roman Architecture." In the third year, "Mechanics, Engineering, Geology and Architectural History, Ornament, Practice and Design" would be required. The fourth year would be "devoted to Civil Engineering, Economic Geology, and again to the all-embracing subject of Architecture."(77)

Ware and Schermerhorn had a confrontation on the architecture curriculum in the fall of 1882, just before it was submitted to the Trustees. Schermerhorn, twelve years Ware's junior, remained to be convinced that there was a sufficiently demanding core of professional studies comprising architectural education:

> I feared that the course would be one with too little hard work in it and that consequently we would be burdened with all the dull minds and lazy students and I suggested that for the present we should add to it certain other studies already taught in the School, but not particularly appertaining to Architecture, to make it a course of equal weight with the other departments. This was done & has since given rise to some complaints that much is taught in the course now not strictly necessary for architects to be conversant with....(78)

On the strength of his experience at M.I.T., Ware had attempted to implement a more differentiated and specialized curriculum from the start. In yielding to Schermerhorn at this stage, he knew he would have to demonstrate anew at Columbia the credibility of his views, and to let his curriculum evolve in its own way under the constraints he found there.

At the beginning of the 1882-83 spring term, Ware hired A.D.F. Hamlin as his first full-time assistant, to teach the history of ornament. This appointment must have come as something of a surprise to Frederick Augustus Schermerhorn and other Columbia trustees. They had expected that, when an assistant was hired, it would be to teach the sanitary engineering courses which Ware himself had been reluctant to take responsibility for.(79) Schermerhorn evidently expressed his views to Ware at this point, because the course announcements for the following year included sanitary engineering among the fourth year subjects to be

taken by architecture students. Even so, Ware continued to avoid introducing any actual course work in this area. Before long, Schermerhorn lost interest in making an issue of the inclusion of sanitary engineering in the architecture curriculum. In his first few years in New York, Ware had managed, probably a bit disingenuously, to preserve his own sense of the scope of architectural education, the wishes of the patron of the department notwithstanding.

(2) Curriculum Revisions and Faculty Appointments, 1883-1903

Ware's major task at Columbia would be to define a full undergraduate curriculum in architecture, embracing all subjects in the sciences and humanities necessary for his students. Some of this he had already done at M.I.T. At Columbia, he would go even further in creating a distinct and diverse curriculum, and it would take him longer to do so. Ware faced a greater inertia at Columbia for two reasons. First, he came into a situation where departments and curricula were clearly established and where the patron of his own new program was explicit about his expectations for architectural education. Second, Ware soon found himself responsible for much larger numbers of students than he had ever taught before, all of them obliged to follow an orderly curriculum in architecture and related subjects, leading to an undergraduate degree.

When Ware came to Columbia in the fall of 1881, he found that department lines and requirements had become firmly set in the two decades since the founding of the School of Mines in 1864. At M.I.T., Ware had the advantage of being a member of the original 1865 faculty. At Columbia, he was faced with the problem of fitting a new department into a fully functioning school. Furthermore, Schermerhorn had a vested

interest, dating from his 1879 Proposal to Establish a Course of Instruction in Architecture, in demonstrating how much of the architecture curriculum could draw on the strengths of the established departments in the School of Mines. Ware had a vested interest, dating from his 1865 Outline of a Course of Architectural Instruction and his 1881 letter to the Columbia trustees, in demonstrating that architectural education was an undertaking all its own, not merely an amalgam of special courses in design and construction with general courses in engineering and applied science. Again, Ware proved to be more persistent in his views than Schermerhorn and other colleagues at Columbia.(80)

It took Ware ten years at Columbia to do what he had done in five at M.I.T.--move the professional studies in architecture forward a whole year to allow for more specialized advanced work. At M.I.T. in 1873-74, the two-year professional curriculum for regular students became a three-year curriculum, with introductory professional studies absorbing many of the general studies previously taken by sophomores. At Columbia in 1891-92, the three-year professional curriculum became a four-year curriculum, with introductory work in architecture beginning immediately in the freshman year. For the first time in his teaching career, Ware had laid out a full undergraduate course in architecture.

Ware took a major step toward excluding inessentials and giving greater emphasis to essentials by bringing most of the auxiliary work in engineering and mathematics within the Department of Architecture. By devising special courses for architects during the next five years, to cover the material once covered by physics, chemistry, botany, and geology, Ware gained still more valuable time for his students. The second and third years became less encumbered with studies outside the

department, leaving room for a fuller development of design and history courses. The fourth year of the curriculum was freed for concentrated work in one of two elective programs: design and history, or construction and practice (later changed to advanced architectural engineering, as regular studies in construction and practice were integrated into the second year of the curriculum). Students could, in addition, elect the alternate program in a fifth, postgraduate year, earning the degree of Master of Arts.

A second factor delaying the differentiation of a specifically architectural curriculum at Columbia was that Ware had to devote considerable energy to developing a four-year undergraduate curriculum for more than twice as many students as he was accustomed to teaching at M.I.T. Throughout the 1880s, the School of Mines had no category of special students, as at M.I.T. In Boston, Ware had devoted most of his energies to the advanced curriculum in design and practice, in which special students were always the majority--on the average 80 percent of architecture students in any year. The School of Mines would not admit special students until 1891-92, and during the remainder of the decade, they averaged only 15 percent of all the students in architecture at Columbia. To complicate matters, class sizes in architecture at Columbia were running as high as 60 students by the late 1880s--twice as large as at M.I.T. during the late 1870s. (Class sizes also doubled at M.I.T. during the 1880s.) During the 1890s, there would be an average of 90 architecture students at Columbia each year, compared with an average of only 30 at M.I.T. during the Ware years. Given the size of enrollments and Columbia's commitment to a full undergraduate education, Ware had to design a coherent four-year curriculum with much more definite

requirements than at M.I.T., and he had to find faculty and assistants to help him administer such a full curriculum for so many students.

For ten years at M.I.T., Ware had had the assistance only of Letang in the design studio. The few student assistants in architecture did little more than help him maintain the architectural collections. While Ware often felt overworked, there is no evidence that he ever asked for a full-time assistant or for adjunct faculty. The Department of Architecture at M.I.T. remained a two-man team. With the involvement of the Boston Society of Architects and the Museum of Fine Arts in the search for Ware's successor, the M.I.T. administration did experiment for one year with a greatly augmented adjunct faculty in architecture. Yet for the remainder of Theodore M. Clark's years at M.I.T., he and Letang would be the only senior faculty, with three or four assistants and lecturers each year in such peripheral areas as sketching, watercolor rendering, decorative painting, history of ornament, and applied mechanics.

At Columbia, the pattern would be quite different. Enrollments grew rapidly during the 1880s, and budgets (supplemented by Schermerhorn, when possible) remained tight. Consequently, the faculty grew by accretion, with all the appointments being made at the junior level. Over a period of fifteen years, Ware hired ten former students to share with him the implementation of a generalized curriculum which never emphasized design as fully as at M.I.T. or engineering as fully as Schermerhorn had envisioned. There was remarkably little specialization among these younger men. In fact, they were men in Ware's own image--remarkably tenacious generalists in a period when more and more students and professionals were demanding more concentration in design and architectural engineering. The result was a department of a very

different character from what Ware had established at M.I.T. and Clark had carried on after him. While the student-faculty ratios at Columbia in the 1890s were about the same as the ratios at M.I.T. in the 1870s--12 to 1, the teaching was quite different, because the denominators--the men Ware selected to work beside him--were so different.

Two M.I.T. alumni, who had studied at the Ecole and worked in major New York offices, were hired to direct the upper level studios. After two years in Paris and a year with McKim, Mead and White, A.D.F. Hamlin came to Columbia in February 1883 to lecture on the history of ornament. Within a year, he was given the major responsibility of directing the third- and fourth-year studios.(81) Grenville T. Snelling had worked for Ware as a part-time research assistant in 1882 while in the office of Charles C. Haight. After four years in Paris, Snelling came to Columbia in 1889 to take responsibility for the third-year studio and to lecture on professional practice.(82) Frank D. Sherman, one of the first graduates of Ware's program at Columbia, was hired in 1887 to direct the second-year studio and to teach the geometrical fundamentals of architectural drawing.(83) Charles A. Harriman, another M.I.T. alumnus, but with no foreign training, was hired in 1890 to direct the first-year studio.(84) Maximilian K. Kress, a draftsman under Hamlin in the mid-1880s, was put in charge of the architectural library and photographic collections in 1888.(85)

After observing the differences between Columbia and M.I.T. through the 1880s, Charles F. McKim had real doubts about the strength of Ware's New York faculty. Following the judging of student work in the 1892 competition for the Columbia Travelling Fellowship, McKim wrote to Richard Morris Hunt, another of the judges:

> I like Hamlin and Sherman and Grenville Snelling, and I love Mr. Ware so much that I wish for his sake that his assistants had gone to school a little longer before they began to teach. The thing that has struck me most forcibly in these Prize Competitions of the Columbia students is the evidence of defective grounding in the elementary principles. Mr. Ware, it seems to me, badly needs a man like Letang.(86)

Ironically, Letang died later in 1892, and the next year, M.I.T. resolutely hired as his successor Desire Despradelle, another young French alumnus of the Ecole.(87)

Meanwhile at Columbia, Ware was concentrating on strengthening the advanced course parallel to the one in design and history--the course in architectural engineering. The next full-time faculty appointment would be in this area. In 1893, Charles P. Warren, another Columbia alumnus, joined the department to supervise the advanced work in architectural engineering, as well as the regular work in construction and practice.(88) In an attempt to answer some of the criticisms of the profession at large concerning insufficient attention to design, Ware hired several promising graduates to assist in the studios. George O. Totten, Jr., an 1891 graduate, worked as an assistant during 1892.(89) John Russell Pope, an 1894 graduate, taught in the second-year studio in 1894-95, but for that year only, before going on for five years of study in Rome and Paris.(90) Henry F. Hornbostel, an 1891 graduate and Ecole alumnus, was hired in 1897 to take over many of Hamlin's duties in the fourth-year studio.(91) Also in 1897, Ware hired William T. Partridge, an 1887 graduate, to assist in the second- and third-year studios.(92) Both Hornbostel and Partridge left Columbia shortly after Ware's retirement in 1903. Two years later, as a result of the recommendations of a committee of Columbia architecture alumni, Ecole alumni, and practicing New York architects, a system of

official ateliers was created to take charge of design teaching at Columbia. Charles F. McKim ran one of the ateliers in his downtown office, with John Russell Pope as his assistant. Thomas Hastings ran the other off-campus atelier, assisted by John V. Van Pelt. William A. Delano and A.H. Gumaer ran the third official atelier, on the Columbia campus. Other private ateliers were conducted around the city by Grosvenor Atterbury, Donn Barber, Henry Hornbostel, Frank E. Perkins, and Whitney Warren. Students would advance toward their degree by earning points in design problems, as at the Ecole.(93)

(3) Design vs. History or Design as History

The reaction of the profession at large, after Ware's retirement, to deficiencies in design instruction at Columbia tells us several things. First, it indicates how active an interest New York architects were taking in the Columbia program by the turn of the century. Second, it indicates that Ware really was devoting a good bit of the curriculum to exercises not strictly definable as exercises in design.

For the first eight years of Ware's teaching in New York, members of the profession paid little attention to his efforts. Unlike the Boston Society of Architects, which had grown up hand in hand with Ware's department at M.I.T., creating annual prizes for his students and welcoming them to their evening discussions on history and theory and practice, the New York Chapter of the A.I.A. appears to have had no supporting role in the Columbia program. The Architectural League competitions, arranged by the younger professionals (many of them M.I.T. alumni), may have been one of the few opportunities encouraging Columbia alumni to carry on their studies in architecture.(94) Ware had grown

skeptical about the value of prizes given in connection with the regular work of students and believed instead that inducements were needed to allow students to look beyond their immediate school work to a period of foreign travel and study. The Rotch Travelling Scholarship, offered by the Boston Society of Architects for the first time in the spring of 1884, stood as a model of this more meaningful kind of prize.(95) Finally, in 1890, a Columbia Travelling Fellowship was created, and in 1891, the McKim Travelling Fellowship, endowed by the architect himself. They would be awarded in alternate years, on the basis of a comprehensive examination in construction, practice, and history, coupled with a major problem in original design.

Many of the Columbia traveling fellows stayed on for a period of study at the Ecole des Beaux-Arts. Already by 1894, some six dozen Americans had had the opportunity of studying at the Ecole. Appreciating the value of this experience, they came together in New York early that year and organized the Society of Beaux-Arts Architects, to promote atelier-style teaching and annual competitions for selecting men to go on for further study in Paris. During the 1890s twice as many Americans would attend the Ecole as had attended in the three decades preceding. Considering this new wave of Beaux-Arts enthusiasm, Ware was fairly astute in characterizing Columbia's fourth year design elective as "what may be called Atelier work," when he addressed the 1895 annual meeting of the A.I.A.(96)

Whatever Ware may have said in deference to the Ecole and its advocates, he more sincerely believed that the teaching of design could not be the preeminent purpose of architectural education. With some distance now from what he and Letang had accomplished at M.I.T., and with

a clear sense of the differences between Columbia and M.I.T. students, Ware had already redefined the place of design in his curriculum in an 1888 address to the Alumni Association of Columbia College:

> At the Institute of Technology, in Boston, also, we followed as closely as we could the Paris example, being greatly aided in doing so by the fact that a considerable portion of our students were special students, able to give pretty much all their time to this work, and that a chief part of these were young men who had already, by work in offices, had an experience which stood them in place of the preparatory studies exacted for entrance into the school in Paris. This system has been continued by my successors with brilliant success. But, though design is the main thing, it is not the only thing, neither can it be taken up to advantage without adequate preparation. The young men we have here are mostly entirely new to the subject, and it is useless to set them to combining and arranging ideas they have never acquired.(97)

Faced with the fact that his Columbia students were younger and less experienced than his M.I.T. students, Ware responded as a conscientious educator to adapt scientific, technical, and architectural course work to the needs of the Columbia undergraduates. His first response was that of an architect teaching in an engineering school--to bring more and more of the technical studies pertaining to architecture under his own control. His second response was that of a humanist, teaching as architect, in an engineering school. He believed that, wherever possible, independent research and classroom presentations in connection with lectures on architectural history and practice should be used as opportunities for learning English composition, history of western civilization, and modern languages, such as French and German. If Ware believed that the School of Mines expected too much of his students on the side of technical education, he also believed that it expected too little of them on the

side of a liberal education. At M.I.T., Ware had no doubt been so engaged by the general intelligence and maturity of the half-dozen students each year who came into his program as the culmination of their liberal education that he gave little thought to the teaching of the humanities through architecture to the rest of his students.

Ware's most complicated task at Columbia involved coordinating the teaching of history and design. He firmly maintained there was a pedagogic weakness in separating the two subjects--a strength in considering them together:

> For what occupies the attention of architects of all times is, as has been said, the single question how to do the work in hand in a sensible and agreeable manner. The way for us to understand why the men of other times answered this question in the way they did, and thus to enter into the real understanding of the results, is to put ourselves as far as possible into their places, and to set before ourselves not their achievements, as examples to be classified, arranged and comprehended, but the problem they had to solve and the conditions which controlled their solution of it.(98)

Already by the mid-1880s, Ware had created a series of problems in "Historical Design," with the programs abstracted from actual works of the Medieval and Renaissance periods. By the early 1890s, he would also be giving exercises in 'translating' facades executed in one set of orders into different sets of orders. Rather than devote all of the time in the architectural history sequence to lectures, Ware asked his students to prepare illustrated weekly reports on a variety of topics. This work in "Historical Research" and "Historical Drawing" was carried on in place of second-semester studio work for both sophomores and juniors. Seniors, who spent most of their time on design or architectural engineering, were

still required to prepare illustrated monthly papers, or "Architectural Essays," throughout the 1890s.(99)

To encourage the accurate understanding of architectural terminology, Ware devised an exercise known as "Design by Dictation," in which first- and second-year students would sketch a building or a component according to his detailed description of it. As a variation on this activity, one group of students would be given photographs, and they would write thorough descriptions, which they would pass on to another group of students, who would attempt to recreate the image from the words. To make his students familiar with architectural vocabulary in French and German, he provide the occasion each week for them to translate aloud from a selected foreign text.

At times, Ware seems to have made the study of the architectural literature an end in itself. Even before the creation of the Avery Library in July 1890, Schermerhorn had provided the funding for an architectural reference library of books and photographs. Ware was determined to have these collections fully utilized and appreciated, even at the expense, frankly, of studio work:

> For the practice of design is the main business of an architect's life, and what is not done here may be done elsewhere by and by. But such a chance to study photographs and books for weeks together is elsewhere hardly to be found.(100)

Ware pursued the development of historical studies at Columbia, because he believed so strongly in a historical sensibility as the most important foundation for intelligent design:

> These lectures and these researches and the drawings and writing to go with them, suffice to give the student a fair knowledge of historic precedents, a

> knowledge which he shares with the historian, the critic and the connoisseur. It is a knowledge of their external aspect [of these precedents], and of the relation of cause and effect in which they stand to each other and to the social and political institutions, and the traditions and fashions of their day, and to the conditions of time and place, and of material and labor, that have helped to mould them.(101)

Students of architecture, however, needed to go even further, in reckoning with history, to arrive at an internal, empathetic understanding of historical design:

> We exhibit to them the architecture of the past as a series of problems just as it appeared to the builders of its own day, showing it not as it looks from the outside, to the historian and critic, but as it looked from the inside, to the architect who designed it.(102)

If Ware could be faulted by some of his contemporaries for diverting so much attention from design (seen only as a series of studio problems), he could also be credited, particularly in hindsight, for demonstrating the necessity and the viability of a balanced and comprehensive professional curriculum. At M.I.T., Ware had Letang, through whom the teaching of architecture came to be identified with the teaching of design. But otherwise, Ware had such limited resources that he could never claim in Boston to be offering more than a short-term course of special study in which design was the subject most readily taken up. In New York, he had the enlightened support of Schermerhorn, who made it possible to assemble a serviceable faculty and to form the nucleus of a library. And he had the mandate to make architectural education a complete formal course of undergraduate study. Ware knowingly committed himself to shaping a curriculum in which all teaching in mathematics, the

sciences, engineering, history, writing, and languages was made to revolve around architectural subject matter.

The course of study at Columbia, in itself, was Ware's summary statement as an educator. It was virtually a translation, into a curriculum, of his own twenty years of study and apprenticeship, from 1848 through 1868, when he first began his formal teaching at M.I.T.: four years at Harvard in liberal arts; two years in New York as a private tutor; two years at Harvard in engineering; four years in architecture offices in Boston and New York (one as a student of design under Hunt); three years in architectural and engineering practice in Boston; two years as an architect teaching, like Hunt, through his own office; and three years as an architect preparing to assume his duties as Professor of Architecture (by travel and a brief period of design study in Paris). The architecture curriculum which Ware had created by the 1890s was unmistakably a liberal arts, fine arts, and engineering curriculum specially adapted to the means of a polytechnic school in an urban university.

3. The Diversity of Architectural Education

a. The Proliferation of Schools and Special Programs

One way of understanding the importance of Ware's contributions in architectural education at M.I.T. during the 1870s is to consider what other options a prospective student had during this decade. There were surprisingly many. While M.I.T. clearly had the preeminent collegiate program in architecture, there were ten others which were carried on with various success. In these earliest years of architectural education, particularly in the largest metropolitan centers, students could also

benefit from courses in drawing offered by local polytechnic institutes and from the educational activities sponsored by local chapters of A.I.A. Probably five times as many students were reached by these programs as by the collegiate schools. These programs would generally train the draftsmen--the paraprofessionals of architecture, while the collegiate schools would generally train the architects, though, as will be shown in Chapter 5, the course for special students at M.I.T. was responsible for training a number of draftsmen and other office assistants.

Ware's own career as an educator takes on a greater depth as we look at his incidental involvement in these other institutions: advising on the creation of the school at Cornell, sending faculty to Syracuse, lecturing in evening schools in Worcester and Boston, and coordinating his efforts at M.I.T. with those of the Boston Society of Architects. He had immediate experience with all the modes of architectural education. His range of experience would help him greatly in developing at Columbia his understanding of the essential nature of collegiate architectural education. And his opportunity to survey all these options from his vantage point as Chairman of the A.I.A. Committee on Education would make him an even more convincing spokesman for collegiate architectural education.

(1) Collegiate Schools of Architecture

(a) Institutional Contexts

By the end of the 1870s, American students looking for opportunities to study architecture within a college or university had a growing number of options.(103) Seven schools, including M.I.T., had created courses in architecture within colleges of engineering and applied science. In 1871,

Cornell University began to offer a full four-year curriculum in architecture, under Charles Babcock, within the College of Civil Engineering and Architecture. The University of Illinois began to shape a course of study for Nathan Clifford Ricker, who enrolled in the Polytechnic Department in 1870 and stayed on after graduation to establish a Department of Architecture in 1873.(104) The University of Pennsylvania began teaching architecture within its Department of Science (later Towne Scientific School), when Thomas W. Richards was named Professor of Drawing and Architecture in 1874.(105) From 1876 to 1878, William LeBaron Jenney taught architecture at the University of Michigan.(106) From 1876 to 1880, Edward Delano Lindsey held the chair of Architecture and Applied Art within the John C. Green School of Science at Princeton University.(107) Finally, some instruction in architecture was being offered by 1878 in the Practical and Scientific School of Washington University.(108)

Four schools during the 1870s had created courses of architecture within colleges of fine arts or liberal arts. At Yale, John F. Weir, who was appointed Director of the School of the Fine Arts in 1869, intended to establish a chair in architecture, but only infrequent visiting lectures were given on the subject to supplement the regular courses in painting and drawing.(109) Syracuse University began to offer a four-year degree program in architecture within its College of Fine Arts in 1873, under Archimedes Russell and Joseph Lyman Silsbee.(110) Russell Sturgis delivered courses of lectures on architecture at the College of the City of New York in 1878-79 and 1879-80, but this effort came to an end when he left for five years of travel and study in Europe.(111) One collegiate school of design offered enough course work in drawing to attract some architecture students. The McMicken School of Drawing and Design of the

University of Cincinnati had helped to prepare about ten architects, builders and draftsmen in the first decade after its founding in 1869.(112)

The size and impact of these eleven collegiate programs in architecture varied considerably. Cornell University and the University of Illinois were the only schools to offer a substantial professional curriculum in architecture comparable to what Ware had inaugurated at M.I.T. By the time Ware left Boston in 1881, he had taught about 235 students. Babcock at Cornell had taught about 95 students and Ricker at Illinois had taught about 45 students by the spring of 1881. Together, these three schools accounted for about 90 percent of all the collegiate students in architecture during this first decade of professional architectural education in the United States. The University of Illinois remained an essentially regional school, with over 80 percent of its students coming from the state of Illinois. Just over 60 percent of Cornell students came from the state of New York, and just under 60 percent of M.I.T. students came from Massachusetts. (About 70 percent came from New England, if one counts the students from the rest of Boston's own region.) M.I.T. remained the most cosmopolitan school, with about two-thirds of its students coming from the nation's twenty-five largest cities and their suburbs. Only about a third of Cornell's students came from these metropolitan areas, and only about a sixth of Illinois' students came from major urban centers--mostly Chicago.(113)

The other eight collegiate programs in architecture remained small, local in impact; and some failed to sustain programs in architecture into the mid-1880s, by which time Ware's new department at Columbia had become the fourth major center of collegiate architectural education in the

United States. The courses at the University of Michigan and the College of the City of New York lasted only two years, until 1878 and 1880, respectively.(114) The course at Princeton lasted only four years, until 1880, and the two students enrolled in it never graduated.(115) The course at Washington University remained dormant for its first seven years, then continued in a limited way for only another seven years, until it was discontinued in 1885.(116) The instruction at the University of Cincinnati never constituted a full course of study in architecture, and was dropped in 1884, after fifteen years and probably as many students.(117) The instruction in architecture at Yale failed to materialize.(118)

Only two schools--Syracuse University and the University of Pennsylvania--had small programs which continued without interruption, but with small local enrollments, into the 1890s and beyond. The Department of Architecture in the College of Fine Arts at Syracuse University had seven graduates by 1881--including three from upstate New York and three from Brazil--and probably twice that number of special students. Clearly, the full-fledged professional curriculum at nearby Cornell held a stronger attraction for prospective students of architecture. The early curriculum at Syracuse, leading to the degree of Bachelor of Architecture, consisted of four years of required studies. About a third of a student's time was devoted to humanities and languages (including only about five hours, total, in the history of art and architecture). About a quarter of his time was devoted to non-architectural drawing and painting; about a fifth of his time was devoted to specifically architectural drawing; and about a fifth of his time to mathematics and science. There was almost no work at Syracuse in construction and practice, in spite of the fact that the two

professors of architecture were practicing architects, one an alumnus of M.I.T.(119)

At the University of Pennsylvania, enrollments in architecture remained small throughout the 1870s and 1880s, averaging only about four students each year, all of them from the greater Philadelphia area. Like the other courses in the Scientific School, the architecture course consisted of a two-year professional curriculum in the junior and senior year. Even then, about three-fifths of an upperclassman's time was devoted to continuing studies in mathematics, science, and engineering. Only a third of his time was devoted to architectural drawing, the remainder being spent on a few courses in the humanities.(120)

Given the relatively minor role of eight of the eleven collegiate programs in architecture during the 1870s, it remains for us to consider the two programs with professional studies as full as those at M.I.T. The next two sections of this chapter deal with the architecture schools at Cornell and Illinois, with emphasis on Ware's own views of these two schools and on comparisons with the curriculum he established at M.I.T.

(b) Cornell University

Cornell University opened in the fall of 1868. President Andrew Dickson White, who had gathered an extensive library of English, French, and German architectural books and periodicals, hoped that a course in architecture might soon be inaugurated.(121) For the first years of the university's operation, White himself directed the independent studies of one student, William Henry Miller, who would establish an architectural practice in Ithaca and design White's house on the Cornell campus.(122) In October 1869, White wrote to Ware, who was just then beginning his

second year of teaching at M.I.T., for suggestions about starting a course in architecture at Cornell. Ware replied that there were probably few young architects both willing to give up their practice and able to plan a full course of professional instruction. He suggested looking for a senior member of the profession, "as is usually the case in Law Schools," but cautioned that "the devising of the scheme could hardly be entrusted with safety to the previous generation." Ware's next thought was that if someone could help White lay out a basic curriculum, the teaching could be done by "two or three men, young and old, of various practical and artistic attainments." Proceeding in this way, Ware told White,

> ... you might reasonably expect to accomplish what you have in view, so far as it can be compassed at all at such a distance from actual examples of architectural work and from the active exercise of the profession.(123)

This may have sounded too deflating, so Ware suggested that after several years, he might be able to send some of his own students to help White start his architecture program.

To persuade the Cornell trustees to authorize the creation of a course in architecture, White offered in 1870 to donate his architectural library to the university. In May 1871, he again contacted Ware for advice. Ware was even more convinced that White would do best to plan and direct the curriculum himself, "assigning it piecemeal to such specialists" as "skilled draughtsmen and learned lecturers" for the actual teaching. Ware mentioned three architects, two of whom had just concluded a series of lectures sponsored by the New York Chapter of the A.I.A. Perhaps they could be brought to Ithaca for a period of time to lecture to Cornell students.(124) He recommended P.B. Wight, age 33, who had been

lecturing on the History and Aesthetics of Architecture; yet Ware thought "he is perhaps too much identified with a certain school (i.e., High Victorian Gothic) to make it wise for you to put him forward as your exemplar."(125) He recommended Robert G. Hatfield, age 56, who had been lecturing on Construction, calling him "a great authority among the New York architects on all practical matters."(126) And he recommended Russell Sturgis, age 35, as "the literary chief of our order," but cautioned that Sturgis "sails in the same ship with Mr. Wight."(127)

Ware was profoundly skeptical at this point in his career about the practicality of implementing a full collegiate course of architectural instruction and described to White two other options for professional education: (1) a course of lectures like that given during the spring of 1871 by the A.I.A. Chapter in New York, or (2) the time-honored pattern of general education, office apprenticeship, reading and study, and foreign travel.(128) Ware's doubts were so great that he ran the risk of insulting White over the basic premises for establishing a program in architecture at Cornell:

> A fundamental question is whether you propose to furnish what they need to architects proper or only to draughtsmen. You could give, of course, a superior training to the latter class much more easily than you could give an extremely second-rate education to the others, and you would probably find it easier to reach them. Is it not also a question whether architecture can be studied to advantage except in cities?(129)

White was not intimidated by Ware's suggestion that there was still room in the market for a school for draftsmen, nor was he deterred by Ware's skepticism about establishing a four-year architecture curriculum in a university as isolated as Cornell. White, in fact, embraced the idea

of providing training for architects whose field of practice would be not in the cosmopolitan cities but in "our larger towns and villages":

> Unfortunately, outside of the great metropolitan cities there are very few architects who are really instructed in their profession. As a rule, they want the fundamental characteristics which a true architect should have. The result is that all over the country, churches and houses are growing up which in twenty years will be laughed at as pretentiously ugly.(130)

In June 1871 the Trustees of Cornell University approved the creation of a chair in architecture. White invited William Fogerty, an obscure English architect, to accept the position, but Fogerty declined.(131) He then turned to Charles Babcock, age 42, an architect and Episcopal clergyman, who had worked for ten years in the office of Richard Upjohn. Babcock was elected to the professorship on September 20, 1871, and he accepted the Cornell appointment over a fresh offer of an appointment in the ministry in New York City.(132)

Babcock came to Cornell in October 1871, and with White, laid out a four-year course study in architecture, within the College of Civil Engineering and Architecture. The curriculum was a balanced one. Drawing was included at least two trimesters each year for three years. The freshman and sophomore years included a heavy concentration in general studies in humanities and languages, and math and science, with four-fifths of a student's time being devoted to these subjects. Lectures on construction and materials began in the third trimester of the sophomore year, and lectures on architectural history were given throughout the junior and senior years. Lectures on heating, ventilation, acoustics, contracts, and specifications were left to the final trimester of the senior year. The training in design was minimal until the senior

year, when it occupied almost half of a student's time. In the junior year, design occupied only a fifth of a student's time, and no design was taught in the freshman or sophomore years.(133) Altogether, over the four-year course of study, the greatest amount of time was spent on auxiliary studies in math and science: 35 percent of the total hours required for a degree. Humanities and languages accounted for 16 percent of a student's time; design for 15 percent; drawing for 13 percent; construction and practice for 11 percent; and architectural history for 10 percent.(134) Some of the material Babcock developed in connection with his teaching was published. His Elementary Architecture appeared in 1876 as part of Krusi's Industrial Drawing Series, and his book on Vaults appeared in 1884.(135)

Babcock's training as a Gothicist under Upjohn and his subsequent training as a churchman did have an impact on his teaching. In the middle of his fifth year of teaching at Cornell, a group of students complained to President White that Babcock spent too little time in the drawing rooms, that the lectures he gave were "archaeological, impractical and too ecclesiological," and that "subjects specified as of great value are not taught, (particularly modern architecture)."(136) Ten of the nineteen hours in architectural history were devoted to the Romanesque and Gothic. While few examples of Cornell student designs have been found, the ones that appeared in publications show an affinity for the Anglo-American Stick and Shingle Style vernacular in secular buildings, as well as for the Early English Gothic and Richardsonian Romanesque in churches.(137)

Until the 1880-81 academic year, Babcock taught alone. That year he hired as an assistant C. Francis Osborne, who had probably worked for Calvert Vaux, to teach the design and construction courses, leaving

Babcock to teach the various lecture courses.(138) In 1894, Clarence A. Martin, a Cornell alumnus, returned to Ithaca to teach all the applied construction courses.(139) The School of Architecture was separated from the School of Engineering in 1896 to become an independent College of Architecture. Babcock stayed on for one more year, until his retirement in 1897. He was succeeded by Alexander Buel Trowbridge, another Cornell alumnus, who had gone on to study at the Ecole.(140)

Cornell did have a two-year course for special students until 1887, but perhaps because of the university's isolation, a substantial number of students stayed for the full four years and earned the degree of Bachelor of Architecture. The metropolitan setting of M.I.T. may have contributed, as much as Ware's laissez-faire attitude, to the high attrition rate of his students in Boston. Yet because of university policy, Ware's Columbia students, most of them from the New York metropolitan area, had no choice but to follow the full degree program in architecture. What Cornell and Columbia had in common was that both institutions placed the value of a full undergraduate education ahead of the expediencies of professional education. From the beginning, Cornell also provided for a course of post-graduate study, yet it is not clear what the requirements were.

Enrollments at Cornell began strong, with 20 students ready to study architecture the year Babcock arrived. Each year during the 1870s, an average of 9 new students would enter his program. During Babcock's first ten years of teaching, the average annual enrollment in architecture was 22--not far behind the average M.I.T. enrollment of 30 during the same years. Until the founding of Columbia, Cornell was the architecture school most often chosen by students from New York State. As President White had projected in the first year of the program, most were students

from the smaller towns: 44 percent came from the Hudson Valley or upstate New York. Only 19 percent came from metropolitan New York or Long Island--and only 14 percent from the five boroughs that in 1897 would become New York City. By the spring of 1881, 34 students had graduated from Cornell with the degree of Bachelor of Architecture--36 percent of those entering. By the same date, only 14 students had graduated in architecture from M.I.T.--only 6 percent of those entering. Because of the differences in emphasis between the two schools, none of the senior theses at Cornell involved design problems. Instead, they were essays on architectural history or theory. (See Appendix J.)

(c) University of Illinois

The early history of the teaching of architecture at the University of Illinois is the story of what provision the university was able to make for the instruction of one student, Nathan Clifford Ricker, who was as much self-taught in architecture as university-trained by the time he graduated in the spring of 1873.(141) Ricker was 26 and had already worked as a mill mechanic, school teacher, piano case maker, blacksmith, and carpenter before arriving at the University of Illinois in January 1870.(142) He enrolled in the College of Mechanics and Engineering, which, since the founding of the university in March 1868, had been planned to accommodate four schools: Mechanical Science and Engineering, Civil Engineering, Mining, and Architecture.(143) The sole instructor representing anything of architecture was James W. Bellangee who had graduated from the University of Michigan in Civil Engineering in 1867 and worked in the Chicago office of architect Gurdon P. Randall until his appointment in the fall of 1869 as Teacher of Architectural and Mechanical

Drawing.(144) Bellangee resigned in June 1871 and was replaced the next fall by Harald M. Hansen, who had studied for two years at the Bauakademie in Berlin. Ricker and Hansen are said to have collaborated in drafting the first description of a curriculum in architecture for the University of Illinois, published in the university catalog for 1871-72.(145) During his time as a student, Ricker was also given the supervision of the carpenter shop and given the responsibility for teaching woodworking and for making repairs to university buildings. Hansen did not return to the faculty for a second year, in 1872-73, so Ricker, entering his senior year, was left to plan his own studies, as well as to direct the work of three other students in architecture. He was awarded his graduation certificate in March 1873 and was invited to remain at the university as principal instructor in architecture, starting in the fall of 1873. Regent John M. Gregory suggested that Ricker spend the rest of the spring and summer traveling and studying in Europe. Ricker went, and for a few months, enrolled at the Bauakademie in Berlin, where his former teacher, Hansen, had been trained.(146)

Given the ways in which the University of Illinois and Nathan C. Ricker improvised to secure for him the preparation he was seeking in architecture, then to inaugurate a full course of study under his direction in 1873-74, it is not surprising that these modest, self-reliant efforts in Illinois escaped the attention of eastern educators and architects. The A.I.A. Committee on Education did not begin reporting on architectural education at the University of Illinois until the fall of 1876.(147) Several years later, Ricker was invited, along with Professors Babcock of Cornell, Lindsey of Princeton, and Sturgis of C.C.N.Y., to address the A.I.A. Convention in New York in November 1879, concerning

their respective schools, but only Sturgis appeared.(148) Ricker was finally elected a Fellow of the A.I.A., as well as a member of the Committee on Education, in absentia, at this convention. Early in August 1881, when Ware and Rogers and most of the architecture profession in Boston were occupied with finding a new Professor of Architecture for M.I.T., Ricker passed unnoticed through Boston, after being rudely received by Professor Kastner, director of M.I.T.'s Lowell School of Practical Design.(149) Ricker returned to his fall semester at Illinois, but in anticipation of the November A.I.A. Convention in Washington, he did send the A.I.A. Secretary a lengthy letter describing the architecture curriculum he had devised.(150) Ware, who himself had left M.I.T. for Columbia in September, read the entire letter to the convention as that year's report of the Committee on Education. He proceeded to comment, in passing, on the teaching at Illinois, and at greater length, on the new curricula proposed for M.I.T. and Columbia.(151)

Ricker's letter in 1881 was the first report that most of the membership of the A.I.A. had of a program that had been in operation already for eight years. While expounding on the curriculum at Illinois, it showed several considerations about architectural education not yet seen in anything written by Ware. Ricker saw three important differences between his western school and those in the east. First, it had the advantage of being remote from an urban center. (Chicago was 125 miles away.) Second, it received students from the public schools who might need remedial work before being admitted to professional studies. And third, it had to meet the needs of the student who, by being "more self-reliant, more independent in his modes of thought, and even more intensely practical, than an Eastern college student," was eager to take

as many courses as possible at one time and to get to work as soon as possible.(152)

It was this third difference which Ricker seized upon and attempted to make the best of. His philosophy of education is summed up in a further statement in which he recognized the essential difference between his program and those in the eastern schools:

> Possibly the aesthetical side of the education of the architect has been less fully developed than the practical and scientific side, because it has been my aim to send out graduates who were well grounded in the principles of scientific construction and were well fitted for office work, so far as this preparation may be made at a school; and then to improve and cultivate their tastes as much as possible in the time.(153)

In recognition of the expectations of Illinois students, Ricker had established a one-year special course of study--not for draftsmen or students wanting concentrated work in design, as at M.I.T.--but for master builders, wanting to pursue "such technical studies of the course in architecture as they may be prepared to enter upon with profit, and as will be most advantageous to them."(154) For all regular students, the curriculum had four component divisions: (1) Technical information (including elements of construction, professional practice, graphical statics, and architectural history); (2) architectural drawing (drafting, rendering, and preparation of working drawings); (3) architectural design; and (4) shopwork. The work in shop practice, unique among the collegiate programs of the decade, had two pragmatic justifications. First, it would give a university student a knowledge of a trade, so that "if he meet with reverses in life, he will still have the means of honestly earning a living." Second, it would prepare an architecture student "for taking

charge of the construction of a building, as superintendent or architect."(155)

The School of Architecture at Champaign, by virtue of its remote location in an agricultural and mechanical university, subsumed every conceivable aspect of professional and paraprofessional education. The Department of Architecture at M.I.T. was only one of several institutions in metropolitan Boston, each oriented to a different group of potential students. From time to time, Ware had devoted his energies to teaching in these various institutions: the Lowell Institute lecture series, the Massachusetts State Normal Art School, the Museum of Fine Arts School, and the Worcester Free Institute. And he could assume that the students interested in shop practice and industrial design would enroll in M.I.T.'s Lowell School of Practical Design, rather than in the special or regular academic course in architecture.

Another apparent difference between the Ware and Ricker may be as much a matter of circumstances as personal approach. Ricker's 1881 letter to the A.I.A. shows him to have a good critical grasp of the various European texts available in all branches of architecture. Similarly, the 1875 inventory of the architectural library at M.I.T. is evidence of Ware's knowledge of the literature.(156) While Ware instilled in his students an appreciation for published authorities through topical research in construction and practice and history, Ricker wanted his students to have complete sets of lecture notes on all subjects, which he prepared using a typewriter and the blueprint process.(157) But it is worth noting that, over the duration of their respective careers, Ware's major published works were texts on areas auxiliary to architectural drawing (i.e., perspective, shades and shadows, construction details, the

orders), while Ricker's published works ranged from several texts on structures to translations of Viollet-le-Duc's Dictionnaire raisonne, Guadet's Elements et theorie de l'architecture, Durm's Handbuch der Architektur, Redtenbacher's Architektonik der Modernen Baukunst, and Ungewitter's Lehrbuch der Gotischen Konstruktionen.(158)

Comparisons of the curriculum at M.I.T. and Illinois must inevitably trace the roots of the differences to Ware's sixteen months in London and Paris and Italy in 1866-67 and Ricker's six months in Berlin and Vienna and northern Europe in 1873. As shown in Chapter 1, Ware's experiences were not limited to the Ecole des Beaux-Arts, but included acquaintances at the Ecole Centrale as well as the R.I.B.A., the A.A., and South Kensington. But by the time Ricker began to take full responsibility for the architecture curriculum at Illinois, Letang had already effected a marked shift toward Beaux-Arts sensibilities and methods in the studio work at M.I.T. Ricker taught in a region in which cultural linkages, including those in building, were more strongly attached to the German-speaking nations of Europe.(159)

(2) Non-Collegiate Polytechnic Institutes

Several non-collegiate institutes of applied science and design played a major role, not so much in the training of architects, as in the training of the draftsmen and clerks who would assist them in their practice. The Franklin Institute in Philadelphia had been teaching drawing, occasionally architectural drawing, since 1824.(160) The Maryland Institute for the Promotion of the Mechanic Arts, in Baltimore, opened a Night School of Design in 1849 and, from the mid-1850s was training an average of a dozen architectural draftsmen each year.(161) By

the mid-1870s, enrollments of architectural draftsmen were averaging about 100 annually in Baltimore. The Cooper Union for the Advancement of Science and Art, in New York, from the time it opened in December 1859, offered evening courses in architectural drawing. In the first year, over 100 students were enrolled in the course.(162) The Worcester Free Institute, in Worcester, Massachusetts, opened in November 1868, and did offer some instruction in drawing for carpenters and builders, though no full course of study was available. In the fall of 1870, Ware commuted the forty miles west to Worcester "to give instruction in Architecture at the Industrial School."(163)

Attached to M.I.T. was a program of free adult education, endowed by John Amory Lowell and governed by the Trustees of the Lowell Institute.(164) Courses were offered in the evenings and on Saturday afternoons, taught by the regular M.I.T. faculty. Each year, six to eight separate courses were offered, averaging about eighteen lectures each. It was the declared purpose of the Lowell Institute "to provide substantial teaching, rather than merely popular illustration of the subjects."(165) Those who wished to attend were, therefore, asked to apply to M.I.T. in writing, "mentioning their present or prospective occupations; and where the course is of a nature demanding preparation, stating the extent of their preliminary training."(166) Ware made a substantial contribution to this program, teaching courses in five of the Lowell Institute sessions during his time in Boston. Only once did he repeat material given earlier. The lecture series which Ware developed for the evening students were:

"Architectural History and Design"
(18 lectures, December 1873 to April 1874)

"Perspectives and the Perspective of Shadows" (9 lectures and 9 lessons, November 1875 to March 1876)

"Office Work and Specifications for Architectural Draughtsmen" (10 lessons, November 1877 to January 1878)

"Elements of Architecture" (12 lectures, December 1878 to March 1879)

"Shadows and Shadows and the Perspective of Shadows" (6 lectures and 6 lessons, January and February 1880) (167)

Little is yet known about the kinds of students who attended Ware's lectures in Boston or Worcester, and it would be interesting to know whether any of the students who first met him in these courses later enrolled as special students in architecture at M.I.T. On evening schools generally, we need to know more about the trades and careers their students were pursuing, before and after their training in architectural drawing.

(3) American Institute of Architects Chapters

(a) The Profession and Its Education Activities

While the emergence of architectural instruction in colleges and universities and in non-collegiate polytechnic schools has been fairly well documented, little attention has been paid to a third option in architectural education during this period--the educational activities sponsored by local chapters of the A.I.A. For several years, before the position of M.I.T. Department of Architecture was clearly secure, the A.I.A. national organization continued to advocate the establishment of a national school of architecture. After this scheme was finally abandoned in the fall of 1870, the contribution of the A.I.A. in the field of

architectural education was most visibly embodied in the local chapters.(168) Among the options offered at one time or another by the most active chapters during the 1870s were: chapter libraries and building museums, lecture series, and competitions or prizes for junior members. Chapter-sponsored facilities and activities, however long they lasted, were for some an alternative to the collegiate study of architecture, and for others, a supplement or sequel to such study.

Certainly these local programs could not have the continuity or comprehensiveness of a collegiate curriculum. And the diversity of the audience at large which took advantage of chapter offerings--architects, draftsmen, amateurs of the arts--was far greater than the diversity in any collegiate student body. Yet the chapter programs could be seen as comparable to a special course in architecture, especially as the organized curriculum at M.I.T. was often relaxed to meet the needs of part-time and short-term students who made up the vast majority of those involved in collegiate architectural education in this period. What the chapters had to offer was also closer to home--literally, in the sense that individuals engaged in any number of pursuits in the daytime could gather in the evening to hear a lecture or do a design problem, and also closer, in the sense that the instruction was given by local architects carrying on full-time practices of their own.

These local offerings would have been viewed as a serviceable curriculum, especially by those prospective students and their mentors who still held to the belief that architectural training was to be gained in an office, with only supplementary instruction needed on certain matters of history, current practice, and design. The collective biographical documentation has not been developed, though, which would allow us to

determine who made use of chapter facilities and activities--to know in what cases the chapters served to introduce students to a field they would go on to study in school, and in what cases chapter offerings were sufficient in themselves to provide an architectural education.

By the end of the 1870s, A.I.A. chapters had been established in eight major urban centers, most of them in the northeast: New York (1867), Philadelphia (1869), Chicago (1869), Cincinnati (1870), Boston (1870), Baltimore (1871), Albany (1873), and Providence/Newport (1875). Only three of these chapters had local Committees on Education: New York, Philadelphia, and Cincinnati. (See Appendix L.) The fact that these committees were organized within several years of the formation of the chapter and were in continuous existence through the 1870s is some indication of the professional interest in architectural education in these cities. The Philadelphia and Cincinnati chapters had only modest results. The former devised but did not implement a plan for an architectural museum.(169) The latter supported, for a few years, an "architectural association" of student draftsmen.(170) The New York Chapter had the widest range of activities but was unable to sustain or institutionalize them. Boston, the home of M.I.T., never had a Committee on Education, yet the involvement of local professionals in educational matters at M.I.T. and Ware's receptiveness to these arrangements make a case study in community architectural education which is fuller in many ways than the story of chapter activities in other cities.

(b) The A.I.A. in New York

The earliest and most productive activities of the New York Chapter were focused on the formation of an architectural library and museum.(171)

As early as 1859, when the New York Chapter and the national organization were still one and the same, solicitation for a library fund was started. The reasons for creating a special architectural library had to do with both availability and access. Architectural books were costly, and an adequate selection of European publications was out of the reach of individual architects as well as the Astor Library. Furthermore, the Astor Library was closed in the evenings, when architects and draftsmen were most likely to be free to pursue their studies, and library restrictions made it impossible for users to make sketches and tracings.(172)

When the A.I.A. in 1867 sought to overcome the exclusive identification with New York which had persisted since the founding of the organization in 1857, local chapters and movable annual conventions were the first gestures toward decentralization. In 1870, the national organization went further, distributing its library to the chapters and disclaiming its intention of creating a national school of architecture. Naturally, the New York Chapter inherited much of this library and some of the zeal for promoting a school. At the second annual A.I.A. convention in 1868, the New York Chapter announced its plan for:

> ... the Architectural Library of the City of New York and the nucleus of a Museum, a Modelling School and such other conservative and educational appliances as may result in the not too distant future in a State Academy of Architectural Art.(173)

Early in 1872--even after the opening of the architecture department at Cornell the previous fall--the New York Chapter was lobbying the New York legislature in the interest of creating a State Polytechnic School. Nothing came of the idea.(174) In 1875, the Chapter heard a paper by A.F.

Oakey (partner of A.J. Bloor, A.I.A. national Secretary), "on the subject organizing a school of Architecture in the City of New York, under the auspices of the Chapter." Again, there was no result.(175) What the Chapter had already accomplished by 1871, in lieu of a school of its own, was a cooperative agreement with Cooper Union "to ensure a more complete supervision of its classes in drawing, preparatory to the study of rudimentary architecture."(176) For several years, members of the Chapter's Committee on Education worked closely with the instructors in the evening classes in architectural and ornamental drawing at Cooper Union.(177) Another indirect outcome of the educational efforts of the Chapter would be the "professorship of architecture and the arts of design" at the College of the City of New York, held by Russell Sturgis, the first chairman of the local Committee on Education.(178) The role of the New York Chapter in the emergence of the architecture program in the School of Mines at Columbia College is not yet known.

Throughout the 1870s, the architectural library remained the focal point of the New York Chapter. Individuals other than practicing members and patrons of the Chapter were placed on a guest readers register, which numbered about 90 persons by 1872.(179) The heterogeneity of the group served by the Chapter collections is evident in this report of 1870, only a year after the library and museum were opened to the general public:

> Besides the constant reference to our volumes and periodicals by practicing architects and connoisseurs, scarcely an evening has passed, since the Library was opened, in which its advantages have not been shared by students and professional draftsmen, and by mechanical apprentices and journeymen, to whom such costly advantages would otherwise be wholly unattainable. Among the representatives of the various callings who hold our Library tickets, are to be found the engineer, the journalist, the college professor and student, the merchant and clerk, the

> broker, consul, clergyman, physician, lawyer, banker, artist-painter, carver, silversmith, carpenter and stonecutter.(180)

The New York Chapter headquarters became a hospitable place for student architects and draftsmen to spend time while looking for work in the city. By 1871, the Chapter kept a register of draftsmen and of office vacancies in order to assist in the placement of these individuals.(181)

The initial plan of the New York Chapter for a lecture series in 1870-71 outlined what could almost be called a curriculum for a special course of evening study, consisting of three ten-week terms each year with lectures four days of the week. One evening each week would be devoted to each of four subjects: History of Architecture, Principles of Construction, Mathematics, and Perspective and Isometrics. Students would be examined and granted diplomas for the successful completion of a full year's work.(182) This scheme did not develop as elaborately as anticipated, but two series of lectures were offered from March through May of 1871. P.B. Wight gave ten Monday night lectures on the History and Aesthetics of Architecture, and Robert G. Hatfield gave ten Wednesday night lectures on Construction. Junior members (students and draftsmen) were admitted free, but there do not seem to have been any exams or diplomas.(183)

From what he had heard of this lecture series, Ware was impressed by the prospects of this kind of architectural instruction. In his letter of June 1871, advising President A.D. White on the creation of an architectural course at Cornell, Ware wrote:

> I am led to doubt whether a complete course of architectural instruction can profitably be undertaken, either with you or with us. I am inclined to suspect that what the profession needs is just what

> Mr. Wight and Mr. Hatfield have been doing in New York, in giving to young men already engaged in their professional work special instruction, from time to time, upon points in which their practical training is likely to leave them deficient.(184)

A fuller series of lectures was offered the following season, in two terms. Wight had moved to Chicago in October of 1871, so his longtime friend and former partner, Russell Sturgis, gave the ten Monday night lectures on the Aesthetics of Architecture, and Hatfield again gave ten Wednesday night lectures on Construction. On Friday nights, L.W. Robinson, a junior member, gave a special class on the mathematics needed for Hatfield's course in Construction. Thursday nights were set aside for papers presented by practicing members of the Chapter. There is no record that, after this auspicious start, such extensive lecture series were continued in 1872-73 and succeeding years.(185)

Competitions in design and construction were envisioned by Russell Sturgis in his initial 1870 circular on educational activities, but the first recorded competition for junior members was not until 1873-74.(186) Another competition in design was held in January 1877, using program for "A Public Library in a Country Town" and "A Music Stand in a Public Park." The drawings were exhibited, along with the current work of senior members, at the annual meeting of the Chapter in February, held at the office of Richard M. Hunt.(187)

All of these activities of the New York Chapter, discontinuous as they may have been, can be understood as the New York equivalents of opportunities distributed among several Boston institutions: the architectural library and museum at M.I.T.; the Lowell Institute free evening lectures, as well as those at M.I.T. and the B.S.A.; and the B.S.A. prizes for M.I.T. student work. Throughout the 1870s, the New York

Chapter was considerably more visible than the B.S.A. in organizing educational facilities and activities, because it could not rest secure in the knowledge that the necessary educational work was being carried on elsewhere in town.

(c) The A.I.A. in Boston

The Boston Society of Architects remained an autonomous provincial organization for three-and-a-half years before finally joining the A.I.A. as a chapter in 1870. More than any other chapter, the B.S.A. helped to further the cause of the professionalization of architecture in an introverted way, by devoting most of its efforts to the continuing education of practicing architects, providing a forum for the discussion of historical and technical papers and for the critique of current work. The Boston organization had the advantage of existing alongside a collegiate school of architecture, which soon after its founding was carrying out many of the educational functions which were otherwise carried out in an ad hoc way by the various A.I.A. chapters.

The B.S.A. was organized in the spring of 1867, probably on the initiative of Ware's partner Henry Van Brunt. Ware was still in Europe and would not return until December of that year, and would not be ready to open the architecture department at M.I.T. until October 1868. Both the B.S.A. and M.I.T., therefore, had to define their roles simultaneously, avoiding duplication of functions while finding ways of lending support to each other.(188)

By the time the B.S.A. first gathered at M.I.T. in March of 1868, Ware had organized the items he had acquired in Europe into the nucleus of M.I.T.'s architectural museum.(189) This collection did not entirely

preempt the B.S.A. from expressing an interest in an architectural museum of some sort, but their lack of a permanent space prevented any collection from taking shape.(190) The B.S.A. was reluctant to be encumbered by a library, preferring the advantages of the cooperative agreement negotiated with the Boston Public Library in November 1867. This agreement authorized the loan of otherwise non-circulating books to B.S.A. members and their students. And the Library welcomed suggestions from B.S.A. members concerning acquisitions.(191)

With the M.I.T. Department of Architecture opening its doors to special students, Boston draftsmen had easy access to Ware's lectures on architectural history and construction and practice. The B.S.A., therefore, felt no need (as did the New York Chapter) to furnish a special lecture series for draftsmen and office assistants. Indeed, the earliest efforts of the B.S.A. were aimed at promoting an exchange of ideas among the senior professional members themselves. At the same meeting that Ware was elected a member of the B.S.A. (December 3, 1867), Charles A. Cummings proposed that members should begin to present papers at the biweekly meetings. Throughout the 1870s, this practice continued, with the membership showing considerable versatility in preparing papers concerning architectural education, professional practice, building technology, architectural history, decorative and fine arts, and contemporary American and European architecture. Ware himself presented papers on education, building technology, and contemporary architecture, saving his lectures on history and the allied arts for M.I.T.(192) His students were invited to attend these B.S.A. sessions, held (except for 1872-75) in the architectural museum at M.I.T.(193)

At the meeting when the B.S.A. finally decided to affiliate itself with the A.I.A. as the Boston Chapter (November 4, 1870), Ware proposed enhancing the casual discussions of current work by inviting members to lay out drawings of their work-in-progress, "showing what they desired to do, what they were obliged to omit for reasons of economy or whims of their clients...."(194) By the middle of the decade, Van Brunt made an effort to revive the discussion of members' work, this time proposing that the B.S.A. meet at recently completed Boston buildings to participate in on-site critiques.(195) One or two members would be designated to prepare opening remarks, the architects themselves would respond, then a general discussion would follow. Half a dozen of these peripatetic critiques were done, between February 1876 and June 1877, taking in such major new works as Memorial Hall and Trinity Church.(196)

By the middle of the 1870s, the B.S.A. also became interested in reaching a wider popular audience, by offering a series of public lectures comparable to the lectures offered by the New York Chapter several years before. These lectures were planned to provide a more general survey of the field of architecture than the courses of lectures sponsored by Boston's Lowell Institute.(197) For ten evenings in the spring of 1875, various B.S.A. members lectured in the auditorium at M.I.T. on some topic pertaining to contemporary architecture. As was the experience in New York, the lectures, "intended for draughtsmen and students, were attended not by those classes only, but by large numbers of ladies and gentlemen quite outside the lines."(198) During the spring of 1876, this lecture series was given again, outside Boston, at the Worcester Free Institute.(199) Like the New York Chapter, the B.S.A. lost interest in its lecture series after two seasons, realizing that to perpetuate such

lectures, professionals would have to take the time to prepare new material or go further afield to reach new audiences.

At the close of the 1868-69 academic year, the first year that the M.I.T. architecture department was in full operation, Ware presented to a meeting of the B.S.A. the student drawings prepared in his classes that spring.(200) While there is no record of any immediate reaction, a resolution was adopted by the B.S.A. on December 22, 1869 establishing a pair of prizes in design and construction for students at M.I.T.(201) The initial separation of prizes was a recognition of the basic separation within the M.I.T. curriculum between the study of design and construction. Separate B.S.A. juries would review the collected work of third- and fourth-year students, awarding one prize and honorable mentions in each field. (See Appendix K.) While few details on the judging for the B.S.A. prizes have been found, it is clear that by at least 1878, the two prizes were being awarded as first and second prizes for portfolios consisting mostly of design work.

Probably the most significant result of the B.S.A. prizes was the opportunity of the profession to review the results of the design teaching which it had delegated to M.I.T., and for the best students to gain the attention of the most influential Boston architects of the time. Few of the students had prior or concurrent experience in local offices, so it cannot be said that the judging involved any rivalry among offices, such as existed in the Paris ateliers. Nor was the winning of a B.S.A. prize necessarily a means of entry into a Boston office or a certificate that the student was ready to try for admission to the Ecole. The careers of the prize-winning students, immediately subsequent to their recognition by the B.S.A., are varied. For every student who did enter a Boston office

or the Ecole des Beaux-Arts, another entered upon a modest provincial practice or gave up the profession entirely. Yet about half of the winners would be heard from again in some notable way--a percentage significantly higher than the one in four of M.I.T. architecture students generally who would go on to a noteworthy regional or national practice.(202)

As early as 1869, the topic of American colonial architecture had been discussed by the B.S.A. (and by the A.I.A. in its national convention). And by 1873-74, Ware had made measured drawing part of the curriculum in drawing and design.(203) The B.S.A., "with a view to stimulating archaeological research and the preservation of a record of colonial work in New England," decided on April 4, 1879 to sponsor a competition in measured drawings prepared during summer vacation of buildings, architectural details and furniture from the colonial period through the early years of independence. The relation of this documentary work to unresolved questions "concerning the history and sequence of our architecture" was emphasized in the announcements of the competition. Ware, Robert S. Peabody, and William G. Preston were to serve as the jury, and the B.S.A. hoped to publish a lithographed portfolio of the drawings submitted. For reasons not known, nothing came of this effort.(204)

Another venture of the B.S.A. in its role as a patron of architectural education was directed at craftsmen engaged in the making of architectural ornament, details, and accessories. On December 1, 1876 a competition was announced for the modeling of a frieze, and it was hoped that future competitions would feature wrought iron and brass work and carving in wood and stone.(205) Fifteen friezes were submitted in January 1877, and the prize was awarded to John Evans, a carver who worked for

H.H. Richardson and taught in the school of the Museum of Fine Arts. There were no further B.S.A. competitions in the allied arts.(206)

b. Ware Reviews New Opportunities in Architectural Education

Throughout his career, Ware was able to survey developments in architectural education from his vantage point as a member of the A.I.A. national Committee on Education. The committee had been created late in 1866 or early in 1867, when Ware was in Europe preparing to assume his teaching duties at M.I.T. Ware was, nonetheless, included as a member of this committee from its inception, in recognition, no doubt, of the fact that he was the one person in the country holding the title of Professor of Architecture. After Ware had been actively teaching for two years at M.I.T., he was elected Chairman of the committee at the Philadelphia convention in November 1870 --the first year the A.I.A. held its annual meeting outside New York. He would deliver his first report as Chairman in November 1871, when Boston--and M.I.T.--were hosts to the fifth annual convention of the A.I.A. During his six years as Chairman, Ware had the opportunity to observe the emergence of most of the new collegiate architecture departments and special non-collegiate programs already mentioned, and to comment on them in each of his annual reports.(207)

Ware's comments were generally written from the point of view of prospective students needing to understand the alternatives available for architectural study, or from the point of view of practicing architects needing to understand the merits of the several programs then in operation.(208) In his first report, given in Boston in 1871, Ware spoke impartially of what he called "the five schools now established." The collegiate schools included M.I.T. (beginning its fourth year in

architectural education) and Cornell (where instruction in architecture began the month before). The non-collegiate "schools" included the architectural course at the Worcester Free Institute (where Ware had taught an evening course during the previous academic year), the architectural course at the Franklin Institute in Philadelphia, and the lecture series organized by the New York Chapter of the A.I.A. (first offered in the spring of 1871 and expanded in the fall and spring of 1871-72). In his report, Ware offered no evaluation of any of these programs. He spoke of the common purpose of all formal architectural instruction--to prepare students to benefit from their experiences in office work or from further study abroad. He was generally optimistic about the prospects for American architectural education--particularly at the collegiate level:

> It is to be hoped that in time the character and extent of the work done by these schools may become such that the necessity of going abroad for purposes of study merely, will be less felt. Meanwhile a thoroughly digested scheme of native study--native to the soil, and suited to our special wants--will probably be developed, and be moulded into the most efficient shape by the process of variation and natural selection of constant trials and occasional successes, to which all the best and most permanent work owes its form.(209)

During the remainder of his time as Chairman of the Committee on Education, Ware's comparative assessments of these and other educational ventures became more explicit. One group of institutions, the collegiate schools, began to receive more extensive coverage, as the non-collegiate polytechnic schools and the activities of the A.I.A. Chapters were receiving less and less attention and favorable comment. Ware's remarks to the 1872 convention of the A.I.A. in Cincinnati show the beginnings of

his reservations about the limited nature of architectural education in the non-collegiate programs. These were "strictly schools of science" and tended to be deficient in "professional and artistic training." He acknowledged their usefulness only insofar as they could teach students "enough of the elements of architectural knowledge and skill to fit them to pursue their studies either in an office or in the more special architectural schools."(210)

By the time of the 1873 A.I.A. convention in Chicago, Ware had concluded that the polytechnic schools he was aware of--in Worcester, Philadelphia, and Baltimore--did not "seriously undertake to afford a proper professional education." They may "give a certain amount of elementary instruction in architectural drawing," but, he concluded, they "do not carry the work far enough to require from us more than a respectful mention." This was Ware's last "respectful mention" of this aspect of architectural education, and the A.I.A. Committee on Education in later years would have nothing to say about the non-collegiate schools that were nonetheless flourishing and proliferating.(211)

When Ware delivered his second education report in November of 1872, he was already able to offer some tentative comparisons between M.I.T. and another major school. Charles Babcock had been teaching architecture at Cornell for a year, and at M.I.T., Eugene Letang had been teaching design for a semester:

> At Ithaca the main effort seems to be directed towards furnishing solid information and practical training, and the students accordingly give their time mainly to the study of the best examples, copying, drawing them out, and sketching them, and thus acquiring technical skill, while they furnish their minds with best knowledge. At Boston the main effort is given to the series of problems in original design, in which every student is allowed to take part as soon as he can draw

> his orders, everything else being secondary and subsidiary to this.... The difference is, indeed, in the blood--one deriving its methods and views from English experience and example, the other from French.(212)

From Ware's reports, A.I.A. members would have concluded--and correctly--that M.I.T. and Cornell had the two most securely established collegiate programs in architecture. Syracuse University, the University of Illinois, and the University of Michigan received only passing mention, because their architecture programs were too new or too small to have shown results. Having already dismissed the non-collegiate polytechnic schools, it remained for Ware to note the importance of the A.I.A. itself in the field of continuing education:

> The meetings of the Chapters afford however, of course, the most obvious means of promoting the educational interests both of practicing members of the profession, and of the young men who are just entering it.(213)

An underlying theme of Ware's reports was that the collegiate schools of architecture could perform a valuable service in helping students make the most of such traditional means of learning as office study and foreign travel. His argument rested on conveying a sense of the pride of the profession and the inherent difference between draftsmen and architects in the seriousness of their educational commitment. He did concede that all of the new schools, including the non-collegiate polytechnic institutes, could "hardly fail to answer an immediate end in furnishing us with a somewhat better class of draughtsmen than have hitherto presented themselves, and in relieving us from much of the labor of their early training." What made the collegiate schools unique was their obligation

... to impress their pupils with a sense both of the dignity and of the difficulty of the work they are undertaking. If these young men can be made to see that many years of pupilage, in schools and in offices, are needed, in the nature of things, to bring them where they wish to stand, and can be made to feel that such a thorough training is worth all it costs, and that nothing less is worth having, it will profit not only themselves and us, but the country. Such an appreciation of their calling, and such an ambition to be worthy of it, would do more than anything to temper the impatience and lightness of mind which hurries so many young men into the independent practice of their profession, and leads them, once they have set up for themselves, to give over study and self-improvement altogether.(214)

Chapter 5

M.I.T. STUDENTS, 1868-1881: BACKGROUNDS AND CAREERS

Introduction

How much of an impact Ware and his architecture curriculum at M.I.T. had upon the careers of his students is difficult to assess. In so many cases, the causal linkage between what a student did in one to ten semesters at M.I.T. and what he or she did after that is uncertain, even in the years immediately after attendance at M.I.T. In the sixteen years that Ware was associated with M.I.T. (1865-1881), 234 students came in contact with his program in architecture. Some of them stayed for only a semester; most stayed for a brief year or two of concentrated study; a very few stayed on for as long as five years.(1) Most students came away from M.I.T. with sufficient drafting skill and design literacy to persuade busy architects to offer them positions as draftsmen or assistants. Some students remained in these subordinate positions for quite some time, moving from firm to firm, and eventually passing through some of the major Boston and New York offices of the period. Others stayed only long enough to advance their drawing ability beyond literacy, a little way toward fluency, in expectation of going on the Ecole des Beaux-Arts. After five or ten years, the preparatory phase of the careers of M.I.T. alumni was usually behind them. Many settled in Boston or New York, but even more returned to their home towns or regions. Some established practices in places where their duties as job superintendents for major firms had taken them. The documentation of many of these careers is still fragmentary. Appendix E presents a synoptic view of the major career steps of M.I.T. architecture alumni.(2)

1. Backgrounds and Careers: Three Views of the Relationship

The aim of this chapter is to look at the various steps in the professional education of the earliest M.I.T. architecture students, considering in turn the relationships between students' geographical origins and their chosen places of later practice, between students' family backgrounds and their choices in education, between M.I.T. students and the major architectural offices of the period, and between M.I.T. students and the premier architectural school of the nineteenth century, the Ecole des Beaux-Arts.(3)

There are two other approaches to describing the relationship between students and careers, and both of these have limitations. First, there is the retrospective approach, crediting M.I.T. whenever a successful architect is found who started there. Second, there is the prospective approach, identifying various groups of M.I.T. students according to their accomplishments by the time they left school and evaluating their subsequent careers in light of this knowledge. The retrospective approach really has little purpose other than to give M.I.T. and Ware the credit for training any noteworthy figure who studied at the school for whatever length of time between 1865 and 1881. Such an approach is historically short-sighted as long as it is concerned with that one decisive episode--"studied at M.I.T."--without taking into account the nature of that episode in relation to others. What was its duration? What was its causal connection with later events? What sort of experiences took place within the episode? And what was the student's attitude toward these experiences?

The other approach, the prospective one, is somewhat more satisfactory, in that it does take into account the duration of the M.I.T.

experience and its quality (as indicated by such achievements as degrees and honors). This approach is essentially predictive, for it takes a finite set of variables associated with work accomplished by students at M.I.T. and relates these to a set of observations about the work eventually (or cumulatively) accomplished in the professional careers of M.I.T. alumni. But this approach shares with the retrospective approach the defect of giving disproportionate weight to the M.I.T. experience, without looking at the experiences intervening between a person's student days and mature career. By being predictive, it is also determinative, suggesting that eventual achievement is more strongly related to student achievement than to any other intervening influences.

2. The Retrospective View: A Sampling of Cases and Patterns

A major fallacy of the retrospective crediting of M.I.T. is that a year or two of enrollment there can be allowed to eclipse the fact that a student may have arrived with two to four years of collegiate training elsewhere. One in every five of the architecture students during Ware's time at M.I.T. had such a background. Also, some qualification is needed, particularly in the early years of the operation of the department, in saying that a student was trained at M.I.T. when he was concurrently working in the office of Ware and Van Brunt, Peabody and Stearns, or another Boston firm. The interplay between the school and the profession will be considered later in this chapter, when we take up the matter of office apprenticeships.

Concentrating retrospectively on the careers of the most illustrious careers of late nineteenth century architects who happen to be M.I.T. alumni can be particularly misleading. For Louis Sullivan and Cass

Gilbert, the most prominent of Ware's M.I.T. students, M.I.T. was more a place of frustration than of precocious accomplishment. Both left dissatisfied after only one year.(4) Several other prominent architects with M.I.T. credentials from the 1860s and 1870s never studied under Ware. Robert S. Peabody was at the school in 1866-67, while Ware was abroad; Wilson Eyre took only the first-year course of general studies in 1875-76; Henry Ives Cobb transferred to Harvard's Lawrence Scientific School after taking only the first-year general course at M.I.T. in 1876-77. Joseph L. Silsbee (M.I.T. 1869-70), Glenn Brown (1875-76), and George F. Shepley (1880-82) all had begun liberal arts or technical studies elsewhere before coming to M.I.T., and all served well-placed apprenticeships after their year or two of formal studies in architecture.

Aside from those M.I.T. students who would emerge among the distinguished designers and professional leaders of their generation, there were half a dozen other noteworthy groupings:

a. alumni who later joined together in partnerships--most of them locally prominent, some of them nationally known;
b. alumni whose private practice was complemented by service in the public sector;
c. alumni who worked behind the scenes as long-time draftsmen or assistants or office managers in major firms or in the office of the Supervising Architect of the U.S. Treasury Department;
d. alumni who formed a pool of freelance draftsmen available to major firms;
e. alumni who found life-long careers or short-term appointments in architectural education;

f. alumni who made major or incidental contributions in architectural publishing.

a. Partnerships formed by M.I.T. Alumni

During the 1880s and 1890s, M.I.T. alumni from the Ware years would come together to form some of the better known firms of the late nineteenth century in Boston and the nation at large. Among the most prominent, in chronological order of formation, were: Rotch and Tilden; Andrews and Jaques; Cobb and Frost; Shaw and Hunnewell; Longfellow, Alden and Harlow; and Heins and LaFarge.(5) At least two dozen partnerships involving two or more M.I.T. alumni arose in these decades. Some 44 alumni--almost one in every five--are known to have joined in partnerships at some point in their careers. Almost two-thirds of the partnerships were formed by classmates--men who had at least one year in common at M.I.T. The remainder were formed by fellow alumni who were near contemporaries. While the average alumni partnership lasted for about a dozen years, some were of impressive duration. Josselyn and Taylor of Cedar Rapids practiced together for 42 years; Andrews and Jaques of Boston for 33; Whidden and Lewis of Portland, Oregon, for 30; Stickney and Austin of Lowell, Massachusetts, for 25; and Heins and LaFarge of New York for 21. No partnerships were formed within the first three years of leaving school, during which time M.I.T. alumni were generally working as office assistants or studying and traveling abroad.(6) Indeed, the average time between leaving M.I.T. and entering into partnership with a fellow alumnus was about nine years. An indication of alumni solidarity through an informal network of continuing communication is found in the five partnerships formed in the 1890s: Chamberlin and Austin, Hoppin and

Ely, Lewis and Paine, Stickney and Austin, Whidden and Lewis. Each of the principals involved had been away from M.I.T., working in other firms between thirteen and nineteen years, before seeking out a fellow alumnus and starting a practice together. Appendix G gives a listing of known partnerships formed by M.I.T. alumni.

The remainder of the careers mentioned in this section are those of single alumni. With few exceptions, they spent only one or two years at M.I.T., and other factors certainly must be taken into account in tracing the directions of their careers. What follows are a series of short summaries of career paths and contributions often overlooked as the attention of historians has been focused on preeminent individuals and familiar partnerships.

b. M.I.T. Alumni as Public Architects

Two Supervising Architects of the U.S. Treasury Department were former classmates at M.I.T.: William M. Aiken (M.I.T. 1877-79), who served from 1895 to 1897; and James Knox Taylor (1877-79), who served from 1897 to 1912. George L. Heins (1879-82), of Heins and LaFarge, served as New York State Architect from 1899 to 1907; and Clarence H. Johnston (1878-79) served as State Architect for Minnesota State Institutions from 1901 to 1930. Edmund M. Wheelwright (1871-72/1876-77) served as City Architect of Boston from 1891 to 1895. Heins, Johnston and Wheelwright held their public appointments concurrent with their continuing work in private practice; Aiken and Taylor had interludes of public service in the midst of successful careers in private practice.(7)

c. M.I.T. Alumni as Long-term Office Assistants

While some alumni gained reputations as principals of nationally or locally prominent firms, others had little visibility in their careers but performed significant functions as head draftsman or office managers in major firms. Amos J. Boyden (M.I.T. 1870-75) rose from a position as draftsman in the office of Cabot and Chandler to head their Philadelphia office. All the rest of these career office assistants had only one or two years at M.I.T. Frank M. Howe (1868-69) served for over ten years as draftsman for Ware and Van Brunt and later became Van Brunt's partner in Kansas City. William M. Kendall (1876-78) worked as office coordinator for McKim, Mead and White for twenty-four years before being taken into partnership. Pierce P. Furber (1875-77) directed the St. Louis office of Peabody and Stearns and was taken into partnership after ten years. David C. Hale (1880-82) advanced from draftsman in the office of H.H. Richardson to construction supervisor and head of the drafting department in the successor office of Shepley, Rutan and Coolidge.

Other M.I.T. alumni in noted firms were: Robert Williams Gilbert (1880-81), head draftsman with Rotch and Tilden; Joseph J. Gracea (1876-78), head draftsman with Sturgis and Brigham; Walter C. Hunting (1879-81), head draftsman with Henry Hardenbergh; and Edward Nichols (1880-81), designer with Little and Browne in Boston.

Several M.I.T. alumni worked for extended periods of time as draftsmen, quantity surveyors, or job superintendents in the office of the Supervising Architect of the Treasury Department: Ervin S. Hubbard (M.I.T. 1872-73), Henry P. Kendall (1872-73), George R. Mann (1875-76), Normand S. Patton (1873-74), and Charles Terrell (1874-75).

d. M.I.T. Alumni as Freelance Draftsmen

Other relatively obscure alumni had no apparent long-term connections with any particular office but may have functioned as freelance draftsmen available to various offices. In Boston, where research in the city directories has provided more thorough documentation than elsewhere, it appears that the following individuals were working as unattached draftsmen for extended periods during the 1870s, 1880s, and 1890s: Jean Hackett (1880-81--one of two women trained in architecture at M.I.T. during the Ware years), Henry H. Morse (1869-70/1871-72); Christel Orvis (1866-69), and George F. Underwood (1875-76). John L. DuFais (1876-77), who worked briefly for Richardson, seems to have served as a freelance draftsman in New York. In addition to being available for general drafting work, some of the M.I.T. alumni in Boston did frequent work as delineators of plates published in the American Architect and Building News: Samuel J. Brown (M.I.T. 1872-73), Edward Dewson (1874-75), Frank M. Howe (1868-69), and William C. Richardson (1873-75). Whether they prepared plates for the firm whose work was published, whether they worked mainly for one firm and did outside work for other firms, or whether they were on call to the editors, W.P.P. Longfellow and William Rotch Ware, has not yet been determined.

e. M.I.T. Alumni as Educators

Before he left M.I.T. for Columbia, Ware trained three men whom he would soon invite to join him in his expanding architecture faculty in New York: A.D.F. Hamlin (M.I.T. 1876-77), Charles A. Harriman (1878-80), and Grenville T. Snelling (1878-82). H. Langford Warren (1877-79), who would

be called to start the Department of Architecture at Harvard in 1893, was a student of Ware. Several other M.I.T. alumni from the Ware years held shorter lectureships in architecture at major universities: Thomas O'Grady (1877-80) and James Knox Taylor (1877-79) at M.I.T.; Edmund M. Wheelwright (1871-72/1876-77 at Harvard; Amos J. Boyden (1870-75) at the University of Pennsylvania; and Harry W. Jones (1880-82) at the University of Minnesota.

f. M.I.T. Alumni and Architectural Publishing

One of Ware's students--his nephew, in fact--made his career in architectural publishing. William Rotch Ware (1871-73) returned from his studies at the Ecole des Beaux-Arts in 1876 to work as Assistant Editor of the newly established American Architect and Building News. In 1881 he succeeded W.P.P. Longfellow as Editor, a position he held until 1907.(8) Edward Dewson (1874-75), who had worked early in his career as an illustrator for the American Architect, later served as editor of a regional periodical, the Southern Architectural Review (Houston).(9) Frank Kidder (1880-81) would publish the first edition of his Architects' and Builders' Pocket-book in 1885, and this standard office reference work would go through numerous editions until the 1940s.(10) Arthur Little (1870-75) would make one of the earliest contributions to the documentation of the Colonial Revival in his Early New England Interiors (1877).(11) Other M.I.T. alumni, whose practice included or even specialized in middle class domestic commissions, published design portfolios or other books in the popular architectural press. Albany architect William M. Woollett (1868-70) published Villas and Cottages, or Homes for All in 1876 and Old Homes Made New in 1878, through the New York

architectural publisher, Amos J. Bicknell. New York architect Arnold W. Brunner (1877-79) published Cottages, or Hints on Economical Building in 1884, and with his partner Thomas Tryon (1878-81), he published Interior Decoration in 1887, both through the New York publishing house of William T. Comstock, successor to Amos J. Bicknell. Indianapolis architect Louis H. Gibson (1872-73/1874-75) published Convenient Houses through the Thomas Crowell Company in New York in 1889. And Buffalo architect William S. Wicks (1874-75) published Log Cabins: How to Build and Furnish Them through Forest and Stream Publishing Company of New York in 1889. The so-called vernacular domestic architecture of the 1870s and 1880s was actually being produced and promoted at all levels of sophistication, and among the M.I.T. alumni there those who recognized the strength of this market and were prepared to design for it.(12)

3. The Prospective View: A Sampling of Cases and Patterns

The principal limitation of the prospective approach is that it concentrates on only a few characteristics of formal architectural education as an indication of future performance. Using the prospective approach to identify what would seem to be the most distinct subgroups among M.I.T. students and to predict later achievement in relation to a single factor in the M.I.T. experience only demonstrates that some of the most salient characteristics are in the long run the least significant.

The most basic division within the student body at M.I.T.--in all departments, not only architecture--was between regular students, intending to stay for four years, do a thesis and earn a degree; and special students, never candidates for a degree. With the expansion of the architecture program from two years to three in 1874-75, an increasing

number of students began to proceed through the curriculum as candidates for a degree. Even so, there was no year in which the architecture department had more than a 10 percent share of the regular degree students enrolled at M.I.T.(13) By Ware's last year of teaching in Boston, only 14 degrees had been awarded in architecture, compared with 99 in civil engineering, 57 in mining engineering, 49 in mechanical engineering, 37 in chemistry, and 24 in other fields.(14) What was distinctive about the architecture department during the Ware years was the large number of special students who came to work in his program. On the average, five out of every six students of architecture were special students. While the inauguration of the three-year course of study in 1874-75 did have the intended effect of increasing the number of regular students in the department, this change further encouraged the enrollment of special students, probably because they could be placed in more clearly defined courses at whatever level seemed appropriate. During the later 1870s, there were an average of 25 special students in architecture in any year. Because Ware always welcomed special students in his department, they eagerly enrolled, and throughout the last seven years of his teaching in Boston, the Department of Architecture had a disproportionately large share of all the special students at M.I.T.--29 percent of the whole group of special students from 1874-75 through 1880-81. (See Appendix B.)

Some of those who started as regular students in architecture gave up their intentions of earning a degree and became special students. A few of them dropped out of school before their fourth and final year.(15) The majority of the regular students maintained their steady progress through the designated curriculum in architecture and eventually earned their degree. The relative insignificance of this small group of regular

students as a pool of future talent must be conceded when we look at the careers of those 14 students who earned the Bachelor of Science in Architecture during Ware's years at M.I.T. Four of them (Dowse, '74; Baker, '78; Eaton, '78; and Higgins, '78) never practiced architecture or left the profession within several years of graduation, and one (Hartwell, '79) died just ten years after finishing his studies. Two (Phillips, '73, and Wilkes, '81) devoted more of their careers to the practice of civil engineering than architecture. One (Snead, '81) managed an architectural iron works. That accounts for more than half of the group already. Four (Beal, '77; Capen, '77; Chamberlin, '77; and Lewis, '81) maintained modest local practices in the Boston area. The remaining two (Boyden, '75; and Furber, '77) achieved important positions as managers of the branch offices of nationally recognized firms: Boyden, with Cabot and Chandler in Philadelphia; Furber, with Peabody and Stearns in St. Louis.(16) It should be emphasized that, during these earliest years of architectural education in American, a four-year curriculum leading to an undergraduate degree in architecture was not yet the norm in professional preparation, nor was it even the most productive way of taking advantage of the collegiate program in architecture available at M.I.T. In fact, it was from the larger group of special students that the most promising professionals emerged.(17)

Ware's curriculum and his manner of directing the department made the architecture program at M.I.T. flexible enough to accommodate students for a single productive year--or maybe two. Of the 214 architecture students who finished their studies at M.I.T. between 1868-69 and 1880-81, 109 of them (51 percent) stayed for only a year. Another 66 (31 percent) left after two years. Only 18 stayed for three years. For special students, a

three-year stay represented either dedication or indecision; for regular students, it meant stopping just short of becoming eligible for a degree. Another 18 stayed for four years, and 3 for as long as five years. Two out of three of those who had the class credits to earn a degree actually prepared a thesis and graduated.(18)

An important qualification must be introduced here. It has not been adequately noted--even by Ware and his contemporaries--that a considerable number of these special students who stayed at M.I.T. for only a year or two were in fact graduate students, and that Ware's program was providing a postgraduate education in architecture for students who had earned a baccalaureate degree in liberal arts or the applied sciences at some other institution. A smaller number of students transferred to M.I.T. for the special purpose of studying architecture, after having begun their college education elsewhere.(19) This group of 46 students with prior collegiate backgrounds had a career record considerably more distinguished than the group of regular students who earned only the four-year undergraduate degree in architecture from M.I.T. It is likely that their additional years of maturity and the broadening influence of their general studies had an immediate effect on the way these postgraduate or transfer students approached the study of architecture and a lasting effect on the way they were able to carry their learning in the world. Whatever their motivations, this group was particularly successful in seeking out further practical and formal training immediately after leaving M.I.T.--experiences which complemented and culminated all their prior years of education.

4. The Integrated View: Four Problems

The retrospective and prospective views tend to be concerned with the association between factors widely separated in time, such as a student's attendance and type of study at M.I.T. and his eventual career accomplishments. The integrated view, however, tends to be concerned with the association between factors more closely connected in time, such as a student's background immediately before coming to M.I.T. and various events in his continuing education or early career immediately following his studies at M.I.T. By looking at the kinds of students who chose to come to M.I.T. to study architecture and the kinds of further education or apprenticeships open to them after they left M.I.T., it is possible to gain a better understanding of the function and contribution of Ware's program of architectural education.

Four problems yet to be examined allow us to apply the integrated view to the most significant factors in the backgrounds and early careers of students: geographical origins, family backgrounds, office apprenticeships, and further study at the Ecole des Beaux-Arts. After an introduction to these four problems, each will be taken up in turn and examined in light of the evidence.

The dual regional and cosmopolitan role of M.I.T.'s architecture program was probably a result of the dual regional and cosmopolitan role of Boston itself in American cultural history. The appreciable number of students from beyond the New England region was also, quite simply, a result of the fact that M.I.T.'s architecture program could accommodate twice as many students annually as its largest competitors, Cornell and the University of Illinois. The drawing power of M.I.T. for a prospective student of architecture was strong enough to make it the choice of a large

majority of New Englanders and some of the most gifted students from the rest of the country. Yet the power of an M.I.T. education to overcome regional inertia in early and later careers was surprisingly weak. Alumni tended to put their skills to work close to home. Relatively few established themselves in New York or other prosperous nation-class cities, other than Boston (where so many of them had been raised).

Family background, as measured by the occupational status of a student's father, is another factor which for the duration of a person's student career, remains involved in a series of career options and choices. In a previous section, it was noted that nearly four dozen of the M.I.T. architecture students of the Ware years were, in fact, postgraduate students, being alumni of another college. Many of these well-educated men went on from a period of studies at M.I.T. to further architectural studies in Paris. There they were joined by another distinct group of M.I.T. alumni--men from mercantile families, who apparently went on to study architecture in Paris for the prestige value of the experience. Alumni in this latter group were also the most likely to abandon architecture for other activities early in their careers.

Several major architectural offices in Boston and New York were particularly receptive to hiring M.I.T. alumni in relatively responsible positions. A period of apprenticeship in the office of Ware and Van Brunt, Peabody and Stearns, H.H. Richardson, or McKim, Mead and White was often as important a career step for an alumnus as a period of further study in Paris. While the continuing education of M.I.T. alumni in most offices was, at best, only incidental to the routine of current work, Ware and Van Brunt and H.H. Richardson are known to have made conscious efforts at various times to provide for exercises and directed study above and

beyond the daily work at hand. These offices, however, had no association with M.I.T. as ateliers comparable to the association between the Paris ateliers and the Ecole des Beaux-Arts. Until the M.I.T. Department of Architecture opened in 1868, Ware and Van Brunt had been taking responsibility for the informal training of certain men in their office. Ware, who was more receptive to special students than any other professor at M.I.T., was also more receptive than any other architect in Boston to allowing students to work in his firm before or during their more systematic studies with him at M.I.T.

The final problem to be considered involves the half-dozen educational paths typically followed by American students who eventually arrived in Paris for the culmination of their architectural studies. During the 1870s and early 1880s, Ware's program at M.I.T. was the single most important common experience for American students bound for the Ecole or work in a Paris atelier. The M.I.T. experience should be seen, though, as only one logical step for the many purposeful students who already had an undergraduate education, or who were aware of the advantages to be gained by a period of office apprenticeship between M.I.T. and the Ecole.

a. Geographical Origins and Career Paths

While M.I.T. was the one American architecture school during the 1870s with a substantial student population from beyond its immediate region--the one school that could therefore be considered in any way cosmopolitan--a large majority of M.I.T. students did, nonetheless, come from the New England region. Of the 234 students who studied architecture at M.I.T. at some time during Ware's term as head of the department, 167 (seven out of every ten) came from New England. As many as 136 came from

Massachusetts, and 114 (almost half of all the architecture students) came from within twenty-five miles of Boston.(20) The yearly shifts in the student population, by place of origin, can be examined in detail in Table 5.1 (page 256).

For the first six years of the operation of the M.I.T. architecture department (1868-74) an average of 63 percent of the students came from the metropolitan Boston area, while only 13 percent came from outside New England. For the remaining seven years of Ware's teaching (1874-81), the Boston area contingent averaged only 37 percent, nearly in balance with the 40 percent of the architecture student population coming from beyond New England. Of the 67 students from outside New England who attended M.I.T. during Ware's thirteen years of teaching, a third came from in or near the major midwestern and western cities which looked to Boston as their educational center. Five came from Cincinnati or the surrounding area. Four each came from the areas around Minneapolis-St. Paul and St. Louis, three each from Chicago and Indianapolis, and two from Milwaukee. One each came from Detroit, Louisville, Denver, and San Francisco, for a total of 25 students from metropolitan areas outside the east coast.(21) The next largest non-New England contingent came from the major metropolitan centers of the Middle Atlantic region: eleven from New York, three from Baltimore, two from Washington, and one from Philadelphia. A small group of nine students came from upstate New York, from Albany west to Buffalo. Only two students came from the South. There were three foreign students, only one of them from Canada.(22)

The specific choices made by certain students concerning their own architectural educations give some measure of the drawing power of Ware's program at M.I.T. relative to other collegiate architecture programs of

the 1870s. George Lewis Heins of Philadelphia decided to transfer to M.I.T. in 1879 after completing his sophomore year at the University of Pennsylvania, rather than remain there to pursue his special studies in architecture under Professor Richards.(23) George Foster Shepley of St. Louis made a similar decision in leaving Washington University after 1879 and proceeding to enter M.I.T. in 1880.(24) William Sidney Wicks from Oneida County, New York, transferred to M.I.T. in 1874 after two years of studying under Professor Babcock at Cornell.(25) These students had begun their technical collegiate education near home at a school where architecture was taught to some extent. Not entirely satisfied with the prospects of finishing their studies at those schools, they sought out the opportunities at M.I.T. The number of students who passed up the school of architecture in their home region to come directly to M.I.T. is a further indication of the drawing power of the Boston school.(26) The reverse cases, in which New England students chose to go to the architecture schools at Cornell or Illinois, are rare and suggest that the attraction of the other two schools was not sufficiently strong to overcome regional inertia.(27)

In pursuing the question of the geographical orientation of M.I.T., we can make some rough estimates of the number of alumni who went into practice in various locations, using the sample of the students in Appendix E whose early or later careers are at least partially documented. The strongest tendency in the first ten years was for alumni to practice in or near their hometowns. At least 78 out of 103 documented alumni (or 76 percent) worked at some time during their first ten years at M.I.T. in the place where they had come from. After the first ten years, when most alumni were established in their careers, 71 out of 125

documented alumni (or 57 percent) were still working near home or were returning there to set up practice. The primary accomplishment of the architecture program at M.I.T. was not, therefore, a redistribution of a professionally educated population, but the introduction of architectural expertise and sophistication into various communities by individuals who returned to these places after studying in Boston. Relatively few alumni not raised in Boston chose to practice there, and relatively few Boston alumni chose to practice anywhere else. Early in their careers, 47 of the approximately 65 students raised in Boston stayed there for a period of time. In their later careers, a concentration of 37 of about 50 Boston-raised architects remained in practice there.

The less common result--the redistribution of alumni who passed through M.I.T.--probably depended on alumni perceptions of the generalized competitive strength of various cities. Boston could not hold many of the M.I.T. alumni who were not raised there. Of the 63 students who practiced in Boston for some time in their first ten years after M.I.T., only 16 of them (or 25 percent) were from outside the metropolitan area. In their later careers, only 8 out of the 45 alumni (or 18 percent) who chose to work in Boston were outsiders. New York was more cosmopolitan in its power to attract trained architects from a variety of places by way of M.I.T. At least 35 of Ware's Boston students went to New York at some time during their early careers. Of these, 27 (or 77 percent) were from outside the City. In their later careers, 27 M.I.T. alumni from the 1870s worked for a time in New York, two-thirds of them with origins outside the metropolitan area. The attraction of Chicago for M.I.T. alumni was considerably weaker, with only 7 working there early in life and only 8 later on. Still, only two of these were returning Chicagoans.

Finally, it is also worth considering that an M.I.T. training may have provided the credentials for a student raised in the New England hinterland to migrate to another locale and readily find work. Of the 103 alumni whose early careers are documented, about 20 came from somewhere in New England outside the metropolitan Boston area. Nine of these stayed for a time in Boston after finishing at M.I.T., 6 went for a time to New York, and 4 spent some time elsewhere in the country. In their later careers, some of these New Englanders returned to their hometowns, but about 15 out of the 25 New England alumni whose later careers are known chose to work for some time outside the region.(28)

b. Family Backgrounds of M.I.T. Students

Louis Sullivan, who entered M.I.T.'s Department of Architecture in its fifth season, 1872-73, gives us a glimpse of the makeup of his class:

> There were perhaps not over thirty students, all told, in the architectural course, and Louis found them agreeable companions. Some of them were University graduates and therefore older than he and much more worldly wise, in their outlook. And there were as well a few advanced students. A few were there as rich men's sons, to whom the architectural profession seemed to have advantages of tone. Arthur Ro[tch] was one of these. A few were there as poor men's sons. They worked hard to become bread-winners. Among these was William Ro[tch] Ware, nephew of the Professor, and George Ferry of Milwaukee. What certain others were there for, including Louis, is a somewhat dubious surmise.(29)

Sullivan's observations would stand as an adequate characterization of any year's architecture class during the 1870s. Information on the family backgrounds of students is of interest insofar as it relates to the immediate and subsequent careers of these students. For the sample of

M.I.T. architecture students whose backgrounds are known, it appears that the occupational status of a student's father has some bearing on a student's exposure to university education prior to coming to M.I.T., on his tendency to pursue further architectural study after M.I.T., and on his susceptibility to giving up the practice of architecture.

First, however, it must be emphasized that only a limited amount of documentation is presently available. From various alumni records, directories, and other sources, it has been possible thus far to determine the occupations of only 70 of the fathers of the 234 M.I.T. students from the Ware years.(30) The largest single group--20 in all--were the merchants, though these range from commission merchants and steamship agents to pickle and popcorn dealers. Most of the fathers documented represented professional or managerial occupations of various descriptions (excepting, for a moment, the architects and engineers counted later): seven physicians, seven clergymen, six bankers or insurance executives, five manufacturing executives, two each from the law, education, music, and the career military, and one journalist--for a total of 34 in professional and managerial fields. All of the remaining 16 fathers with known occupations were associated with the building trades--many at a professional level. The fathers of Harvey Hannaford, Henry Hartwell, Richard Howland Hunt, and William Martin Woollett, and possibly Emil Frommann, were practicing architects.(31) The fathers of Ion Lewis and Alexander Wadsworth Longfellow, Jr. were civil engineers or surveyors. At the paraprofessional level were several builders: the fathers of Edgar Hammond, Thomas O'Grady, Jr., and George W. Page, Jr. George Avery's father was a plasterer; Clarence Cook's father was a carpenter; William Whidden's father was a mason.(32) And the fathers of Herman Duker, Henry

Monks, and Frank Spinning were in the lumber and millwork business.(33) With the limited sample of family occupational and social information now available, and with the prospect that no more than half the fathers of M.I.T. architecture students from the Ware years are ever likely to be documented, the relationships between family and school and career can only be suggested. The conclusions which follow really amount to hypotheses for further research.(34)

Of the 70 families in the documented sample, 28 had sent their sons to a liberal arts (or in a few cases, technical) college before these men went on to M.I.T. to study architecture. Almost all of these college-trained students, in turn, also had a rigorous secondary education in a private academy or selective metropolitan public school.(35) There seem to be differences in the family backgrounds of architecture students who came to M.I.T. with some collegiate education already behind them. Of the 23 known fathers from the learned professions in the sample of 70--physicians, clergymen, lawyers, educators, musicians, career military officers, and journalists--15 (or 65 percent) had sons who received a basic education at some other college before going on to M.I.T. Of the 31 known fathers in the higher-ranking managerial and commercial occupations, only 10 (or 32 percent) had sons who attended another college before M.I.T. Of the known fathers in the building fields, only 3 (or 19 percent) had sons who attended another college first.(36) It is not clear when sons decided to study architecture--whether they had some inclination of doing so at the end of secondary school, or whether they made up their minds while in college. Looking at the evidence in another way, fathers in the managerial commercial, and building fields may have even been more

receptive to sending their sons directly to M.I.T. than fathers in the learned professions.

The subsequent careers of the M.I.T. architecture students with known family backgrounds may tell us something about the status of architecture among the various professions and occupations. The patterns for further study at the Ecole des Beaux-Arts--or for travel in Europe--are different from the patterns noted above for prior education. Three factors most strongly associated with further European study and travel are: (1) a family background with a high regard for the intellectual life; (2) a family background with exposure to the building trades; or (3) a family background with appreciable wealth. Here the learned professions seem divided, along intellectual vs. pragmatic lines, with 9 of the 11 sons of clergymen, educators, and musicians going on to Europe after M.I.T.--5 of them to the Ecole itself--and only 5 of the 12 sons of physicians, lawyers, military officers, and journalists going on to Europe.(37) Of the 16 sons of architects, surveyors, builders, and suppliers, 7 went on to Europe--5 to the Ecole.(38) Among the 31 sons from managerial and commercial families, as many as 14 (mostly sons of bankers and manufacturers and cotton merchants) went on to Europe--10 of them to the Ecole.(39) It is as if three views of the role of the architect were guiding students through their educational careers: the architect-as-scholar, preparing to take his place among the intellectual learned professions of his father's generation; the architect-as-educated builder, preparing to take a fully professional role in the field of architecture; and the architect-as-privileged traveler, with more means for extended study but perhaps fewer expectations--of his own or from his family--about his entry into the field.

Still one more aspect of the subsequent careers of M.I.T. students appears to bear some relation to family background--the tendency to leave the profession of architecture, without ever practicing as a draftsman, or after several years of indifferent practice. The overall dropout rate for students whose family background is known is 11 out of 70 (or 16 percent). The rate is highest among students whose fathers represent the managerial and commercial occupations--9 out of 31 (or 29 percent); and lowest among the 16 students whose fathers represent the building fields--0 percent. Among the 23 students whose fathers represent the learned professions, only 2 (from among the 7 physicians' families) abandoned architecture. Otherwise, the dropout rate is 0 percent for the rest of the pragmatic and intellectual branches of the learned professions.(40)

c. Architectural Offices and Early Careers

The architectural office in the period following the Civil War was still dependent on manual techniques for reproducing the drawings and other documents required throughout the stages of design and construction.(41) As the number and size of the commissions in an office increased, a larger work force was needed to attend to the numerous aspects of numerous jobs. Several architects who began their careers in this period working as assistants in one of the larger firms later recalled the routine functions they had performed or observed. Robert D. Andrews began as an office boy with his uncle Robert S. Peabody in 1874, and after a year, took two semesters of course work in architecture at M.I.T. In a 1917 reminiscence, he emphasized the clerical nature of so much of the office work of these earlier years:

> Office hours then were from half past eight until half past five, with an hour out at noon. My work as office boy involved clearing off all the tables, and putting away the drawings and account books in the large vault at night, and taking them out in the morning; running out with drawings and notes to contractors' shops, and copying letters and full sizes. The latter had to be done by laying a sheet of detail paper under the drawing and pricking through all the lines, when the original was taken up and the pin-points traced in pencil and connected. As for the letters and bills, because there were no typing machines they were written by hand in ink, and copied by pressing them, in a screw press, against moistened sheets of thin paper bound up in books made for the purpose. The writing was legible through the paper. Copies of specifications were all written by hand, and had to be carefully compared with the original to prevent mistakes. There was no "economy" paper, nor any blueprints; all copying involved as much manual labor as the original.(42)

Andrews mentioned another factor contributing to the proliferation of clerical work in many offices. Architects were still entering into separate contracts for the various aspects of construction, and all of these contracts had to be written out and superintended by the architect and his assistants.(43)

Welles Bosworth was studying at M.I.T. in the spring of 1886 when he was invited by H.H. Richardson to come out to the Brookline office for two weeks in March to assist in tracing details. He, too, recalled--65 years later--the laborious nature of office work at the beginning of his career:

> ... in those early days of primitive methods of producing architect's drawings, it was the custom to make all record drawings on cloth-mounted egg-shell paper, in ink. The masonry was painted red, if brick, and brown or grey for stone, with yellow for wood. These quarter-scale plans and sections were traced in ink, on tracing cloth, from which the blueprints were made for the builders. Details were traced in dark pencil, on thin yellow paper--torn off a huge roll against a wall--from which builder's blueprints were made.(44)

Too little anecdotal evidence is now available to tell us how frequently Boston architects called on M.I.T. students to do part-time temporary work. City directories, as well as letters, reminiscences and alumni records, do allow us, though, to trace the early careers of alumni who were hired as draftsmen and other assistants during this period.

Between the mid-1860s and mid-1880s, at least 33 Boston firms and 12 New York firms gave employment to M.I.T. alumni soon after they left school. Most of these were firms formed soon after the Civil War, by young architects, who, like Ware and Van Brunt, had been born in the 1830s and who comprised the active membership of the Boston Society of Architects and the New York Chapter of the A.I.A. Four firms employed the largest number of M.I.T. alumni: Ware and Van Brunt, Peabody and Stearns, H.H. Richardson, and McKim, Mead and White.(45)

(1) Ware and Van Brunt

The partnership of Ware and Van Brunt was established in the spring of 1864. Both men had been associated in 1859 as students in the New York studio of Richard M. Hunt, who was, in effect, conducting an atelier in the absence of an architecture school. Ware and Van Brunt were eager to recreate some of this experience in their Boston office for the benefit of their assistants. This early teaching effort helped Ware to test his ideas on architectural education and apparently attracted the attention of M.I.T. officials as they were conducting their search for someone to serve as Professor of Architecture.(46) Until the fall of 1868, when the Department of Architecture received its first students, Ware's only way of accommodating interested students was to take them into the office. From the beginning, he was convinced of the importance of a general education

as a foundation for architectural study in any setting, whether office or polytechnic university. When eighteen year-old George Tilden came into Boston from Phillips Exeter Academy in October 1863, asking to be taken into the office as a pupil, Ware tried to persuade him to go to Harvard first. Ware was finally persuaded, though, to accept him into the office. Yet the distinction between students and draftsmen must have been maintained in these early years, for Francis W. Chandler later recalled that he had entered the office as "a student for two years, staying on as a draftsman."(47)

By the time the Department of Architecture was in operation, Ware must have started advising prospective office pupils to enroll first as special students at M.I.T. At the same time, he continued to welcome certain of his M.I.T. students to work concurrently as assistants on certain tasks in the office.(48) As might be expected, all but two of the nineteen assistants in the firm after 1868 were M.I.T. alumni or students.(49)

(2) Peabody and Stearns

The office of Peabody and Stearns was established in the spring of 1870, toward the end of the second year of operation of the architecture department at M.I.T. Throughout the ensuing decade and a half, this office played an important role in the training of M.I.T. men, who account for twelve of the twenty-one draftsmen and assistants whose association with Peabody and Stearns has been documented.(50) This office even gave employment to a few men before and during their studies at M.I.T., but did not do this as frequently as Ware and Van Brunt.(51) Peabody and Stearns

also gave a few men a year or so of experience between their studies at M.I.T. and further studies in Paris.(52)

The office responsibilities given to most of the M.I.T. men are not known. Arthur Little assisted Peabody in his research into American Colonial architecture, accompanying him on a documentation trip north of Boston in July of 1877 and publishing his own Early New England Interiors (1878) as a result.(53) Pierce P. Furber, who was among the few to graduate in architecture from M.I.T., went directly to work as a draftsman for Peabody and Stearns in 1877. By 1883, he was put in charge of the St. Louis office of the firm, and from 1889 until his death in 1893, he was a full partner.(54) Like the office of H.H. Richardson, the office of Peabody and Stearns depended on an extensive team of draftsmen to prepare large duplicate sets of drawings and on a handful of trusted assistants to supervise construction in other cities. More needs to be known about how both firms delegated responsibilities, and how they made use of men with varying amounts of formal and informal training.

(3) H.H. Richardson

In 1878 H.H. Richardson moved his drafting office from New York to Brookline, Massachusetts, where he had been living and carrying on preliminary design work since 1874. A total of about three dozen draftsmen and assistants worked in Richardson's Brookline office between 1878 and 1886.(55) A quarter of these had Harvard backgrounds, like Richardson, but nearly half had M.I.T. architecture backgrounds--some measure of the utility of the school as the largest single source of draftsmen and assistants for one of the America's most prestigious firms. Only one M.I.T. student is known to have worked for Richardson, though,

before 1879.(56) The initial link between M.I.T. and Richardson in Brookline was represented not by a student, but by Eugene Letang. At the beginning of the 1879-80 academic year, faced with the prospect of substantial cutbacks in faculty salaries, Ware arranged for Letang to spend afternoons at the Brookline studio, doing detail and design work. This arrangement probably did not extend beyond 1879-80, but it opened the way for M.I.T. students in Richardson's office.(57) Even so, few alumni went to work for Richardson during Ware's tenure as head of the department. Of the seventeen M.I.T. men who found employment with Richardson before his death in 1886, only four started before 1881.(58) An additional eight students, who had completed (or just begun) their course work under Ware, were hired by Richardson between 1882 and 1886, when Theodore Minot Clark--Richardson's assistant from 1869 to 1877--was head of the architecture department at M.I.T. Seven more students, trained entirely under Clark, were working for Richardson by 1886.(59)

What the M.I.T. men from Ware's time did in the Richardson office is some indication of the adequacy of their training. Both Warren and Andrews served as head draftsman. Hale soon rose to the same position with Richardson's successor firm, Shepley, Rutan and Coolidge. Alden had major supervisory responsibilities for Richardson's work in Albany and Pittsburgh, and Longfellow had similar responsibilities in other cities. Jaques accompanied Richardson on his European trip in the summer of 1882. Shepley, who was promoted to junior partner shortly before Richardson's death, became one of the principals in the successor firm. If these M.I.T. alumni held important positions in the Richardson office, there were other M.I.T. men who seem to have remained in subordinate positions. There is evidence, however, that within the two years following

Richardson's death, M.I.T. men who started in subordinate positions were receiving more substantial raises in the successor firm than non-M.I.T. men, probably reflecting the enlarged professional duties they were entrusted with in the office.(60)

While M.I.T.-trained assistants were capable of assuming various responsibilities in the office, there were others whose preparation was more rudimentary. If Richardson was willing to hire men with varying proficiencies, he had to give some thought to the teaching functions of his studio. One Richardson employee later recalled that the office assistants would have their lunch outdoors on the Brookline estate, then spend some time sketching before returning to work:

> This sketching from nature not only of plant life, but of buildings and bits of architectural detail was part of the training prescribed for all of his men. The constant study of architectural books was made equally important and out-of-doors exercise he made an essential thing, although in later years he did not follow this course himself.(61)

(4) McKim, Mead and White

The office of McKim, Mead and White was established in New York in 1874. For the next thirty-five years it would be one of the most important training offices for Ware's M.I.T. students, and later, his Columbia students. By the time Ware left Boston in the early fall of 1881, M.I.T. had already supplied the McKim office with nine of its twenty-nine assistants (including the short-time partner, William B. Bigelow).(62) By the end of 1882, nine more M.I.T. alumni would be among the twenty new draftsmen hired by the firm. Among this latter group were

three M.I.T. students who had just returned from the Ecole, where they had been studying since the late 1870s.(63)

The growth of McKim's firm during the 1870s and the increasing attraction of New York as a center of architectural practice were factors responsible for the increasing numbers of M.I.T. students who chose to go into this New York office in the late 1870s and early 1880s. Francis Bacon returned from Europe in 1879 and joined McKim; Cass Gilbert did the same in the following year. Daniel Willard, who had been working in New York since finishing at M.I.T. in 1877 joined McKim in 1881. Alfred Harlow left a Boston firm for the McKim office in 1881, as Joseph Wells had done in 1879. William M. Kendall left a Boston firm to work for George Post and joined McKim, Mead and White in 1882, becoming office manager about 1892 and a full partner in 1906. After 1882, the influx of M.I.T. students to the McKim office virtually ceased, as the Richardson office became a more attractive opportunity during its most productive years in the mid-1880s.(64) As noted in the case of the Richardson office, only a third of the assistants working in Brookline between 1879 and 1886 came from M.I.T. That fraction would be closer to a quarter if the date were pushed back to 1874--the year Richardson moved from New York and the year McKim and Mead began to work together. The cumulative number of M.I.T. alumni working for McKim over a comparable period--from 1874 to the spring of 1886--is twenty out of the total of seventy-seven, or about a quarter. In both the Richardson and McKim offices, it would be a major task to account for the backgrounds of the great majority of non-M.I.T. men working as assistants during these years. What is most significant is that these were, almost without exception, not men from the other American architecture schools. They were probably men who had worked in other

offices as apprentice draftsmen before being further trained by Richardson or McKim for the special purposes of either firm. In supplying these major metropolitan firms of the period with college-trained architects, M.I.T. retained a monopoly, probably well into the 1890s, by which time Ware's program at Columbia had become a major force.(65)

d. M.I.T. Students and the Ecole des Beaux-Arts

(1) Collegiate Backgrounds of Ecole Students

During the four decades following Richard M. Hunt's admission in 1846 as the first American student at the Ecole des Beaux-Arts, a total of 54 Americans officially attended the Paris school, and another 40 American went to Paris to work in an atelier without ever being admitted to the Ecole. The M.I.T. Department of Architecture was the single most important common denominator in the backgrounds of this group of 94 Americans--33 of whom attended M.I.T. between 1865 and 1885.(66) But M.I.T. was not the only conspicuous common denominator. Harvard College would be credited with 31 of the students who later went on to Paris, although 13 of these Harvard alumni went by way of M.I.T. The backgrounds of American students in Paris show half a dozen common patterns for their educational careers prior to their studies at the Ecole or in an atelier. The typical educational paths of the group of 50 American students associated with Harvard or M.I.T. were:

(a) Harvard preparation, but no M.I.T. preparation

(i) Harvard undergraduate study--then Paris (10 students, including 7 enrolled at the Ecole)

(ii) Harvard undergraduate study--then office apprenticeship--then Paris (8 students, including 4 enrolled at the Ecole)

(b) M.I.T. preparation, alone or with other factors

(i) M.I.T. architecture study--then Paris (6 students, including 2 enrolled at the Ecole)

(ii) M.I.T. architecture study--then office apprenticeship--then Paris (11 students, including 6 enrolled at the Ecole)

(iii) Harvard (or other) undergraduate study--then M.I.T. architecture study--then Paris (9 students, including 6 enrolled at the Ecole)

(iv) Harvard undergraduate study--then M.I.T. architecture study--then office apprenticeship--then Paris (7 students, including 4 enrolled at the Ecole)

(a) Harvard Preparation, without M.I.T.

The role of Harvard in preparing American students for architectural study in Paris depends on the period under consideration. Until 1868, when the M.I.T. Department of Architecture officially opened, Harvard did seem to have a monopoly on the preparation of American students, with 12 of its alumni already having gone to Paris.(67) Yet from the time Ware's department started receiving students, Harvard men seemed to realize that a year or so of further study in architecture at M.I.T. would be a good preparation for the Ecole. (In the absence of anecdotal information, we have no way of knowing which Harvard students decided to stay in Boston and do postgraduate work in architecture, only to discover that they might have the aptitude to go on to study in the milieu of the Ecole.) From 1869 until 1885, 20 Harvard alumni went on to Paris, but only 7 did not avail themselves of the opportunity to study at M.I.T. During the 1850s and 1860s, however, some Harvard men, including H.H. Richardson, were able to gain admission to the Ecole within a year or two of arriving in Paris, without having had any appreciable exposure to architecture. Before the

advent of American architectural schools, one could only turn to architectural offices willing to offer some informal teaching. At least 6 of the Harvard contingent in Paris in the early years did have the advantage of a period of apprenticeship in an office.(68) The "American ateliers" would continue through the 1870s and 1880s to play a role in the training of young architects, whether bound for Paris or not. For those who were, these receptive offices provided a practical interlude between formal study in an American school and formal or informal study in or around the Paris school.(69)

(b) M.I.T. Preparation, Alone or with other Factors

The important function of M.I.T. as a postgraduate school of architecture, especially in preparing American students for the Ecole and its milieu, becomes clearer as we look at the educational profiles of the various groups of M.I.T. students who did choose to go to Paris for the culmination of their studies. First there were those who were not postgraduate students--whose only collegiate education consisted of one to three years in the architecture department at M.I.T. A small group of six relatively obscure students did manage to go directly from M.I.T. to Paris, without any apparent office work in between. Two were no doubt encouraged by receiving the Boston Society of Architects' annual prize for an M.I.T. student in design, but nothing is known of their subsequent careers.(70) The only noteworthy student from this group was William B. Bigelow, who returned from Paris to establish a short-lived partnership with McKim and Mead. Three out of these six students belonged to one of the first three classes in architecture at M.I.T., and therefore had no

direct exposure to the Ecole way of thinking as introduced by Letang in the spring of 1872.

A more auspicious path for students with only an M.I.T. education to follow on the way to Paris was to spend some time in an architect's office. For those who left M.I.T. in the early years, without ever knowing Letang, the Boston offices of Nathaniel J. Bradlee and Ware and Van Brunt provided some further architectural training.(71) During the late 1870s and early 1880s, the Boston firms of Cabot and Chandler and Sturgis and Brigham gave additional experience to M.I.T. alumni. A few students went on to work for unknown architects in Boston, New York, or Chicago. And Louis Sullivan, of course, worked briefly with Furness, then Jenney. Yet there is no explainable correlation between the time these students spent at M.I.T., the time they spent in Paris, their enrollment status at the Ecole, and their later prominence in the profession. Four were four-year regular students. Three of these submitted theses and two of these received B.S.A. prizes. The rest stayed only a year at M.I.T. Few would spend more than a year or two in Paris. With the exception of Louis Sullivan, and Richard H. Hunt, who joined his father in practice, the majority of these men became partners in firms locally prominent in Boston during the 1880s and 1890s.

The largest M.I.T. contingent in Paris were the 16 postgraduate students--all but two of them with undergraduate educations at Harvard.(72) Most were M.I.T. students during the mid to late 1870s. Only three had not been exposed to Letang. Most of these postgraduate students spent only one year in the architectural course at M.I.T. (The three who stayed on remained for no more than two years.) Many of them were sure enough of their overall preparation that they went straight to

Paris within a year of leaving M.I.T., and six of nine who did were admitted to the Ecole without much need for further tutoring.(73) Arthur Rotch, both Shaw and Hunnewell in Boston; J.B.N. Wyatt in Baltimore; and A.D.F. Hamlin of Ware's Columbia faculty in New York would have important though localized careers after returning from Paris.

Finally there were seven students who had the fullest possible preparation before going on to Paris: Harvard undergraduate educations, a year or two in architecture at M.I.T., and a year or two in Boston offices, such as Ware and Van Brunt, Peabody and Stearns, Sturgis and Brigham, Cabot and Chandler, and H.H. Richardson.(74) The most obscure of these extensively educated students--Curtis, Monks, Perkins--spent four to six years in Paris, none of them officially enrolled at the Ecole. The others, whose later careers would be more noteworthy--Peabody, Ware, Willson, Longfellow--were admitted to the Ecole but stayed less than two years before returning to practice.

(2) Atelier Choices of American Students

The story of American students who went on to Paris--to try to gain entry to the Ecole des Beaux-Arts or to be satisfied simply to work in an atelier in the shadow (really the aura) of the Ecole--will not be complete until we have a better sense of how students came to understand the opportunities open to them in Paris. How important was admission to the Ecole itself for American students, ineligible for the Diploma or the Grand Prix? How did American students perceive the character of particular ateliers and patrons? How did American students in Paris make use of the formal curriculum of the Ecole and the informal curriculum of the ateliers and Paris itself? While we do know the atelier choices of

almost all of the American students during the four decades from 1846 to 1885, we know too little as yet of the reasons behind these choices, or even of the teaching and design style associated with the various ateliers. Table 5.2 (page 257) gives a summary of the ateliers chosen by American students, and Appendix H gives a full listing of American architecture students in Paris--M.I.T. alumni as well as men with other backgrounds, men enrolled at the Ecole as well as those simply attached to an atelier.(75)

While Ware was in Paris in the summer of 1867, he was joined by Charles F. McKim, Robert S. Peabody, and Francis W. Chandler. McKim and Peabody associated themselves with the relatively new atelier of Honore Daumet and were admitted to the Ecole in the first session of 1868.(76) Chandler, and possibly Ware himself, worked on concours programs in the atelier but did not enter the Ecole. Altogether, 15 American students would associate themselves with the atelier Daumet by 1885--7 of them (2 from M.I.T.) merely studying within the atelier. Two waves of American students entered this atelier--10 between 1864 and 1875, then none until the 5 who came to the atelier in the single year 1885.(77)

A more sustained record of attracting Americans was held by the atelier of Jules Andre, who taught 19 American students, from H.H. Richardson in the early 1860s to Thomas Hastings and Bernard Maybeck in the early 1880s. Again the Americans would be equally divided between formal and informal study--10 of them enrolled in the Ecole, 9 studying only in the atelier. But this was not a popular atelier with M.I.T. students. Only one relatively obscure alumnus went to study with Andre.(78)

By contrast, the atelier Vaudremer, who never had a Grand Prix winner, had the greatest concentration of American students from the late 1860s through the late 1870s--18 of them, 14 of whom were M.I.T. men.(79) The atelier Vaudremer (where Letang had studied) held a particularly strong attraction for M.I.T. students finishing after the spring of 1872, Letang's first term as design instructor at M.I.T. While the atelier had been functioning since 1860, only 5 Americans had worked with Vaudremer prior to 1874, when Letang's first students began arriving in Paris. Between that date and 1880, when Vaudremer gave up his activities as patron, M.I.T. students would account for 12 of the 13 Americans in the atelier.(80) They were a group soon to be distinguished in their careers. After a period of official studies in the Ecole and in the atelier, William E. Chamberlin, Alexander W. Longfellow, Arthur Rotch, Louis Sullivan, William Rotch Ware, William M. Whidden, and Edmund R. Willson would each establish careers of local or national significance by the end of the 1880s. The remaining 4 M.I.T. students who worked with Vaudremer in the late 1870s without being enrolled in the Ecole were, with the exception of Francis R. Allen, a more obscure group.(81)

By the year 1880, the number of Americans in Paris was great enough to promote a real spirit of camaraderie among men who would soon emerge as the leaders of their profession, locally and nationally. Cass Gilbert, who spent the early part of 1880 traveling in France, mentioned meeting Chamberlin, Longfellow, Whidden, Willson and also John Stewardson (of the atelier Pascal) in Vaudremer's atelier.(82) Even thirty years later, a group of Americans who had been in Paris around 1880 would gather to be photographed as "The Old Paris Crowd." Present in 1907 were Chamberlin, Longfellow, and Willson--all students of Vaudremer and the Ecole. Also

present for the photograph were men who had probably been traveling through Paris about 1880, without being enrolled in the Ecole or even associated with any atelier, as far as we know: Robert D. Andrews, William D. Austin, Francis H. Bacon, and Edmund M. Wheelwright--all M.I.T. alumni--and C. Howard Walker, Lecturer in Architecture at M.I.T. after Ware's departure. The group remembered Joseph M. Wells, who had died in 1890, and John Stewardson, who had died in 1896, by including them as silhouettes in the 1907 photomontage.(83)

5. Backgrounds and Careers: A Summary View

Ware's curriculum for architectural education was conceived at a time when architects in New York and Boston and other centers were beginning to define and reinforce their professional status, and the need for efficient and reliable training was a clear issue in their campaign for professionalization. The nationwide expansion of building activity following the Civil War created a demand for competent draftsmen and assistants, yet the emerging large offices of the 1870s and 1880s were simply too busy to be able to provide the necessary training for beginning employees.

The inclusion of architecture among the engineering and scientific fields in the program for professional education at M.I.T. reinforced the position of architecture as a field amenable to systematic instruction. Ware was particularly astute in accepting large numbers of special students in his program, knowing that the profession itself in these formative years of architectural education would welcome students with any amount of formal training and would continue to provide on-the-job training to alumni who knew the essentials of design, construction, and

professional practice. By its location in Boston, the architecture program at M.I.T. also began to function as a graduate professional school in relation to the liberal arts programs at Harvard and other well-established colleges. Not until after the turn of the century--well after Ware had completed his active teaching career at Columbia--would the campaign for professionalization advance to the point that formal education became the norm, as special study preparatory to office work gradually gave way to regular study preparatory to baccalaureate degrees and state licensing requirements. Ware's clear understanding of the position of his program within M.I.T. and within the educational and professional milieu of Boston allowed him to frame a course of study which taught just enough, for just as long, to just as many as could take advantage of the availability of a collegiate architectural education.

Table 5.1

Geographical Origins of M.I.T. Architecture Students

Year	Total New Students	Metropol. Boston[a]	Other Mass.[b]	Other New Engl.[c]	Metropol. NY	Upstate NY	Mid Atlantic[d]	Metropol. Midwest[e]	Other Midwest	Other[f]
pre-1868	4	3	1	0	0	0	0	0	0	0
1868-69	9	6	1	0	0	1	0	0	1	0
1869-70	15	9	2	2	1	0	0	1	0	0
1870-71	15	9	0	4	0	0	1	1	0	0
1871-72	17	11	2	2	0	0	0	0	0	2
1872-73	21	13	4	1	0	1	0	2	0	0
1873-74	19	13	3	1	0	0	0	1	1	0
1874-75	12	5	0	2	0	1	0	2	1	1
1875-76	27	13	3	4	1	3	1	2	0	0
1876-77	17	8	3	2	1	0	0	1	2	0
1877-78	19	7	0	5	1	0	1	4	0	1
1878-79	19	5	1	1	1	2	1	5	3	0
1879-80	18	6	1	1	3	1	2	0	2	2
1880-81	22	6	1	6	3	0	0	4	1	1
Totals	234	114	22	31	11	9	6	23	11	7

[a] Essex, Middlesex, Norfolk, Plymouth, Suffolk Counties
[b] Includes 5 from Springfield, 2 from Worcester
[c] Includes 4 from Hartford, 2 from Providence, 1 from New Haven
[d] Maryland, Pennsylvania, District of Columbia
[e] Includes 5 from Cincinnati, 4 from Minneapolis-St. Paul, 4 from St. Louis, 3 from Indianapolis, 3 from Chicago, 2 from Milwaukee, 1 from Detroit, 1 from Louisville
[f] South, West, Foreign

Table 5.2

Americans and Their Ateliers, 1846-85*

Atelier	Total Americans	Enrolled in Ecole		Atelier Study Only	
		M.I.T. Alumni	Non-M.I.T. Students	M.I.T. Alumni	Non-M.I.T. Students
Andre	19	0	10	1	8
Coquart	5	1	1	1	2
Daumet	15	6	2	2	5
Davioud	1	0	0	0	1
Douillard	1	0	0	0	1
Gerhardt	1	0	0	1	0
Guadet	9	1	5	0	3
Laisne/Ginain	3	0	3	0	0
Lefuel	3	0	3	0	0
Moyaux	5	2	2	0	1
Pascal	10	1	2	3	4
Train	3	0	3	0	0
Triquet	1	0	1	0	0
Vaudremer	18	8	3	6	1
	94	19	35	14	26

Total Americans enrolled in Ecole, 1846-85: 54
Total Americans studying only in ateliers, 1846-85: 40
Total M.I.T. alumni studying in Paris, 1846-85: 33
Total non-M.I.T. Americans studying in Paris, 1846-85: 61

*This table is a summary of the enumeration of American architecture students in Paris given in Appendix H.

Conclusion

WILLIAM ROBERT WARE: A LIFE IN EDUCATION

The architecture program that William Robert Ware established at M.I.T. in 1868 marked the beginning of collegiate architectural education in the United States. Throughout the 1870s, after significant architecture programs had been established at Cornell (1871) and the University of Illinois (1873), M.I.T. remained the preeminent American school for professional architectural education. M.I.T. had the highest annual enrollments--an average of 30, compared with 20 at Cornell and 15 at Illinois. By 1881, the year Ware left for Columbia, M.I.T. had trained more alumni in architecture than all the other schools combined. Ware had worked with about 235 students, Professor Babcock at Cornell with about 110, Professor Ricker at Illinois with about 60, and other collegiate instructors with no more than 40. M.I.T. was the most influential architecture school of the 1870s, not only in terms of numbers of alumni, but also in terms of numbers of prominent careers, many of them national in impact by the 1890s. M.I.T., by virtue of its location in Boston, was the most cosmopolitan of the three schools, attracting a wider distribution of students than other schools and opening the way more readily than other schools to further study or travel in Europe. M.I.T. was the only school where the teaching of design was a major part of the curriculum and the only American school, for almost three decades, where design was taught by a native French alumnus of the Ecole des Beaux-Arts. M.I.T. was the only school with an administration, a faculty, and a curriculum flexible enough to accommodate the needs of special students, seeking just the crucial amount of formal training in architecture to

advance in their careers. These part-time or short-term students fell into two groups, each considerably larger in metropolitan Boston than in rural Ithaca or Champaign: one group of graduates of liberal arts colleges, another group of draftsmen and assistants from local offices. Both groups on coming to M.I.T. were more mature and determined about their professional studies than the typical candidates for a four-year undergraduate degree, whether at M.I.T. or any of the other schools.

These features which distinguish M.I.T. from the other architecture schools of the period were interconnected, with generally favorable implications. Because M.I.T. chose to emphasize a special, ideally two-year undergraduate curriculum in architecture, the university was late in developing a full four-year undergraduate curriculum integrating architecture with course work in science and engineering, humanities, and languages. Indeed, the most noteworthy difference between Ware's teaching at M.I.T. during the 1870s and his teaching at Columbia during the 1880s and 1890s was his shift of emphasis from a special curriculum to a full undergraduate curriculum in architecture. Because M.I.T. had the largest, most transient, most sophisticated group of students of any architecture school of the period, their expectations for the years they spent in school led to considerable differentiation and experimentation in the curriculum. The hiring of Eugene Letang in 1872 to supervise the work in design was the earliest instance of specialization in an American school of architecture. With Letang available to teach design in the studios at M.I.T. and with dozens of architecture offices in Boston available to give M.I.T. alumni tangible experience in construction and practice, it was only natural that design in the Ecole des Beaux-Arts tradition came to be the focus of the curriculum at M.I.T. Because special students stayed at

M.I.T. for only a year or two, this concentration in design had a particular impact on them. The existence of a creditable architecture program at M.I.T., where studio work was supervised by an Ecole alumnus, made it possible for American students attracted to the Ecole to get a more adequate preparation before leaving for Paris. In the two decades before Ware opened his department at M.I.T., about 15 Americans had gone to Paris to study architecture, either officially at the Ecole or unofficially in one of the ateliers. Then during the little more than a decade of Ware's teaching in Boston, five times that number went to Paris. Thirty of the 75 Americans who studied in Paris between the late 1860s and early 1880s were M.I.T. alumni. M.I.T. came to serve an important minority of students--who would later be among the most influential alumni of the Ware years--as a preparatory school for the Ecole, taken more or less seriously according to their individual vision. Louis Sullivan, a student at M.I.T. during 1872-73, remarked in his Autobiography that "as time passed he began to discover that this school was but a pale reflection of the Ecole des Beaux Arts; and he thought it high time that he go to headquarters to learn if what was preached there as a gospel, really signified glad tidings."(1) For many other less restless, less demanding students, M.I.T. fulfilled a democratic virtue by offering as much of the Ecole on native grounds as they thought they needed, to enter into respectable architectural practice.

In short, M.I.T. during the 1870s was doing a better job of fulfilling several roles as a collegiate school of architecture other than the simple role of providing a full undergraduate education with architecture as the chosen course of professional study. Instead, M.I.T. was serving as a "graduate school" in architecture for alumni of liberal

arts colleges. It was serving as a preparatory school for the Ecole. And it was serving as a vocational school for draftsmen with no further ambitions for collegiate education.

Few of the features of the architecture program that Ware shaped at M.I.T. (and later at Columbia) make sense without reference to his attitudes about professional education. In spite of his letters and pamphlets of the 1860s and 1870s on the training of American architects and his articles and addresses of the 1880s and 1890s on various aspects of his curriculum, he was more a man with convictions as a teacher than a man with a philosophy of education. Throughout his career, he believed that architectural education should be fitted to a wide range of student capabilities and needs. He could concentrate during his M.I.T. years on defining and developing essential specialized studies in architecture, because he felt the greatest responsibility in those years for the culminating education of his more advanced students. With perfect consistency, he could concentrate during his Columbia years on integrating general studies in sciences and liberal arts in a full undergraduate professional course, because he felt the greatest responsibility during those later years for the lifelong general and professional education of all beginning students.

Even during his first decade of teaching at M.I.T., Ware must have conveyed a strong sense of the bearing of all knowledge upon the study and practice of architecture. A.D.F. Hamlin, who had known him when a student at M.I.T. during the mid 1870s, later as a colleague at Columbia throughout the 1880s and 1890s, and finally as a friend through the years of Ware's retirement, remembered the essence of his teaching:

> To his thinking, architecture as a profession to be taught was something more than a business or a means of earning one's living; it was a department or section of the larger and broader life in which it was related to all other activities and interests; it was a great and inspiring career, because it opened to its practitioner innumerable gates of access to fascinating and illuminating fields of thought and action. Painting, sculpture, the opera, philosophy, religion, science, history, literature,--with all of these architecture was concerned. And for its practice he insisted that two things were chiefly necessary--common sense and good taste; and in his opinion, to the development and cultivation of good taste and common sense the efforts of every teacher, whether of mathematics, theory, design, history, drawing, or professional ethics, ought always to be directed.(2)

C. Howard Walker, who taught occasionally at M.I.T. from the 1880s through the 1920s, also recalled how Ware was able to make architecture, particularly the study of its history, a means of access to all the humanities and fine arts:

> It was also to him an all embracing art which held intimate communion with painting, sculpture, music and literature, with history, poetry, and the belles lettres. He considered that "next to a university education, the most liberal education was that of architecture." By his own example, and by a delightful subtle indirectness he led many to eclectic study who would otherwise have walked the straight and narrow path of a walled-in specialty.(3)

Ware represented nineteenth-century eclecticism at its best. As a humanist with subsequent training as engineer and designer, he represented in himself the disciplines which, with an emphasis that could vary from school to school and from student to student, formed the basis of an architectural education. In an age when eclecticism in architecture was too often associated with eclecticism of style, Ware taught a generation of students that the only eclecticism that could truly sustain a career in architecture was an eclecticism of knowledge.

William Robert Ware

and the Beginnings of Architectural Education

in the United States, 1861-1881

by

John Andrew Chewning

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Haverford College
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Master of Regional Planning
Cornell University
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Volume 2

Figure 1. William Robert Ware, 1871 (Courtesy, M.I.T. Museum)

Figure 2. Eugene Letang, 1870s (Courtesy, M.I.T. Museum)

Figure 3. William Robert Ware, 1880s (Courtesy, M.I.T. Museum)

Figure 4. William Robert Ware, 1889
(Courtesy, Avery Architectural and Fine Arts Library)

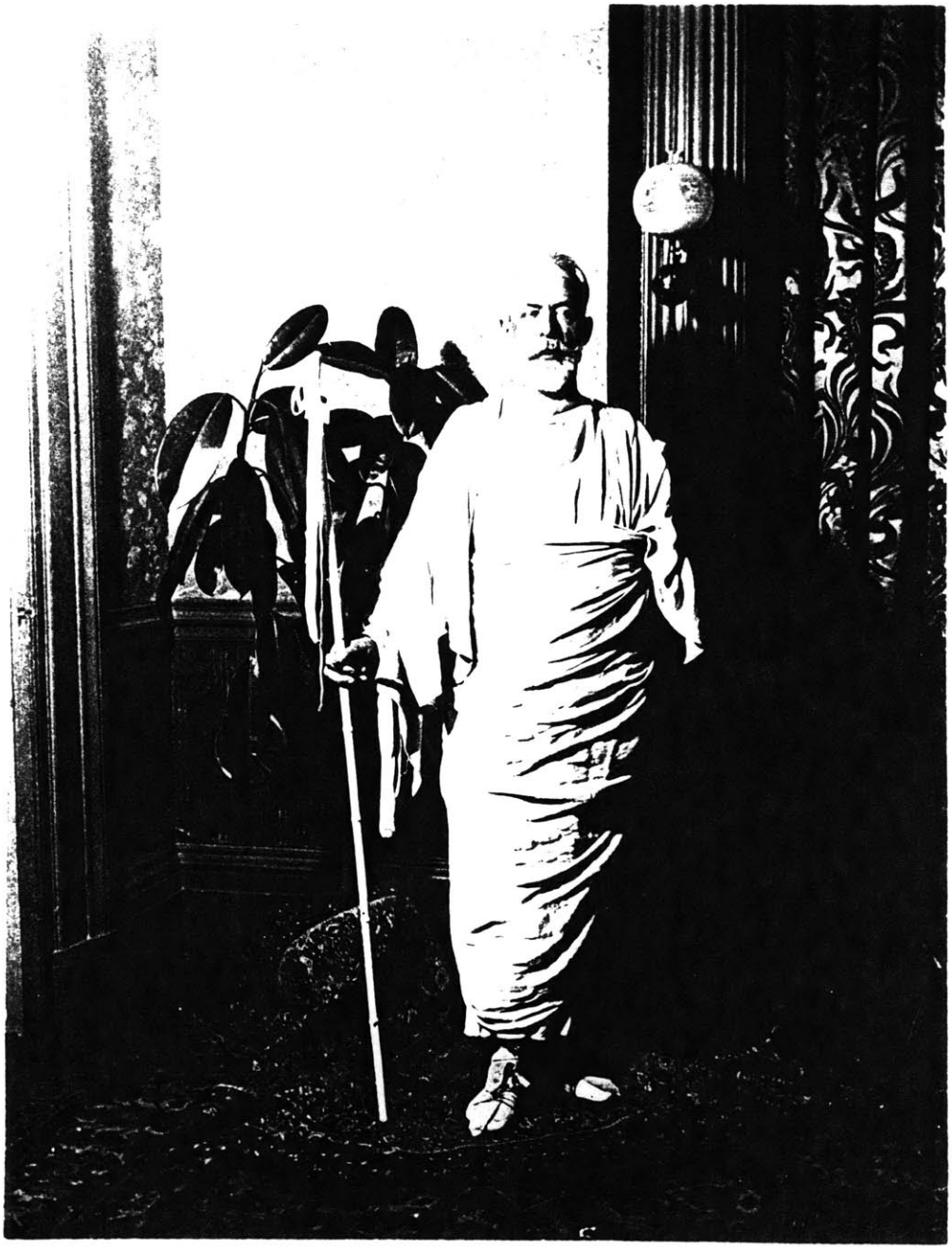

Figure 5. William Robert Ware at the Home of George B. Post, 1890s
(Courtesy, Avery Architectural and Fine Arts Library)

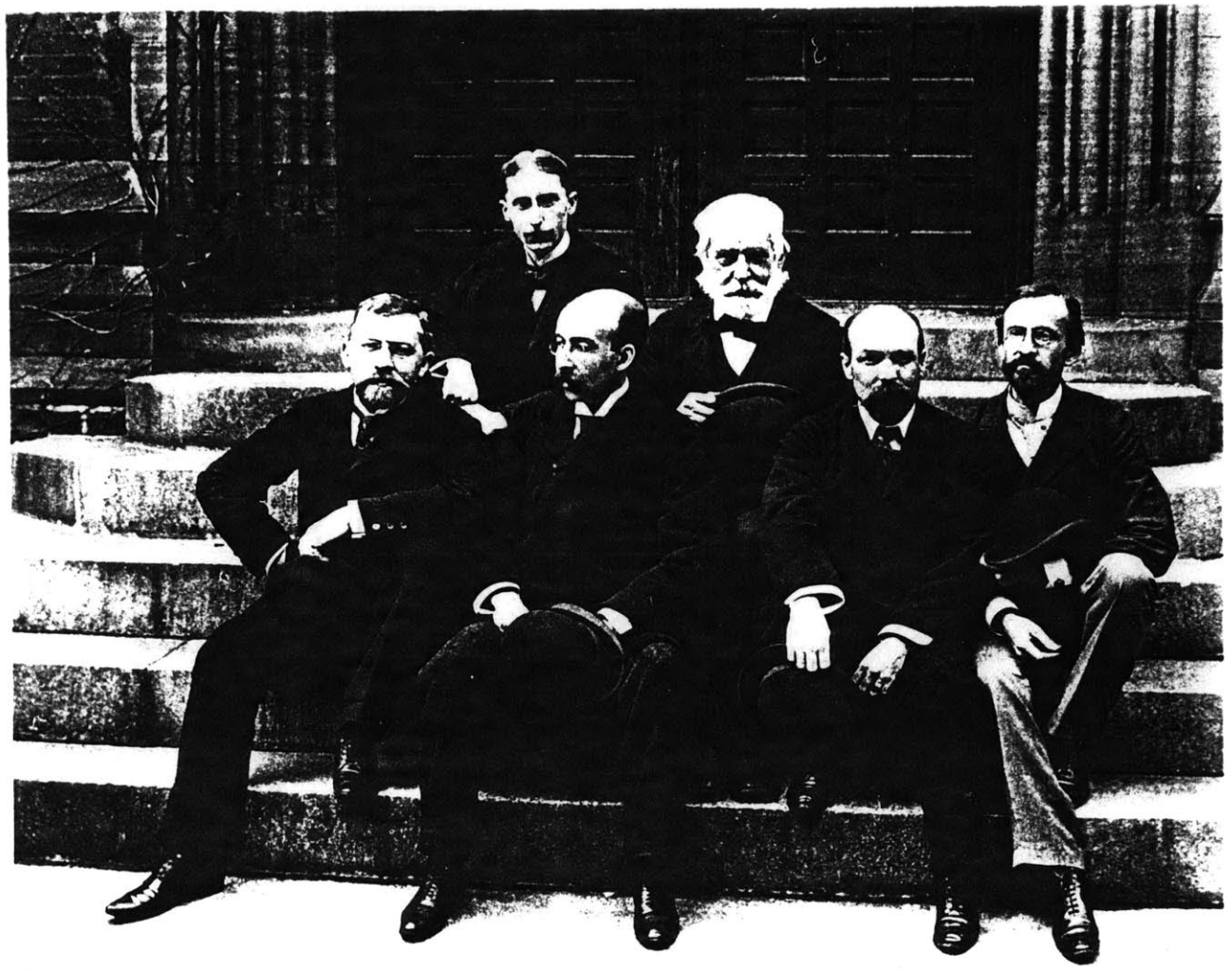

Figure 6. Department of Architecture Faculty, Columbia University, c.1895-96
Top: Charles P. Warren, William Robert Ware; Bottom: Maximilian K. Kress, Frank D. Sherman, Grenville T. Snelling, A.D.F. Hamlin (Courtesy, Avery Architectural and Fine Arts Library)

Figure 7. Plate from Examples of Building Construction, by William Robert Ware, 1876
(Courtesy, Boston Athenaeum)

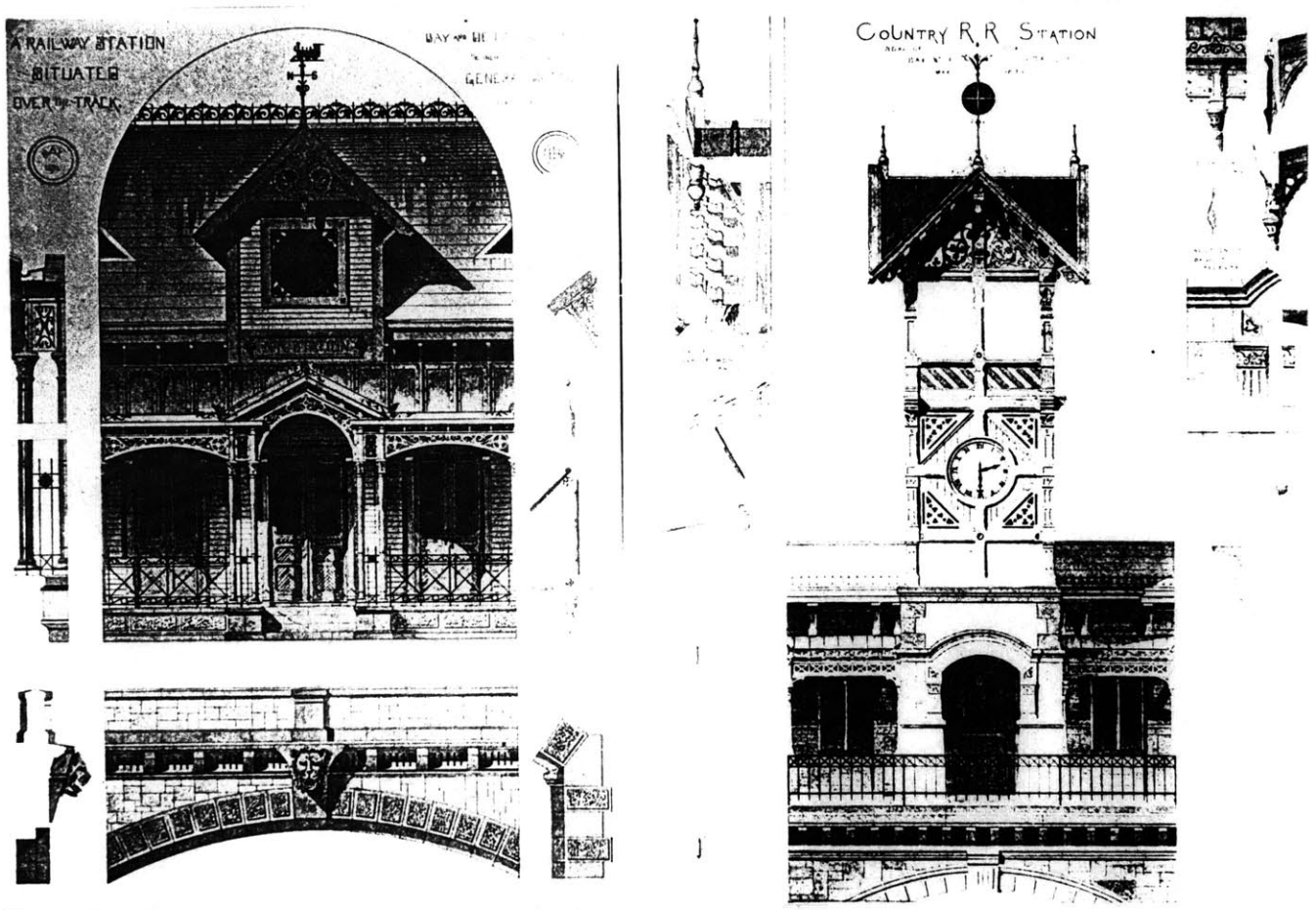

Figure 8. Left: E.H. Barnard, Design Problem: Railroad Station, 1874;
Right: W.B. Dowse: Thesis Drawing: Railroad Station, 1874
Source: Architectural Sketch-Book 2 (September 1874)
(Courtesy, Boston Athenaeum)

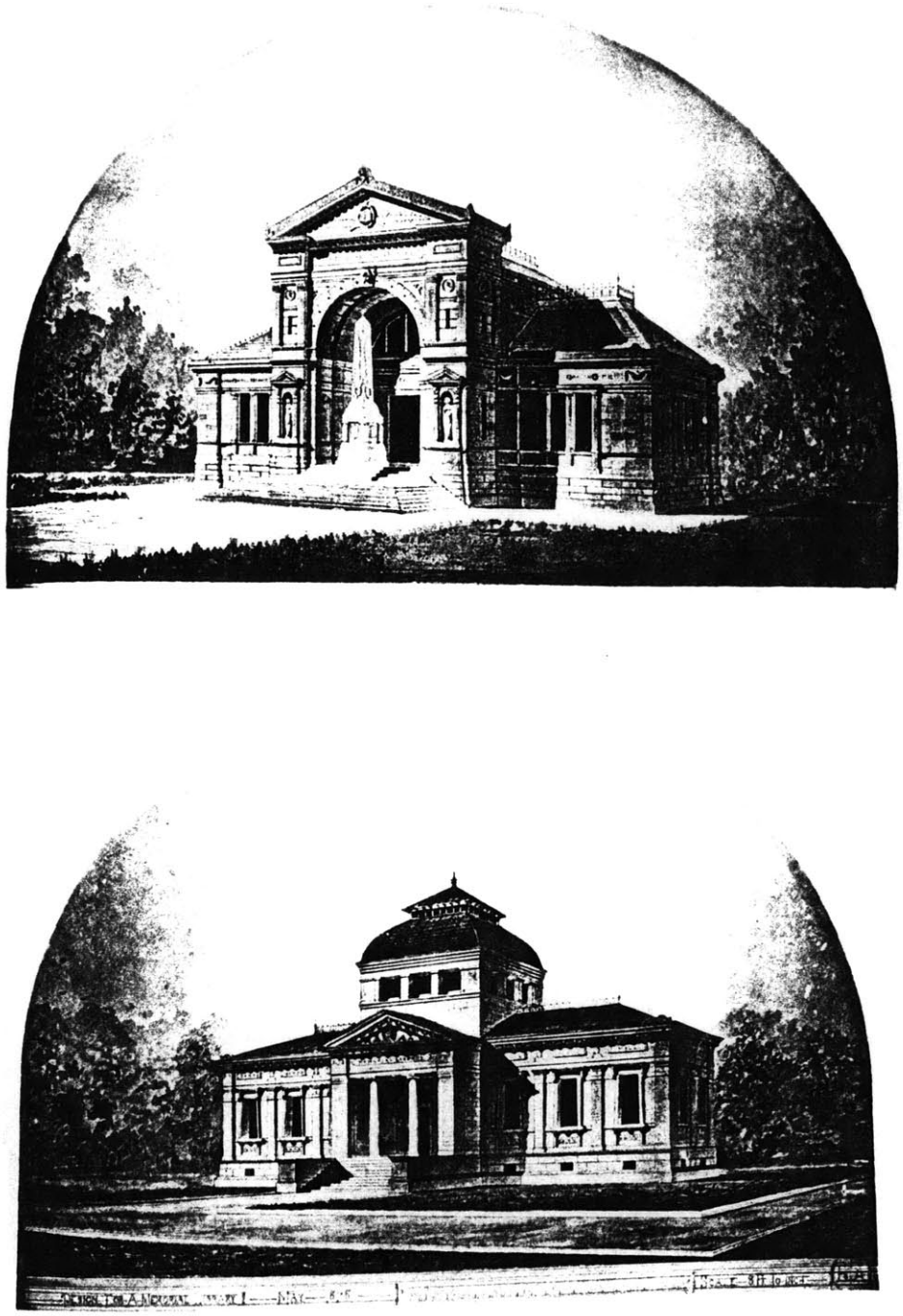

Figure 9. Design Problem: Memorial Library, 1875
Top: W.C. Richardson; Bottom: H.G. King
Source: Architectural Sketch-Book 2 (May 1875)
(Courtesy, Boston Athenaeum)

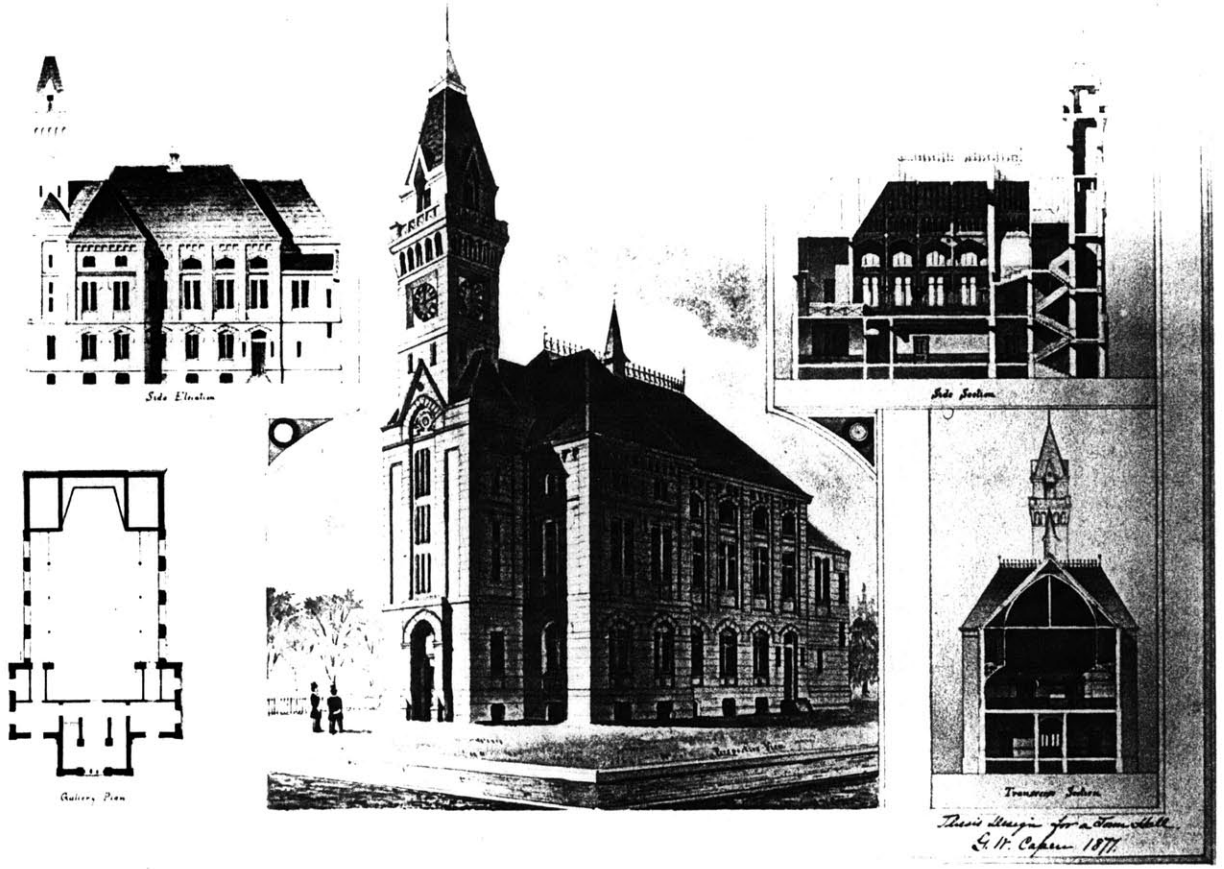

Figure 10. G.W. Capen, Thesis Drawing: Town Hall, 1877
(Courtesy, M.I.T. Museum)

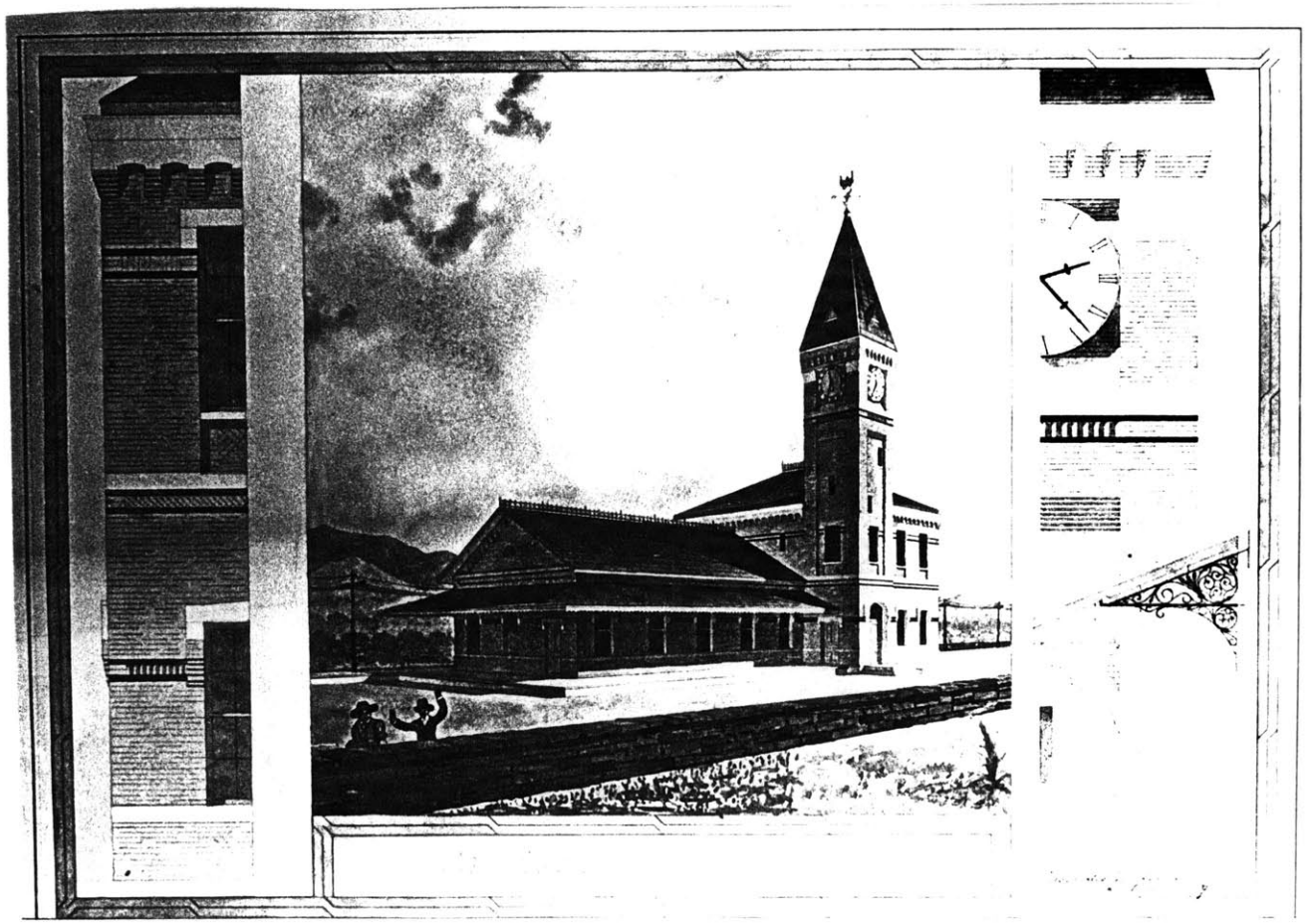

Figure 11. P.P. Furber, Thesis Drawing: Railroad Station, 1877
(Courtesy, M.I.T. Museum)

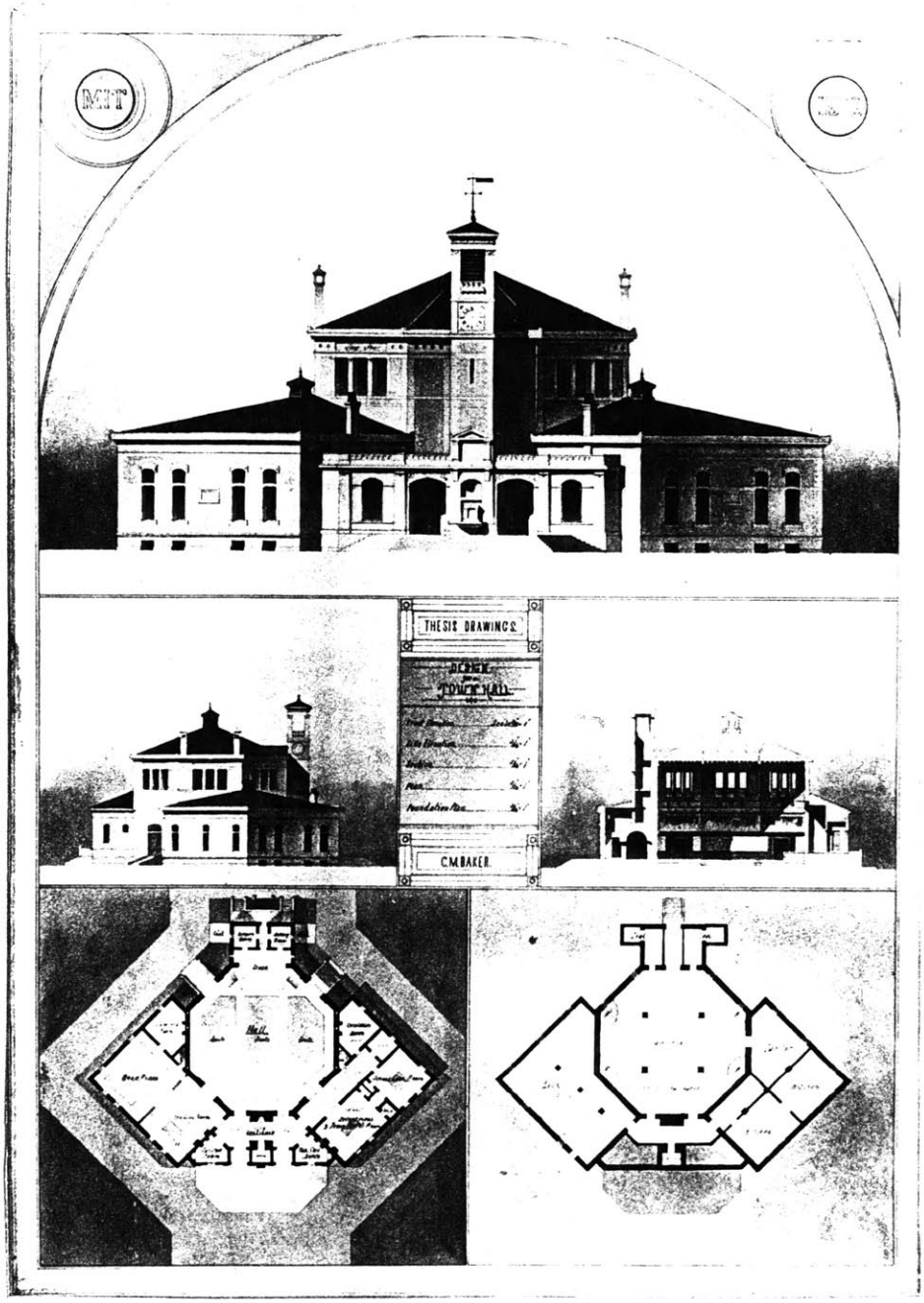

Figure 12. C.M. Baker, Thesis Drawing: Town Hall, 1878
(Courtesy, M.I.T. Museum)

Figure 13. C.S. Eaton, Thesis Drawing: Scientific Academy, 1878
(Courtesy, M.I.T. Museum)

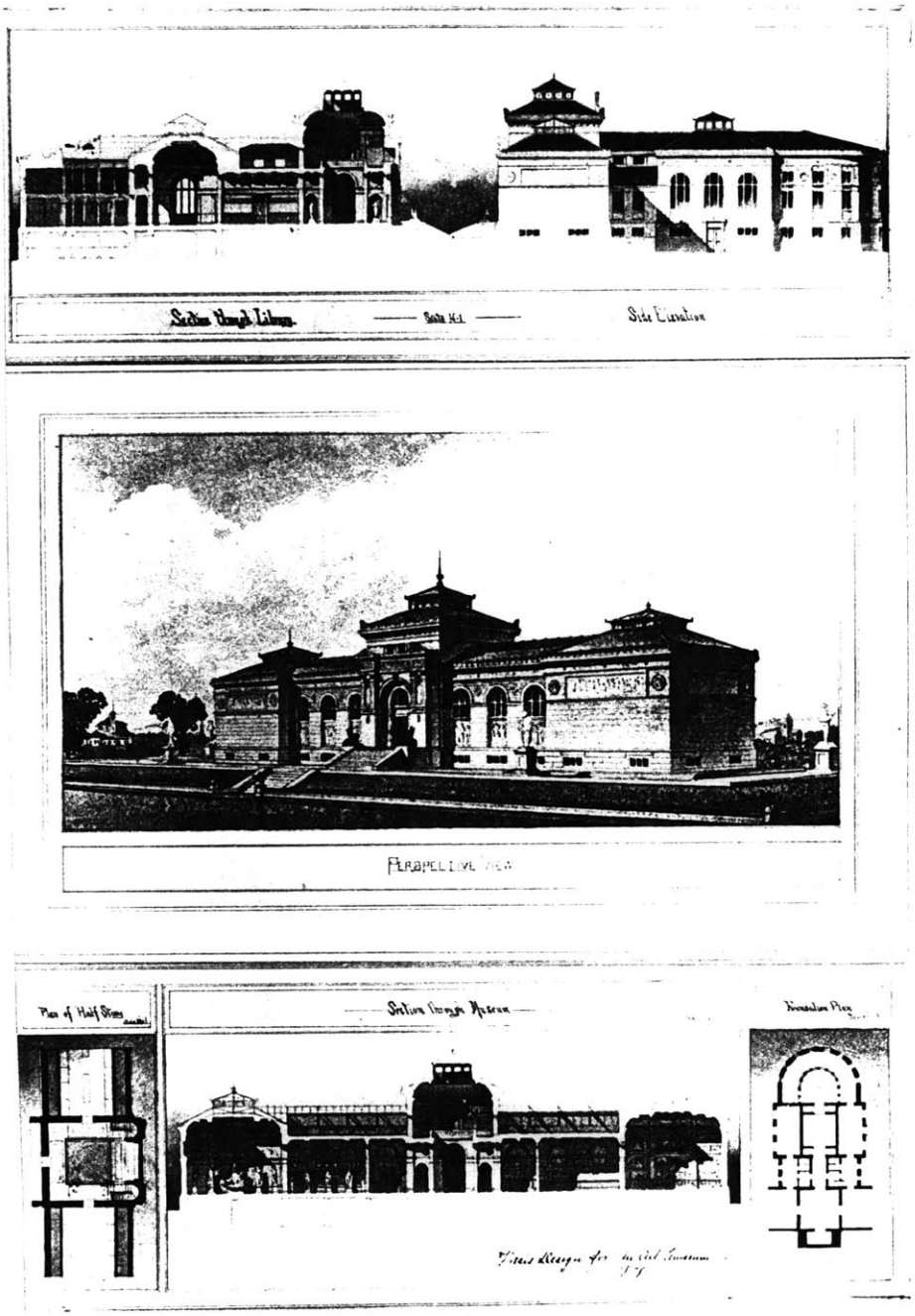

Figure 14. A.S. Higgins, Thesis Drawing:
Museum of Fine Arts and Library, 1878
(Courtesy, M.I.T. Museum)

ABBREVIATIONS

A.A.	Architectural Association (London)
A.A.A.	Archives of American Art
AABN	American Architect and Building News
A.B.	Bachelor of Arts degree
AC...	M.I.T., Annual Catalogue...[for particular academic year]
(AC)	Archival Collection (designation used by M.I.T. Archives)
A.I.A.	American Institute of Architects
AIA Proc...	Proceedings of the Nth Annual Convention of the American Institute of Architects...[for particular year]
AIAJ	American Institute of Architects Journal
AJE	American Journal of Education
A.M.	Master of Arts degree
AQ	American Quarterly
arch.	architect, or architecture, depending on context
ARec	Architectural Record
ASB	Architectural Sketch-Book (Boston)
(ASC)	Archival Special Collection (designation used by M.I.T. Archives)
A.S.S.A.	American Social Science Association
asst.	assistant
AtM	Atlantic Monthly
b.	born
B.A.	Bachelor of Arts degree
B.Arch.	Bachelor of Architecture degree
B.C.E.	Bachelor of Civil Engineering degree
bldg.	building
bldr.	builder
B.P.L.	Boston Public Library
B.S.	Bachelor of Science degree
B.S.A.	Boston Society of Architects
c.	circa
CE	civil engineer, or civil engineering, depending on context
CFM	Charles Follen McKim
Chi.	Chicago
Cin.	Cincinnati
Croquis	Croquis d'Architecture
CtY-Ms	Connecticut: New Haven: Yale University--Manuscripts and Archives
d.	died
DAB	Dictionary of American Biography
DAIA-Ar	District of Columbia: American Institute of Architects--Archives
DAIA-Fd	District of Columbia: American Institute of Architects--A.I.A. Foundation
Delaire	Louis-Therese David de Penanrun, Louis-Francis Roux, and Edmond-Augustin Delaire, Les Architectes Eleves de l'Ecole des Beaux-Arts (1907)

dftsm.	draftsman
DLC	District of Columbia: Library of Congress
DLC-Ms	District of Columbia: Library of Congress--Manuscript Div.
DNB	Dictionary of National Biography
ed.	editor
EdBA	Ecole des Beaux-Arts
EMJ	Engineering and Mining Journal
engr.	engineer, or engineering, depending on context
Eur.	Europe
FAIA	Fellow of the American Institute of Architects
FRIBA	Fellow of the Royal Institute of British Architects
GdA&B	Gazette des Architectes et du Batiment
G.P.	Grand Prix de Rome (Ecole des Beaux-Arts)
H	Harvard College
HEQ	History of Education Quarterly
HHR	Henry Hobson Richardson
Hitchcock	Henry-Russell Hitchcock, American Architectural Books (followed by item number in Hitchcock list)
HLSS	Lawrence Scientific School, Harvard University
Hon. Men.	Honorable Mention
HVB	Henry Van Brunt
ICA-B	Illinois: Chicago: Art Institute of Chicago--Burnham Library
instr.	instructor
JAE	Journal of Architectural Education
JSAH	Journal of the Society of Architectural Education
JSS	Journal of Social Science
KC	Kansas City
LA	Los Angeles (not Louisiana)
M.A.	Master of Arts degree
MB	Massachusetts: Boston: Boston Public Library
MBAt	Massachusetts: Boston: Boston Athenaeum
(MC)	Manuscript Collection (designation used by M.I.T. Archives)
MCLf	Massachusetts: Cambridge: Longfellow National Historic Site, Archive
MCM-Ar	Massachusetts: Cambridge: M.I.T.--Institute Archives and Special Collections
MCM-Mu	Massachusetts: Cambridge: M.I.T.--M.I.T. Museum (formerly M.I.T. Historical Collections)
MCM-Ro	Massachusetts: Cambridge: M.I.T.--Rotch Architectural Library
ME	mechanical engineer, or mechanical engineering, depending on context
MEA	Macmillan Encyclopedia of Architects
M.F.A.	Boston Museum of Fine Arts

mfr.	manufacturer
mgr.	manager
MH-Ar	Massachusetts: Harvard University--Archives
MH-FA	Massachusetts: Harvard University--Fine Arts Library, Fogg Museum
MH-GSD	Massachusetts: Harvard University--Loeb Library, Graduate School of Design
M.I.T.	Massachusetts Institute of Technology
MnHi	Minnesota: St. Paul: Minnesota Historical Society
NAR	North American Review
NCAB	National Cyclopedia of American Biography
NIC-Ms	New York: Ithaca: Cornell University--Department of Manuscripts and University Archives
NNC-A	New York: New York City: Columbia University--Avery Architectural and Fine Arts Library
NNC-RBMs	New York: New York City: Columbia University--Rare Book and Manuscript Library
NUC-pre 56	National Union Catalog--Pre-1956 Imprints
NYC	New York City
OCAI	William Robert Ware, Outline of a Course of Architectural Instruction (1866)
OCH	Ohio: Cincinnati: Cincinnati Historical Society
partn.	partner
Pgh.	Pittsburgh
Ph.B.	Bachelor of Philosophy degree
PR...	M.I.T., President's Report for the Year Ending...
Programme	William Robert Ware, The Programme of the Course of Instruction in the Department of Architecture (1868)
R	Regular Student at M.I.T. (i.e., pursuing course toward Bachelor of Science degree)
R.A.	Royal Academy of Arts (London)
ret.	retired
(RG)	Record Group (archival designation used by National Archives and A.I.A. Archives)
RGA	Revue Generale de l'Architecture
R.I.B.A.	Royal Institute of British Architects
RIBAJ	Royal Institute of British Architects Journal
RIBAT	Royal Institute of British Architects Transactions
RMH	Richard Morris Hunt
R.P.I.	Rensselaer Polytechnic Institute
RR	Railroad
Rwy	Railway
S	Special Student at M.I.T. (not candidate for degree)
S.B.	Bachelor of Science degree
SMQ	School of Mines Quarterly
(SR)	Series (archival designation used by A.I.A. Archives)
St.L.	St. Louis
stud.	student, or student of, depending on context

supt.	superintendent of construction
Supv. Arch.	Office of Supervising Architect, U.S. Treasury Dept.
TA	Teaching Assistant
T-B	Ulrich Thieme and Felix Becker, Allgemeines Lexikon der Bildenden Kunstler von der Antike bis zur Gegenwart (1907), followed by volume number and page number
TAR	Technology Architectural Review
vic.	vicinity
w.	with (before name of firm, when status as student, draftsman, assistant, or partner not known)
WBR	William Barton Rogers
Withey	Henry F. and Elsie Rathburn Withey, Biographical Dictionary of American Architects (Deceased)
WP	Winterthur Portfolio
WRW	William Robert Ware
WWW	Who Was Who
Y	Yale University

Introduction: Notes

1. Arthur Clason Weatherhead, The History of Collegiate Education in Architecture in the United States (Los Angeles: privately printed, 1941). Weatherhead (1888-) received a B.Arch. from the University of Pennsylvania in 1925 and attended Columbia in 1929-30. At the time the dissertation was submitted, he was serving as Dean of the College of Architecture and Fine Arts at the University of Southern California.

2. Ralph Thomas Walker (1889-1973), trained at M.I.T. in 1909-11 under Francis W. Chandler and Desire Despradelles, was President of the A.I.A. from 1949 to 1951. MEA 4:363.

3. American Institute of Architects, The Architect At Mid-Century (New York: Reinhold Publishing Corp., 1954). Vol. 1: Evolution and Achievement, ed. Turpin C. Bannister; Vol. 2: Conversations Across the Nation, ed. Francis R. Bellamy. Turpin Chambers Bannister (1904-1982) received a B.Arch. from Columbia in 1928 and a Ph.D. in Fine Arts from Harvard in 1944. At the time of the survey, he was Head of the Department of Architecture at the University of Illinois.

4. James Philip Noffsinger, The Influence of the Ecole des Beaux-Arts on the Architects of the United States (Washington: Catholic University of America Press, 1955). Noffsinger (b. 1925) received a B.Arch. and M.Arch. from Catholic University in 1952 and 1953. Walter A. Taylor, Director of Education and Research for the A.I.A. and administrator of the Architect At Mid-Century report, was one of Noffsinger's advisors.

5. An intriguing but enigmatic list summarizes the training of "114 outstanding [American] architects of all time periods," showing their choice of educational paths among such available options as school, office, atelier, or Ecole; another list tabulates the educational backgrounds and atelier choices of 512 Ecole-trained American architects. Noffsinger's work will be largely superseded by Richard Chafee's forthcoming study of Americans who studied architecture in Paris.

6. Theodor Karl Rohdenburg, A History of the School of Architecture, Columbia University (New York: Columbia University Press, 1954). This study appeared on the occasion of the two hundredth anniversary of the founding of Columbia University.

7. Caroline Shillaber, Massachusetts Institute of Technology School of Architecture and Planning, 1861-1961: A Hundred Year Chronicle (Cambridge: MIT Press, 1963). The "Department of Building and Architecture" did not become a part of the prospectus for the organization of M.I.T. until 1864. The university opened in 1865, with Ware as Professor of Architecture.

8. The finding aid for Manuscript Collection 14: "William Robert Ware, Papers, 1863-1914," MCM-Ar, explains the provenance of these materials. The accession of additional personal papers in 1978 as Manuscript Collection 19: "William Robert Ware, Papers, 1846-1917," and the

completion in 1978 of the cataloging of the papers of William Barton Rogers, first President of M.I.T., gave impetus to the present study.

9. Alan K. Laing, Nathan Clifford Ricker, 1843-1924, Pioneer in American Architectural Education (Champaign-Urbana: University of Illinois, 1973). Turpin Bannister, department head at Illinois at the time of the eightieth anniversary of Ricker's graduation, marked the occasion with a paper published later in 1953: "Pioneering in Architectural Education," AIAJ 20 (July and August 1953).

10. Ethel Sara Goodstein, "Charles Babcock: Architect, Educator and Churchman" (M.A. thesis, Cornell University, 1979).

11. This issue of the JAE was in part a response to the 1976 exhibition of Beaux-Arts drawings at the Museum of Modern Art and the accompanying publication, edited by Arthur Drexler, The Architecture of the Ecole des Beaux-Arts (New York: Museum of Modern Art, 1977). The JAE issue was produced by Guest Editors Lawrence Anderson, former Dean of Architecture and Planning at M.I.T., and Peter Collins. It included articles on J.-F. Blondel, Georges Gromort, John Galen Howard, William W. Wurster, on Ecole design training, and reminiscences by Jean Labatut and Roger Bailey. This author contributed the article, "William Robert Ware at M.I.T. and Columbia," which has been expanded in Chapters 1 and 4 of the present study. The 1979 article integrated archival material only recently made available (see n. 8) with information from various serial publications documenting the curriculum at M.I.T. and Columbia.

12. Richard Walter Lukens, "The Changing Role of Drawing and Rendering in Architectural Education" (Ph.D. dissertation, University of Pennsylvania, 1979). See also Marian Scott Moffett, "The Teaching of Design: A Comparative Study of Beginning Classes in Architecture and Mechanical Engineering" (Ph.D. dissertation, M.I.T., 1975); Michael Pause, "Teaching the Design Studio, A Case Study: M.I.T.'s Department of Architecture, 1865-1974" (Ph.D. dissertation, M.I.T., 1976).

13. Richard Oliver, ed., The Making of an Architect, 1881-1981: Columbia University in the City of New York (New York: Rizzoli, 1981). Articles by David G. De Long, Steven M. Bedford, and Susan M. Strauss documented the founding and early years of the architecture program at Columbia.

14. Anthony Alofsin, "Toward a History of Teaching Architectural History: An Introduction to Herbert Langford Warren," Journal of Architectural Education 37 (Fall 1983), 2-7. Alofsin is enlarging his study into an official history of the Graduate School of Design. See also Klaus Herdeg, The Decorated Diagram: Harvard Architecture and the Failure of the Bauhaus Legacy (Cambridge: MIT Press, 1983), and Alfred Swenson and Pao-Cin Chang, Architectural Education at I.I.T., 1938-78 (Chicago, 1978).

15. On the 1979 JAE article, see n. 11. While prior research on architectural education and educators has provided the most central context for this study, other areas of research bearing upon this study should be mentioned. An extensive sociological literature on the attributes of professionalism and the processes of professionalization can be examined for comparative and theoretical discussions of the dynamics of

professional careers, societies, and schools in other fields. The essential general literature on professionalism includes the following works: Roy Lewis and Angus Maude, Professional People in England (Cambridge: Harvard University Press, 1953); W.J. Reader, Professional Men: The Rise of the Professional Class in Nineteenth Century England (London: Weidenfeld & Nicolson, 1966); Robert Perrucci and Joel E. Gerstl, Profession without Community: Engineers in American Society (New York: Random House, 1969); Robert Mark Harmon, "'Profession' and 'Professional': A Conceptual Investigation" (Ed.D. dissertation, Temple University, 1975); Burton J. Bledstein, The Culture of Professionalism: The Middle Class and the Development of Higher Education in America (New York: W.W. Norton, 1976); Alexandra Oleson and Sanborn C. Brown, eds., The Pursuit of Knowledge in the Early American Republic: American Scientific and Learned Societies from Colonial Times to the Civil War (Baltimore: Johns Hopkins University Press, 1976); Alexandra Oleson and John Voss, The Organization of Knowledge in Modern America, 1860-1920 (Baltimore: Johns Hopkins University Press, 1979); Magali Sarfatti Larson, The Rise of Professionalism: A Sociological Analysis (Berkeley: University of California Press, 1977); Gerald L. Geison, Professions in America (Chapel Hill: University of North Carolina Press, 1983); Idem, Professions and the French State (Philadelphia: University of Pennsylvania Press, 1984).

Another body of literature on technical education, much of it from the fields of history of education and intellectual history, can be examined for general and institutional studies of professional education in the engineering fields. The essential works include: Frank W. Eller, "Engineering Education in the United States" (Ph.D. dissertation, Columbia University, 1958); James Gregory McGivern, "First Hundred Years of Engineering Education in the United States (1807-1907)" (Ed.D. dissertation, Washington State University, 1960) [published with the same title, Spokane: Gonzaga University Press, 1960]; Frederick B. Artz, The Development of Technical Education in France, 1500-1830 (Cambridge: MIT Press, 1966); John Hubbel Weiss, The Making of Technological Man: The Social Origins of French Engineering Education (Cambridge: MIT Press, 1982); Julius Stratton, Mind and Hand: M.I.T., The Nineteenth Century (forthcoming).

In looking at the engineering fields most closely allied to architecture, the literature of professionalism is often inseparable from the literature of professional education. The profession of mechanical engineering is discussed in these works: Oberlin Smith, "The Engineer as a Scholar and a Gentleman," Transactions of the American Society of Mechanical Engineers (1890-91), 49-50; Jaroslaw Drahomyr Stachiw, "The Birth of a Profession: The Transition from Mechanic to Engineer" (Ed.D. dissertation, Pennsylvania State University, 1963); Berenice M. Fisher, "Public Education and 'Special Interest': An Example from the History of Mechanical Engineering," History of Education Quarterly 6 (1966), 31-40; Monte A. Calvert, The Mechanical Engineer in America, 1830-1910: Professional Cultures in Conflict (Baltimore: Johns Hopkins University Press, 1967); John Mihalasky, "The Role of Professional and Engineering Education Societies in the Development of the Undergraduate Industrial Engineering Curriculum" (Ed.D. dissertation, Columbia University, 1973); Per Sturla Arthur Christiansen, "Theory and Practice in the Formative Years of American Mechanical Engineering Education: A Cultural and Historical Analysis" (Ed.D. dissertation, Boston University, 1975).

The profession of civil engineering education is discussed in these works: Charles Warren Hunt, Historical Sketch of the American Society of Civil Engineers (New York: A.S.C.E., 1897); John B. Babcock, "The Boston Society of Civil Engineers and Its Founder Members," Journal of the B.S.C.E. 23 (July 1936), 151; Daniel H. Calhoun, The American Civil Engineer: Origins and Conflict (Cambridge: Technology Press, 1960); Idem, The Intelligence of a People (Princeton: Princeton University Press, 1973); Raymond H. Merritt, Engineering in American Society, 1850-1875 (Lexington: University Press of Kentucky, 1969); William H. Wisely, The American Civil Engineer, 1852-1974: The History, Traditions and Development of the American Society of Civil Engineers (New York: A.S.C.E., 1974).

The profession of architecture, particularly in the United States and Great Britain, has been well documented during the past four decades. Barrington Kaye submitted his doctoral dissertation at the University of London in the field of sociology in 1951, taking architecture as a case study in professionalization. His research was later published as The Development of the Architectural Profession in Britain: A Sociological Study (London: George Allen & Unwin, 1960). The first study of the architecture profession in the United States was prepared for the centennial of the A.I.A.: Henry H. Saylor, The A.I.A.'s First Hundred Years (Washington: A.I.A., 1957). The role of the architect throughout history was the theme of a collection of essays edited by Spiro Kostof: The Architect: Chapters in the History of the Profession (New York: Oxford University Press, 1977). The role of the architect in the consciously professionalized world of the nineteenth and twentieth centuries was the focus of Andrew Saint's The Image of the Architect (New Haven: Yale University Press, 1983). Roger K. Lewis discussed the nature of architectural education and architectural practice in the United States in the 1970s and 1980s in Architect? A Candid Guide to the Profession (Cambridge: MIT Press, 1985). A study directed by Helene Lipstadt and Harvey Mendelsohn examined the tensions between history and technology, architecture and engineering, in the French periodical literature of the nineteenth century: Architecte et ingenieur dans la presse: polemique, debat, conflit (Paris: Imprimerie Theoria, 1980). Two recent dissertations in the history of architecture have examined the professionalization of architecture in the United States in the six decades between the Civil War and the First World War. Richard Michael Levy took a comparative approach in "The Professionalization of American Architects and Civil Engineers, 1865-1917" (Ph.D. dissertation, University of California, Berkeley, 1980), developing much useful documentation from the professional periodicals and many useful summary tables from the standard biographical sources. Sibel Bozdogan Dostoglu took the approach of a local case study in "Towards Professional Legitimacy and Power: An Inquiry into the Struggle, Achievements and Dilemmas of the Architectural Profession through an Analysis of Chicago, 1871-1909" (Ph.D. dissertation, University of Pennsylvania, 1982), testing local data against various models of professionalism and professionalization.

Chapter 1: Notes

1. In [M.I.T.], Objects and Plan of an Institute of Technology (Boston: John Wilson & Son, 1861), 3. Hereafter cited as Objects and Plan. Rivalry among the major American cities and the local boosterism of entrepreneurs--and educators--were, during the 1850s and 1860s, virtually the only forces acting to keep America (actually, any one of several principal cities and their trade regions) competitive in the international market of art manufactures and general industrial production. With the creation of the Bureau of Education in the Department of the Interior in 1867, there was finally a demonstrable national interest in gathering information on art education and technical education, but still no national educational program other than the 1862 program for agricultural and mechanical land-grant colleges--which was really only the enabling legislation for a series of diverse state programs. In the absence of central governmental policy, it remained for such states as Massachusetts and New York to act to create public programs in comprehensive art and technical education, in order to support the position of their state manufactures in an international market that was not only economically but also aesthetically competitive. On entrepreneurial activity in New York, see Carl W. Condit, The Port of New York, vol. 1: A History of the Rail and Terminal System from the Beginnings to Pennsylvania Station (Chicago: University of Chicago Press, 1980).

2. PR...1872, 4.

3. PR...1872, 4. See also Massachusetts, Legislature, House Document 260 (March 30, 1959).

4. William Barton Rogers (1804-1882) was educated at the college of William and Mary, where he succeeded his father, Patrick Kerr Rogers, as Professor of Natural Philosophy and Chemistry in 1828. He taught these subjects and mathematics until 1835, when he was simultaneously appointed as Professor of Natural Philosophy at the University of Virginia and as State Geologist of Virginia. Rogers headed the state survey until 1848 and taught until 1853, moving to Boston in that year. He had been elected as an honorary member of the Boston Society of Natural History in 1842 and in 1846 had prepared, for the Trustees of the Lowell Institute, "A Plan for a Polytechnic School on Boston" (in Emma Savage Rogers, ed., Life and Letters of William Barton Rogers, vol. I, Appendix C (Boston, Houghton Mifflin & Co., 1896), 420-27). Rogers spent the remainder of the 1850s lecturing in Boston and traveling in Europe. Once drawn into the enterprise of the Committee of Associated Institutions, his services became indispensable. As this group evolved into the Massachusetts Institute of Technology, Rogers was elected first President of the new institution in 1862 and served until 1868, when he stepped aside for reasons of health and finally resigned in 1870. He served another brief term as President from 1878 until 1881, completing his service to M.I.T. in September 1881, about the same time as Ware. On the contributions of Rogers to the founding and early administration of M.I.T., see Julius Stratton, Mind and Hand: M.I.T., The Nineteenth Century (forthcoming).

5. "Memorial of Committee of Associated Institutions of Science and Art," Massachusetts, Legislature, House Document 13 (January 1860). Some of the rhetoric of urban rivalry was heard in Rogers' addresses at the Massachusetts State House in support of the proposals of the Associated Institutions of Science and Arts. A reporter paraphrased Rogers' remarks of February 16, 1860: "Here, if anywhere in this country, we have the elements for the establishment of such an educational museum; the centre of manufacturing industry, the seat of the highest social refinement, the beneficent patron of everything good, beautiful and elevated, Boston is, of all places in this country, and perhaps in the world, the proper place for this all-important and much-needed auxiliary to the cause of education. Having neither the splendor of Paris, nor the population of London or New York, Boston, in the general intelligence, wealth, munificence and refinement of her people, can compare favorably with any of the cities of the globe." Boston Journal, February 17, 1960.

6. See PR...1872, 4-6. The Boston architects and engineers who endorsed the Objects and Plans of the Institute of Technology within the first year, thereby becoming "Members of the Massachusetts Institute of Technology," included: Ware's first employer, Edward C. Cabot, and Ware's current civil-engineer partner, Edward S. Philbrick. Most of the rest were also practicing civil engineers (William Edson and his partner Joel Herbert Shedd), or architects with a strong engineering background (George M. Dexter, who was Cabot's structural engineer for the Boston Athenaeum; Robert Morris Copeland; Greely S. Curtis). Included on the list were Van Brunt's first employer and teacher, George Snell; John Stevens; Alexander R. Esty. None of the men, then under thirty, who would by the end of the decade emerge as the leaders in the architectural profession in Boston, was listed as a charter member of the Institute of Technology. Among the architects of the older generation not present in the list were: Hammatt Billings; N.J. Bradlee; Gridley J.F. Bryant; Arthur Gilman; Jonathan Preston. See Account of the Proceedings Preliminary to the Organization of the Massachusetts Institute of Technology (Boston: John Wilson & Son, 1861), 9-14.

7. Objects and Plan, 5.

8. Ibid., 4.

9. Ibid. Rogers' 1860 report was still being deliberated in the Massachusetts Legislature when New York entrepreneurs used it as the basis for their plan to establish an Institute of Technology in Central Park. After citing the essential provisions of Rogers' report in a letter to the editor of the New York Tribune, one of the New York partisans offered this conclusion: "It is doubtful whether the country at this time needs two Institutes of Technology; and if we can have only one, that one should certainly be located here. New York, owing to its central position and commercial advantages, is the proper place for it; and an institution destined to have such a powerful influence upon the development of the material resources of this country, should be located in a more central spot than Boston." [letter to the editor, dated January 24, 1861], reprinted in Boston Journal, February 13, 1861. New York interest in the Boston endeavor continued for several years, however. On April 1, 1864, the New York Evening Post printed a proposal for the "New York Institute

of Technology" which drew heavily on Rogers' 1860 Objects and Plan. Rogers immediately wrote to the New York paper and graciously noted the similarity of the two proposals: "The Massachusetts Institute of Technology will rejoice to welcome a sister Institute in New York, and cannot but be gratified at the reproduction in your city in such unchanged form of an educational plan in many respects new, and which we feel proud to have originated." [letter to editor, dated April 4, 1864], reprinted in Boston Advertiser, April 11, 1864. By the time of this exchange, the Massachusetts Institute of Technology had been incorporated for three years, and Rogers was about to publish his next major educational document, Scope and Plan of the School of Industrial Science.

10. Objects and Plan, 19.

11. The guiding principle in assembling the collection, Rogers believed, should be "the extent of practical instruction to be derived from it" rather than "the multitude of objects which it might embrace." He contemplated curatorial departments of Mineral Materials, Organic Materials, Manufacturing Arts, Implements and Machinery, and Domestic and General Architecture, Ship Building, and Inland Transport. The architectural department would include models and drawings of buildings, and examples "of the diversified mechanical and chemical contrivances employed in the supply and distribution of heat and light, water and air." He mentioned, in concluding, that "benefits of no small social importance might be anticipated from an ample illustration of the arrangements and inventions adapted to the economy of the household, and especially to the promotion of cleanliness, comfort, and health, in the workshops and in the homes of the poor." Objects and Plan, 13-20. While the Departments of Civil Engineering and Architecture did install collections in their rooms at M.I.T., these collections remained haphazard in the way they were acquired and more or less restricted to the use of the faculty and students and their professional colleagues around Boston.

12. The April 10, 1861, Act of the Massachusetts Legislature granted adjacent Back Bay sites to the Boston Society of Natural History and M.I.T. The Massachusetts Horticultural Society built Horticultural Hall in 1865 in the older part of town, on Tremont Street (across Bromfield Street from the Studio Building, completed in 1862).

13. The Franklin Institute, established in 1824, had published a regular series of Proceedings since 1826. See Bruce Sinclair, Early Research at the Franklin Institute (Philadelphia: Franklin Institute, 1966), and Idem, Philadelphia's Philosopher Mechanics (Baltimore: Johns Hopkins University Press, 1974).

14. Rogers proposed that the Society of Arts would consist of a governing Committee on the Museum and a governing Committee on the School of Industrial Science; a Committee on Publications charged with the management and editing of a Journal of Industrial Science and Art; and a series of twelve Committees of Arts, each concerned with a particular field or topic of investigation. Among those proposed subcommittees were ones concerned with Household Economy, Engineering and Architecture, and Graphic and Fine Arts. These subcommittees and the Committees on the Museum and Publications were never active, and the Museum and Journal were

never established. The Committee on the School, however, became the committee of overseers for the curriculum and faculty of M.I.T. The Society of Arts did not attract many architects or civil engineers, but those who were members represented a kind of professionalism receptive to the idea of a regular social and intellectual exchange with other professionals in the community. By 1870 the architect- and engineer-members included some of the charter members of the Massachusetts Institute of Technology who had endorsed Rogers' Objects and Plan in 1860-61: Edward C. Cabot, Robert Morris Copeland, Edward S. Philbrick, and J. Herbert Shedd. New members included two of the representatives of the older generation missing from the earlier list: Hammatt Billings and Jonathan Preston; and several members of the emerging generation of Boston architects: J. Pickering Putnam, Samuel J.F. Thayer, Henry Van Brunt, and William Robert Ware. See AC...1870-71, 51-54. By 1880, however, the architect and engineer membership had thinned considerably, partly because of deaths but probably also because of a parochialization of professional interests, represented by organizations such as the Boston Society of Architects (founded 1867) and the Boston Society of Civil Engineers (founded 1848). Only four of the ten architect- and engineer-members of 1870 remained in the Society of Arts in 1880: Edward S. Philbrick, Jonathan Preston, J. Pickering Putnam, and William Robert Ware. Only two new members in this category had joined: M.I.T. industrial design instructor Charles Kastner and architect John H. Sturgis. See AC...1880-81, 82-84.

15. On Ware's paper, see pp. 38-54. On December 1, 1864, William Barton Rogers gave a paper on "Technological Institutions in Europe." Its contents are not known.

16. Objects and Plan, 21.

17. Ibid., 22.

18. Ibid.

19. Ibid., 23.

20. On the shaping of the program for the School of Industrial Science, see Stratton, Mind and Hand.

21. The promotion of the technical and art education essential for excellence in manufacturing would become an objective of the Massachusetts public schools, with the Art Education Act of 1870. See Chapter 2, pp. 110-11.

22. Among the enterprises figuring in preparations during the War for western settlement afterward were several in which the Ames family of Massachusetts were involved. Over three generations they developed and managed the Ames Plow and Shovel Co. in North Easton, Massachusetts. Oakes Ames (1804-1873) served in the U.S. House of Representatives from 1862 to 1873, where he headed the Committee on the Pacific Railroad. His brother Oliver (1807-1877) was a major investor and executive officer in the Union Pacific Railroad from 1865 until his death. He and his son Fredrick Lothrop Ames (1835-1893) had established a private agricultural

library by 1860. H.H. Richardson's North Easton library and town hall were commissioned as memorials to Oliver and Oakes Ames, the latter implicated in a conflict of interest scandal in Congress. John Ames Mitchell (1845-1918), nephew of Oliver and Oakes Ames, was a student draftsman with Ware and Van Brunt about 1863-64. He was the family's principal architect in North Easton during the 1870s. His return to Paris to pursue his artistic studies opened the way for the entry of Richardson as the architect for Ames family commissions between 1877 and 1886. On the Ames family, their role in the national political and economic program, and their role as architectural patrons, see Lawrence Joseph Homolka, "Henry Hobson Richardson and the Ames Memorial Buildings" (Ph.D. dissertation, Harvard University, 1976).

23. Justin Smith Morrill (1810-1898) was elected as a Whig from Vermont in 1854 and became a Republican before the end of the decade. He would serve in the House until 1866 and in the Senate until 1898. His first bill for land-grant colleges was drafted in 1857, passed by both houses of Congress in 1858, but vetoed by the Democratic President, James Buchanan, in 1859. The bill was reintroduced and passed during the next administration and was signed into law by President Lincoln on July 3, 1862, as a major piece of legislation in the Republican program to promote agriculture and western settlement. The Act provided for the allocation, to every state, of 30,000 acres of federal land for each Senator or Representative in that state's delegation. Western states had such federal lands within their own borders; eastern states received scrip for the acreage of federal land in the West to which they were entitled. The proceeds from the sale or lease of the land or scrip would then be appropriated by the state legislature to support agricultural and mechanical colleges. See Earle D. Ross, Democracy's College: The Land Grant Movement in the Formative Stage (Ames: Iowa State College Press, 1942); Edward Danforth Eddy, Colleges for Our Land and Time: The Land-Grant Idea in American Education (N.Y.: Harper & Bros., 1957); Gordon C. Lee, "The Morrill Act and Education," British Journal of Education Studies 12 (1963-64), 19-40; Allan Nevins, The State Universities and Democracy (Urbana: University of Illinois Press, 1972).

24. See PR...1872, 7. The Massachusetts Agricultural College grant was made two days later. The 1861 grant of a building site for M.I.T. from the state-controlled share of new land in the Back Bay should not be confused with the grant of a share of Morrill Land-Grant revenues to M.I.T. in 1863. By the charter of 1861, the Massachusetts Institute of Technology and the Boston Society of Natural History--the one institution from the Associated Institutions of Science and Arts that remained in the cultural partnership--had been awarded a full block of the state's land in the Back Bay. The block (bounded by Berkeley, Clarendon, Boylston, and Newbury Streets) was divided so that the eastern one-third was designated as the site for the Boston Society of Natural History and the western two-thirds as the site for M.I.T. Land use covenants were included in the deeds, specifying that neither institution could cover more than one-third of its site with buildings. See PR...1872, 6-7.

25. The details of rival lobbying between Harvard and M.I.T. in the field of polytechnic education, with Gov. John Andrew favoring Harvard, are discussed in Stratton, Mind and Hand. Of the six New England states, four

awarded their Morrill revenues to established scientific colleges within private universities: Connecticut (on June 24, 1863) added to the endowment of the Sheffield Scientific School at Yale; Rhode Island (on January 23, 1863) added to the endowment of the Agricultural and Scientific Department of Brown; New Hampshire (on July 9, 1863) added to the endowment of Dartmouth by helping to create the New Hampshire College of Agricultural and Mechanic Arts alongside the existing Chandler Scientific School; and Massachusetts aided M.I.T. Vermont (on November 11, 1862) gave its revenues to the public University of Vermont and State Agricultural College at Burlington. Maine (on March 25, 1863) created Maine State College of Agriculture and the Mechanic Arts at Orono. See U.S. Bureau of Education, Report to the Commissioner of Education ... 1870, 74-75.

The public-private support of these various New England schools, as calculated from the cumulative endowment funds, 1862-72, from Land-Grant funds and private sources can be seen in this abbreviated table (Source: Report to the Commissioner of Education ... 1873, lxxv-lxxvi):

Institution	Total Endowment 1862-1872	Percent from Morrill Act	Percent from Private Sources
Brown	$ 50,000	100.0	(?)
Univ. of Vermont	171,985	71.3	28.7
Maine State Coll.	249,359	46.7	53.3
Dartmouth	194,000	41.2	58.8
Yale	485,000	27.8	72.2
M.I.T.	589,795	26.3	73.7
Mass. Agric. Coll.	598,724	13.4	86.6

26. Objects and Plan, 29.

27. Ibid., 28.

28. The designation, "Committee on Instruction," was used until 1869-70. Beginning in 1870-71, the designation, "Committee on the School," was reinstated.

29. [M.I.T.], Scope and Plan of the School of Industrial Science of the Massachusetts Institute of Technology (Boston: John Wilson & Son, 1864). Hereafter cited as Scope and Plan.

30. Ibid., 3-5. An intermediate category was also envisioned--students who would attend specific courses in the Special and Professional curriculum "such as descriptive geometry applied to construction, perspective...." While the details are not made clear, the report proposed awarding "certificates of attainment" to the more disciplined students pursuing partial courses of professional study in "Architectural Drawing," "Descriptive Geometry and Its Applications," "Mathematics applied to Construction," etc. Ibid., 10, 19.

31. Ibid., 5-9.

32. Rogers had rather haughtily remarked in his 1860 report that "the system of merely popular lecturing in its usual form would be inconsistent with the grave practical purposes which we have in view." Objects and

Plan, 27. The Lowell Institute lecture series, endowed by John Amory Lowell, is discussed in Chapter 4, pp. 198-99. Programs of popular lectures on architecture organized by members of various A.I.A. Chapters are also discussed in Chapter 4, pp. 204-05, 208-09.

33. Scope and Plan, 10.

34. A Department of Physics was organized in 1873; a separate Department of Mathematics was not organized until the early 1920s.

35. It is worth noting that in the 1864 report, Architecture, Mechanical and Civil Engineering, which had been differentiated in all other respects, still followed a common curriculum through the third year. This final differentiation would be accomplished by the time the first M.I.T. Annual Catalogue was published in 1865. All departments would become further specialized in 1873-74, when two-year programs of professional study were expanded into three-year programs. See Chapter 2, pp. 95-96.

36. Scope and Plan, 12-14.

37. No evidence concerning outside consultation or authorship of particular parts of the curriculum has yet been found. For the list of subscribers, see n. 6. One of the few published items which contained ideas on the social benefits of architectural education consistent with those of Rogers was David Boswell Reid's "A College of Architecture and Its Relation to Professional Education and to the Improvement of Public Health," in Henry Barnard's American Journal of Education (December 1856), 629-41. David Boswell Reid (1805-1863) began his career as a practical chemist and physician in Edinburgh, and during the 1840s he was engaged in designing and installing the ventilation and lighting systems in the new Houses of Parliament. He came to the U.S. in 1855 and began to lecture on ventilation and hygiene in dwellings. Reid's 1856 argument for a curriculum in architecture resulted from his more than two decades of experience with the mechanical systems of buildings. He served briefly as Professor of Physiology and Hygiene at the University of Wisconsin (1859-60) but was frustrated in his attempts to start polytechnic schools in Wisconsin and Minnesota. I have not yet determined whether Rogers knew of the various articles on European systems of polytechnic education, published in Henry Barnard's AJE from 1855 to 1881. There are no letters from Barnard in the Rogers Papers at M.I.T. and no mentions of Rogers or M.I.T. in the AJE--even in the special vol. 21 (1870) on Scientific and Industrial Education in Europe. I have not yet examined the Will S. Monroe Collection of Henry Barnard Manuscripts at the N.Y.U. Library. On Barnard's documentation and promotion of technical education, see Richard Emmons Thursfield, Henry Barnard's American Journal of Education (Baltimore: Johns Hopkins Univ. Press, 1945); Robert B. Downs, Henry Barnard (Boston: Twayne, 1977).

38. Henry Ware, Jr. (1794-1843) was the son of Henry Ware (1764-1845), Hollis Professor of Divinity at Harvard since 1805. Henry, Sr. was instrumental in founding the Harvard Divinity School in 1819, where Henry, Jr. served as Professor of Pulpit Eloquence and Pastoral Care, from 1830 to 1842. Emma Forbes Ware, Ware Genealogy; Robert Ware of Dedham,

Massachusetts, 1642-1699, and His Lineal Descendants (Boston: David Clapp & Son, 1901), 99-100, 157-58, 302-03.

39. Henry Ware, Jr. had three children by his first wife, Elizabeth Watson Waterhouse (1793-1824), daughter of Cambridge physician, Benjamin Waterhouse:

John Fothergill Waterhouse Ware (1818-1881)
Mary Elizabeth Ware (1820-1870)
Henry Ware (1822-1823)

He then had six children by his second wife, Mary Lovell Pickard (1798-1849), daughter of English merchant Mark Pickard:

Robert Ware (1828-1831)
Ann Bent Ware Winsor (1830-1907)
William Robert Ware (1832-1915)
Harriet Ware (1834-1920)
Emma Forbes Ware (1838-1898)
Charles Pickard Ware (1840-1921)

William Ware's older brother John was a clergyman in Fall River, Cambridge, Baltimore, and Boston (Arlington Street Church, 1872-81). John was the father of William Rotch Ware (1848-1917), the architect and editor. His younger brother Charles was head of the records department of the Boston office of Bell Telephone. Emma Forbes Ware, Ware Genealogy, 157-58, 232-33.

40. Grace Williamson Edes, Annals of the Harvard Class of 1852 (Cambridge: Harvard University Press, 1922), 204-07.

41. Ware's course work at Harvard can be summarized as follows: Languages--17 semesters (8 of Latin, 6 of Greek, 2 of French, 1 of German); rhetoric and declamation--8 semesters; history and political economy-- 6 semesters; philosophy (ethics and logic)--5 semesters; sciences-- 5 semesters (3 of physics, 1 each of chemistry and zoology); mathematics-- 4 semesters. Harvard College Student Records [Fall 1848-Spring 1852], MH-Ar.

42. Harvard College, Report of the Class of 1854: 1854-1894 (Boston: George H. Ellis, 1894).

43. Edes, Annals, 205, 222.

44. The Crystal Palace, at Sixth Avenue and 42nd Street, was the first large iron and glass structure in the United States. WRW to Emma Ware, March 26 and April 23, 1853. Ware Papers (MC 19), folder 1, MCM-Ar. By the time he returned to New York in 1859, the Crystal Palace was gone, having burned October 5, 1858.

45. WRW to unidentified, June 1854, Ware Papers (MC 19), MCM-Ar. It is possible that the letter was addressed to the Boston architect Edward Clarke Cabot, whose training was as a painter and whose practice was made possible by collaboration with engineers and builders like George Minot Dexter and Jonathan Preston. Cabot's Boston Athenaeum opened at the end of Ware's freshman year at Harvard. His Second Boston Theater was under

construction during Ware's years in New York. Ware's first employment in an office would be with Cabot, 1856-58. See n. 49.

46. Ibid.

47. The course in Civil Engineering was directed by Henry Lawrence Eustis (1819-1885), an alumnus of Harvard (1838) and the U.S. Military Academy (1842). Eustis served in the Army Corps of Engineers in Washington, Newport, and Boston before returning to West Point as Assistant Professor of Engineering in 1847. Two years later, he was appointed to the faculty of the Lawrence Scientific School. See Stephen Paschall Sharples, "The Lawrence Scientific School," Cambridge Historical Society Proceedings 4 (1909), 79-86; Arthur Zaidenberg, "From Reforms to Professionalization: The Transition of Attitudes Toward Scientific Education at Harvard" (Ph.D. dissertation, U.C.L.A., 1974).

48. Report of the Class of 1854, 20. (See n. 42.) George Snell (1820-1893) had been in practice in Boston since 1850. For more on Snell, see n. 51 and 77.

H.H. Richardson entered the regular undergraduate program at Harvard in the spring of 1856, Ware's last semester at the Lawrence Scientific School. It is doubtful, though, that Richardson was acquainted while at Harvard with Ware, Van Brunt, or Gambrill, four to six years his seniors.

49. Edward Clarke Cabot (1818-1901) had no academic training and spent the years between 1835 and 1845 raising sheep in Illinois and Vermont. His amateur training was sufficient, however, for him to win the 1846-47 competition for the design of the Boston Athenaeum, which he built between 1846 and 1849 in association with George Minot Dexter. E.C. Cabot practiced architecture in Boston with his brother, James Elliot Cabot (1821-1903), from 1849 to 1858 and again from 1862 to 1865. (James Elliot Cabot graduated from Harvard in 1840 and spent the next three years traveling and studying in Europe. He returned to Harvard to study law and did legal work for several years before going into architectural practice. In 1862 he published a series of articles on seventeenth- and eighteenth-century New England domestic architecture under the title of "House-Building," Atlantic Monthly 10 (October 1862), 423-31. He taught philosophy at Harvard in 1869-71 and 1874-75, and served as the literary executor of Ralph Waldo Emerson and in 1887 published a memorial biography of him: A Memoir of Ralph Waldo Emerson.) Both Cabot brothers were charter members of the Massachusetts Institute of Technology in 1861 (see n. 6) and remained active members of the M.I.T. Society of Arts. E.C. Cabot was chosen in 1867 by the charter members of the Boston Society of Architects to be its President, an office he held until 1895, when he was made Honorary President. From 1875 to 1888, E.C. Cabot practiced in partnership with Francis W. Chandler (In 1888, Chandler became head of the Department of Architecture at M.I.T.); and toward the end of his career, Cabot practiced in partnership with M.I.T. alumnus, Arthur G. Everett, and Samuel W. Mead. See Margaret Henderson Floyd, "Edward Clarke Cabot," MEA 1:363-64; Robert B. Shaffer, "Emerson and His Circle: Advocates of Functionalism," JSAH 7:3/4 (July-December 1948), 17-20; J.E. Cabot obituary, Brookline Chronicle, January 24, 1903.

50. Ware graduated from the Lawrence Scientific School on July 16, 1856. Sometime in the late spring or early summer of 1856, he prepared a set of drawings for a new "Chemical Building" for Harvard, for Josiah Parsons Cooke, Professor of Chemistry and Mineralogy, 1851-94. See letter of Cooke to Corporation of Harvard College, July 26, 1856. Harvard College Paper, Second Series 23 (1856), 255-57. The commission for what would be Boylston Hall was subsequently awarded to the Berlin/Vienna-trained architect Paul Schulze, whose working drawings were ready by the fall of 1856. In the spring of 1857, Ware was swept up in the antislavery politics of many Boston intellectuals. A week after the Supreme Court handed down the Dred Scott decision, implicitly allowing for an extension of slavery into such territories as Kansas and Nebraska, Ware wrote to his sister expressing his disappointment about the decision and mentioning that he had been practicing his "patriotism and architecture together by drawing some porches for the Kansas Free State Hotel, thus planting the seeds of the arts in the virgin soil." WRW to Emma Ware, March 16, 1857. Ware Papers (MC 19), folder 2, MCM-Ar. In the late summer of 1858, he prepared drawings for alterations to the Boston house of his uncle, Dr. Charles Eliot Ware. WRW to Emma Ware, September 3, 1858. Ware Papers (MC 19), folder 2, MCM-Ar.

51. Van Brunt, who had worked for Snell from about 1854 to 1857, remembered the way that Boston office had been conducted: "Pupils were apprentices, and as in my own case, often looked with eager and unsatisfied eyes through the glass of their master's locked bookcases." Henry Van Brunt, "Richard Morris Hunt," AIAJ 8 (October 1947), 185. Snell and Cabot were, incidentally, the only Boston architects invited to join the A.I.A. (founded February 23, 1857) during its first year.

There were several prior connections among these men which helped in bringing them all together in the Hunt studio. Van Brunt and Gambrill had been classmates at Harvard (Class of 1854) and had worked together in the Boston office of George Snell since about March 1855. Sometime in 1858, Gambrill wrote to another Harvard classmate in Philadelphia: Horace Howard Furness, older brother of Frank, who later recalled how he learned about Hunt's teaching in New York: "My brothers were instrumental in influencing me to come to New York and place myself under Mr. Hunt's instruction. A short time after one of my brothers came home..., he received letters from two of his classmates who intended to become architects.... They [Gambrill and Van Brunt] were so much struck with Mr. Hunt and his enthusiastic method of teaching, they wrote my brother about it; he in turn showed it to my father, and, after a family council, it was decided I should enter at once as a student of Mr. Hunt's just established school of architecture." Memoir of Frank Furness [c.1896], included in Catherine Clinton Howland Hunt, Manuscript Biography of Richard Morris Hunt (c.1907), 45, American Architectural Archive, NNC-A. (Furness had met Hunt two years before--in the late spring of 1856, when Hunt stopped in Philadelphia on his way back to New York from Washington, where he had been working for Thomas Ustick Walter on the U.S. Capitol. Hunt came to call on William Henry Furness, Jr., Frank's oldest brother, an artist, and a friend of Hunt's from Paris. Ibid., 37-38.) Ware and Quincy had gone through the Lawrence Scientific School together in civil engineering (1854-56), where Gambrill was also a student for one term (fall 1854).

52. In the heyday of the studio in the fall of 1859, Hunt was 32, Ware and Van Brunt were both 27, Gambrill and Quincy were 25, Post was 22, and Furness was 20.

53. Much has been written on the Hunt studio, so little will be repeated here. See William A. Coles, "Richard Morris Hunt and His Library as Revealed in the Studio Sketchbooks of Henry Van Brunt," Art Quarterly 30 (Fall-Winter 1967), 225-38; William A. Coles, ed., Architecture and Society: Selected Essays of Henry Van Brunt (Cambridge: Harvard University Press, 1969), 10-14; James F. O'Gorman, The Architecture of Frank Furness (Philadelphia: Philadelphia Museum of Art, 1973), 23-30; Paul R. Baker, Richard Morris Hunt (Cambridge: MIT Press, 1980), 93-107. Annette Blaugrund, "The Tenth Street Studio Building: A Roster, 1857-1895," American Art Journal 14 (Spring 1982), 64-71. (Dates when various pupils were in Hunt's studio are derived from Coles and Baker.)

Furness later recalled one of the early lessons in design which Ware received from Hunt: "I remember well his going up to Ware's board a few days after the latter's arrival, when the monthly problem, as I remember it, was a public fountain to be erected in the central part of a town. Ware had worked at his design for most (if not all) of the previous night. Mr. Hunt looked at his drawings and said: 'Heavens! We have the washtubs, where are the washwomen?' and then: 'Well, I don't know but that the washtubs might be fixed up, if so and so were done, to look something like a fountain.' Ware was a little downcast, but when his master began to show him how it should be done, he became intensely interested, and, by the end of the month had succeeded in the matter of design beyond his expectation." Furness Memoir, in Catherine Clinton Howland Hunt, Manuscript Biography, 48-49. Additional anecdotes on Hunt's design teaching are quoted in Chapter 3 of the present work, p. 130.

54. Memoir of William Robert Ware [c.1896], included in Catherine Clinton Howland Hunt, Manuscript Biography, 55-57.

55. Van Brunt joined the A.I.A. in 1857; Gambrill in 1858, Quincy in 1859; Post in 1860; Furness not until 1866. The Crayon was published from 1855 to 1861. On the Ruskinian circle in New York, see David H. Dickason, The Daring Young Men: The Story of the American Pre-Raphaelites (Bloomington, Indiana University Press, 1953); Roger B. Stein, John Ruskin and Aesthetic Thought in America, 1840-1900 (Cambridge: Harvard University Press, 1967); Henry-Russell Hitchcock, "Ruskin and American Architecture," in John Summerson, ed., Concerning Architecture (London: Penguin, 1968).

56. Ware found the Brooklyn church "an object of curiosity, ... very tasty and simple within, not much ornament but what there is, carving & coloring of the best sort ... & has all the advantages for seeing & hearing that I had in view." WRW to Emma Ware, April 30 postscript to March 20, 1859 letter, Ware Papers (MC 19), folder 2, MCM-Ar. Second Unitarian Church stood at the corner of Clinton and Congress Streets, Brooklyn, until it was demolished in the 1960s. Designed in 1857 and completed the following year, this was the second church in the New York area by Jacob Wrey Mould (1825-1886), a student (c.1846-51) of Owen Jones. His first American commission was All Souls' Unitarian Church (1853-55), which stood at the corner of Fourth Avenue and 20th Street, Manhattan. All Souls', with its horizontal bands of Caen limestone and red

Philadelphia brick, was known as the "Church of the Holy Zebra." Second Unitarian, perhaps because of the multiple roof surfaces over the extended octagonal crossing, was known as the "Church of the Holy Turtle." Both are illustrated--with plans and interiors--in David Van Zanten's article, "Jacob Wrey Mould: Echoes of Owen Jones and the High Victorian Styles in New York, 1853-1865," JSAH 28 (March 1969), 41-57. Van Zanten has suggested that the artistic attraction of Mould for Frank Furness was reinforced by the ties between two Unitarian ministers: Rev. Henry Whitney Bellows, pastor of All Souls', and Rev. William Henry Furness, Frank's father. Ware was graciously received at Second Unitarian, Brooklyn, by Rev. Samuel Longfellow (1819-1892), brother of the poet and abolitionist pastor there. Rev. Longfellow invited him back to sketch the church at any time.

57. On the Gothic vs. Classic debate at M.I.T. during the 1870s, see Chapter 3, pp. 135-40.

58. Ware Memoir, in Catherine Clinton Howland Hunt, Manuscript Biography, 55-57. The others all stayed for a little more than two years. Gambrill and Post left sometime in 1860 to form their own partnership. Van Brunt also left in 1860 to go to work for Detlef Lienau. Furness stayed until the spring of 1861, when he entered the Army. (He had been "intending to go with Quincy to Paris to complete [his] architectural education." Furness Memoir, in Catherine Clinton Howland Hunt, Manuscript Biography, 52.) Quincy did go on to study in Paris, leaving the Hunt studio in 1861 or 1862. For more on Quincy, see n. 81.

59. Edward Southwick Philbrick (1827-1889) graduated from Harvard in 1846. In the next decade he went to work as a construction engineer for the Boston and Worcester Division of the Boston and Albany Railroad. From early 1860 until sometime in 1863, Ware and Philbrick worked as partners, listing themselves in the directories as architects (1860, 1863), or as architects and civil engineers (1861, 1862). Between 1872 and 1875, Philbrick helped to plan and design the water supply system for Brookline, Massachusetts. He also served as a consulting sanitary engineer for other cities. See obituary in Boston Evening Transcript, February 14, 1889.

60. Philbrick and Ware started at 130 Tremont Street, across from the corner of the Boston Common by Park Street Church. In 1862 they moved into the new Studio Building, two blocks up Tremont Street, across from the Granary Burying Ground. The Boston and Worcester Station was located on Beach Street, three blocks west of the present South Station.

61. Peabody reminiscences, in A Master and His Pupils [pamphlet on November 28, 1903 testimonial dinner in honor of Ware] (Boston, c.1903). (Ware had just retired from Columbia and from four full decades of teaching in the spring of 1903.) Peabody regretted that these earliest buildings by Ware "have either been torn down or transformed."

62. Tilden reminiscences, in A Master and His Pupils, 4. John Goddard Stearns (1843-1917) finished his studies in civil engineering at the Lawrence Scientific School in the summer of 1863 and immediately went to work for Ware as chief draftsman and office manager. Tilden, who entered the office in mid-October 1863, was explicit in stating that "John Stearns

was in command, as Mr. Van Brunt had not yet joined Mr. Ware." Stearns remained in the office until 1870, when he formed his lifelong partnership with Robert S. Peabody.

63. Dates and other details of Van Brunt's military service are taken from his own autobiographical sketch in the manuscript 1854 Class Book in the Harvard University Archives, HUD254.714F, 317-19. After leaving the studio of Richard M. Hunt sometime in 1860, Van Brunt stayed in New York to work for Detlef Lienau. He joined the Navy from New York and served as Secretary to the North Atlantic Blockading Squadron under Rear Admiral L.P. Lee. Van Brunt's name does not appear, however, in any of the manuscript Civil War records of the National Archives and Records Administration (e.g., Abstracts of Service: Records of Officers, 1798-1893; Rendezvous Reports for Enlisted Men; General Pension Index). The only other mention of Henry Van Brunt in the Navy appears in the accounts of maneuvers off the coast of North Carolina in early 1862, in Edward K. Rawson and Robert H. Woods, eds., Official Records of the Union and Confederate Navies in the War of the Rebellion, Ser. 1, Vol. 6 (Washington: U.S. Government Printing Office, 1897, 581-93. The Boston Directory ... for the Year Commencing July 1, 1864 provides the first listing of the firm of Ware and Van Brunt.

64. See also n. 52. It is reasonable to assume that Ware took primary responsibility for the teaching work of the office, while Van Brunt took primary responsibility for the design work. Van Brunt was also keenly interested in architectural criticism and in the educational work of the Boston Society of Architects, and Ware was apparently the designer of several works from the firm. The attribution of certain works to Ware rests on a few incidental accounts. In an autobiographical sketch in his Harvard Class Book, there is this entry: "1866 Designed the Ether Monument in Pub[lic] Gard[en], Bos." 1852 Class Book, 492, HUD252.714F, MH-Ar. (The sculptural figure atop the Ether Monument was the work of John Quincy Adams Ward.) A French biographical account makes a distinction between the works of Ware and Van Brunt in collaboration and the works of Ware alone: "Nous avons indique dans la precedente biographie ses ouvrages a Cambridge, en collaboration avec M. van Brunt; la premier eglise de Boston, la gare des voyageurs de l'Union a Worcester (Massachusetts) et l'Ecole americaine d'archeologie, a Athens, sont les oeuvres personnelles de M. Ware." Alexandre DuBois, Les architectes par leurs oeuvres, Elie Brault, ed., III (Paris: H. Laurens, 1893), 438-39 (emphasis added). I know of no other source ascribing the First Church, Boston (1865-67), or the Union Passenger Station, Worcester (1874-77), to Ware. The American School of Classical Studies, Athens (1885-86), was indeed designed by Ware, and its construction was supervised by Samuel Breck Parkman Trowbridge, one of Ware's first architecture graduates at Columbia (1886). J.R. Wheeler, letter to the editor, New York Evening Post, June 14, 1915. On the work of the firm Ware and Van Brunt, see William J. Hennessey, "The Architectural Works of Henry Van Brunt" (Ph.D. dissertation, Columbia University, 1979). On the broad intellectual interests of Van Brunt, see William A. Coles, ed., Architecture and Society: Selected Essays of Henry Van Brunt (Cambridge: Harvard University Press, 1969).

65. WRW to John D. Runkle, April 27, 1865, Ware Papers (MC 14), box 1, folder 2, MCM-Ar. John Daniel Runkle (1822-1902) would serve as Professor

of Mathematics at M.I.T. from 1865 to 1868 and again from 1880 to 1902, and as President from 1870 to 1878. The only mention of prior contacts between M.I.T. officials and Ware comes at the beginning of the letter: "You have once or twice made the suggestion that the Institute of Technology is likely presently to take up the problem of Architectural education, and that you hope to avail of the experience Mr. Van Brunt and I have had of late with our pupils in the solution of it."

66. WRW to Runkle. The titles of the works consulted were not given, and they have not been determined from other sources. Ware believed that one of the important functions of an academic department of architecture would be to serve as a clearinghouse of current information: "The Institute [M.I.T.] could not do a greater service than to collect opinions and authorities, and by organizing discussion do something to fix professional usage." Ibid.

67. WRW to Runkle: "Where so much is to be done in the collecting of information, it would of course be profitable to the whole class and stimulating to each member of it to put them upon the search, making them contribute the result of their reading or of their conversation with mechanics and experts to the common stock. I have practiced this method with my own pupils with very satisfactory results."

68. Tilden reminiscences, in A Master and His Pupils, 5. (See n. 61.)

69. Ibid., 6.

70. Thirty-five years later, in a talk before the Society of Beaux-Arts Architects in New York, Ware himself made explicit the links between Hunt's studio (where both he and Van Brunt had studied in 1858-59), and their own Boston office (where both Peabody and Stearns had worked between 1863 and 1867), and the training offered by Peabody and Stearns after 1870. He confirmed that the "Boston experiment [the office teaching of Ware and Van Brunt] resulted in the system being adopted at Technology [M.I.T.]." William A. Boring [manuscript notes of remarks by WRW], October 16, 1893. Archives of Beaux-Arts Institute of Design. This reference was brought to my attention by Dennis Steadman Francis, whose knowledge of the personalities behind New York architecture in the nineteenth century was enormously rich.

71. On the M.I.T. and non-M.I.T. students who worked in the office of Ware and Van Brunt, see Chapter 5, pp. 241-42.

72. Jonathan Preston (1801-1888) had proposed to build M.I.T.'s building for less than the amount proposed by Arthur Gilman, who had also prepared designs and estimates. His son, William Gibbons Preston (1842-1910), was studying in Paris in the atelier of the brothers Douillard in the early 1860s. William appears to have assisted his father with the design of the M.I.T. building and the adjacent building for the Boston Museum of Natural History. Jean Follett is doing research on William G. Preston for a Boston University dissertation.

73. Gridley James Fox Bryant (1816-1899) was the son of an engineer and builder. After his training with Alexander Parris, he opened his own

practice in Boston in 1837, and by the time of the 1872 Boston fire, he had built 152 of the buildings in the central business district. During his career, he would also design about 130 governmental buildings. Arthur Gilman was a partner of Bryant from 1859 to 1866; John H. Sturgis from 1861 to 1866; Louis P. Rogers from 1868 to 1875. Among the draftsmen trained in the Bryant office were Charles A. Cummings (c.1856); Edmund Quincy, Jr. (c.1857-58); Louis P. Rogers (c.1858-66); and Clarence S. Luce (c.1875-79). See Robert B. MacKay, "Gridley J.F. Bryant," MEA 1:315-16.

74. In educational circles, some may have recalled that Cabot had once been considered for a professorship at Harvard. Shortly after the Lawrence Scientific School opened, the Corporation of Harvard College contemplated establishing a professorship in architecture. Cabot, then age 29, was mentioned as the prime candidate as early as May 1847. Edward Everett, President of Harvard College and Cabot's strongest supporter, wrote to Josiah Quincy, Jr., a member of the Athenaeum building committee, to inquire whether Cabot had "the talent, the good taste, the aptness to acquire and communicate knowledge, & the geniality of character desirable in a Professor." Letter of October 27, 1847, President's Papers, Edward Everett Letters, UAI15.884, MH-Ar. Both the creation of the professorship and the advisability of hiring Cabot remained in question until January 31, 1848, when Everett wrote to Benjamin Pierce, Professor of Mathematics, that the Corporation had decided not to include a Department of Architecture in the Scientific School. For more on Cabot, see n. 49.

75. James F. O'Gorman, "H. and J.E. Billings of Boston: from Classicism to the Picturesque," JSAH 42 (March 1983), 54-73.

76. Nathaniel Jeremiah Bradlee (1829-1888) worked with George Minot Dexter (1802-1872) from about 1846 to 1852 and took over his practice. During the next three-and-a-half decades, Bradlee built some 500 buildings in the Boston area, while serving on numerous boards of directors of New England banks, insurance companies, and railroads. The organizational meeting of the Boston Society of Architects would be held in his office in May 1867. Bradlee would publish a History of the Introduction of Pure Water into the City of Boston (Boston: Alfred Mudge & Son, 1868). Among the draftsmen who worked with Bradlee before the establishment of the department of architecture at M.I.T. were: Louis Weissbein (c.1856); Henry P. Hall (c.1856-64); William S. Park (c.1865); Albert E. Swasey, Jr. (c.1865-66); and Edward Delano Lindsey (1865-67). Walter T. Winslow, who was in Paris studying with Andre from 1864 on, returned to Boston to work for Bradlee in 1872, eventually becoming a partner in 1884. On the M.I.T. alumni who worked for Bradlee, see Appendix K. Bradlee is documented mainly from In Memoriam: Nathaniel Jeremiah Bradlee [memorial obituary pamphlet] (Boston, c.1889). [Copy at MBAt]

77. George Snell (1820-1893) is one of the more enigmatic members of the profession in Boston during the mid-nineteenth century. He was born and educated in London, attending King's College and studying in the office of Harvey Lonsdale Elmes (1814-1847). Snell came to Boston in 1850. He designed the Boston Music Hall in 1852. Henry Van Brunt was a student/draftsman in Snell's office from the fall of 1854 until the fall of 1857, and Charles D. Gambrill entered the office in March 1855. Both Van Brunt and Gambrill left to go to Hunt's studio in New York late in

1857. In 1857, Snell collaborated with Henry Greenough in the design of Harvard's University Museum. About 1860, Snell formed a partnership with James R. Gregerson, and their most important early work together was the Boston Studio Building (1861-62), patterned in both program and design after Hunt's New York Studio Building (1857-58). Most of the work of Snell and Gregerson consisted of houses built in the Back Bay during the 1860s, 1870s, and 1880s. (George A. Clough [1843-1910], trained in this office between 1863 and 1869, became the first City Architect of Boston, serving 1873-83.) Snell was among the "charter members" endorsing the creation of the Massachusetts Institute of Technology in 1860-61. (See n. 6.) He became an Honorary Member of the A.I.A. in 1857 and a Fellow in 1867. He stayed out of the B.S.A. until 1873--six years after its founding--and resigned from both the B.S.A. and the A.I.A. in 1877. Snell had, however, been elected a Corresponding Member of the R.I.B.A. in 1853--only three years after his emigration to America--and was only the second American architect to be so honored. (Frederick Diaper [1810-1905], who had been a pupil of Robert Smirke before leaving for the U.S. about 1836, was elected a Corresponding Member in 1842.) Snell's obituary made note of the modest nature of his practice in Boston: "If he had been a stirring business man, like some of the modern architects, his list of public buildings might have been longer, but his tastes were in every way quiet, and he preferred his two rooms in the Studio Building, with one or two draughtsmen to help him, to the bustle of a huge office with an army of assistants." AABN 39 (March 4, 1893), 129-30.

78. Arthur Delavan Gilman (1821-82) attended Washington [now Trinity] College in Hartford, c.1838-40, and then traveled and studied in Europe. His critical interest in a modern architecture based on Renaissance prototypes dated from 1844, when he published his article, "Architecture in the United States," in the North American Review 58 (April 1844), 436-80. (He delivered a series of lectures on the same topic for the Lowell Institute in Boston in 1844-45; the published article was nominally a review of Edward Shaw's Rural Architecture.) Gilman was among the first to present a design plan for the Back Bay in 1856, which was probably the one responsible for the street plan which was actually followed. He was among the first architects to introduce modern French apartment and hotel types in Boston. His Arlington Street Church (1859-61) was the first major building completed in the Back Bay. From 1859 until 1866 Gilman worked in partnership with Gridley Bryant, designing such notable works as the new Boston City Hall (1861-65) and Horticultural Hall (1865). In spite of his training, critical convictions, and stylistic versatility, Gilman does not seem to have had any direct or indirect associations with M.I.T., either before 1865 or after. From 1867 until his death in 1882, he practiced in New York City. See Margaret Henderson Floyd, "Arthur Delavan Gilman," MEA 2:208-10.

79. Charles Amos Cummings (1833-1905) graduated in civil engineering from Rensselaer Polytechnic Institute in 1853 and worked as a draftsman for Gridley Bryant in about 1856. He carried on an independent practice until about 1864, and was in partnership with Willard T. Sears (1837-1920) from about 1867 to 1890. See Cynthia Zaitzevsky, "Cummings and Sears," MEA 1:481-82.

80. John Hubbard Sturgis (1834-1888) studied in London with James K. Colling from 1855 to 1857 and worked with Gridley Bryant from 1861 to 1866. From 1866 until his death he would practice in partnership with Charles Brigham. See Margaret Henderson Floyd, "John Hubbard Sturgis," MEA 4:148-50.

81. Edmund Quincy, Jr. (1834-1894) received his collegiate education at the Lawrence Scientific School, graduating in civil engineering with Ware in 1856. During 1857-58, while Ware went to work for Edward C. Cabot, Quincy went to work for Gridley Bryant. In 1859, both Quincy and Ware were together in the New York studio of Richard M. Hunt. While in New York, Quincy did some civil engineering work. According to this obituary, "he was occupied with the work of bringing the water from Harlem to the city. While thus employed he contracted malaria and was obliged to give up his position and return home." Quincy was out of the country, traveling in Europe and studying in Paris from about 1862 until 1869. By the fall of 1869 he was back in Boston and carried on an inconspicuous architectural practice combined with real estate activities. He worked with Ware and Van Brunt, c.1870-73, on a series of houses for the Quincy German Homestead Association in Dedham, Massachusetts. Quincy obituary, Boston Post, January 9, 1894; Boston Evening Transcript, January 10, 1894; Josiah Quincy, Moderate Houses for Moderate Means: A Letter to Rev. E.E. Hale (Boston: James R. Osgood & Co., 1874).

82. It was certainly in Ware's favor that both James E. Cabot and Edward S. Philbrick were active in the organizational work of M.I.T. during 1864 and 1865.

83. WRW to Runkle, April 27, 1865.

84. In the April letter to Runkle, Ware quoted a lengthy exposition of the monthly system of design competitions at the Ecole des Beaux-Arts, from a letter sent by "a friend of mine now in the Atelier of M. Andre." It has not been possible to establish exactly who this was. Five of Andre's American students in the early 1860s could have been Ware's source. Ware had probably not yet met H.H. Richardson, who was only a freshman at Harvard the year Ware was finishing at the Lawrence Scientific School. Richardson's only return trip to Boston during his six years in Paris was in the winter of 1861-62--too early to have brought them together to discuss their direct and indirect experiences with French teaching methods. Furthermore, the quotation sounds like the explanation of a person newly arrived in Paris. Walter T. Winslow, who entered the atelier Andre about 1864, was a former student in the Boston office of N.J. Bradlee but had no known direct association with Ware. Edward Delano Lindsey, a Harvard graduate (1862), had worked with R.M. Hunt before entering the atelier Andre in 1863. More likely as Ware's correspondents were two Boston men who also joined the atelier Andre about 1864: John Ames Mitchell, who had been a student in the office of Ware and Van Brunt c.1863-64 (See n. 22); or Edmund Quincy, Jr., who had been associated with Ware both at the Lawrence Scientific School and in Hunt's New York studio. (See n. 81.) Ware's early sources of information on British architectural education are not known.

85. WRW to Runkle, April 27, 1865.

86. For the design and construction of Memorial Hall, see Jack W. Lampl, Jr., "The Birth and Times of a Monument: Memorial Hall" (undergraduate thesis, Harvard University, 1941); Robert B. Shaffer, "Ruskin, Norton, and Memorial Hall," Harvard Library Bulletin 3 (Spring 1949), 213-31; Robert B. Shaffer, "Charles Eliot Norton and Architecture" (Ph.D. dissertation, Harvard University, 1951); Daniel D. Reiff, "Memorial Hall: The Splendor beneath the Dust," Harvard Bulletin 74 (March 1972), 29-42; William J. Hennessey, "The Architectural Works of Henry Van Brunt" (Ph.D. dissertation, Columbia University, 1979), 29-47; Bainbridge Bunting, Harvard: An Architectural History (Cambridge: Harvard University Press, 1985), 84-92. Dates used here are taken from Shaffer (1949).

87. He wrote: "I have been very busy and very much interested about the proposed Alumni Hall.... We made a stunning set of drawings which I know were much admired by the Committee. They have not been exposed to public view. After some reverses the prospect for doing something seems pretty fair again." Ware to Emma Ware, August 2, 1865, Ware Papers (MC 19), folder 2, MCM-Ar.

88. The design was officially approved by the Committee of Fifty, and the commission was awarded to Ware and Van Brunt on December 12, 1865. See Shaffer (1949), 217.

89. See Hennessey, "Henry Van Brunt," 53-56.

90. M.I.T. Corporation: Government Records, vol. 1, 1862-1866, 247-48. MCM-Ar. As early as the time of Ware's appointment, M.I.T. officials were apparently contemplating the appointment of an additional instructor in architecture. The Boston Daily Evening Transcript reported on the naming of the M.I.T. faculty on September 16, 1865, and mentioned the possibility of still more appointments: "Besides that above, it is understood that additional instructors will soon be appointed in the departments of Navigation and Nautical Mechanics, Architectural Drawing and Design...."

91. His remarks to his sister show not only the realization of the urgency of work in the firm but also the perception that the Memorial Hall commission was not yet entirely secure, and that the First Church project was already going well (though the commission would not be awarded until April 1866): "The question [of my departure for Europe] is likely to be settled however by the state of affairs in my office. I must go when I can. It looks more and more like our getting the Church, while the Alumni Hall is still at sea.... If either of these things should come to fruition I should have to stay by all winter and get to work under way, but should hope to get off in the Spring." Ware to Emma Ware, September 25, 1865, Ware Papers (MC 19), folder 2, MCM-Ar.

92. An Outline of a Course of Architectural Instruction (Boston: John Wilson & Sons, 1866) is a pamphlet of 36 pages. The prefatory note by Ware is dated February 1, 1866, under his office address, 36 Studio Building. As Ware indicates in this note, "Some portions of [the paper] had previously been read in New York, at a meeting of the American Institute of Architects." However, no clippings or manuscript records concerning this event have been found in the A.I.A. Archives, Washington, D.C. On the response of members of the profession to Ware's ideas, as set

forth in the pamphlet, see pp. 52-54. Long excerpts from Ware's pamphlet were reprinted in England, in The Builder 24 (June 23, 1866), 463-65. Excerpts were also published in the Technology Review (April 1940), 237, to mark the 75th anniversary of M.I.T., and the pamphlet was reprinted in facsimile by M.I.T. in 1942. Ware's pamphlet is item 1330 in the Hitchcock list of American Architectural Books--all of them available on microfilm from Research Publications, Inc., New Haven. An Outline of a Course of Architectural Instruction is hereafter abbreviated as OCAI.

93. OCAI, 5. Emphasis in original.

94. OCAI, 7.

95. OCAI, 9.

96. The American Institute of Architects, organized in 1857, remained a predominantly local New York body until the first A.I.A. national Annual Convention met in October 1867. The publication of a journal, contemplated by New York members of the A.I.A. as early as 1866, was delayed until the A.I.A.-endorsed American Architect and Building News made its appearance as a weekly magazine in January 1876. See Mary Norman Woods, "The 'American Architect and Building News' 1876-1907" (Ph.D. dissertation, Columbia University, 1982).

97. OCAI, 15.

98. OCAI, 6.

99. OCAI, 9.

100. OCAI, 14.

101. OCAI, 30.

102. OCAI, 16-17.

103. OCAI, 30. Emphasis in original.

104. OCAI, 30.

105. OCAI, 13.

106. OCAI, 12.

107. OCAI, 13.

108. OCAI, 31. This prize was suggested to Ware by the Grand Prix of the Ecole des Beaux-Arts. He urged that it be endowed, not by outside benefaction, but by M.I.T. itself, "in the expectation of having the sum more than made up by the greater accession of pupils from the more distant parts of the country." OCAI, 32. The Boston Society of Architects created an annual prize for M.I.T. students in 1870, and the Rotch Travelling Scholarship was created, after consultation with Ware and the

B.S.A., in 1883. On the issue of the geographic distribution of the student population, see Chapter 5, pp. 231-35.

109. OCAI, 13. This idea of an advanced course of study in design and practice would be further developed by Ware in his 1872 departmental report. See Chapter 2, pp. 89-91.

110. OCAI, 13-14.

111. OCAI, 9.

112. OCAI, 10

113. WRW to Runkle, April 27, 1865.

114. OCAI, 10.

115. WRW to Runkle.

116. OCAI, 19. The delicacy of the problem of finding one's proper relationship to the past can be seen in Ware's series of oppositions listing illegitimate and legitimate uses of precedent, in the paragraph which follows: "It is perhaps not impossible to meet, or rather get round, the difficulty; the difficulty of discriminating nicely between memory and invention, between pedantical learning and wholesome knowledge; the forbidden work of copying, and the legitimate and indispensable work of imitation, by keeping the two things as far apart as may be to start with; and not letting students enter the region where the difficulty and conflict are felt, until they are somewhat robust and mature through practice and experience."

117. OCAI, 19.

118. OCAI, 19-20.

119. On the nineteenth-century pedagogy of drawing and design, see Chapter 2, pp. 107-17. Ware understood his aesthetic course to be somewhat at variance with the familiar pedagogy of the time: "Such a course is, I known, open to the reproach of attempting to reconstruct civilization out of abstract ideas, and of trying to make students learn to design buildings out of the depths of their own consciousness." OCAI, 20. He was in no way interested in such ends, only with the development of a means of reconciling history and the present. What in a later generation would be the grounds for a manifesto was to Ware only a passing premonition of the consequences critics might imagine from an a priori, deductive scheme.

120. OCAI, 20. Ware's lifelong belief in the value of the small sketch would later manifest itself in recommendations that architectural competitions go through a preliminary stage of unelaborated sketches.

121. OCAI, 20.

122. See Chapter 3.

123. OCAI, 20-21.

124. OCAI, 21. Emphasis in original. Ware and Van Brunt had experimented with problems in architectural reconstruction in teaching students in their own office in 1864-65. See p. 30.

125. OCAI, 22.

126. OCAI, 23.

127. The manuscript "pamphlet" is included in the Ware Papers (MC 14), box 1, folder 2, MCM-Ar. Charles Dexter Gambrill (1834-1880) graduated from Harvard in 1854 in the same class as Van Brunt and spent the fall semester at the Lawrence Scientific School, entering the same class as Ware. In March 1855, Gambrill joined Van Brunt as a pupil in the Boston office of George Snell. Late in 1857, Van Brunt and Gambrill both went to New York and joined George Post in the studio of Richard M. Hunt. Ware was in Hunt's studio in 1859. Gambrill and Post began architectural practice together, from 1860 to 1866. Between 1867 and 1878, Gambrill was in partnership with H.H. Richardson. From March 1879 until his death, Gambrill continued in practice in New York with Harry Edwards Ficken. Gambrill killed himself in September 1880. He was active in the A.I.A. and served as national Secretary, 1864-66 and again in 1879. See manuscript 1854 Class Book in the Harvard University Archives, HUD254.714F, 105-07.

128. Gambrill, manuscript "pamphlet" (March 1866).

129. Ibid. Gambrill's partner at the time was probably still Post, not Richardson.

130. I have not yet examined A.I.A. manuscript records in the A.I.A. Archives, Washington, D.C., to see what discussions of architectural education were held during 1865-66, but as shown in the following note, such discussions dated back to at least 1860.

131. The A.I.A. met in New York, October 22-23, 1867. The 1867 proposal, submitted as the report of the A.I.A. Committee on Education, is contained in Proceedings of the [First] Annual Convention of the American Institute of Architects (New York: Raymond & Caulon, 1867), 13-16. Ware did not attend the A.I.A Convention, because he was still in Europe visiting architectural schools and professional societies, but he was listed as a member of the Committee on Education for 1867. Leopold Eidlitz was Chairman, and the other members were the New York architects, Robert G. Hatfield, Emlen T. Littell, and Samuel A. Warner. As early as February 1867, Charles Gambrill had written to Henry Van Brunt concerning the A.I.A. plans for a school of architecture: "The school is to be established--not schools as you suggest which would fritter away our means and dissipate our energies, instead of concentrating them in one strong effort--and that can only be done effectively by a central organization. A building will ultimately be erected containing an architectural museum and such donations, of books and the materials of the Institute as a body as can only be provided and cared for by a central organization. Ware is doing a splendid service in Europe--we are fortunate in having so able a

representative." Gambrill to Van Brunt, February 22, 1867, A.I.A. Office Files, Secretary, Letterbooks, Correspondence, Outgoing, 1864-1876, DAIA-Ar. No evidence has been found to indicate whether Gambrill, Van Brunt, or anyone else communicated to Ware in Europe about the A.I.A.'s plans for a school of architecture.

Eidlitz and Hatfield emerged as prominent members of the A.I.A. Committee on Education between 1867 and 1868, probably because of their longstanding interest in the issue. The A.I.A. Minutes show that on December 20, 1864, Hatfield had discussed with Calvert Vaux the prospect of "establishing a collegiate Institute for architects." At least as early as 1860, New York architects had been talking of a "college" or "academy" of architecture. The A.I.A. Minutes for January 17, 1860 record that "L. Eidlitz suggested the Propriety of appointing a committee of three who should have the power to associate with themselves five gentlemen not members of the Institute with object of establishing a Library and a College for the education of Architects. Upon motion resolved: That a committee of five be appointed by the Chair with power to associate with themselves five or seven gentlemen for the purpose of establishing a Library and Academy for the Education of Architects. Committee appointed: L. Eidlitz, Jas. Renwick, F. Diaper, J.W. Ritch, R. Upjohn." I am grateful to Tony Wrenn, A.I.A. Archivist, for pointing out that the A.I.A.'s interest in creating a school of architecture in New York dates back to the early 1860s.

132. Ware would be an active member of the A.I.A. Committee on Education from 1868 through 1876, serving as Chairman from 1871 through 1876. He would serve again on this Committee from 1879 through 1896. See Appendix L.

133. When appointed in September 1865, Ware had hoped to locate someone to teach drawing. The arrangements for this year are recounted in letters from Ware to Rogers, September 9, 1867; and to the M.I.T. Committee on the School, September 16, 1867. Rogers Papers (MC 1), box 4, folder 58, MCM-Ar. The first Annual Catalogue, for 1865-66, specified the required first- and second-year work in mechanical drawing (including lessons in ink and watercolor drawing and in orthographic, isometric, spherical, and perspective projections), as well as freehand drawing (including lessons in blackboard drawing) "from models, casts and photographs, and from studies of landscape." AC...1865-66, 12, 18. It was expected that all third- and fourth-year students would continue with exercises in drawing--"in the making of the sketches, diagrams, patterns, models and working drawings used in their respective departments." AC...1865-66, 25.

134. All of these aspects are mentioned in the two 1867 letters cited in the preceding note. Ware told Rogers in the letter of September 9, 1867, that he was glad he had agreed to supervise the drawing classes during the 1865-66 academic year, "as this experience has made the drawing schools I have seen here [in Paris] and in England much more intelligible and instructive."

135. WRW to Van Brunt, January 30, 1867, Ware Papers (MC 14), MCM-Ar. Henry A. Phillips, a student at M.I.T. (1869-73), recalled many years later, "There were no third or fourth year men in this [first M.I.T. annual] catalogue, printed in the fall of 1865, but there were certainly

students in architecture before the end of the school year." Phillips to D. Everett Waid [Treasurer, A.I.A.], February 3, 1924. Membership Applications (RG 803), 1924:H-R, box 15, DAIA-Ar. I am grateful to Richard Chafee for locating this reference.

136. WRW to Rogers, April 24, 1866, Rogers Papers (MC 1), box 4, folder 54, MCM-Ar. Ware's request for a leave of absence was brought before the M.I.T. Corporation on June 27, 1866. See M.I.T. Corporation: Government, Records, vol. 2, 1866-73, 59, MCM-Ar. On the April 27, 1865 letter, see pp. 29, 34-35.

137. WRW to Rogers, April 24, 1866.

138. Hennessey, "The Architectural Works of Henry Van Brunt" (Ph.D. dissertation, Columbia University, 1979), 32, 53.

139. But little was actually done on Memorial Hall during Ware's absence, from August 1866 to December 1867, as donations and alumni comments on the design were slow in arriving. The project was returned to Ware and Van Brunt for modifications in March 1868. (See also Chapter 2, n. 7.) Construction of the First Church began in April 1867, and the church was opened for services in May 1868. See Hennessey, "Henry Van Brunt," 33, 53.

140. Ware claimed to have been responsible at least for the stained glass. On reading Royal Cortissoz's John LaFarge: A Memoir and a Study, published in April 1911 (pp. 186-89), Ware took issue with the assertion that the commissioning of LaFarge had been Van Brunt's idea and wrote to Cortissoz: "It was, indeed, I and not Van Brunt that suggested his [LaFarge's] working with glass. I had already when in England in 1867 obtained the windows for the First Church, which are still I think the best English windows in this country, and the negotiations and correspondence about those in Memorial Hall was always in my hands. Glass seemed to me a material which LaFarge would find especially congenial, as the event proved." WRW to Cortissoz, June 19, 1911, Ware Papers (MC 14), box 1, folder 12, MCM-Ar.

141. WRW to Rogers, May 29, 1866, Rogers Papers (MC 1), box 4, folder 54, MCM-Ar.

142. The details concerning the Milton Fund are confused and were the subject of misunderstandings between Ware and the M.I.T. administration prolonged well into the 1880s. The problem seems to have been that, while Ware did raise the balance of $2000, he spent it directly, on his own authority, without depositing it with M.I.T. The list of Milton donors, that would have enabled us to reconstruct this collective home-town patronage of the M.I.T. architectural library, has been lost from the otherwise prolific correspondence of the 1870s and 1880s on the subject of the Milton Fund. See [William Rotch Ware] Manuscript Biography of William Robert Ware [c.1916], Ware Papers (MC 14), box 2, MCM-Ar.

143. William Pitt Preble Longfellow (1836-1913), nephew of the poet, graduated from Harvard College in 1855. After several years in Louisville, Portland (ME), and Boston, he returned to the Lawrence

Scientific School, completing the course in Civil Engineering in 1859. During the fall and winter of 1859-60, he worked in the Boston office of Edward C. Cabot, filling the position left vacant by Ware when he left for New York to study with Hunt. In April 1860, Longfellow opened his own architectural office in Boston, and by the middle of the following year had begun to share an office--probably a partnership--with Morris Dorr. (From 1862 until early 1869, Longfellow and Dorr had their office in the Studio Building; Ware also had his office there, with Philbrick until 1863, with Van Brunt until 1867--when Ware and Van Brunt moved to Pemberton Square.) B.S.A. circular notices preserved in the A.I.A. Scrapbooks in the A.I.A. Archives show Longfellow at 18 Pemberton Square (perhaps with A.C. Martin) by January 1869. W.P.P. Longfellow had been doing some teaching in drawing, music, and German at the New Church School in Waltham since the fall of 1863. See Boston directories; The Class of 1855 of Harvard College, 1855-1865 (Boston: Alfred Mudge & Son, 1865). [Copies at DLC, MH-Ar, MBAt] Longfellow informed Ware by the summer of 1867 that he could not continue as an instructor in mechanical and freehand drawing during the 1867-68 year. On April 6, 1869, Longfellow was appointed Assistant Architect under A.B. Mullett, Supervising Architect of the Treasury Department. For the next two-and-a-half years, until his resignation on October 1, 1871, Longfellow served as both draftsman and superintending architect on the Boston Post Office, the New York Post Office, the San Francisco Branch Mint, and the Portland (OR) Custom House. See U.S. Treasury Department, Office of Supervising Architect, Registers of Letters Received, January 1, 1868 through October 31, 1871 (RG 121), Legislative and Natural Resources Branch, National Archives and Record Service, Washington, D.C. During the next four years, Longfellow traveled in Europe, returning to practice in Boston by 1874. In the fall of 1875, he was named Editor of the American Architect and Building News, which began publication in January 1876--a position he filled until resigning on May 1, 1880. Longfellow was one of several candidates interviewed in the summer of 1881 to succeed Ware as head of the Department of Architecture at M.I.T. This matter is discussed in Chapter 4.

144. Ware's correspondence from Europe must have been prolific. From references within the correspondence which survives, he seems to have written twelve- to twenty-page letters to at least one of his younger brothers and sisters every two weeks, using the letters as an epistolary journal in which he recalled the events of the past several weeks. The Ware Papers (MC 19) in the M.I.T. Archives contain the fullest set of manuscript letters, dating from August 1866 through August 1867, mostly addressed to his sisters Harriet Ware (1834-1920) and Emma Forbes Ware (1838-1898) and his brother Charles Pickard Ware (1840-1921). These letters do make it possible to reconstruct most of his itinerary, and they contain references to buildings, galleries, and libraries he visited and to persons he met. But the letters contain few details of or reactions to these experiences. What is mentioned is of interest to us as material which has crossed Ware's own threshold of significance. Because these are family letters, we are fortunate to find among them whatever sustained comments on architectural and educational matters Ware chose to include. In the other group of Ware Papers (MC 14) in the M.I.T. Archives are typescript transcriptions of portions of a few of these family letters, as well as letters to Henry Van Brunt and to Ware's older half-sister Mary

Elizabeth Ware (1820-1870). The location of the originals is not known. A few letters to Pres. William Barton Rogers, written in September 1867 when Ware and Rogers were both in Paris and discussing plans for the 1867-68 year at M.I.T., are among the Rogers Papers (MC 1) in the M.I.T. Archives. References in the set of family letters (MC 19) indicate that throughout Ware's 1866-67 trip, there were additional letters to Van Brunt and Rogers (now lost), which no doubt contained important details on European architecture and contemporary architects and schools of architecture and drawing. However, the sum of information from all three sets of surviving letters does confirm what and whom Ware definitely saw while in Europe. Whatever lacunae there may be, may someday be filled in from other sources.

145. Allusions to London churches in his letters of October 11 and December 7, 1866 confirm that he had already stopped in London, probably within his first month in Britain.

146. Ibid., 87.

147. AIA Proc...1867, 17. Among the items presented by Ware to the R.I.B.A. on January 14, 1867 were a volume of lithographs of R.M. Hunt's designs for the Central Park gateways and a volume of photographs of P.B. Wight's designs for the National Academy of Design. The donation included a number of unbound photographs of eighteenth-century Anglo-American country houses and construction details of timber frame buildings. Also represented among the unbound photographs were recent works by English-trained or -influenced architects--Upjohn, Withers, Diaper, Vaux, Mould--and by architects representing "the German and French influence"--Eidlitz, Lienau, Hunt, and Wight. Ware also presented a copy of his Outline of a Course of Architectural Instruction, which was identified as having been read before a meeting of the A.I.A. Excerpts from this pamphlet had already been published in Britain the previous summer in The Builder 24 (June 23, 1866), 463-65. See RIBAT 17 (1866-67), 81-85.

On the history of the R.I.B.A., see J. Alfred Gotch, ed., The Growth and Work of the R.I.B.A., 1834-1934 (London: R.I.B.A., 1934). Before Ware's visit to Britain in 1866-67, the A.I.A. had already elected four British architects as Honorary Members--most of them of the generation of Richard Upjohn (1802-1878) and T.U. Walter (1804-1887): Sir George Gilbert Scott (1811-1878, AIA Hon. 1859); C.R. Cockerell (1788-1863, AIA Hon. 1860); Sir Charles Barry (1795-1860, AIA Hon. 1860); and one man more closely contemporary with Richard M. Hunt (1827-1895): George Edmund Street (1824-1881, AIA Hon. 1866). After Ware's visit (not necessarily on his initiative or as a result of his work as A.I.A. Corresponding Secretary from 1868 to 1870), the A.I.A. sought to fill the gaps in its honorary British membership, electing men mostly older than Street: A.J. Beresford-Hope (1820-1877, AIA Hon. 1867); Thomas L. Donaldson (1795-1885, AIA Hon. 1871); Thomas H. Wyatt (1807-1880, AIA Hon. 1871); J.A. Picton (1805-1889, AIA Hon. 1871); George Godwin (1815-1888, AIA Hon. 1871); John Ruskin (1819-1900, AIA Hon. 1871); Sir Matthew Digby Wyatt (1820-1877, AIA Hon. 1871); William Burges (1827-1881, AIA Hon. 1871); James Fergusson (1808-1886, AIA Hon. 1872); and J.K. Colling (1816-1905, AIA Hon. 1873). No more British architects were elected to the A.I.A. for over two decades--the next Honorary Members being Francis C. Penrose (1817-1903, AIA Hon. 1896); Alfred Waterhouse (1830-1905, AIA Hon. 1896); R. Norman

Shaw (1831-1912, AIA Hon. 1900). Among the British architects and designers born before 1840 who were never elected by the A.I.A. were: Sir Joseph Paxton (1803-1865); Owen Jones (1809-1874); William Butterfield (1814-1900); John L. Pearson (1817-1897); Robert Kerr (1823-1904); George F. Bodley (1827-1907); J.J. Stevenson (1831-1908); Philip Webb (1831-1915); William E. Nesfield (1835-1888); and E.R. Robson (1835-1917). Source: AIA Proc...1902, 221-24.

148. Ware wrote to Upjohn concerning these developments in March or April 1867. Another set of photographs was assembled by A.J. Bloor, A.I.A. Secretary, sent on July 3, 1868, and acknowledged by T.L. Donaldson, R.I.B.A. Secretary for Foreign Correspondence, on July 22, 1868. Perhaps a set of items was also sent by the A.I.A. in the winter of 1867-68. See AIA Proc...1867, 17, and Donaldson to Bloor, July 22, 1868, A.I.A. Office Files, Secretary, Correspondence, Incoming, 1857-1876 (RG 801, SR 1), box 1, DAIA-Ar.

149. On January 30, 1867, Ware wrote Van Brunt with an account of the speech, indicating that he had spoken impromptu, from only a half page of notes and that his remarks had been recorded by a stenographer. Ware Papers (MC 14), MCM-Ar. The published version in RIBAT 17 (1866-67), 81-90, is probably an edited version of this typescript.

150. Ibid., 81-84.

151. RIBAT 17 (1866-67), 84-85. He concluded this section of his remarks with the isolated remark that the buildings in "the newer parts of the country ... do not, as far as I know, present any unusual features, except, indeed, the gigantic warehouses for corn erected in the Western cities." The following year (on February 3, 1868), Gervase Wheeler, an English architect who had been practicing in the United States since the late 1850s and who had recently returned to practice in his native country, would address the R.I.B.A. on "Peculiarities of Domestic Architecture in America," RIBAT 18 (1868-69), 117-28, 167-89.

152. RIBAT 17 (1866-67), 85-86. On the Snell office, see n. 51, 77; on the Hunt office, see pp. 26-27, 130; on the Ware and Van Brunt office, see pp. 29-31.

153. RIBAT 17 (1866-67), 86-87. See also n. 166.

154. Thomas Leverton Donaldson maintained that America "had perhaps shown greater aptitude in the improvement of the inventions of others, as well as great intelligence in the application of them to the necessities and purposes of life," and looked forward to a time when American architects "would improve themselves by an adherence to those rules of previous centuries which had produced the buildings of which this country and Europe generally boasted." Matthew Digby Wyatt developed this argument into a cause-and-effect explanation of the process of American architectural progress: "technical dexterity ... in the structural use of wood, iron, and stone" combined with architectural education were two factors which promised "a successful future for American art." Two additional "incentives to good art"--indeed, which "must lead to genius"--were less particularly connected with architecture but constituted

favorable background conditions: "urgent requirements" and "enormous wealth and unbounded progress." RIBAT 17 (1866-67), 88.

155. Digby Wyatt was curious about building types, thought to be highly developed in America, by which "the great monster Necessity in America was supplied": hotels, stores, and warehouses. Alexander J. Beresford-Hope was curious about the extension of the collaboration between architecture and landscape architecture, beyond the realm of picturesque country seats to the "planning of the American streets." Beresford-Hope was critical of the grid system and convinced of the urbanistic "advantages of the radiating plan" ... "of which Washington was a distinguished instance." Such a plan, he argued, "would give a great impetus to the growth of architecture," because it would "make the great public edifices the principal objects." Ware called attention to the collaboration of architecture and landscape architecture in the laying out of "new parts of towns," such as Boston's Back Bay. RIBAT 17 (1866-67), 88-90.

156. Thomas Hayter Lewis wished for more comments on the various art and design schools in America besides M.I.T. Charles Forster Hayward welcomed the news that the M.I.T. course of study would begin with "general" rather than "technical education," and that not only mechanical drawing but also freehand drawing would be a part of the curriculum. RIBAT 17 (1866-67), 89.

157. Ware to Van Brunt, January 30, 1867, Ware Papers (MC 14), MCM-Ar.

158. Ibid. Ware mentioned Thomas Leverton Donaldson, Thomas Hayter Lewis, Robert Kerr, Matthew Digby and Thomas Henry Wyatt, Charles Forster Hayward, John Pollard Seddon, George Godwin, Thomas Roger Smith, Thomas Miller Rickman, Alfred Waterhouse, Robert Jewell Withers, Alexander James Beresford-Hope, and two who could not be present: James Fergusson and Frederick Pepys Cockerell.

159. Thomas Leverton Donaldson (1795-1885) studied with Soane at the Royal Academy, c.1815-17. Between 1818 and 1823 he traveled in Italy, Greece, and Asia Minor, measuring ancient buildings. He was a co-founder of the R.I.B.A. in 1834, Secretary from 1835 to 1839, Gold Medallist in 1851, President from 1863 to 1865, and long-time Secretary for Foreign Correspondence (1839-63 and 1866-71). He also served as Treasurer of the Architectural Publication Society and contributed articles to its Dictionary. Donaldson was elected a member of the Accademia di San Luca in 1822, of the Institut de France in 1835, and an Honorary Member of the A.I.A. in 1871. In his practice, he was District Surveyor for South Kensington until 1885. See DNB 15, 214-15; Sandra Blutman, "The father of the profession," RIBAJ 3rd Ser. 74 (1967), 542-44. For a list of his extensive contributions to the RIBAT, see Alexander Beazeley, comp., Index to the First Series of the Transactions of the R.I.B.A...., 1835-1884 (London, 1891), 16-18. Ware met Donaldson probably shortly after arriving in Britain, and Donaldson, as Secretary for Foreign Correspondence, provided him with a "circular letter of introduction." RIBAT 17 (1866-67), 81.

University College was founded in 1826 as a non-sectarian university offering professional instruction and opened in 1828. While a chair in architecture had been proposed in 1827, it was not until 1841 that one was

created, with Thomas Leverton Donaldson as the first professor. From the start, Donaldson's two-year curriculum of lectures assumed a division between "Architecture as a Fine Art" and "Architecture as a Science." By the 1860s, Donaldson's Fine Arts lectures covered history (the orders and period styles); principles of composition and town planning; architectural elements; building types; and professional practice and ethics. The Science lectures covered building materials and specifications and contracts. The course for each of the two years consisted of a series of 30 lectures in Fine Arts and 30 lectures in Science. In conjunction with the Science lectures, there were occasional visits to London buildings and construction sites, as well as some laboratory experiments. Students were also encouraged to attend the lectures in Civil Engineering. There were no provisions for studio exercises in design in conjunction with the Fine Arts lectures. Since 1840, however, University College made separate provision for instruction in drawing under Prof. G.B. Moore, who covered "Geometrical, Isometrical and Perspective Projection" and "The Drawing of Architecture, Fortification, Landscape, Figure and Ornament." In both the first and second years, Donaldson gave examinations in "Fine Art" and "Construction." Departmental recognitions (Prize and First Certificate, Second Certificate, and sometimes Third Certificate) were determined by the examination scores. For a diagrammatic view of the various professorships at University College pertaining to architecture and the fine arts, see Hugh Hale Bellot, University College London, 1826-1926 (London: University of London Press, 1929), Chart 2. The summary given here is based on The University College, London, Kalendar for the Session 1863-64 (London: Walton & Maberly, 1863), 17-18, 40-42, 77-78, 158-61. I have not traced the development of Donaldson's curriculum over his twenty-four years of teaching, nor have I looked at the changes, if any, which may have occurred in response to the inauguration in 1863 of the Voluntary Examination by the R.I.B.A.

160. Thomas Hayter Lewis (1818-1898) had studied with Joseph Parkinson and Sir William Tite. From 1849 to 1859 he practiced with Thomas Finden and from 1859 to 1869, alone. While Secretary of the R.I.B.A. (1859-), he was one of the advocates of the Voluntary Examinations in 1860. (See n. 163.) Lewis was the author of "On Architectural Education," RIBA Conference Papers (1871), 32; "The Fine Arts, and Their Connection with Education" (his Inaugural Lecture at University College, 1865); and books on Early Christian and Byzantine architecture. See RIBAT 3rd Ser. 6 (December 24, 1898), 99-100, 126-30; T-B 23: 164. During Lewis' tenure as Professor of Architecture, Felix Slade would endow in 1868 a separate school of fine arts at University College, and the Slade Lectures of Prof. Edward Poynter would commence in 1870-71. Hayter Lewis would teach courses in archaeology in the Slade School, 1873-76; and T. Roger Smith would do the same in 1876-77. Smith would succeed Lewis as Professor of Architecture in 1881. I have not traced the development of the curriculum under Lewis; have not compared the first Lewis syllabus (1865-66) with the last Donaldson syllabus (1864-65); and have not seen the syllabus for the 1866-87 year that Ware was in London. The 1868-69 Lewis syllabus is simply a more concise version of the 1863-64 Donaldson syllabus. See University College, London, Kalendar, Session 1868-69 (London: James Walton, 1868), 32-33, 60-61, lxx-lxxiv.

161. Robert Kerr (1823-1904) was raised in Aberdeen, where he studied architecture as a pupil of the City Architect. He served as District Surveyor for St. James's, Westminster, from 1842 to 1902. He was elected to the professorship at King's College on November 15, 1861. He was also a founder and first President of the Architectural Association (1847-48), and after retiring from King's College, lectured at the A.A. on "Materials: Their Nature and Application," from 1892 to 1896. Kerr is best known as the author of The Gentleman's House (1865) and later published The Consulting Architect (1886). His numerous articles in the RIBAT include "Suggestions on the Architectural Voluntary Examination of the Institute," RIBAT 20 (1869-70), 209. A listing of these articles can be found in Beazeley, Index, 28 (n. 159).

King's College was founded in 1828 as an Anglican urban university and opened in 1831 in a wing added to Somerset House. The teaching of architecture was not assigned to a chair, as at University College, but since 1840 had been supervised by a Professor of the Arts of Construction within the Department of Engineering. (The other half of the department was under the supervision of a Professor of Manufacturing Art and Machinery.) This division along the lines of civil and mechanical engineering meant that architecture would be taught with an emphasis on structures and systems, in a curriculum corresponding to the "Architecture as a Science" half of the curriculum at University College. Robert Kerr, who was Professor of the Arts of Construction at King's College at the time of Ware's visit, had succeeded the first professor, William Hosking (1800-1861), who had taught from 1840 until his death. Both men had been trained as architects. Hosking's practice, however, had concentrated on bridge, railway, and sanitary engineering. Kerr's practice was more specifically architectural. See Fossey John Cobb Hearnshaw, The Centenary History of King's College London, 1828-1928 (London: George G. Harrap & Co., 1929), 147-48, 190, 260, 390-91, 426. The Department of Civil Engineering opened in 1838 and was, in some years, known as the Department of Applied Science, embracing "natural philosophy, manufacturing arts, engineering, and architecture." I have not yet seen any of the annual calendars of King's College, containing descriptions of the program in the Arts of Construction.

University and King's Colleges were incorporated into the University of London in successive steps between 1898 and 1905, and by 1910, a plan had been developed to consolidate all of the teaching in architecture at University College, in what would become known as the Bartlett School of Architecture in 1913. RIBAJ 3rd Ser. 12 (November 12, 1904), 14-15; and AA Notes 19 (November 1904), 159.

162. WRW to Sister [Harriet Ware], January 15 and February 16, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. His reaction to Kerr's lecture was this: "It was only Construction & no great account, but I was glad to hear it."

163. The Metropolitan Building Act of 1855 gave the R.I.B.A. the responsibility for examining candidates for District Surveyor's positions. As the R.I.B.A. Board of Examiners carried out these duties, various senior members saw the advantage of a general examination for all architects. Arthur Ashpitel, who had presided over the Board of Examiners, agreed in 1860 to chair a Committee on Voluntary Examination. In 1863, the first examinations were held, with George Gilbert Scott and

M. Digby Wyatt as Examiners. Examinations were next held in 1864 (Arthur Ashpitel, G.G. Scott, T. Hayter Lewis, Examiners); and 1866 (Arthur Ashpitel, Edwin Nash, John W. Papworth, Examiners). One day each was devoted to Construction; Professional Practice; Materials; Physics; History and Literature; and Mathematics/Languages/Geometrical Drawing/Mensuration; and two days were devoted to Drawing and Design. By 1882, the examination was a requirement for Associate Membership in the R.I.B.A. See Gotch, Growth and Work (n. 147); Robert Kerr, "Suggestions on the Architectural Voluntary Examination of the Institute," RIBAT 20 (1869-70), 209-21.

164. The introduction was mentioned in Ware's letter to his sister Harriet, January 15, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. Richard Phene Spiers (1838-1916) had studied in the Engineering Department at King's College, London, and would have known Prof. Kerr. Between 1858 and late 1861, he was a student at the Ecole des Beaux-Arts and a member of the atelier Questel. He was a friend of H.H. Richardson, who was in Paris (in the atelier Andre) between September 1859 and June 1861, when Richardson left for a nine-month excursion to London and Boston. Spiers continued his studies in the Royal Academy Schools. In 1863 he won the R.A. Gold Medal and in 1865, the R.I.B.A. Soane Medallion. For eighteen months in 1865-66 he traveled in Germany, France, Greece, Constantinople, Palestine, Syria, and Egypt. See Building News 111 (October 11, 1916); RIBAJ 3rd Ser. 23 (October 21, 1916), 334-36; Richard Chafee, "Richardson's Record at the Ecole des Beaux-Arts," JSAH 36 (1977), 176, 181. It is not yet clear why Ware neglected to investigate any of the German schools where architecture was taught. William Barton Rogers, in planning M.I.T., was certainly aware of German developments in polytechnic education. See Stratton, Mind and Hand (n. 4). Language should not have been a problem, for Ware had a beginner's knowledge of German from one semester of study at Harvard. (He had no apparent preparation in Italian, yet he spent three months traveling through Italy.) Leo Marx has suggested that Ware's avoidance of Germany had deeper roots, in the aversion to German intellectualism that would have pervaded the thinking of his father and other Harvard Unitarians during the 1840s and 1850s. On the German tradition in American architectural education, see Introduction, n. 14; and Chapter 4, n. 148 and 161.

165. Spiers was working with William Burges during 1866 and 1867 on designs for the Law Courts competition. He would have been in a position to discuss the merits of the various designs and might have helped Ware obtain the 61 photographs of this competition which he took back to Boston.

166. Ware to Sister [Harriet Ware], January 15 and February 16, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. Spiers would also serve as President of the A.A. in 1867-68. See also Architectural Association, The Architectural Association School of Architecture (London: A.A., 1934); Idem, AA 125 Exhibition (London: A.A., 1974).

167. Spiers was responsible for the continuity of the design instruction at the R.A., although the "visiting critics" set their own programs. W.R. Lethaby recalled that this arrangement was not entirely successful: "The constant master [Spiers] was, of course, overruled by the various opinions

of the succession of Visitors, and thus the influence of the one man who could have taught us something of system and linked us to the larger European tradition of the time was rendered unavailing." Lethaby noted that Spiers was "a follower of Cockerell, and he was not able to accept the narrowly concentrated view of the Gothic revivalists," and "he openly admired the diverse gifts of Street, Shaw and the others." (Street, Shaw, and Waterhouse were among those, c.1880, who served as "visiting critics" at the R.A.) RIBAJ 3rd Ser. 23 (October 21, 1916), 334-36.

168. The 1888 American edition of Spiers' Architectural Drawing [London, 1887] contained a preface by Ware. However, no correspondence between the two men has yet been found to show any continuing exchange of views on their teaching or publishing interests. A work comparable to Ware's American Vignola (5 eds., 1902-c.1929) was Spiers' The Orders of Architecture, Greek, Roman, and Italian (6 eds., 1890-1926), compiled from C.-P.-J. Normand's Nouveau parallele des ordres (1819). Works comparable to Ware's eclectic Greek Ornament (1878) and Parallel of Historic Ornament (1879) were Spiers' editions of Lewis Vulliamy's Examples of Classic Ornament from Greece and Rome (1907) and Alexander Speltz's Styles of Ornament from Prehistoric Times to the Middle of the Nineteenth Century (1910). While Ware's longer original works dealt with technique--Modern Perspective (1883) and Shades and Shadows (1912), Spiers' dealt with history. Spiers collaborated with William James Anderson (1864-1900), who was lecturing on Ancient, Renaissance, and Modern architecture at the Glasgow School of Art from 1893-94 through 1898-99, to write The Architecture of Ancient Greece and Rome. The book was completed by Spiers after Anderson's death, and published in a single volume in 1902. After the First World War, the publishers decided to divide the work into two separate books. William Bell Dinsmoor revised and rewrote the first part, published as The Architecture of Ancient Greece in 1927; Thomas Ashby revised and rewrote the second part, published as The Architecture of Ancient Rome in the same year. Spiers also edited Constantin Uhde's Architectural Forms of the Classic Ages (1909) and revised editions of James Fergusson's History of Architecture (1902) and his History of Indian and Eastern Architecture (1910). He contributed articles on Persian and Roman architecture to Russell Sturgis' Dictionary and on architecture and archaeology to the Encyclopaedia Britannica. Miscellaneous articles and lectures prepared by Spiers between 1889 and 1905 were published under the title, Architecture East and West (1905). He wrote at least two earlier articles pertaining to architectural education: "On the Students' Text-book Proposed to be Published by the Institute," RIBAT (1870-71), and "The French Diplome d'Architecture and the German System of Architectural Education," RIBAT (1883-84).

169. Ware had a letter of introduction from a Mr. Boxall to Edwin Landseer, who had declined to accept the presidency of the R.A. in 1866 following the death of Sir Charles Lock Eastlake (1793-1865, Pres. 1850-65). He expected at least to see "the architectural apparatus at the R.A." Ware to Sister [Harriet Ware], January 15, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. In February, Ware was Scott's guest at his country house in Ham (Kent). Published information on the duties of the architectural professorship is limited to "Abstract of the Constitution and Laws of the Royal Academy of Arts," in William Sandby, The History of the Royal Academy of Arts, from Its Foundation in 1768 to

the Present Time, 2 vol. (London: Longman, Green, Longman, Roberts and Green, 1862), II, 417-54. The date of these regulations is not known. The Professors of Architecture are listed in Sidney C. Hutchinson, The History of the Royal Academy, 1768-1968 (New York: Taplinger, 1968), Sandby, History, II, 251, 274, 322, mentions Scott's R.A. lectures before actually assuming the professorship. See also John Evan Hodgson and Frederick A. Eaton, The Royal Academy and Its Members (New York: Charles Scribner's Sons, 1905).

170. The role of the R.A. in teaching figure drawing to architectural students was discussed by Scott, Spiers, and Westmacott (R.A. Prof. of Sculpture) at the R.I.B.A. meeting of November 21, 1864. See "A Discussion upon the Report of the Artistic Architectural Education Committee," RIBAT 15 (1864-65), 15-24. A.J. Beresford-Hope, in his "Opening Address" as R.I.B.A. President, November 6, 1865, spoke of the need for cooperation with the R.A. He considered one of its most useful functions in architectural education to be the life drawing class and proposed also that the R.A. augment the architectural section of its annual exhibition. T.L. Donaldson spoke at the same meeting of the value of his own early training at the R.A. and recommended it to the current generation of students. RIBAT 16 (1865-66), 3-4, 11.

171. After submitting letters of recommendation, portfolios, and drawings prepared according to the entrance examination program, students would be admitted to study at the R.A. for a period of up to seven years. They had to attend the various courses of annual lectures and the class in perspective. Programs for the Gold Medal competition in architecture would be issued in odd-numbered years, and the winner received a traveling scholarship which made it possible for him to go on an extended sketching tour on the Continent. Architecture students could also earn a Silver Medal for work in measured drawing. The synopsis of requirements is based on Sandby, History, II, 417-54. A list of biennial Gold Medal winners and programs for the architectural submissions from 1769 to 1903 is given in Hodgson and Eaton, The Royal Academy, 388-91. For an indication of the differences between the English and French academic attitudes toward the monumental program, compare this list of R.A. programs with the list of annual Ecole des Beaux-Arts Grand Prix programs from 1720 to 1967 in Donald Drew Egbert, The Beaux-Arts Tradition in French Architecture Illustrated by the Grands Prix de Rome (Princeton: Princeton University Press, 1980), Appendix 2, 168-200.

172. Both Wyatt and Beresford-Hope were at the R.I.B.A. meeting of January 28, when Ware spoke on American architecture, and they may have met with him on other occasions, before or after. Matthew Digby Wyatt (1820-1877) began the study of architecture with his brother Thomas Henry Wyatt (1807-1880) in 1836. That same year he won the R.I.B.A. essay prize. Between 1844 and 1846 he traveled in France, Italy, Sicily, and Germany. He served as administrative secretary for the Great Exhibition in 1850-51 and edited the resulting publication on the industrial arts shown at the Crystal Palace. Wyatt collaborated with Isambard Kingdom Brunel in the design of Paddington Station (1852-55), with Owen Jones in the reerection of the Crystal Palace at Sydenham (1854), and with George Gilbert Scott in the design of the India Office (1867). Wyatt wrote the essays on Renaissance and Italian styles for Owen Jones' Grammar of

Ornament (1856). He was R.I.B.A. Secretary (1855-59) and a Gold Medallist (1866). In 1869 he was named the first Slade Professor of Fine Arts at Cambridge. (Ruskin was the first Slade Professor at Oxford, 1870-79 and 1883-84; Edward Poynter was the first Slade Professor at University College, London, 1871-75.) See John Martin Robinson, The Wyatts: An Architectural Dynasty (Oxford: Oxford University Press, 1979), 202-18; Derek Linstrum, ed., Catalogue of the Drawings Collection of the R.I.B.A.: The Wyatt Family (Farnborough: Gregg International Publishers, Ltd., 1974), 20-21; and Nikolaus Pevsner, "Matthew Digby Wyatt," Studies in Art, Architecture and Design (London: Thames & Hudson, 1968), vol. 2, 96-107, 266-68. Pevsner found him "a highly insensitive architect," whose "buildings are no more than a foil to his achievement as a critic and theorist of design and architecture," and went on to show that "all his signal contributions concern the principles of design and the appreciation of a new technological architecture." For the sake of argument, Pevsner drew attention to the affinity between Wyatt and Henry Cole (as spokesmen for industrial design and the improvement of taste among producers and consumers) in opposition to Ruskin and Morris. Robinson pointed out, "In his Slade lectures at Cambridge [Wyatt] emphasized that the study of the Five Orders was of real practical use in training the eye to appreciate relations of scale and design."

Alexander James Beresford-Hope (1820-1887) was the youngest son of Thomas Hope (1769-1831), arbiter of taste in British interior design for the first three decades of the nineteenth century. Beresford-Hope was Conservative M.P. from Maidstone (1841-52 and 1857-59), from Stoke-upon-Trent (1862-68), and from Cambridge University (1868-87). He wrote, among other works: The Common Sense of Art (1858); The English Cathedral of the Nineteenth Century (1861); The Condition and Prospects of Architectural Art (1863); and The Art-Workman's Position (1864). See DNB 27, 309-11.

Henry Cole (1808-1882) began his work in government service with the reorganization of the Public Record Office in 1838, and in 1849 he became a member of the executive committee planning for the Great Exhibition of 1851. Upon the closing of the Crystal Palace, he became interested in gathering many of the objects displayed into a permanent museum. In 1852 he was made Secretary of the School of Practical Art, successor to the Government Schools of Design, which embraced a network of 36 local art schools (increased to 91 by 1864). Cole became Secretary of the Science and Art Department, which administered these schools, first under the Board of Trade, then, after 1856, under the Education Department, and he held this position from 1853 until 1873. As a designer of "art manufactures" and as a writer of guidebooks, he used the pseudonym, Felix Summerly. See Henry Cole, Fifty Years of Public Work of Sir Henry Cole, ed. Alan S. and Henrietta Cole, 2 vol. (1884).

The best discussion of the South Kensington Schools of Design can be found in Stuart Macdonald, The History and Philosophy of Art Education (New York: American Elsevier, 1970). See also Frank P. Brown, South Kensington and Its Art Training (London: Longmans, Green, 1912); Quentin Bell, The Schools of Design (London: Routledge & Kegan Paul, 1963); Michael Argles, South Kensington to Robbins: An Account of English Technical and Scientific Education since 1851 (London: Longmans, Green & Co., 1964); Joint Publishing Committee, Survey of London, Vol. 38: The Museums Area of South Kensington and Westminster (London: University of London, 1975); Victoria and Albert Museum, The History of the Victoria and

Albert Museum (Small Picture Book No. 31) (London: Her Majesty's Stationery Office, 1976).

173. WRW to Emma Ware, February 19, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar.

174. WRW to Rogers, September 9, 1867, Rogers Papers (MC 1), box 4, folder 58, MCM-Ar: "I have, as I told you, laid my lines in England in the hope of catching some suitable person trained specially to teach these things...."

175. On Ware's wider involvement in drawing instruction, see Chapter 2, pp. 107-17. Ware returned to Boston with "a series of drawings illustrating the course of instruction pursued in the South Kensington School of Art and other schools established by the science and art department" of the British government. Programme, 12.

176. WRW to Sister [Harriet Ware], February 16, 1867. Ware Papers (MC 19), box 1, folder 4, MCM-Ar. The Workingmen's College was founded in 1854 by Rev. Frederick Denison Maurice (1805-1872), a leader of the Christian Socialist movement in the early 1850s. Originally located in Red Lion Square, Bloomsbury, it moved to Great Ormond Street, several blocks away in 1857. Maurice continued as its Principal for the rest of his life, and Ruskin supervised the drawing classes at the College from 1854 to 1858, lecturing there occasionally after that. Two of Ruskin's books were a result of his teaching (1854-58, 1860) at the Working Men's College: The Elements of Drawing (1857) and The Elements of Perspective (1859). Ruskin's chapter from The Stones of Venice (1851), "On the Nature of Gothic Architecture: and herein of the true functions of the workman in art," was reprinted in 1854 for the opening session of the College. See DNB 37, 102; 22 (Suppl.), 1185-86; F.D. Maurice, Administrative Reform and Its Connexion with Working Men's Colleges (Cambridge: Macmillan, 1855). On the contributions of Ruskin to art education, see Robert Hewison, John Ruskin: The Argument of the Eye (Princeton: Princeton University Press, 1976), and papers throughout The Works of John Ruskin (Library Edition), ed. E.T. Cook and A. Wedderburn (London, George Allen, 1903-12). At the May 15, 1865 meeting of the R.I.B.A., Ruskin gave a paper entitled "An Enquiry into Some of the Conditions at Present Affecting the Study of Architecture in Our Schools," RIBAT 15 (1864-65), 139-56.

177. WRW to Sister [Harriet Ware], February 16, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. Mr. Papworth was either John Woody Papworth or his brother Wyatt A.V. Papworth. See n. 179.

178. WRW to Sister [Harriet Ware], February 16, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. Matthew Arnold (1822-1888) is well-known for his work as a poet and critic. His contributions in the field of education have received less attention. Arnold went to France in 1859 to report on elementary schools for the Newcastle Commission (1858-61), a Parliamentary group studying the education of the poor. His report, The Popular Education of France, was published in 1861. He was sent to Europe again by the Schools Inquiry Commission ["Middle Class School Commission"] (1865-67), to investigate the secondary education of the middle class. Between April and November 1865 he traveled and met officials in France,

Italy, Germany, Austria, and Switzerland. His report was nearing completion in January and February of 1867, while Ware was in London, and it was published in March 1868 as Schools and Universities on the Continent. See Matthew Arnold, Schools and Universities on the Continent, vol. 4 in The Complete Works of Matthew Arnold, ed. R.H. Super (Ann Arbor: University of Michigan, 1964), 344-53; Sir Joshua Girling Fitch, Thomas and Matthew Arnold and Their Influence on English Education (New York: Charles Scribner's Sons, 1897); Frank J.J. Davies, "Matthew Arnold and Education" (Ph.D. dissertation, Yale University, 1934).

179. John Woody Papworth (1820-1870) was the older son of John Buonarotti Papworth (1775-1847), who is best known for his Rural Residences (1818). The elder Papworth was also a founder of the R.I.B.A. in 1834 and of the Government Schools of Design at Somerset House in 1836. During 1836-38, the elder Papworth served as first director of the Schools of Design, and his son John served as first secretary. John Woody Papworth assisted his brother Wyatt in the direction of the Architectural Publication Society. Ware described John Papworth as "a most exciting man to the intellectuals." WRW to Mary E. Ware, February 8, 1867, Ware Papers (MC 14), MCM-Ar. See also DNB 43, 196-97, 198; Builder 28 (1870), 559-60.

Wyatt Angelicus VanSandau Papworth (1822-1894) was the younger son of John Buonarotti Papworth. From 1866 to 1887 he served as surveyor to the Alliance Assurance Company. As a member of the Cloth Workers Company of the City of London, he took an interest in technical and art education in connection with textile design. When Ware was in contact with him in 1867, he was at work on a revised edition of Joseph Gwilt's Encyclopedia of Architecture. His most important contribution was his work as Secretary and Editor of the Architectural Publication Society, which he and his brother established in 1848. The Dictionary of the Architectural Publication Society, published in eight volumes of text and three of illustrations from 1853 to 1892, contained 18,456 articles. Ware mentioned the gift of the Dictionary in AC...1868-69, 28, and PR...1872, 36. For a list of the papers by the Papworth brothers published in RIBAT, see Beazeley, Index, 36-37 (n. 158). See also DNB 43, 198-200; RIBAJ 1 (1893-94), 618; David Watkin, The Rise of Architectural History (London: Architectural Press, 1980), 85.

180. Undated letter fragment [January or February 1867], Ware Papers (MC 19), folder 3, MCM-Ar; PR...1872, 48. Fergusson may have mentioned his current project of revising the 1855 Handbook for publication as A History of Architecture... (1865-67). By 1875 M.I.T. owned the latter volumes. It is possible that Ware met with George Godwin, editor of The Builder, on another occasion besides the R.I.B.A. meeting of January 28--particularly since Ware had alluded in his speech to the A.I.A.'s intention to start "an Architectural Journal." Godwin had long taken an interest in American architects, having assisted T.U. Walter in his 1838 visit to England and having corresponded with A.J. Downing during the 1840s. See RIBAT 17 (1866-67), 89.

George Godwin (1815-1888) began the study and practice of architecture with his father in 1828 and in 1835 won the first R.I.B.A. essay prize for his study on "Concrete." He was an organizer of the Art Union of London in 1836-37. A frequent contributor to art, architecture, and engineering journals, he became Editor of The Builder (then two years old) in 1844. His contributions to the popular literature on the history

of architecture include Buildings and Monuments, Modern and Mediaeval (1850) and History in Ruins (1853). In 1881 he endowed the Godwin Bursary, the R.I.B.A. traveling fellowship for the study of construction and practice in Europe and the United States. See DNB 22, 58-59; RIBAT 31 (1880-81), 219.

181. Acknowledged in AC...1868-69, 28. The A.A. Sketch-Book was inaugurated in 1867. It contained no sketches of current work or student projects, only sketches of British (mostly Medieval) architecture. The Spring Gardens Sketch-Book was inaugurated in 1867, by students in the office of George Gilbert Scott.

182. Without itemizing specific contributions, Ware acknowledged the following individuals as having given "not only photographs of their works, but [also] tracings and lithographic copies of working drawings, with specimens of specifications, estimates, bills of quantities and various forms of business papers": Robert William Edis (1839-1927); Enoch Bassett Keeling (1837-1886); Edwin Nash (c.1804-1884); John Norton (1823-1904); John Woody Papworth (1820-1870); Thomas Miller Rickman (1827-1870); Alfred Waterhouse (1830-1905); and Robert Jewell Withers (1823-1894). PR...1872, 36. Ware visited the offices and materials yards of the Cubitt Brothers on several occasions but was unable to get any drawings. In Scotland he had obtained 41 photos of "modern buildings" (or of the drawings), including some by David Bryce (1803-1876). By comparison to these British acquisitions, M.I.T., by 1875, had 104 photos of modern American buildings or drawings, and 83 tracings or copies of American working drawings. The French photographs and drawings were the most numerous in the collection. There were also large groups of original drawings in the 1875 inventory grouped by medium, without mention of subject or nationality. Not one of these hundreds of drawings and photographs is known to survive. See AC...1868-69, 28; PR...1875, 180-81.

183. Ernst Leopold S. Benzon (c.1821-1873) was the London manager of the firm of Naylor & Co., dealers in iron and steel. While the details of his life are still unclear, there is an E.L. Benson listed in the 1847 Boston directory, associated with Naylor & Co. From 1848 through 1860, an Edmund L. Benzon, also associated with Naylor & Co., is listed in the directories, though from 1856 on, he is listed with no home address in Boston. Ernst Leopold S. Benzon died in September 1873 at his country house in Scotland.

184. WRW to Harriet Ware, January 15, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. Charles Francis Adams (1807-1886) was appointed by President Lincoln in the spring of 1861 to be United States Minister to the Court of St. James's, where he served until June 1868. See DAB 1, 42-47.

185. The Benzon set of 60 Ecole drawings was later supplemented by the 77 original drawings brought to M.I.T. by Eugene Letang in 1872. By 1875, M.I.T. also had 250 photographs of Envois de Rome. See PR...1875, 180-84. While Benzon was a noted collector of books and manuscripts, the circumstances of his acquiring the Ecole drawings are not known, nor are the arrangements he made with M.I.T. The M.I.T. Annual Catalogues repeatedly state that the drawings were a gift; Ware's first departmental

report states, however, that they were purchased in the winter of 1867-68, as soon as he returned from Europe. See AC...1868-69, 35; PR...1872, 35. A copy of the 1867 inventory of Benzon's library is in the Newberry Library in Chicago. See also three 1875 sale catalogs for the Paris and London auctions of his books and manuscripts: Catalogue des livres rares et precieux, manuscrits et imprimes provenant de la bibliotheque de feu M. Benzon... (Paris: Bachelin-Deflorenne, 1875); Catalogue of an important & a valuable portion of the books & manuscripts of the late Ernst L.S. Benzon... (London: Dryden Press, 1875); and A ... list of ... books and manuscripts of the late E.L.S. Benzon, and others... (London, 1875). There was little on architecture in these sales, except three Ruskin titles and one Stuart and Revett.

186. WRW to Sister, March 4, 1867. Ware Papers (MC 19), box 1, folder 4, MCM-Ar. Wyatt had gone to Paris in 1849 to report on the French Exposition and would return in 1850-51 with Henry Cole, as the Crystal Palace Exhibition was being planned. Ware had probably also read George R. Burnell's paper, "On the Present Tendencies of Architecture and Architectural Education in France," RIBAT 15 (1864-65), 127-37; discussed further, 157-64.

187. Ibid. For more on Quincy, see n. 81. For more on Mitchell, see n. 22. Charles Callahan Perkins (1823-1886) had studied painting in Paris and Leipzig from 1843 (when he graduated from Harvard) to 1850 and again from 1865 to 1869. As an art historian, he lectured at Trinity College, Hartford, in 1857-58, and later at the Lowell Institute in Boston. He was the author of Tuscan Sculptors (1864); Italian Sculptors (1868); Raphael and Michaelangelo (1878); Historical Handbook of Italian Sculpture (1883); and Ghiberti et son ecole (1886). Perkins was the editor of American editions of Eastlake's Hints on Household Taste [London, 1868] (Boston: James R. Osgood, 1872) and von Falke's Art in the House [Vienna, 1871] (Boston: L. Prang, 1879). Perkins would make his greatest contribution as an educator--particularly as an advocate of art education. He would serve as a member of the Boston School Committee from 1871 until 1884. For more on the roles of Perkins and Ware in promoting art education, see Chapter 2, n. 108. See also DAB 14, 464-65; Samuel Eliot, "Memoir of Charles Callahan Perkins, A.M.," Massachusetts Historical Society Proceedings, 2nd ser., 3 (1887), 223-46.

188. Ware's observations are recorded in his March 4 letter: "Mr. Trelat turned out to be quite a young man [age 46], full of enthusiasm for his undertakings & ready to take an interest in my own, and I sat an hour and more very satisfactorily...." Trelat introduced Ware to several of the faculty of the Ecole Centrale. "They took me all over the school, which is just beginning but was very interesting, though there was not much to see, and promised me every facility and information." WRW to Sister, March 22, 1867. Ware Papers (MC 19), box 1, folder 4. Emile Trelat (1821-1907) studied engineering and ceramics at the Ecole Centrale des Arts et Manufactures, and worked under Visconti on several projects, including the New Louvre. He was a superintendent of construction on the buildings for the 1855 Exposition. From 1854 until 1895, he held a position as instructor at the Conservatoire des Arts et Metiers, with responsibility for courses in civil construction. From 1871 until 1891, he served as Chief Architect for the Departement de la Seine-et-Marne.

189. The Ecole Centrale d'Architecture (later the Ecole Speciale d'Architecture) was organized in May 1865 and opened November 10, 1865, to provide a more concentrated and comprehensive education in architecture than was being offered by either the Ecole des Beaux-Arts or the Ecole Centrale des Arts et Manufactures. Among the 137 original trustees were many architects and engineers in private practice, industrialists, government officials, and faculty of the Ecole Centrale des Arts et Manufactures and the Conservatoire des Arts et Metiers. The school is given extensive coverage in the Gazette des Architectes et du Batiment (hereafter GdA&B) from 1865 through 1869. (The Gazette was edited by Anatole de Baudot and E.E. Viollet-le-Duc (fils). Viollet-le-Duc (pere) was one of the early trustees of the Ecole Centrale. The curriculum consisted of drawing lessons in all three years, and lecture courses, each conducted by a single faculty member. The first-year lecture courses (with the number of sessions in each) were: stereotomy, descriptive geometry, stone cutting, and frame construction (50 lectures); general physics (including properties of materials, heat, meteorology, magnetism, electricity, acoustics, lighting, 25 lectures); general chemistry (25); stability of structures (25); geology (12); history of civilization (12); hygiene (8); and natural history (i.e., botany, 10 lectures). The second- and third-year lecture courses were: perspective, shades and shadows (20 lectures); physics applied to architecture (including heating and ventilating, sanitation, lighting, electricity, 20 lectures); chemistry applied to building (i.e., fabrication, properties, and conservation of materials, 20 lectures); construction equipment (20); theory of architecture (30 lectures, given by Trelat himself); comparative history of architecture (30); construction (i.e., materials, architectural elements, 35 lectures); construction management (10); building law (10); and political economy (12). Students were promoted from one class to the next by means of annual examinations and concours, and the concours for the diploma occupied fifty days at the end of the third year. GdA&B 3 (1865), 59-60, 75-79, 92-93. Faculty for each lecture course are named in GdA&B 3 (1865), 240.

190. WRW to Sister, March 4 and 22, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. Ware was in Paris in the aftermath of the abortive Reform Decree of 1863, in which Viollet-le-Duc had attempted to make the Ecole des Beaux-Arts more relevant to contemporary conditions. On the Ecole reforms, see Albert Boime, "The Teaching Reforms of 1863 and the Origins of Modernism in France," Art Quarterly n.s. 1 (Autumn 1977), 1-39; Richard A. Moore, "Academic Dessin Theory in France after the Reorganization of 1863," JSAH 36 (October 1977), 145-74.

191. WRW to Sister, July 30, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar.

192. Ibid. Eugene Guillaume (1822-1905), a sculptor, was Director of the Ecole from 1866 to 1878. He should not be confused with Edmond-Jean-Baptiste Guillaume (1826-1894), who served as Professor of Theory of Architecture from 1884 to 1894.

193. WRW to Sister, July 30, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. Cesar-Davis Daly (1811-1893) studied under Felix Duban. He edited the Revue generale from its beginning in 1840 until its termination

in 1890. Daly gave Ware ten volumes of the Revue generale and the early volumes of L'architecture privee au XIXe siecle (1860-77). On these gifts, see AC...1868-69, 29 and Programme, 14. Daly later published a house by Ware and Van Brunt in the Revue generale 29 (1872), 236-37, pl. 60--one of the few American works ever to appear in this journal. For a biographical sketch and bibliography on Daly, see Robin Middleton and David Watkin, Neoclassical and Nineteenth Century Architecture (New York: Abrams, 1980), 395. See also Richard John Becherer, "Between Science and Sentiment: Cesar Daly and the Formulation of Modern Architectural Theory" (Ph.D. dissertation, Cornell University, 1980).

The Societe Centrale was founded in 1840. Victor Baltard (1805-1874) was President, 1865-68 and 1871-74.

194. WRW to Sister, July 30, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. A. Morel was the publisher of the Gazette des Architectes et du Batiment and of Emile Trelat's prospectus, L'Ecole centrale d'architecture (1864).

195. WRW to Sister [Emma Ware], August 11, 1867, Ware Papers (MC 19), box 1, folder 4, MCM-Ar. The recognition of contemporary French architects by professional societies in the United States and Great Britain is some measure of the official attention to current work in Paris. It should be remembered that the R.I.B.A. was founded in 1834 and the A.I.A. in 1857. Considering that the Americans studying in the Paris ateliers far outnumbered the British, it is surprising that more patrons were not elected to A.I.A. Honorary Membership. Before Ware's visit to France in 1867, the A.I.A. had elected only two French architects as Honorary Members: Hector Martin Lefuel (1810-1880, AIA Hon. 1860, RIBA Hon. 1857); and E.E. Viollet-le-Duc (1814-1879, AIA Hon. 1860, RIBA Hon. 1856). Ware assumed the duties of A.I.A. Corresponding Secretary between January 1868 and November 1870, but it was Hunt who, in December 1868, nominated a substantial list of French architects for Honorary Membership. (Ware even had to get their addresses from Hunt in order to notify them of their election, suggesting that he had not made much of an acquaintance with them in 1867.) Hunt's nominees were: Felix Duban (1797-1870, AIA Hon. 1869, RIBA Hon. 1840); Albert Lenoir (1801-1891, AIA Hon. 1869, never RIBA Hon.); Louis Duc (1802-1879, AIA Hon. 1869, RIBA Hon. 1867); Victor Baltard (1805-1874, AIA Hon. 1869, RIBA Hon. 1867); and Theodore Ballu (1817-1885, AIA Hon. 1869, RIBA Hon. 1876). Elected by the A.I.A. in subsequent years were the architects and critics: Cesar Daly (1811-1893, AIA Hon. 1871, RIBA Hon. 1844); Hippolyte Taine (1828-1893, AIA Hon. 1872, never RIBA Hon.); Henri Labrouste (1801-1875, AIA Hon. 1873, RIBA Hon. 1868); Charles Garnier (1825-1898, AIA Hon. 1873, RIBA Hon. 1867); Emile Trelat (1821-1907, AIA Hon. 1881, RIBA Hon. 1881); Eugene Letang (1842-1892, AIA Hon. 1892, never RIBA Hon.); Jean-Louis Pascal (1837-1920, AIA Hon. 1900, never RIBA Hon.); and Emile Vaudremer (1829-1914, AIA Hon. 1902, RIBA Hon. 1874). Among the French architects or atelier patrons born before 1840 who were made Honorary Corresponding Members of the R.I.B.A. but not the A.I.A. were: Jean-Baptiste Lesueur (1794-1883, RIBA Hon. 1846); Emile-Jacques Gilbert (1793-1874, RIBA Hon. 1855); Charles Rohault de Fleury (1801-1875, RIBA Hon. 1855); Charles Texier (1802-1871, RIBA Hon. 1863); Leon Vaudoyer (1803-1872, RIBA Hon. 1868); Charles Questel (1807-1888, RIBA Hon. 1872); Paul Abadie (1812-1884, RIBA Hon. 1876); Gabriel Davioud (1823-1881, RIBA Hon. 1879); Victor Ruprich-Robert

(1820-1887, RIBA Hon. 1881); and Louis-Jules Andre (1810-1890, RIBA Hon. 1885). Influential French architects or atelier patrons who were never elected to either the R.I.B.A. or the A.I.A. include: Jacques-Ignace Hittorff (1792-1867); Abel Blouet (1795-1853); Simon-Claude Constant-Dufeux (1801-1871); Honore Daumet (1826-1911); and Julien Guadet (1834-1908). Sources: AIA Proc...1902, 221-24; A.I.A. Office Files, Secretary, Correspondence, Outgoing (RG 801, SR 1.1), box 1, book 1, p. 65; book 2, pp. 15-17, DAIA-Ar; RIBA Kalendar...1885-86, 39-40. Ware was elected a Corresponding Member of the Societe Centrale des Architects in 1868, and until 1885 was the only architect from an English-speaking country so honored.

196. WRW to Sister [Emma Ware], August 11, 1867.

197. As early as 1864, Henry Van Brunt was translating Viollet's Entretiens sur l'architecture (Paris, 1858, with supplemental atlas, 1863). In October 1864, the A.I.A. in New York took note of Van Brunt's project and considered establishing an "A.I.A. Press" to publish his translation. A.I.A. Minutes, October 1864. I am grateful to Tony Wrenn, A.I.A. Archivist, for this reference. The first volume of Van Brunt's translation finally appeared as Discourses on Architecture (Boston: J.R. Osgood & Co., 1875). The second volume (based on the French edition of 1872) appeared as Lectures on Architecture (Boston: J.R. Osgood & Co., 1881).

198. WRW to [Sister?], undated letter [probably August 1867], Ware Papers (MC 19), box 1, folder 4, MCM-Ar. Victor Duruy (1811-1894) served as Minister of Public Instruction from 1863 to 1869. Ware gave no details about his study of the drawing schools of Paris, and I have not yet found background documentation on these schools. Ware returned to Boston with "a series of drawings illustrating the course of study in ornament and the human figure, pursued in the municipal schools of Paris, including some specimens of the drawings made from memory at the Ecole Imperiale et Speciale du Dessin (known as the "Petit Ecole," and renamed in 1877 the Ecole Nationale des Arts Decoratifs). Programme, 12.

199. WRW to Committee on Instruction, September 16, 1867. See also Rogers to WRW, September 7, 1867; WRW to Rogers, September 9, 1867; WRW to Rogers, September 16, 1867, Rogers Papers (MC 1), box 4, folder 58, MCM-Ar.

200. WRW to Frank Dempster Sherman, September 26, 1891. Ware Papers (MC 14), folder 20, MCM-Ar.

201. A.W. Longfellow, soon after entering the atelier Vaudremer, wrote to his cousin that "sous-Patron [Gustave Raulin] ... told me he had Prof. Ware for an eleve & knew Cousin Will [W.P.P. Longfellow]." A.W. Longfellow to Alice [Mary Longfellow], January 18, 1880, A.W. Longfellow Papers, MCLf. Richard Chafee has pointed out that either Raulin or Longfellow must have been confused. Raulin was only 30 in the summer of 1867 when Ware was in Paris, and was therefore past his days as a student at the Ecole and not yet established as an architectural journalist or atelier patron. (He was a founder of the Croquis d'Architecture in 1866 and a commentator for Cesar Daly's Revue generale from 1876 to about 1880.

Raulin had probably just started as sous-patron in the atelier Vaudremer in 1880. He may have confused William Robert Ware, in Paris in 1867, with his nephew, William Rotch Ware, in Paris from 1874 to 1876.

Charles McKim arrived in Paris about September 1867 and sought out the company of Ware and Peabody. Instead of entering the Ecole Centrale des Arts et Manufactures, as he had planned, McKim entered the atelier Daumet and the Ecole des Beaux-Arts. Other Americans studying in the atelier Daumet in the fall of 1867 included Sidney V. Stratton and Alfred H. Thorp. For more on the atelier Daumet, see Chapter 5, p. 252.

202. On Lindsey, see Chapter 1, n. 84, and Chapter 4, n. 109; on Mitchell, see Chapter 1, n. 22; on Quiney, see Chapter 1, n. 81. For more on the atelier Andre, see Chapter 5, p. 252. For more on the atelier Questel, see Chapter 5, n. 75. Emmanuel Brune (1836-1886) had studied at the Ecole Polytechnique before joining the atelier Questel and being admitted to the Second Class of the Ecole des Beaux-Arts in 1858. He was promoted to the First Class in 1860. He won the Premier Second Grand Prix in 1862 and the Premier Grand Prix in 1863. He would serve as Professor of Construction at the Ecole des Beaux-Arts from 1871 to 1886. Drawings of Brune's Envois de Rome, "The Antiquities of Cori," were once in the collections of the M.I.T. architectural library. PR...1875, 182.

Chapter 2: Notes

1. See William Downes Austin, A History of the Boston Society of Architects in the Nineteenth Century (From 1867 to January 4, 1901) (3-vol. typescript, August 1942), Vol. 1, Chapters 1-3, MBAt. Austin was convinced about Van Brunt's role in founding the B.S.A., stating that "until indisputable evidence to the contrary turns up, the writer's opinion will be that the Boston Society of Architects owes its genesis to the initiative of Henry Van Brunt." Chapter 1, p. 19. On the intentions of the charter members, Austin wrote, "The chief dissatisfaction of the few leaders appears to have been in the non-recognition by the intellectual elements of Society, of Architecture as a learned profession.... But the rank and file of the Charter Members ... had the idea, in joining, that the Society would be a sort of polite trade union...." Chapter 2, pp. 2-3. The intellectual tone prevailed, and by the end of 1867, the B.S.A. began to devote a large part of each meeting to the reading of a paper by one of the members.

2. Van Brunt had spoken at several of the organizational meetings about the A.I.A., and the constitution and bylaws adopted by the B.S.A. on June 21, 1867 were largely based on those of the A.I.A.

3. Austin, "History of the B.S.A.," Chapter 3, p. 8.

4. Ibid. On Cabot, see this present work, Chapter 1, n. 49, 74; on Thayer, see Chapter 5, n. 42; on Bradlee, see Chapter 1, n. 76.

5. Austin, "History of the B.S.A.," Chapter 3, pp. 8, 15, 18.

6. B.S.A. members discussed the first annual exhibition of M.I.T. student work on June 4, 1869, having considered the idea of creating annual prizes for M.I.T. students as early as April 16, 1869. On December 22, 1869, the B.S.A. Prizes in Design and Construction were officially established, with the first judging to take place in the spring of 1870. For more on these prizes, see pp. 209-210. The B.S.A. leadership took an active interest in the choice of Ware's successor in 1881. See Chapter 4.

7. The spring of 1868 was also a time of renewed activity on Memorial Hall. Since February 1866, the Harvard Building Committee had been receiving the comments of alumni concerning the 1865 Ware and Van Brunt design, and by January 1868, the committee decided to request a major revision in the design, primarily to change the memorial section of the building from an appendage on the west end to a transverse hall beneath the tower. After much bickering, the revised design was finally adopted on July 15, 1868, and a set of drawings was on display for guests at Harvard's Commencement exercises that same day. Construction did not begin until spring 1870. See Shaffer, "Ruskin, Norton and Memorial Hall," Harvard Library Bulletin 3 (1949), 226-27; WRW to Rogers, July 18, 1868, Rogers Papers (MC 1), box 4, folder 60, MCM-Ar.

8. WRW to Rogers, July 18, 1868.

9. Rogers memo for meeting of M.I.T. Government, August 20, 1868, Rogers Papers (MC 1), box 4, folder 60, MCM-Ar. At the meeting the next day, Ware was finally recognized by the administration as a regular member of the faculty, with full-time teaching duties. Ware's salary had been uneven, and paid irregularly, between 1866 and 1868. (No payments were shown for 1865.) For the first six months of 1866, he was paid $900; during the entire time he was in Europe, from August 1866 to December 1867, he received five payments totaling $1500. Between December 1867 and October 1868 he received only $600. With the official opening of the Department of Architecture in October 1868, Ware's salary began to be paid quarterly, totaling $1200 per year. See M.I.T. Cash Book No. 1, 1862-1872 (ASC 6), MCM-Ar, and undated memo, Rogers Papers (MC 1), box 4, folder 61, MCM-Ar. Twelve other faculty members were earning between $1400 and $2000. It appears that the balance of $800 between Ware's $1200 salary and the $2000 salary of the other full professors was intended by Pres. Rogers to be set aside "for the preparation of drawings & for such special help in the Dept. as may be found to be necessary after the opening of the classes." Rogers memo for meeting of M.I.T. Government, August 20, 1868, Rogers Papers (MC 1), box 4, folder 60, MCM-Ar. On August 21, 1868, the M.I.T. Government confirmed Ware's $1200 salary and authorized Rogers "to assure Mr. Ware of a further appropriation for the uses of the department, contingent upon its receipts." M.I.T. Corporation: Government, Records, vol. 2, 1866-1873, 130-31. Before any payments were made for Ware's second year of full-time teaching (1869-70), Pres. Rogers wrote a memo, on December 27, 1869: "As the department of Architecture has now been brought into full operation, I would also recommend that the salary of Professor Ware be raised to the same amount [i.e., $2000], with the condition that he shall defray from his own salary, the expense of the assistant in drawing whom he has engaged." Rogers memo, December 27, 1869, Rogers Papers (MC 1), box 4, folder 63, MCM-Ar. The $2000 per annum salary for all senior faculty was increased in 1870-71 to $2500. Salaries would remain at this level until January 1, 1879, when the salaries of all full professors were, in an episode of budget tightening, cut by 10 percent. During most of the 1870s, M.I.T.'s President earned $3500 per year, and Eugene Letang, Assistant in Architecture and the highest-paid Assistant in the school, earned $2000.

10. Hereafter cited as Programme. The introduction was dated August 26, 1868.

11. Programme, 5, 9-10.

12. See Chapter 1, pp. 20-22, 38-52.

13. Programme, 9.

14. Programme, 9. These were the studies Ware had advocated in his 1865 Outline to prepare students for the needed work as office assistants and construction superintendents, and which Rogers in 1864 had anticipated under the general heading of "Lectures on Building or Practical Architecture."

15. In the 1865 Outline, Ware did not elaborate on these subjects, because he was not yet thinking in detail about the integration of his

proposed course of architectural instruction in an operating school of science and technology. Ware's "Scientific and Literary Studies" of 1868 involved an extension of some of the first- and second-year work in other departments at M.I.T., specially adapted to problems in architecture. "Scientific and Literary Studies" would not be retained as a separate component of the architecture curriculum in the 1870s, as Ware would redistribute various topics under the heading of Construction and Practice or simply carry them along as auxiliary studies. It should be noted that in 1868-69, M.I.T. began offering a sixth major field, co-equal with those in Civil Engineering, Mechanical Engineering, Mining, Chemistry, and Architecture--a field called Science and Literature. This was an interdisciplinary course of study, usually taken by students preparing for a career in business or medicine.

16. The progressive stages, which Ware had observed in the drawing schools of London and Paris, were still only implicit in his listing of the Exercises in Drawing in the 1868 Programme, but would be a confirmed part of the M.I.T. architecture curriculum by 1875. They included blackboard drawing, crayon [pencil] and charcoal drawing, pen and ink line drawing, India ink shading, watercolor rendering, modeling (clay, plaster, wax), lithography and etching, drawing from memory, sketching from nature, and sketching buildings. None of this was present in the 1865 Outline, and a graded drawing curriculum was only one of the incidental results of Ware's European trip. Rogers had been more concerned in 1864 with the application of drawing to various fields (e.g., topographic plans, working drawings, shop drawings) than with the pedagogy of drawing itself. For more on drawing instruction, see pp. 107-17.

17. Programme, 6-7.

18. Ibid.

19. Ibid. This was Ware's first statement of the idea that the Diploma of Architect (i.e., degree of Bachelor of Science) would be contingent upon the submission of a thesis project. The notion, not much elaborated in the 1865 Outline, of a series of graded diplomas or certificates persisted in the 1868 Programme. Here Ware perpetuated the idea of issuing Certificates of Attainment, representing a student's "qualification as an Architect, Draughtsman or Assistant." There is no evidence in the records of the M.I.T. Registrar that such certificates were ever issued in architecture. A non-degree student would most likely have relied on a letter from the M.I.T. Secretary or from Prof. Ware, stating that he had done certain work in architecture at M.I.T. But no such letters have yet been found.

20. He had placed ads in the Saturday and Monday Boston papers announcing this debut and invited members of the Committee on Instruction to attend the first several classes. Ware to Rogers, November 2 and 6, 1868, Rogers Papers (MC 1), box 4, folder 61. When the A.I.A. held its second annual convention in New York on December 8, 1868, the new program at M.I.T. may have been commented on, but no mention of the school was recorded in the A.I.A. Proceedings, and no report was submitted by the Committee on Education, of which Ware was a member.

21. The figures are taken from Ware's own account of his department in the early years, appearing in PR...1872, 37. An examination of the M.I.T. Annual Catalogues and of the M.I.T. Registrar's records enables us to identify nine students who were studying architecture or taking preliminary courses in 1868-69. Among these were Stephen C. Earle, Frank M. Howe, W. Whitney Lewis, George T. Tilden, and William M. Woollett. Most of the draftsmen attending the lectures were never registered. See Appendix D.

22. PR...1872, 37. The design problems for this year and subsequent years are discussed in Chapter 3. Francis Ward Chandler, in his obituary reminiscences of Prof. Ware, mentioned that Ware was also lecturing on architectural practice and descriptive geometry during 1868-69. Technology Review 17 (July 1915), 424.

23. Again, the figures are Ware's in PR...1872, 38. Annual Catalogues and Registrar's records verify about eighteen students for 1869-70, including William B. Bigelow, W. Whitney Lewis, Joseph Lyman Silsbee, and William M. Woollett. See Appendix D.

24. Francis Ward Chandler, in his obituary tribute to Ware, stated "It was he who first inspired me with the idea of becoming an architect, and it was as far back as in 1864 that I entered his office--Ware and Van Brunt--a student for two years, staying on one more as a draughtsman." Technology Review 17 (July 1915), 423-24. This chronology is confirmed, with some time lag, by the Boston directories, which list him as a draftsman [with Ware and Van Brunt] in 1866 and 1867. Chandler was in Paris from the summer of 1867 to September 1869, where he worked on Ecole design problems in the atelier Daumet, alongside Charles F. McKim and Robert S. Peabody--without, however, being enrolled in the Ecole. A.W. Longfellow, who worked for Chandler in 1878-79, recounted, when first considering going to the Ecole himself: "Mr. Chandler was not in the school [Ecole] & Mr. Peabody was & they both did the same problems & went sketching together in the off times." Longfellow to his mother [Elizabeth Porter Longfellow], March 16, 1879, A.W. Longfellow Papers, MCLf. Incidentally, Longfellow wrote a week later that Chandler had cautioned him of having to do too much menial work in the service of First Class men if he were not registering regularly for competitions in the Ecole. Besides, he wrote, "Mr. Chandler wants me to have the incentive of the competitions & the centralizing influence of the school." Longfellow to his mother, March 23, 1879, A.W. Longfellow Papers, MCLf.

25. PR...1872, 37-38. In the latter half of the 1869-70 spring term, Ware was able to replace Chandler with Theodore O. Langerfeldt, who gave lessons in watercolor rendering, and Virgil Williams, who gave lessons in crayon [pencil] drawing. T.O. Langerfeldt may have been the son of C.W.R. Langerfeldt, a German immigrant who had worked in Boston as an artist and art supply dealer since 1850. T.O. Langerfeldt practiced architecture in Boston from about 1870 to 1874, then taught watercolor rendering until his death in 1906. Virgil Williams established himself as an artist in Boston in 1866, after ten years of travel in Italy. In 1869-70, he also taught a course at Harvard, in drawing from plaster casts. Williams moved to San Francisco in about 1871 and founded a School of Design, which he directed

until his death in 1886. See Boston directories, and Williams' obituary in Boston Evening Transcript, January 13, 1887.

26. Chandler was actually the third person to head the department, succeeding Theodore Minot Clark, who, as Ware's immediate successor, served from 1881 to 1888. (On the search for Ware's replacement, see Chapter 4.) Chandler's teaching under Ware was brief: from October 1869 to April 1870, and perhaps again in the following year, from October 1870 to February 1871. (Dates are inferred from Ware's summary account of the work of the department, from 1868 to 1872, appearing in PR...1872, 38-39--an account which, in spite of its proximity to events, is imprecise.) Chandler's activities during spring-summer 1870 and spring-fall 1871 are not known. About this time, he is said to have "organized the Free Drawing Schools for the City of Cambridge." The Boston directory (for the year beginning July 1870) lists him both at M.I.T. and in the office of Ware and Van Brunt, as a draftsman. The directory for the following year lists him as an architect at 14 Devonshire Street, where he probably was associated with Peabody and Stearns. He might also have been working in some capacity for the Supervising Architect of the Treasury Department, on the Boston Post Office, under construction from 1870 to 1874. Chandler succeeded W.P.P. Longfellow as Assistant Architect, under Supervising Architect A.B. Mullett. His oath of office is signed November 17, 1871, and his letter of resignation, December 10, 1874. During these three years in government service, Chandler saw the Boston Post Office to completion. (It was substantially undamaged by the Boston fire of November 9, 1872, which burned everything else to the north and east.) He also worked on the New York Post Office and Chicago Custom House, and on government buildings in Hartford, St. Louis, and Raleigh. See U.S. Treasury Department, Office of Supervising Architect, Registers of Letters Received, August 1, 1872 through August 31, 1875, RG 121, Legislative and Natural Resources Branch, National Archives and Records Administration. Chandler returned to Boston, where in 1875 he entered into partnership with Edward C. Cabot, twenty-six years his senior. The partnership lasted until 1888, when Chandler withdrew to become head of the Department of Architecture at M.I.T., a position he held until 1911. See Technology Architectural Review 1 (February 15, 1888), 1.

27. PR...1872, 38. In addition to the 1869-70 design problems discussed in Chapter 3, students applied the lessons from the construction lectures by preparing "working drawings of a small frame house, with details and specifications, according to designs of their own." Ibid. See also pp. 99-100.

28. PR...1872, 38-39. On the creation of the B.S.A. prizes, see n. 6, above. The juries and winners of these prizes are listed in Appendix K. After 1872-73, the distinction between a design prize and a construction prize appears to have been dropped, and by the end of the decade, it is clear that these prizes were being awarded to the two students with the best and second-best portfolios, representing the full range of their work during the year.

29. PR...1872, 39. See Appendix B.

30. For reasons which Ware does not specify, the work in construction during 1870-71 was minimal, and the B.S.A. Prize in construction was not awarded for that year. PR...1872, 39.

31. Ibid.

32. WRW, Letter to the editors [on the death of Letang], AABN 38 (December 10, 1892), 171.

33. PR...1872, 39.

34. See Ware, Letter to the editors (n. 32). Alfred Greenough (1844-1884) joined the atelier Vaudremer in March 1868 and was admitted to the Second Class of the Ecole that October. With the outbreak of the Franco-Prussian War, Greenough returned briefly to Boston (during August and September of 1870), at which time he could have conferred with Ware. Between October 1870 and June 1871, Greenough pursued his architectural studies in London, at South Kensington "and in the various architectural societies" (most likely the Architectural Association). The Treaty of Frankfurt was signed on May 10, 1871, and from June 1871 to late 1873, he was again studying in Paris. Back in the United States in 1874 and 1875, Greenough would return to his studies at the Ecole, interspersed with travel in Europe, remaining abroad until December 1881. After several months in Boston, he departed for Japan, India, and Burma, where he died of cholera, at age 40, in May 1884. See Second, Third, Fourth, Fifth, and Sixth Report of the Secretary of the Class of 1865, in Harvard College (Cambridge; 1868, 1871, 1875, 1878, 1885). Copies at DLC, MBAt, MH-Ar. A review of the Greenough family history helps to explain Alfred Greenough's artistic interests and the source of the income which allowed him to spend so many years in an extended program of foreign study. He was the son of Alfred Greenough, Sr. (1809-1851), whose brothers included: Horatio Greenough (1805-1852), the sculptor; Henry Greenough (1807-1883), the Cambridge architect; Richard S. Greenough (1819-1904), also a sculptor; and John Greenough (1801-1852), an artist. The father of all of these brothers was David Greenough (1774-1836), a Boston merchant, real estate agent, and builder, who constructed, among other things, a section of Bulfinch's Colonnade Row in 1810-14 and who purchased and remodeled the old Province House in 1824. See Hamilton Perkins Greenough, Some Descendants of Captain William Greenough of Boston, Massachusetts (Santa Barbara: privately printed, 1969), 37-45.

35. See Ware, Letter to the editors (n. 32).

36. Ibid. Jean-Eugene Letang was born in Boulleret (Cher, 50 km NE of Bourges) on May 20, 1842, and died in Boston on November 28, 1892. Until the age of 20, he worked for his father, a stonecutter. When Eugene Letang was called to military service in 1862, his uncle, a civil engineer in the government service, arranged for him to go to Paris to study either engineering, architecture, sculpture, or music. Eugene chose architecture and first entered a Paris preparatory school, then the atelier Vaudremer by about November 1864, in anticipation of taking the examinations for admission to the Ecole des Beaux-Arts. He was admitted to the Second Class of the Ecole on November 2, 1865, and was promoted to the First Class on July 27, 1869. In 1869 he received the Prix Deschaumes, "for his

personal qualities and his talents as an artist." His one known work, a villa at Chateau-Landon (Seine et Marne, 30 km S of Fontainbleau), built c.1871-74, was illustrated in AABN 4 (October 12, 1878). Greenough would have been associated with Letang in the atelier Vaudremer since March 1868. See M.I.T. Personnel Files, MCM-Mu; Delaire, Les Architectes eleves de l'Ecole des Beaux-Arts (Paris: Librairie de la Construction Moderne, 1907), 146, 327; Thomas O'Grady, biographical account of Letang, Technology Architectural Review 1 (June 15, 1888), 15-16; Arthur Rotch, obituary of Letang, Technology Quarterly (December 1892), 295. O'Grady commented further on the relationship between Letang's earliest training as a stone-cutter and his later study and teaching: "His extended study of stereotomy, both in theory and practice, gave him great skill in solving its most difficult problems. Spiral staircases with vaulted ceilings, complicated buttresses, carving and other detail, studied from the great Gothic cathedrals, gave him a rare preparation for his future profession."

37. [William Rotch Ware], Manuscript Biography of William Robert Ware [c.1916], Ware Papers (MC 14), box 2, folder 16, MCM-Ar.

38. Letang was officially appointed on January 3, 1872, but he did not receive his first paycheck until March 1872. His salary was paid irregularly during the remainder of the 1871-72 academic year, totaling $1400 by October 1, 1872. From 1872-73 until 1879, Letang earned $2000 per year, making him the highest-paid Assistant (later Instructor) at M.I.T. See M.I.T. Cash Book No. 1, 1862-1872; No. 2, 1872-1876; No. 3, 1876-? (ASC 6); M.I.T. Corporation: Government, Records, vol. 2, 1866-73, 254, 278; M.I.T. Corporation, Records of Committee on Instruction, vol. 1, 1866-87, 78, MCM-Ar. But when the Corporation voted a 10 percent reduction in the salaries of all faculty, effective January 1, 1879, Letang's salary was cut by 20 percent, to $1600. It is not clear whether he was working in 1878 to supplement his income, but he certainly was forced to do so during 1879 and 1880. See Chapter 5, p. 244.

39. Letang served as Assistant in Architecture, 1871-78; Instructor in Architecture, 1878-80; Assistant Professor of Architecture, 1881-84; Associate Professor of Architecture, 1884-91; Professor of Architectural Design, 1891-92. M.I.T. Personnel Records, MCM-Mu; Rogers to Letang, December 27, 1880, Rogers Papers (MC 1), box 1, folder 109, MCM-Ar.

40. While in the atelier Vaudremer, Letang won medals in Mathematics-- announced August 13, 1867, Croquis d'Architecture 2 (hereafter cited as Croquis) (August 1867), 5; Construction in Wood and Construction in Stone-- announced August 13, 1868, Croquis 3 (August 1868), 6. He received "second mentions" in the concours involving projets rendus on these subjects: un odeon ou salle de concert--Croquis 1 (January 1867), 6 (a Greek Ionic order was specified); une mairie--Croquis 1 (March 1867), 5; un hotel de sous-prefecture--Croquis 2 (September 1867), 4 (Ware was in Paris on August 2, 1867, when these projects were exhibited at the Ecole, but could hardly have been introduced to Letang at the time); un petit musee--Croquis 4 (May 1869), 6. And he received one "first mention" for the rendu of un peristyle --Croquis 3 (March 1869), 6. None of Letang's projects is illustrated in the Croquis, but comparable projects by others in many of the same concours are shown throughout the monthly portfolios of this publication. Richard Chafee has emphasized to me the significance

of this publication. Richard Chafee has emphasized to me the significance of the fact that Letang's real distinction in Paris was achieved in mathematics and construction, not design. Two elaborate sheets of his projet for Construction in Wood show his capacity for the analysis and depiction of a complex structure of intersecting roof gables. Chafee believes that Letang's strong constructional sensibility would have made him congenial to Ware and to students in Boston. Little is known, though, about the ways in which Ecole construction problems might have been utilized at M.I.T. Construction details in M.I.T. thesis drawings are rare, and minimal.

41. Vaudremer studied in the atelier of Guillaume-Abel Blouet, who, as Professor of the Theory of Architecture at the Ecole from 1846 to 1853, was responsible for writing all the programs for monthly concours. Vaudremer also studied with Emile-Jacques Gilbert, whose earliest training had been under J.-N.-L. Durand in the Ecole Polytechnique. Blouet and Gilbert were contemporaries of Henri Labrouste (1801-1875), Louis Duc (1802-1879), and Leon Vaudoyer (1803-1872). Vaudremer was runner-up for the Grand Prix of 1854, and by replacing Diet, who did not go to Rome in 1853, was able to spend several years at the French Academy. After traveling in Greece with Honore Daumet (1826-1911), and working in Paris under Felix Duban (1797-1870) and Victor Baltard (1805-1874), Vaudremer was given the commission for the prison in the rue de la Sante in 1862 (completed 1885). His most noteworthy commission, the church of St.-Pierre-de-Montrouge, was begun in 1864 and completed in 1872. See Robin Middleton and David Watkin, Neoclassical and Nineteenth Century Architecture (N.Y.: Abrams, 1980), 356, 383-434; Donald Drew Egbert, The Beaux-Arts Tradition in Architecture (Princeton: Princeton University Press, 1980), 58-59, 184; "Emile Vaudremer," AIAJ 3 (July 1915), 293-99; Louis Hautecoeur, Histoire de l'architecture classique en France, 7: La fin de l'architecture classique, 1848-1900 (Paris: A. & J. Picard, 1957), 360-71. A chronological list of Vaudremer's principal works is given by Middleton and Watkin, 430.

42. More projects by Vaudremer than by any other architect are published in the Croquis d'Architecture, the student publication of the Intime Club, during its first ten years. M.I.T. received the folio volumes of the Croquis, but there is no evidence that Letang brought with him any Vaudremer drawings or tracings.

43. "Emile Vaudremer," AIAJ 3 (July 1915), 295. A.W. Longfellow, M.I.T. alumnus and student in the atelier Vaudremer in the late 1870s, wrote home describing the attitudes he found there: "Our Patron despises anything not constructive or logical & so I think the tendency of the Atelier most excellent--far better than I dreamed. He suggests little new to you, but helps you work out your own ideas & make them good & logical.... I do not mean to say that the Patron does not suggest new ways, but I mean to say he is not inventively brilliant, but succeeds through careful study, trying every known way & change, & so I think his influence wonderfully good and most encouraging to us youngsters." Longfellow to his mother [Elizabeth Porter Longfellow], n.d. [late 1879 or early 1880?], A.W. Longfellow Papers, MCLf.

44. AIAJ 3 (July 1915), 298.

45. A.W. Longfellow gave his impression of the ideological independence of Vaudremer: "... he is a follower of the Greeks in feeling & of the Moyen Age in construction. He thinks the Ecole des Beaux-Arts disgraceful in its judgements & tendency & only good for plans & arrangements. He has fought against the other patrons in the juries for years so much so that our atelier got no mentions--then ... his work & name finally took him into the [Institut de France] last year [1879]... The good logical designs & views begin to be appreciated [and] our atelier enlarges..." [next page missing]. Letter to Alice Longfellow, January 18, 1880, A.W. Longfellow Papers, MCLf. On American students in the atelier Vaudremer, see Chapter 5, pp. 253, and Appendix H. In spite of his American following, Vaudremer was not elected an Honorary Member of the A.I.A. until 1902.

46. An itemized inventory of the drawings, appearing in PR...1875, 182-84, helps to document additional Second Class concours in which Letang participated between 1865 and 1869. Letang drawings, once at M.I.T. but now lost, included projets rendus for a church, hotel-de-ville, palais d'industrie, and museum of natural history--and four projets rendus which won him second or first mentions: an academy of music [odeon] in the Ionic order, a mairie, a small palace, and a peristyle in the Corinthian order. Also at M.I.T. were two of Letang's Construction projects: a restaurant at a railway station (Construction Generale) and a salle de pas perdus (Construction en Fer).

47. PR...1892, 25.

48. [William Rotch Ware], Manuscript Biography of William Robert Ware [c.1916], Ware Papers (MC 14), box 2, folder 16, MCM-Ar.

49. "Death of Professor Eugene Letang," AABN 38 (December 3, 1892), 141.

50. Ibid.

51. Cass Gilbert to Clarence Johnston, January 5, 1879, Clarence Johnston Collection, MnHi. In his letter of January 16, 1879, to Johnston, Gilbert reported that he and Letang were again "on excellent terms."

52. Charles F. McKim to Richard M. Hunt, April 2, 1892, McKim Papers, box 1, book 1, DLC-Ms. Letang died on November 28, 1892.

53. Of the total of 32 hours per week that third- and fourth-year students were scheduled to spend in the classroom each term in 1871-72, over half were allotted to architectural drawing and design (18 hours in the fall, 21 in the spring). Letang took the major responsibility for the supervision of this work and freed Ware to give more attention to the curriculum in construction and practice, building materials, and architectural history. See year's schedules in AC...1871-72, 55-58.

54. PR...1872, 35-50.

55. AC...1872-73, 50; also in AC...1873-74, 52; AC...1874-75, 50; AC...1875-76, 51.

56. PR...1872, 44.

57. Ibid., 45.

58. PR...1872, 45-46.

59. The division between the science and art of architecture remained a part of the standard rhetoric of the profession and was heard insistently again in the spring and summer of 1881, when the Boston Society of Architects was advising M.I.T. on the reorganization of the architecture department following Ware's resignation. On this episode, see Chapter 4, pp. 149-52.

60. The Registrar's records continue in 1872-73, for one more year, simply to identify special students in architecture without listing the specific courses each of them was taking.

61. AC...1872-73, 26. The Registrar's records do not show the relative amounts of time or credit units devoted to particular subjects, as do the Annual Catalogues. The record of W.B. Dowse, a third-year regular student in architecture in 1872-73, shows a reasonable correspondence with the Annual Catalogue in mathematics, the sciences, and the humanities, but does not itemize his presumably more intensive work in architectural drawing and design.

62. AC...1872-73, 30-31. The Registrar's records for E.H. Greenleaf and H.A. Phillips, fourth-year regular students in architecture, again are more specific about the diversity of courses taken in addition to architecture than about the specialized work done within the field of architecture.

63. AC...1873-74, 26. The correspondence between the courses listed in the Annual Catalogue and in the Registrar's records is closer than in previous years. Still, the introductory architectural history course was not listed separately in the records, suggesting that this subject matter was considered to be covered by the simple designation of "Architecture."

64. See Appendix B: columns showing Cumulative Years at M.I.T. (Compare numbers of continuing and finishing students in each year.)

65. AC...1874-75, 24. The Registrar's records show that Shades and Shadows actually continued to be taught as a second-year course in 1874-75, while Stereotomy continued to be taught as a third-year course. This continuity is further confirmed by both the Annual Catalogue and Registrar's records for the next year, which show Shades and Shadows in the second year and Stereotomy in the third year.

66. AC...1874-75, 24.

67. Ibid.

68. AC...1875-76, 24.

69. The Visiting Committee, appointed December 8, 1875, consisted of James Elliot Cabot, architect; Phillips Brooks, clergyman; George Barrell Emerson, educator; John Murray Forbes, railroad executive; and J. Baxter Upham. M.I.T. Corporation, Records of the Committee on Instruction, vol. 1, 1866-87, 108, MCM-Ar. While there is no record of their findings, Cabot did comment at a regular meeting of the Committee on Instruction in February 1877 that "no attention was paid to construction in the class of special architectural students at the Institute." President Runkle replied that regular degree candidates were getting adequate preparation but that the special students, "most of whom could not pass the regular entrance examinations, were entirely unable to take up this part of the course, and practically pursued simply Architectural Drawing and Design." Ibid., 119.

70. AC...1876-77, 26.

71. Ibid.

72. The courses in Structures of Stone/Wood/Metal were never recorded as such by the Registrar, and it appears that, from 1873-74 through 1875-76, they were covered by the simple designation of "Civil Engineering." The fourth-year course in Building Materials, which had been listed in both the Annual Catalogues and Registrar's records since 1873-74, continued to be so listed until at least 1880-81. The fourth-year Theory of Architecture and Strength of Materials courses, listed in the Annual Catalogues since 1873-74, were first listed as such in the student records in 1876-77.

73. AC...1876-77, 26.

74. Applied Mechanics had been listed as a third-year course and Applied Physics as a fourth-year course since 1873-74. In 1877-78, these courses begin to be listed in the Registrar's records for third- and fourth-year students. By 1880-81, Physical Lab is appearing in the records of third- and fourth-year students. Ornament first appears in the student records in 1878-79; Decorative Arts, in 1880-81.

75. James P. Monroe, Secretary of M.I.T., later recalled that Prof. Ware did not like to give marks or insist that his special students register in the Office of the Secretary. Technology Review 27 (February 1925), 193.

76. Ware had anticipated the way he hoped to teach construction in the 1865 Outline of a Course of Architectural Instruction, 11: "It is proposed to assign to the students as a subject for study some definite structure in brick, stone, wood, or iron, and call upon them to prepare working drawings, full specifications, estimates of quantity and cost, and calculations of weight and strength, accompanied by a general description of the work. These programmes should not be too difficult. A good many short exercises of this sort are more edifying than a very few long ones."

77. Construction and Professional Practice was to include "Specifications. Contracts and Architectural Law. Estimating and Measuring. The Superintendence of Work. Building Materials and Processes. The Useful Arts pertaining to Building. Trades and

Manufactures. The History of Constructive Methods. The Study of Works in Progress." Wednesday afternoons were to be devoted to Construction and Professional Practice; Monday afternoons to Composition and Design; the remainder of the week to general studies and exercises. Programme, 9.

78. The class notes of A. Hun Berry, a special student in 1869-70 and 1870-71, provide our only detailed record of this aspect of Ware's teaching. See A. Hun Berry Notebooks, 1869-75 (MC 172), MCM-Ar. The sequence of weekly lectures through the fall and spring of 1869-70 was this: 1. Excavation and Foundation; 2. Piling; 3. General Provisions, Carpenter Work (and quality of timber); 4. Boards and Planks (and types of wood); 5. Framing; 6. Nails and Spikes, Framing Problems; 7. Framing Details; 8. Studding; 9. Partitions, Floors; 10. Moldings; 11.-15. Doors, Windows, Stairs; 16. Plastering; 17. Stucco; 18.-19. Specifications; 20. Contractor; 21. Foundations and Cellars; 22. Ironwork; 23. Roof Trusses. Ware began the next fall where he had left off, giving three more weeks of lectures on roofs, before proceeding with eight weeks of lectures on a miscellany of topics: the orders; moldings; pediments; arches; stairs; perspective; and aesthetics. In the spring of 1870-71, Ware found focus again, by offering two distinct courses of lectures: one on architectural history and one on construction and practice. The latter series of lectures addressed the following topics: 1.-3. Contracts; 4. Stables; 5.-6. Plumbing; 7.-8. Stoves and Furnaces; 9. Gas Systems and Piping; 10.-11. Estimating and Measuring; 12. Office Practice.

79. The other requirements of the assignment were mentioned by Ware in PR...1872, 38.

80. PR...1872, 41.

81. PR...1873, 84. Ware continued: "Many of the special students have taken this advanced course in construction in the place of the scientific study of construction with which the regular students are occupied."

82. The Annual Catalogue for 1878-79 suggests that carpentry and masonry had, by then, been reduced to first-semester courses, offered in alternate years, followed in the second semester by contracts or plumbing. Cass Gilbert confirms that carpentry had, in fact, been finished by the end of the first term of 1878-79. Gilbert to Clarence Johnston, January 16, 1879, Clarence Johnston, MnHi. Gilbert reported that he had copied everything that Ware had put on the blackboard and offered Johnston transcriptions from his notes.

83. PR...1875, 148-49.

84. AC...1873-74, 26; AC...1876-77, 26.

85. John Daniel Runkle (1822-1902) served as President of M.I.T. from 1870 to 1878, before which (1865-68) and after which (1880-1902) he was Professor of Mathematics at M.I.T.

86. PR...1873, x.

87. PR...1877, ix-x.

88. By 1877 the B.S.A. Prize in construction had been abandoned in favor of a second-place prize in design, awarded in the judging of the students' annual portfolios of graphic work.

89. PR...1877, ix-x.

90. Minutes of February 8, 1877 meeting, M.I.T. Corporation, Records of Committee on Instruction, vol. 1, 119, MCM-Ar.

91. Ibid.

92. This transfer was approved by the M.I.T. Corporation on April 9, 1879. See M.I.T. Corporation: Government, Records, vol. 3, 1873-1887, 127, MCM-Ar. Ware proposed advertising in the Plumber and Sanitary Engineer to secure donations or loans for this museum. Ware to Rogers, October 25, 1879, Rogers Papers (MC 1), box 6, folder 94, MCM-Ar.

93. AC...1879-80, 44.

94. See Chapter 4, pp. 149-60.

95. In the spring of 1870-71, Ware devoted one day each to the Acropolis, Pompeii, Roman Dwellings, and the Renaissance, and four days to French architecture, from late Medieval to Neoclassical. In 1871-72, Ware lectured on such miscellaneous topics as the Orders, the Topography of Rome, and the Tuileries and Louvre. By 1872-73, he could report that "the study of the history of architecture has been pursued more systematically than in previous years," with the lectures extending from fifth-century Greece through the fourteenth century. A. Hun Berry Notebooks, 1869-1875 (n. 78); PR...1872, 41; and PR...1873, 85.

96. See PR...1875, 148. In 1874-75, when the architecture major began in the second year, the history sequence, starting with the Orders, was accordingly moved down from the third and fourth to the second and third years. See AC...1873-74, 26, 53, and AC...1874-75, 24, 50-51.

97. Sullivan's account has the incidental interest of confirming that a course on the Orders was being offered as early as 1872-73. His notes appear on the first two pages of a ledger book now in the Rare Book Collection of Avery Library, Columbia University. The ledger, measuring approximately 33.6 cm x 21.6 cm, is inscribed: "Louis H. Sullivan/Mass. Institute of Technology/Boston/Nov. 23rd, 1872." On page 1, Sullivan wrote: "-Notes-/on/Professor Ware's Lectures on Architecture/Lecture 1. Introductory" and proceeded to record a paragraph of Ware's commonplaces about office training and school training. At the bottom of page 1, the account of the elements of an order begins, and it continues onto page 2. Unfortunately, pages 3 through 22 have been torn out, and the notebook is known to have been in that condition at least since the early 1950s. The late Willard Connely examined it in preparation for writing "New Chapters in the Life of Louis Sullivan," AIAJ 20 (September 1953), 107-14, and noted even then that pages 3 through 22 were missing. A later adaptation of this functional-mnemonic explanation of the orders appears in Ware's American Vignola (Scranton: International Textbook Co., 1902), 9-11.

98. Three Sullivan tracings of plates from an as-yet-unidentified French edition of Vignola are in the collection of the Art Institute of Chicago. They are all executed in ink on tracing paper and measure approximately 30 cm x 20 cm. Titles are inscribed at the top of each sheet: "ORDRE DORIQUE MUTULAIRE de J. Barrozzio de Vignole."; "PIEDESTAL, BASE, CHAPITEAU ET ENTABLEMENT DORIQUE. Vignole"; "PIEDESTAL, BASE, CHAPITEAU ET ENTABLEMENT TOSCAN. VIGNOLE". The Sullivan tracings help to confirm a more important point--that Ware was using Vignola in the classroom at M.I.T. some thirty years before his own American Vignola, developed from class exercises at Columbia, was first commercially published in 1902. Ware recounts, in his introduction to that work, that his own use of Vignola dated back to his year in Hunt's studio in 1859: "I remember very well the day when, as I was carefully drawing out a Doric Capital according to the measurements given in my Vignola, Mr. Hunt took the pencil out of my hand and, setting aside the whole apparatus of Modules and Minutes, showed me how to divide the height of my Capital into thirds, and those into thirds, and those again into thirds, thus getting sixths, ninths, eighteenths, twenty-sevenths, and fifty-fourths of a Diameter which the rules required, without employing any larger divisor than two or three." American Vignola (Scranton: International Textbook Co., 1902), 3. Sullivan's Art Institute tracings, are, however, entirely literal, showing the mensural system of modules and diameters, without any notations suggesting the system of ratio and subdivision followed by Hunt and Ware.

99. Students who attended for only one year would have missed either Medieval or Renaissance history. There are only two clues in the President's Reports indicating which course was offered in which year: Medieval in 1872-73 and Renaissance 1873-74. See PR...1873, 85, and PR...1874, 17. By extrapolation, the years for Medieval would have been: 1874-75, 1876-77, 1878-79, and 1880-81; the years for Renaissance: 1875-76, 1877-78, and 1879-80. No correspondence has yet been found to confirm that this was, in fact, the pattern which was maintained in the later years of the decade.

100. When Ware was in London in 1867, Fergusson offered him ten copies of the Handbook of Architecture. See Ware letter fragment, n.d. [January-February 1867], Ware Papers (MC 19), folder 3, MCM-Ar. Cass Gilbert reported, near the end of the first term in 1878-79, that Ware was concluding Greek architecture and moving on to a single lecture on Pompeii and Herculaneum, using Rosengarten's Handbook of Architectural Styles for a text. Gilbert to Clarence Johnston, January 16, 1879, Clarence Johnston Collection, MnHi. Die Architektonischen Stylarten was first published in 1857; English editions were published in 1866, 1876, 1878; American editions, in 1867, 1876. Albert Rosengarten (1809-1893) had studied with Labrouste in 1839 and carried on a practice in Hamburg from 1842. See T-B, vol. 29, 18.

101. Again, Gilbert provides the only anecdotal evidence yet discovered concerning this course. During 1878-79, Ware lectured on color, using Owen Jones' Grammar of Ornament. See Gilbert to Clarence Johnston, January 16, 1879, Clarence Johnston Collection, MnHi. He also lectured on his favorite topic of stained glass, offering a series of aesthetic principles or maxims which Gilbert recorded. Gilbert to Johnston, August 26, 1879.

102. A. Hun Berry's notebooks are still the best source of information on Ware's classroom teaching. (See n. 78.) In the construction vs. decoration debate, as in various others, Ware took the middle ground: "Archt does not decorate construction nor construct decoration but carries the whole work together & the archt taking the materials as he finds them uses them together to make beautiful objects." ([Lecture on architectural aesthetics], January 30, 1871.) On the gothic vs. classic debate, and its implications for architectural design, he asked, "To what point in blg should attention be directed[?]" and answered:

> "Classical School Elevation
> Gothic School Expression of Construction
> Another School thinks Plan is the principal thing."
> [Ecole des Beaux-Arts]

([Lecture on criticism], May 29, 1871.)

103. A. Hun Berry Notebooks (n. 78).

104. AC...1871-72, 42.

105. Samuel Edward Warren (1831-1909) was raised in Newton, MA, and graduated from R.P.I. in 1851. From 1851 until 1872 he taught at R.P.I., where he was Professor of Descriptive Geometry and Drawing, 1854-72. The M.I.T. professorship in this same area was authorized by the Committee on Instruction on December 29, 1871, just eight days after they had recommended the hiring of Letang to enhance the teaching in architecture. Warren's department was abolished by this same committee, for reasons not yet known, on April 2, 1875. See M.I.T. Corporation, Records of Committee on Instruction, vol. 1, 80, 103, MCM-Ar; PR...1873, xi. While at M.I.T., Warren also lectured at the Massachusetts State Normal Art School. After 1875, he devoted himself to writing and private teaching. WWW 1, 1303. His publications include An Elementary Course of Free-hand Geometrical Drawing (1873); Elementary Projection Drawing (1873); Drafting Instruments and Operations (1879); Elementary Linear Perspective of Form and Shadow (1891).

106. The comings and goings of faculty in these areas are too complicated to summarize here. Between 1865 and 1881 at least 20 different individuals taught auxiliary drawing courses at M.I.T.

107. On Ware's extramural lectures on these topics, see Chapter 4, pp. 198-99. Between January and September 1878, Ware published thirteen lessons on perspective in the AABN. These appear in vol. 3, pp. 4-5, 19-20, 46-48, 64-65, 85-86, 99-101, 135-37, 157-58, 173-75, 199-201, 216-18; and vol. 4, pp. 47-48, 71-73, 99-101. Many of the plates were drawn by Ware's former student, Amos J. Boyden (M.I.T. 1870-75). Before his teaching duties at Columbia became heavy, Ware gathered these lessons, with additional material, into a book: Modern Perspective: A Treatise upon the Principles and Practice of Plane and Cylindrical Perspective (Boston: J.R. Osgood & Co., 1883, 1885). The work was later published by Macmillan (1895), for whom Ware prepared a Revised Edition in 1900.

108. On May 16, 1870, an Act of the Massachusetts Legislature authorized the immediate establishment of evening schools of drawing for apprentices

and journeymen in the mechanical trades. With the expectation of starting a Normal Art School in Boston, the act authorized the Commonwealth and City "to employ a suitable teacher from the South Kensington Art School" to direct the training of drawing teachers for both the adult evening schools and the public day schools.

The adoption of this act is part of a larger story of shared interests among Boston educators and other intellectual leaders in the years following the Civil War. Much of the advocacy for art education emerged from the newly established American Social Science Association. The A.S.S.A. was founded in the fall of 1865, about the time that instruction began at M.I.T. William Barton Rogers, President of M.I.T., was President of the A.S.S.A. until 1869. During 1869, the Standing Committee on Education of the A.S.S.A. directed their attention to "the subject of Popular Education in Art," considering such topics as the establishment of art museums and the dissemination of "reproductions of classic works of art in public schools." William Robert Ware, Charles Callahan Perkins, and Edward Clark Cabot joined the A.S.S.A. during 1869, and together with James M. Barnard and John Quincy Adams Ward, they constituted the Special Committee on Art in Education. Perkins was a painter and member of the Boston School Committee. (See Chapter 1, n. 187.) Cabot was Ware's first mentor in architecture and President of the Boston Society of Architects. (See Chapter 1, n. 49.) Ward was a noted New York sculptor. Rogers, Ware, and Perkins had all been together at the Paris Exposition in the summer of 1867, and were already talking about prospects for general art education in the United States and the European precedents for such instruction. See Chapter 1, pp. 108-11. In 1869, the A.S.S.A. Special Committee entered into correspondence with Henry Cole and other European authorities on art education. Reports of this Committee appear in the Journal of Social Science 1 (1869), 151-52; 2 (1870), 217-22; 3 (1871), 202-06.

As the Massachusetts legislature proceeded with its deliberations on the Art Education Act in the spring of 1870, the twelve Lowell Institute Lectures were given over to members of the A.S.S.A. The first paper of the series (which covered the full range of interests of the A.S.S.A.) was "Art Education in America," delivered by C.C. Perkins on February 22, 1870. A list of the A.S.S.A./Lowell Institute Lectures appears in JSS 2 (1870), viii-ix, and Perkins' paper is among those published in JSS 3.

As a result of Ware's committee work in the A.S.S.A. and his teaching position at M.I.T., he was among nine New England educators invited by the State Board of Education in December 1869 to comment on the then pending Art Education Act. Although Ware did not respond until September 1870--nearly five months after the passage of the bill, his remarks must have guided state and local officials in planning for its implementation. His informative letter, outlining a sequential curriculum in drawing similar to what he had observed at South Kensington, was published along with the others in Massachusetts, Board of Education, Industrial or Mechanical Drawing. Papers on Drawing (Boston: Wright and Potter, 1870).

With the founding of the Boston Museum of Fine Arts in February 1870 and the passage of the Art Education Act in May 1870, the A.S.S.A. Special Committee on Art in Education seems to have been disbanded, yet the subject continued to be of interest to A.S.S.A. members. Perkins gave a paper on "Art Schools" at the October 1870 annual meeting of the A.S.S.A. C.O. Thompson of the Worcester Free Institute spoke to a January 1871 meeting of Boston members of the A.S.S.A. on "Industrial Drawing." These

two papers were published in JSS 4 (1871), 95-104, 105-12. From about 1876 to 1878 Ware served as a member of the A.S.S.A. Standing Committee on Health, which was concerned with issues of public and mental health and professional licensing. For more on the A.S.S.A., see Thomas L. Haskell, The Emergence of Professional Social Science: The American Social Science Association and the Nineteenth-Century Crisis of Authority (Urbana: University of Illinois, 1977).

In the months following the adoption of the Art Education Act, Perkins conferred with John Dudley Philbrick, Superintendent of Boston Public Schools, and with members of the School Committee, to get authorization to write again to Henry Cole at South Kensington concerning candidates for the city and state directorship of art education. About October 1870, Cole recommended Walter Smith (1836-1886), a South Kensington alumnus. Smith had been serving as Art Master and Headmaster at the Leeds School of Art and Science and Training School for Art Teachers since 1859. In 1863 he had prepared a report for the British government on art education in France. Smith first visited Boston to meet with city and state officials in May-June 1871. He returned to England during the summer of 1871 to collect models and other examples, and took up his duties in October 1871. He served until July 1882, when he was succeeded by Otto Fuchs, a naval architect. During 1882-83, Smith stayed in Boston as Principal of the New England Conservatory School of Fine Arts. In 1883 he went home to England, where he served as Director of the Art Department at Bradford Technical College, until his death in September 1886. Many of the papers and reports of Walter Smith on art and industrial education were published as pamphlets. His American Text Books of Art Education, with their accompanying Teachers' Manuals for Freehand Drawing, were initially published by J.R. Osgood (1873-75), but were subsequently taken over by L. Prang (1875-82). For a listing of the educational materials produced by Smith, see John D. Philbrick, The Catalogue of the United States Collective Exhibition of Education, Paris Universal Exposition, 1878 (London: Chiswick Press, 1878), 94-96; NUC Pre-56 552: 270-72. Biographical data from U.S. Department of the Interior, Bureau of Education, Art and Industry. Education in the Industrial and Fine Arts, Isaac Edwards Clarke, ed. (Washington: Government Printing Office), Part I (1885), 47, 61, 79, 155, 282-83, 347, 576, 609; Part II (1892), xlii-xlviii. Smith's most comprehensive exposition of South Kensington methods and their application in Boston is found in his Art Education, Scholastic and Industrial (Boston: J.R. Osgood & Co., 1872). Of the 40 plates, 26 show architectural drawings of art schools in England and the United States, including a proposed art school for Boston. On the development of art education, see Frederick M. Logan, Growth of Art in American Schools (N.Y.: Harper & Bros., 1955); Stuart Macdonald, The History and Philosophy of Art Education: Chapter 13, "America Imports Cole's System" (N.Y.: American Elsevier, 1970). On the South Kensington Schools, see Chapter 1 of the present work, n. 172.

109. AIA Proc...1871, 58-59. The A.I.A. met in the auditorium and rooms of the architecture department at M.I.T. on November 14 and 15. Ware and Smith prepared an exhibit of student drawings illustrating various systems of art education in Europe: England, Belgium, France (Paris), and Germany (Nuremberg).

110. The numbers of students reached by Smith's comprehensive program of art education are impressive. Teacher Training Classes in Boston attracted between 500 and 600 annually. Teachers' Institutes attracted over 1000 in the course of a year. Evening Drawing Classes attracted from 100 to 400 in each of the 20 to 30 cities where they were offered. See U.S. Office of Education, Report of the Commissioner of Education... (Washington: U.S. Government Printing Office), annually throughout the 1870s.

111. By 1879, 201 students had received certificates after three years of study at the State Normal Art School, and 113 of these were already employed as drawing teachers across the state. (50 stayed on to work toward a fourth-year diploma.) Report of the Commissioner of Education for the Year 1879 (Washington: U.S. Government Printing Office, 1879), ccxiii.

112. During 1873-74, Ware was scheduled to lecture for two hours on Monday evening and two hours on Thursday afternoon on "Building Construction." Massachusetts, State Board of Education, Report of the Board of Visitors of the Massachusetts State Normal Art-School (Boston: Wright and Potter, 1874), 16-17. At least one of Ware's former M.I.T. students, A. Hun Berry, took classes at the Normal Art School. After four years of working as a draftsman/architect/civil engineer for the Boston and Lowell Railroad, Berry enrolled in the third-year class at the Normal Art School in 1875-76. Ware opened the year saying that architectural drafting "begins by small works on large scale & ends with large works on smaller and smaller scales." He insisted that the techniques and conventions of architectural draftsmanship would only be taught in the Evening Drawing Classes, and that his job at the Normal Art School was to teach drawing fundamentals. Accordingly, he gave exercises in shades and shadows, first of solid geometric forms, then of architectural components, then of whole buildings. He gave a rigorous introduction to the orders, and required that students be able to draw typical orders from memory. See A. Hun Berry Notebooks (n. 78). From 1880-81 to 1883-84, architecture and perspective were taught at the Normal Art School by Walter F. Brackett. During the mid-1870s, Ware, Perkins, and Smith spoke occasionally to the Massachusetts Art Teachers' Association, a group of students and faculty at the State Normal Art School organized in May 1874 to promote lectures on art education. A collection of thirty papers from the 1874-75 academic year was published as The Antefix Papers (Boston, 1875), including Ware's paper on "Charcoal Drawing." In 1875-76 he gave a paper on stained glass. Ware's student, A. Hun Berry, was Vice President of the Association during 1875-76. Its activities ceased after June 1877.

113. Examples of Building Construction consists of 48 color lithographic plates, measuring about 40 cm by 28 cm, published in a tied folder. The work has sometimes been attributed to the professor's nephew, William Rotch Ware. Information on the publisher's advertisement as well as on the title page of the accompanying teachers' manual confirms that William Robert Ware was the author. See Suggestions to Teachers and Pupils for the Practical Use of Examples of Building Construction (Boston: L. Prang & Co., 1877). Copy at DLC. The publisher's advertisement on the cover of the portfolio of plates shows that Examples of Building Construction was part of a series of a dozen recently published or projected collections of

"Examples for advanced study in high schools, drawing classes and art schools." The relation between Ware's Examples and English precedents in this genre remains to be examined. In an appendix to Art Education (1872), Walter Smith wrote, "until such works are designed or reproduced here, we may have to depend upon our supplies from abroad," and in the field of architecture, he named I.B. Tripon's Architectural Studies, Glenny's Examples of Building Construction, and Laxton's Examples of Building Construction.

Evidence that Ware used Examples at M.I.T. is provided by a nearly complete set of student tracings from this work at the Boston Athenaeum, in the collection entitled "E.J. Lewis, Jr., Architectural Drawings in Manuscript" (Gift of estate, May 23, 1938). Only Plates 15 and 39 are lacking. Edwin James Lewis (1859-1937) was a regular student at M.I.T. from 1877 to 1881 and later practiced architecture in Boston and Milton.

Another strain of art education pedagogy entered the United States through the Normal and Training School at Oswego, N.Y., where [Johann Heinrich] Hermann Krusi (1817-1903) taught drawing and the philosophy of education from 1862 to 1887, according to the theories of Pestalozzi. (While teaching, 1846-52, at the Home and Colonial Infant and Training School in London, Krusi had written A Progressive Course of Inventive Drawing on the Principles of Pestalozzi [1850].) See DAB 10, 510. On the Pestalozzian tradition of "object teaching", using natural materials and solid geometric "type forms", see American Journal of Education 12-17 (1862-68), passim; Dorothy Rogers, Oswego: Fountainhead of Technical Education (1961). Krusi's Industrial Drawing Series from his Oswego years was published by D. Appleton & Co., N.Y., and paralleled the Prang series for the Massachusetts State Normal Art School. Included in the Krusi series was a work on architectural details, prepared by Ware's colleague, Prof. Charles Babcock of Cornell: A Series upon Elementary Architecture (like Ware's Examples, published 1876). Babcock's work consists of 75 bound lithographic plates, measuring about 28 cm by 40 cm. It has less coherence but greater variety than Examples. In addition to working drawings and details for a small frame house and small masonry church, Babcock included numerous details associated with all historical periods. See also Chapter 4, n. 137.

114. These lessons were given daily during part of the year in 1872-73. It is not known how long this work remained in the curriculum and under the direction of Letang.

115. Gilbert, in his letters to Clarence Johnston, from January through June of 1879, showed an intense interest in atmospheric and ambient qualities in various sets of student design projects, often paying more attention to coloristic effects and sheet layout than to the composition of the buildings themselves. Gilbert and fellow student Arnold W. Brunner arranged that spring to take special watercolor lessons from T.O. Langerfeldt, who had taught at M.I.T. from 1868-69 through at least 1870-71. (See n. 25.) Also taking part were students Oscar E. Brandt and William M. Aiken. During the summer of 1879, Gilbert loaned his watercolor portfolio to fellow student Albion M. Marble to study before returning to M.I.T. in the fall. (Gilbert himself did not return.) See Gilbert to Johnston, May 29 and June 22, 1879, Clarence Johnston Collection, MnHi.

116. PR...1875, 149.

117. PR...1876, 178.

118. M.I.T., Catalogue of the Models, Instruments, Samples Papers and Drawings Exhibited by the Massachusetts Institute of Technology, Boston, Massachusetts, Centennial Exhibition, Philadelphia, 1876 (Philadelphia: Collins, 1876; Boston: A.A. Kingman, 1876); also in PR...1876, 178.

119. Another work published as part of the Prang series of drawing examples for art education might have been utilized at this stage. Parallel of Historic Ornament was prepared by Karl F. Heinzen between 1874 and 1877 "under the Supervision of William R. Ware" and was published in 1879. Its ten densely packed lithographic plates showed a variety of ornamental details from ancient Egyptian culture through the Renaissance. Heinzen (1844-1911) was identified as "late of the Polytechnic School of Switzerland, at Zurich." Beginning in 1876, he was listed in the Boston directories as a lithographer.

120. PR...1872, 40.

121. ASB 2 (January 1875), 2. Cass Gilbert, who took his sketching more seriously than most, was reminded when in Europe of the importance of being thoroughly practiced in sketching: "Let your preparation be a thorough mastery of the pencil. Sketch figure subjects, arches and carving. Learn to sketch stained glass in color if possible. Practice every conceivable perspective, especially the perspective of figures above you, and of large tracery windows." Gilbert to Clarence Johnston, April 12, 1880, Clarence Johnston Collection, MnHi. Emphasis in the original.

122. Among the subjects chosen were doorways, dormer windows, cast and wrought iron work, and ornamental brickwork. See PR...1875, 149. The interrelation between the training in sketching received by M.I.T. students and the emergence (c.1871) of the sketching group of young Boston architects, known as the Portfolio Club, cannot be documented until more is known about the early careers of the students and the membership of the Club. Both groups, in turn, figured as draftsmen and as subscribers for two publications which emerged in Boston during the 1870s: the Portfolio Club's own Architectural Sketch-Book (J.R. Osgood, July 1873 to December 1876), and the American Architect and Building News (begun by J.R. Osgood in January 1876). The plates in both publications give a synoptic view of the current work in Boston and vicinity which would surely have attracted the attention of students during their years at M.I.T.

123. Richardson's Brattle Square Church was under construction from summer 1870 to fall 1873; his Trinity Church, from about spring 1873 to fall 1876; Sturgis and Brigham's Museum of Fine Arts from 1870 through 1879; Cummings and Sears' New Old South Church during 1873 and 1874.

During the early 1870s, there was an intriguing overlap between a proposed new building for M.I.T. and a design problem in the studio. On April 9, 1873, the Commonwealth of Massachusetts granted to M.I.T. the trapezoid of land bordered by Boylston Street and Huntington Avenue, as the site for a new Chemistry Building. The parcel of land was immediately in front of Trinity Church, for which Richardson was still revising the

drawings (between June 1872 and April 1874). Meanwhile pilings were being driven for Trinity Church, beginning April 21, 1873. Plans and estimates for the M.I.T. Chemistry Building were considered by the M.I.T. Corporation on September 3, 1873, and the project was temporarily abandoned. A second set of bids was considered in June 1874. Ware himself may have prepared sketches for the Chemistry Building, and the firm of Ware and Van Brunt may have prepared working drawings and specifications, either for the summer 1873 bidding or the spring 1874 bidding. Norcross began construction on the Trinity Parish House in March 1874 and on the Church itself in March 1875. Each spring between 1873 and 1875, M.I.T. architecture students were assigned a design problem for a School of Chemistry, for a site identical to the trapezoid of land at Boylston Street and Huntington Avenue. As early as February 10, 1875, M.I.T. was willing to exchange this parcel of land in order to make way for a public square. Briefly in 1879, there were new proposals for a Chemistry Building in front of the by-then-completed Trinity Church, and drawings were prepared by William H. Dabney, an architecture alumnus of M.I.T. Finally in 1882-83, the City of Boston assembled various parcels of land between Trinity Church and Dartmouth Street, allowing for the creation of Copley Square. Ware's nephew, William Rotch Ware, later reconstructed some of the thinking in the Chemistry Building episode: "Copley Square, as a civic and topographical possibility of great worth, had not begun to be understood; and the legislators were hardly competent to value the wrong that would be done to Trinity Church by crowding in a new building in front of it. Moreover Bostonians were quite used to see their churches fronting upon narrow streets." [William Rotch Ware], Manuscript Biography of William Robert Ware, Ware Papers (MC 14), box 2, folder 19, pp. 104-06, MCM-Ar. See also Doreve Nicholaeff, "The Planning and Development of Copley Square" (M.Arch.A.S. thesis, M.I.T., 1979), 59-69; Jeffrey Karl Ochsner, H.H. Richardson: Complete Architectural Works (Cambridge: MIT Press, 1982), 114-15.

124. Gilbert was accompanied by Silas R. Burns of Morgantown, West Virginia, another student just completing his first term at M.I.T. (until Burns left school in mid-February). Among the buildings Gilbert sketched (or intended to sketch) were: the Boston and Providence Depot, by Hartwell and Swasey, now demolished, but published in ASB 1 (July 1873); the New York Mutual Life Insurance Co. Building, by Peabody and Stearns, 1874-75, now demolished, but published in ASB 1 (April 1874) and ASB 2 (September 1874); the First Church (Unitarian), by Ware and Van Brunt, 1865-67; the Brattle Square Church, by H.H. Richardson, 1870-73; Trinity Church, by H.H. Richardson, 1872-77; and the Central Congregational Church (now Church of the Covenant), by R.M. Upjohn, 1866. When Gilbert went on a short vacation during the recess between semesters, he sketched, in Norwich, Connecticut, the Park Congregational Church, by Stephen C. Earle, 1873. In Worcester, he sketched Ware and Van Brunt's Union Passenger Station, 1874-75, now demolished, but published in ASB 1 (February 1874). See Gilbert to Clarence Johnston, January 5 and 16 and February 5, 1879, Clarence Johnston Collection, MnHi. Glenn Brown, a student at M.I.T. in 1875-76, also reported sketching the tower of the Brattle Square Church and watching the progress on Trinity Church. See Glenn Brown, Memories, 1860-1930 (Washington: W.F. Roberts Co., 1931), 17-18, 25-26.

125. In January and February of 1879 Gilbert visited H.H. Richardson; Cummings and Sears; Hartwell and Tilden (where he met George T. Tilden); Cabot and Chandler (where he met draftsmen Amos J. Boyden, Alfred B. Harlow, and William C. Richardson); and Peabody and Stearns (where he met draftsman Alfred S. Higgins). See Gilbert to Clarence Johnston, January 16 and February 5, 1879, Clarence Johnston Collection, MnHi. Later in the spring Gilbert reported, "Mr. Ware got hold of some English working drawings ... and advised me to trace them." Gilbert to Johnston, May 29, 1879. Gilbert's diligence during the first month alone of 1879 is recorded in his own summary account: "I have traced 22 plates for my tracing book, 16 of which are construction plates; gone through two [design] problems; written up two papers on the lectures, and made a number of sketches in my sketchbook." Gilbert to Johnston, February 5, 1879.

126. Gilbert had worked as a draftsman for A.M. Radcliff in St. Paul from the fall of 1876 (he was barely 17) until the fall of 1878, when he came to M.I.T. for two semesters. See Patricia A. Murphy, "The Early Career of Cass Gilbert: 1878 to 1895" (Master's thesis, University of Virginia, 1979).

127. Among the eighteenth- and early nineteenth-century structures measured and drawn were the Hollis Street Church (Bulfinch, 1787-88; moved to East Braintree 1810; burned 1897) and Park Street Church (Banner, 1809)--both sheets published in ASB 2 (January 1875), pl. 31; King's Chapel (Harrison, 1749-54); Old South Church (1729-30); Christ Church, Salem Street (1740; steeple rebuilt by Bulfinch, 1807). Among the recent structures selected were Emmanuel Church (Esty, 1862); Central Congregational Church (R.M. Upjohn, 1866); First Church (Ware and Van Brunt, 1865); and several railroad stations. Ware is ambiguous about whether this latter group was actually measured or merely sketched. PR...1875, 149.

128. At the fifth annual exhibition in May 1876, attendance during three days totaled 30,300. About 120 drawings representing art education in Massachusetts were exhibited at the Philadelphia Centennial Exposition in the summer of 1876, along with the Prang publications developed for use in art education.

129. Massachusetts, State Board of Examiners, Report of the State Board of Examiners on the Second Exhibition of Works from the Free Industrial Drawing-Classes of the State of Massachusetts, 1873 (Boston: Wright & Potter, 1873), 6-7. The M.I.T. Department of Architecture exhibited 40 drawings, "chiefly original designs," and the Lowell School of Industrial Design exhibited 150 drawings, "partly copies and partly original designs, of muslins, cashmeres, carpets, paper-hangings, and oil-cloths."

130. Massachusetts, State Board of Examiners, Report of the State Board of Examiners on the Fourth Exhibition of Works from the Free Industrial Drawing-Classes of the State of Massachusetts, 1875 (Boston: Wright & Potter, 1875), 5.

131. Walter Smith, Report on Drawing. Addressed to the School Committee of the City of Boston, Massachusetts (Boston: Rockwell & Churchill, 1880), 239.

132. PR...1872, 42.

Chapter 3: Notes

1. For example, there is the statement in Turpin C. Bannister's 1954 report on American architectural education: "Although the French system underwent necessary modifications, something of the Ecole's breadth and spirit enriched MIT teaching." The Architect at Mid-Century: Evolution and Achievement (New York: Reinhold Publishing Corp., 1954), 99. By Beaux-Arts, we and Ware's contemporaries can mean three different things: (1) a teaching method involving routine and special sketch and rendering problems on the orders, other architectural components, and building types, for an imagined urbane upper middle class clientele; (2) a style, really a synthetic eclectic approach to classicism; or (3) a presentation format, consisting of sets of fully rendered drawings, mostly orthographic, with few perspectives. The bulk of this chapter is concerned with the adaptation of the Beaux-Arts teaching method at M.I.T. during the 1870s. Some consideration is given to issues of presentation format in section 5 of this chapter and to issues of style in Section 6. These became more insistent issues in the polemics of architectural criticism and architectural education during the 1880s and 1890s, with the widening acceptance of Beaux-Arts teaching methods in American schools of architecture.

2. On the Grand Prix competitions, see Arthur Drexler, ed., The Architecture of the Ecole des Beaux-Arts (New York: Museum of Modern Art, 1977); and Donald Drew Egbert, The Beaux-Arts Tradition in French Architecture, Illustrated by the Grands Prix de Rome (Princeton: Princeton University Press, 1980). A brief summary of the monthly concours is given by Annie Jacques, "The programmes of the architectural section of the Ecole des Beaux-Arts, 1819-1914," in Robin Middleton, ed., The Beaux-Arts and Nineteenth-Century French Architecture (Cambridge: MIT Press, 1982), 58-65.

3. On the esquisse and rendu projects at the Ecole, see Richard Chafee, "The Teaching of Architecture at the Ecole des Beaux-Arts," in Drexler, Architecture of the Ecole, 61-109; Idem, "Richardson's Record at the Ecole des Beaux-Arts," JSAH 36 October 1977), 175-88; and Jacques, "The programmes." The texts of programs for the esquisse and rendu projects for the Second and First Classes of the Ecole were published in the Croquis d'Architecture. This publication was started in May 1866 by the Intime Club, a group of Ecole students, mostly from the atelier Questel. The Croquis was published monthly from May 1866 to December 1886 (with some interruption during the Franco-Prussian War in 1870-71), then intermittently until December 1898. Until 1875, programs were published verbatim, for nearly every monthly project in both classes. The bulk of each monthly issue of the Croquis was devoted to illustrating student work receiving medals or mentions in month before, in five or six lithographed folio plates sketched from the winning student drawings. During the period from 1866 to 1875, the enumeration of the 250 programs published in the Croquis is as follows: 52 Second Class esquisses; 70 Second Class projets rendus; 57 First Class esquisses; 71 First Class projets rendus.

4. It is possible to document the titles and some of the programs for M.I.T. design problems with reasonable confidence from 1868 through 1876,

by means of Ware's accounts of the work of the department in the annual M.I.T. President's Report. Only occasionally thereafter were programs and projects published in the new Boston periodical, the American Architect and Building News.

No manuscript drawings for the concours in architectural design or perspective in the Second Class of the Ecole des Beaux-Arts were retained by the Ecole, and only the best of the drawings for the construction concours were kept by the school. Only a limited number of drawings for the First Class architectural concours were saved. See Chafee, "Richardson's Record," 178. It is likely that many of these student drawings were kept by the students themselves and may be preserved among French collections of architectural drawings for work later done in professional practice. In the United States, at least two sets of Ecole project drawings survive: the drawings done by Richard M. Hunt in the Second and First Class, between 1846 and 1854, and the drawings done by Arthur Rotch in the Second Class between 1876 and 1880. The Hunt drawings and lithographed programs issued by the Ecole for these various projects are in the Richard Morris Hunt Collection of the American Institute of Architects. The Rotch drawings are in the collections of the M.I.T. Museum. Except for the latter group of drawings, there is no readily available manuscript evidence of the student design work at the Ecole for the years between 1865 and 1881. Only the published sketches (derived from original drawings) in the Croquis d'Architecture give a reasonably complete view of the monthly projects during this period.

Examples of original drawings done for the routine design problems at M.I.T. are even more scarce. Only three projects survive, drawn by Everett G. Hapgood about 1876. These drawings are in the collections of the M.I.T. Museum. One Cass Gilbert drawing for a reconstruction of a Roman interior is at Avery Library, Columbia University. As with the French student work, it is possible that such drawings will begin to be identified as more collections of American architectural drawings are discovered, studied, and cataloged. A scrapbook portfolio of photographs of routine student drawings was compiled by the M.I.T. Department of Architecture, probably in the late 1870s. It includes the only known drawing of a project before 1872--a May 1870 project for a school and library building. The scrapbook contains nine projects from May 1872, prepared in response to Letang's first major design problem for a casino in a garden. Also of interest are numerous small projects following seven design programs issued during 1872-73--the one year that Louis Sullivan attended M.I.T. M.I.T. Department of Architecture, "Portfolio of Student Work" (c.1870-78), Rotch Architectural Library, M.I.T. The scrapbook apparently had at least 58 numbered pages; 26 of these are now missing, including the first 22. Three pages are exact duplicates. Four pages are photomontages containing from three to twenty different projects. Also in the scrapbook are photographs of three M.I.T. thesis projects from 1877 and 1878, and two unidentified projects.

A final source of graphic material documenting routine student work is the architectural periodical literature of the mid to late 1870s. A total of ten different design problems are represented in photolithographs of ink or watercolor renderings published in the Architectural Sketch-Book in 1874 and 1875 and in the American Architect and Building News between 1876 and 1878. (The Architectural Sketch-Book (hereafter cited as ASB) devoted its May 1875 issue to M.I.T. student work.)

Drawings for senior theses at M.I.T. are retained by the M.I.T. Museum, and eleven of the fourteen thesis projects submitted during the Ware years survive. Manuscript thesis texts, explaining solutions of the program, rationalizing material and stylistic choices, and presenting structural details and calculations are retained by the Institute Archives at M.I.T. Ten thesis texts from the Ware years survive. Selected early these drawings have been published in Caroline Shillaber, Massachusetts Institute of Technology School of Architecture and Planning 1861-1961: A Hundred Year Chronicle (Cambridge: MIT Press, 1963). Included are Henry A. Phillips' 1873 project for a Water Works; William B. Dowse's 1874 project for a Country Depot; George W. Capen's 1877 project for a Town Hall; Charles S. Eaton's 1878 project for a Scientific Academy; and Charles M. Wilkes' 1881 project for a Bank Building. See Appendix J.

5. PR...1872, 41-42.

6. Many years later, in 1889, Robert S. Peabody was serving as a visiting critic in the M.I.T. design studio, and he found occasion to call attention to the lingering influence of the Croquis. Peabody, who had begun his career as a draftsman in the office of Ware and Van Brunt before going on in 1867 to the atelier Daumet (with Chandler) and the Ecole des Beaux-Arts, questioned the preoccupation with Ecole student work at M.I.T.: "What I would urge is, that the designs of the Intime Club are not after all the work of great masters. The young men who have made them have in great measure gained inspiration from other books and from the existing monuments by which they are happily surrounded. As far as possible, I would, therefore, eschew the Intime Club's journal and rely rather on the standard works and standard monuments.... In short, I would urge as far as possible the study of the original authorities rather than the study of them at second-hand...." Technology Architectural Review 2 (June 1, 1889), 3.

7. A. Hun Berry Notebooks, 1869-75 (MC 172), MCM-Ar.

8. A.W. Longfellow to Mother [Elizabeth Porter Longfellow], May 13, 1877, A.W. Longfellow Papers, MCLf. Longfellow, nonetheless, was enthusiastic about this particular problem, writing that "it is very good fun and real work of a practical kind."

9. WRW, The American Vignola [1902] (New York: W.W. Norton, 1977), 3.

10. James F. O'Gorman, The Architecture of Frank Furness (Philadelphia: Philadelphia Museum of Art, 1973), 24.

11. See Chapter 1, pp. 69-70.

12. A Supplement to the Third Annual Catalogue of the Massachusetts Institute of Technology: The Programme of the Course of Instruction in the Department of Architecture (Boston: Alfred Mudge & Son, 1868), 12. (Hereafter cited as Programme)

13. Ware identifies this initial set of drawings, at M.I.T. by 1868, as those presented to him by Ernest Benzon, a Boston merchant and bibliophile living in London. Programme, 12. For more on Benzon, see Chapter 1,

n. 183, 185. The Benzon set of drawings (not itemized in the 1875 inventory) should be distinguished from the set of drawings brought by Letang to M.I.T. in 1872 (and itemized in the 1875 inventory). See n. 16.

14. Ware mentions the volumes received from Daly in the Programme, 14.

15. For more on Chandler, see Chapter 2, n. 24, 26.

16. The listing is in PR...1875, 181-85. For more on Letang, see Chapter 2, pp. 79-87.

17. For textual comparisons, see n. 19.

18. On the atelier Vaudremer-Raulin, see Chapter 2, pp. 83-84, and Chapter 5, p. 253.

19. Ecole: Un pont dans un jardin d'agrement, Croquis 1(June 1866), 1, 6, 7: "Ce pont serait au confluent de deux petites rivieres; au centre s'elevrait un pavillon ouvert et auquel on descendrait au niveau de l'eau par des rampes ou degres, a un palier servant d'embarcadere pour les promenades en gondoles." M.I.T.: A Bridge in a Park, AABN 3 (April 20, 1878), 137: "We suppose that the reservoir by which a large city is supplied with water is situated in a public park, and that it is desired to build across it a foot bridge fifty feet in length, which shall at the same time commemorate the completion of these water-works." M.I.T. students' drawings for the bridge in a park resembled those of Second Class Ecole students for the 1868 esquisse problem, un pont en pierre, Croquis 3 (July 1868), 5,6; (September 1868), 6. Ecole: Un pont limitrophe, Croquis 5 (September 1871), 6: "Ce monument, qu'on suppose devoir etre eleve en commemoration d'un traite de paix.... A chacune de ses entrees s'elevrait un arc monumental, a proximite duquel se trouveraient deux petits pavillons, l'un pour un poste militaire, l'autre pour une poste de douaniers." M.I.T.: A Monumental Bridge, PR...1875, 156-57: "It is supposed that two neighboring nations, having settled by arbitration a question of boundary, agree to erect over a stream, which forms the frontier determined upon, a bridge.... It is necessary to erect at each extremity of the bridge one or two small buildings to serve as custom-houses.... In the centre of the bridge, over the middle of the stream and marking the exact boundary, is to be a triumphal arch, or Arch of Peace...."

20. AABN 2 (March 17, 1877), 83.

21. Ibid.

22. Ibid.

23. See particularly the thesis texts prepared by Charles Morrill Baker and Charles Sumner Eaton in 1878, MCM-Ar.

24. WRW, American Vignola, 3.

25. O'Gorman, The Architecture of Frank Furness, 25.

26. AABN 5 (January 11, 1879), 14.

27. AABN 5 (August 11, 1877), 254.

28. Ibid.

29. PR...1872, 38.

30. The only known M.I.T. student drawing prior to 1872 is the one by Joseph A. Pond, for a school and library building, done in a High Victorian Gothic style. A photograph of it is included in the "Portfolio of Student Work" (c.1870-78). (See n. 4.)

31. ASB 2 (May 1875), 2.

32. George Walter Capen, "A Town Hall" (manuscript B.S. thesis, M.I.T., 1877), 3. MCM-Ar.

33. Charles Sumner Eaton, "A Scientific Academy" (manuscript B.S. thesis, M.I.T., 1878), 1. MCM-Ar.

34. Gilbert to Johnston, February 5, 1879. Clarence H. Johnston Papers, MnHi. The Gothic design referred to was Johnston's competition entry for the St. Paul railroad station.

35. Ibid.

36. On the relation between Viollet and the Ecole, see Egbert, The Beaux-Arts Tradition, 62-66.

37. A.W. Longfellow to Mother, n.d. but probably early 1880, A.W. Longfellow Papers, MCLf. Longfellow went on to say that "It (probably Viollet's Dictionnaire raisonne) is our bible in many ways at the Atelier Vaudremer." See also obituaries and tributes to Viollet-le-Duc in AABN 6 (September 27, October 11, 18, 1879), 97, 114, 127, and AABN 7 (January 3, 1880), 4.

38. Gilbert to Clarence Johnston, June 22, 1879, Clarence H. Johnston Papers, MnHi. Scott had died on March 27, 1878, and was the subject of tributes in The Builder 36 (1878), passim, and AABN 3 (April 6, 1878), 117. In his letter to Johnston, dated July 21, 1879, Gilbert clarified his preferences concerning the London offices where he would like to work: "I have pronounced for Street first, Waterhouse second, Shaw third, and Burges fourth as my choice; and I have held to Street as my man." Ware wrote to colleagues in London on Gilbert's behalf, and John H. Sturgis wrote to Waterhouse, for whom he had once worked. Nothing came of any of these contacts, and Gilbert could not find work in any London office. He simply spent the time between January and July 1880 traveling in England and France. See various letters of Gilbert to Johnston, June 1879-July 1880, Clarence H. Johnston Papers, MnHi.

39. The Technology Architectural Review (hereafter cited as TAR) was published irregularly in eight numbers per year for three years, from November 15, 1887, to December 31, 1890. It was a publication of the

Architectural Society of the Massachusetts Institute of Technology, under the editorship of Henry D. Bates (who graduated in architecture in 1888), Thomas R. Kimball (special student in architecture, 1884-87), and Irving T. Guild (special student in architecture, 1885-87). For more on the Architectural Society, see Chapter 4, pp. 163.

40. TAR 1 (February 15, 1888). Cf. Ware's 1872 remarks, Chapter 4, pp. 124.

41. TAR 1 (April 15, 1888).

42. At the end of the third volume, the editors declared their intention to make the Review a publication of more general professional interest by dropping most of the M.I.T. student work. The publication did not resume, however, until May 1907, when it was reintroduced as the Technology Architectural Record.

Chapter 4. Notes

1. In addition to the instances of published design problems noted in the previous chapter, it should be reiterated that M.I.T. student drawings were regularly included in the annual Boston exhibitions of art education drawings sponsored by the Massachusetts State Normal Art School beginning in 1872. The Boston Society of Architects reviewed student portfolios in preparation for awarding the annual B.S.A. Prizes. In a larger realm, M.I.T. student drawings were exhibited at the Philadelphia Centennial Exhibition in 1876, where no other collegiate or non-collegiate school of architecture was represented. I have not yet determined whether M.I.T. student drawings were exhibited by the United States at the 1873 Vienna Exposition or the 1878 Paris Exposition.

2. Frederick Augustus Schermerhorn (1844-1919), an 1868 graduate of the School of Mines (Mining Engineering) had been a Trustee since 1877. He managed extensive real estate interests in New York City. He was the grandson of Peter Schermerhorn, Jr., Director of the Bank of New York (from 1814 to 1852); and the brother-in-law and neighbor of Richard Tylden Auchmuty, Jr. (1831-1893)--onetime partner of James Renwick, Jr. (from 1858 to 1861) and member of the Improved Dwelling Association and the Sanitary Reform Society. Schermerhorn's interest in incorporating sanitary engineering in the architecture curriculum has been linked to his association with Auchmuty and other scientific reformers. See Steven M. Bedford, "History I: The Founding of the School," in Richard Oliver, ed., The Making of an Architect, 1881-1981: Columbia University in the City of New York (New York: Rizzoli, 1981). See also May N. Stone, "The Plumbing Paradox: American Attitudes toward Late Nineteenth-century Domestic Sanitary Arrangements," WP 14 (Autumn 1979), 283-309. Schermerhorn was authorized by the Columbia Trustees on April 7, 1879, to draw up a proposal for an architecture curriculum. He presented his report on May 2 to the committee on the School of Mines, which referred it to the Board of Trustees on May 5. The report, with Schermerhorn as author, was printed as a pamphlet entitled, Proposal to Establish a Course of Instruction in Architecture in the School of Mines (New York: Columbia College, 1879). [Copy in Columbiana Collection, Columbia University]

3. Schermerhorn, Proposal, 3. Schermerhorn's curriculum is described on pp. 7-8 of the Proposal and is summarized by Bedford, "History I," p. 10, n. 40. The five existing courses in the School of Mines were: Mining Engineering, Metallurgy, Civil Engineering, Analytic and Applied Chemistry, and Geology and Paleontology.

4. Schermerhorn, Proposal, 5.

5. Schermerhorn, Proposal, 5-6. For the fourth-year "projet", Schermerhorn suggested that the drawings could be measured drawings, reconstructions, drawings for alterations to existing buildings, or original designs.

6. Schermerhorn, Proposal, 6.

7. Catherine Clinton Howland Hunt, Manuscript Biography of Richard Morris Hunt (c.1907), 161-62. American Architectural Archive, NNC-A. The Committee on the School of Mines submitted a report to the Trustees of Columbia College on February 2, 1881, with the resolution: "... that there be established a professorship of Architecture in the School of Mines, the professor holding the same to take charge of a course of instruction in Architecture and sanitary engineering to be compensated at the rate of five thousand dollars per annum." College papers, January-May 1881. NNC-RBMs.

8. Minutes for April 4, 1881, College Papers, January-May 1881. The March 5 letter, published in the AABN on August 6, 1881, is discussed later in this chapter.

9. No record exists of the discussions at the April 1 meeting of the Committee on the School, except for this note: "Prof. Ware entered at length into the needs of the Architectural Department, and on conclusion of his remarks the meeting was dissolved." M.I.T. Corporation, Records of the Committee on Instruction, vol. 1, 1866-87, 192-93, MCM-Ar.

10. The salary differential was noted by Rogers as Ware's motivation for leaving M.I.T. See Rogers to F.A. Walker, July 7, 1881, Rogers Papers (MC 1), box 7, folder 117, MCM-Ar. Ware was probably earning $2500 at M.I.T. in 1880-81, compared with the $5000 per annum offered by Columbia in the three-year contract which ran from October 1, 1881 to October 1, 1884. In that year, the architecture department at Columbia was put in full operation, and Prof. Ware was granted an annual salary of $6000. During his last decade at Columbia (May 1892 to June 1903), he was earning $7500 per year. From his retirement until his death in June 1915, Ware received an annual pension of $3750 (i.e., half of his salary at retirement). Information from "Columbia College, Officers and Servants and Their Compensation" (Ledger book in collection of Michael Radow, New York City).

Ware's frustrations at M.I.T. were never voiced so strongly in 1881 as they had been in 1878 and 1879, when the entire faculty was subjected to massive budget reductions. To Ware, the hard times of the late 1870s seemed a failure of promise and expectation. Here are excerpts from his Ciceronian letter of September 19, 1878, to one of the members of the Committee on Instruction of the M.I.T. Corporation:

"The School as it now stands is a very good school. But it is not the sort of school that we were invited to take part in, and the career we are following is not the career upon which we were invited to enter....

"There is a chance to make as good a school of Architecture as there is in the world; the circumstances are unusually favorable, and we have gone far enough to see our way through. That is what I was invited to accomplish, and I know I could do it....

"Well-endowed schools of architecture are rising in different parts of the country, stimulated by our success. We have a long start, and there is every opportunity to retain the unquestioned advantages we posses....

"The question, how a school of Architecture should be organized, what equipment it should have, what branches should be taught, and how, has never been raised. It is only within a year that any inquiry has been made at all, and there the question has been how little money would

suffice to carry the work along on the present basis of minimum performance....

"I have myself two or three times as many subjects as I ought to have, or can properly attend to, counting in evenings and Sundays, and my time is so engrossed with actual contact with my classes that reading and study and proper preparation are out of the question. Most of the work that I undertake I am capable of doing very well. But I seldom get a chance to do my best....

"Now at the end of twelve years we find ourselves just where we were at the beginning, except that many of us have made meanwhile great pecuniary sacrifices and that we are now, many of us, so committed to the enterprise and identified with it, that no alternative is open to us but to keep on to the end....

"Other of the professors are turning their eyes elsewhere and longing to cut free from these false relations. But for my own part I am so identified with the work that I have no expectation but to remain in it as long as I am fit for any work at all....

"Meanwhile, the lives of my students are made or marred by what they get and what they do not get in the two or three years at the turning-point of their lives that they spend under my care. It seems to me wicked, when there is so much that they could get in these years, that they should be given so little. When they write to me to ask about the school, I cannot tell them not to come, for I know it is, so far, the best thing going. But I feel like a swindler all the same.

"Cannot the corporation be somehow made to feel the responsibility they have assumed, towards us and towards them?" Ware to Edward Atkinson, September 19, 1878, Rogers Papers (MC 1), box 5, folder 82, MCM-Ar.

11. Rogers Papers (MC 1), box 7, folder 114. A Special Committee to find a Professor of Architecture (hereafter referred to as the search committee) was named on June 4, to be headed by Pres. Rogers. The other two members were drawn from the standing Committee on the School: Edward S. Philbrick and Edward Atkinson. M.I.T. Corporation, Records of the Committee on Instruction, vol. 1, 1866-87, 194, MCM-Ar.

12. Rogers wrote to Francis A. Walker, his designated successor as President, for suggestions on Ware's replacement. Walker knew of no likely candidates. See Rogers to Walker, July 7, 1881, and Walker to Rogers, July 18, 1881, Rogers Papers (MC 1), box 7, folder 117, MCM-Ar.

13. Rogers to E.C. Cabot, May 19, 1881, Rogers Papers (MC 1), box 7, folder 115, MCM-Ar; see Ware to Gerard Beekman, June 9, 1881, College Papers, June-December 1881, NNC-RBMs.

14. Cabot was Chairman of the Permanent Committee on the M.F.A. School from 1877 to 1900. Ware served as Secretary of the M.F.A. School Committee from 1877 through 1881 and remained a member of that Committee, in absentia, until 1891. The other members of the M.F.A. School Committee in the spring of 1881 were: Martin Brimmer (1829-1896; first President of M.F.A.); Joseph Foxcroft Cole (1837-1892; painter; student in Paris c.1860-75); Edward William Hooper (1839-1901; attorney, treasurer of Harvard College, 1876-98); John LaFarge (1835-1910; painter; decorative work for Trinity Church, 1876-77); Gen. Charles Greely Loring (1828-1902; Egyptologist and first Director of M.F.A., 1876-1902); Francis Davis

Millet (1846-1912; Royal Academy of Fine Arts, Antwerp; Secretary of Massachusetts Commission to Vienna Exposition, 1873); Robert Swain Peabody (1845-1917; architect; early student of Ware); Charles Callahan Perkins (1823-1886; member of Boston School Committee, 1870-83; President, Boston Art Club, 1869-79). See H. Winthrop Peirce, The History of the School of Fine Arts, Boston: 1877-1927 (Boston: Museum of Fine Arts, 1930), 101.

15. E.C. Cabot to Rogers, April 8, 1881, Rogers Papers (MC 1), box 7, folder 112, MCM-Ar.

16. Ibid.

17. Ibid.

18. Rogers to E.C. Cabot, May 19, 1881, Rogers Papers (MC 1), box 7, folder 115, MCM-Ar.

19. Cabot's reply to Rogers suggested that the M.F.A. School still intended "to enlarge its sphere of action" and would continue to consult with M.I.T. Switching to his role as B.S.A. President, Cabot asked to be kept informed during the search. Cabot to Rogers, May 29, 1881, Rogers Papers (MC 1), box 7, folder 115, MCM-Ar.

20. Van Brunt [with Cabot and Cummings] to Rogers, June 9, 1881, Rogers Papers (MC 1), box 7, folder 116, MCM-Ar. At this point, however, the B.S.A. had no committee organized to meet with M.I.T. officials, as it was invited to do in mid-July. Cabot, Van Brunt, Cummings, Sturgis, and probably others conferred among themselves from time to time during the summer to draft joint replies to Rogers. Cummings and Van Brunt appeared before the M.I.T. Committee on the School on July 19. All of these men were current or former officers in the B.S.A.: Cabot was President (1867-1895); Sturgis was Vice President (1873-83); Cummings and Van Brunt were both former Secretaries (1871-76 and 1877-79, respectively). T.M. Clark, who was Secretary, 1880-83, and who would emerge as a candidate for the M.I.T. position, was not involved in these consultations.

21. Philbrick to Rogers, June 9, 1881, Rogers Papers (MC 1), box 7, folder 116, MCM-Ar.

22. Ibid.

23. Cummings [with Cabot and Van Brunt] to Rogers, August 1, 1881, Rogers Papers (MC 1), box 7, folder 118, MCM-Ar.

24. Augustus Lowell, a member of the M.I.T. Committee on the School, seconded the nomination of Longfellow, as did former M.I.T. President John D. Runkle. Edward Atkinson, also a member of the M.I.T. Committee on the School and a member of the search committee, seconded the nomination of Clark, preferring to consider Longfellow for a position as Assistant in the department. Atkinson also suggested Alfred Greenough as an Assistant. See Lowell to Rogers, August 10, 1881; Runkle to Rogers, August 22, 1881; Atkinson to Rogers, August 9, 1881. Rogers Papers (MC 1), box 7, folders 118, 119, MCM-Ar.

25. Longfellow later explained that he found the $2500 salary and $2000 department budget too low and that he was apprehensive about the future direction of M.I.T. as Rogers retired and Francis A. Walker took over as President. See Longfellow to Rogers, August 19 and 30, 1881; Edward Atkinson to Rogers, August 25, 1881. Rogers Papers (MC 1), box 7, folder 119, MCM-Ar. Atkinson, who had been Clark's strong advocate earlier in August, explained to Rogers that Clark had just begun to establish a successful practice, earning about $5000 per year.

26. Clark to Atkinson, August 25, 1881. Rogers Papers (MC 1), box 7, folder 119, MCM-Ar.

27. See Rogers to Clark, August 26, 1881; Clark to Rogers, August 30, 1881; Babb to Clark, August 31, 1881. Rogers Papers (MC 1), box 7, folder 119, MCM-Ar.

28. See Rogers to Clark, September 1, 1881; Clark to Rogers, September 2, 1881; Ware to Rogers, September 4, 1881. Rogers Papers (MC 1), box 7, folder 120, MCM-Ar. Evidence of Ware's persuasion is found in the September 4 letter, in which Ware alluded to Rogers' September 1 "invitation to come to the relief of the Committee in any way I could." Clark's letter of September 2 expresses a tentative interest in response to Rogers' invitation the day before to come for an interview on September 6. Clark and Ware conferred at length on September 3 and 5 to discuss the curriculum. See pp. 156-60.

29. Alfred Greenough (1844-1884) had been at the Ecole (atelier Vaudremer) since 1868, with the exception of two periods away from Paris, 1870-71 and 1874-75. An account of Greenough is given by A.W. Longfellow who arrived in the atelier Vaudremer in May 1879: "Alfred Greenough ... has money & a conscientious desire to really study archt'e & has been here 11 years.... He goes home to B[oston] in a few years--I mean in 18 months & is dreading the influence of the 'atmosphere' on his art. I am beginning to see & feel what is meant by an atmosphere of art & I fear Greenough can get little sympathy even in Boston though he is very popular & I as everyone think him charming." Longfellow to his mother [Elizabeth Porter Longfellow], May 11, 1879. A.W. Longfellow Papers, MCLf. Greenough finally returned to Boston in December 1881. On the contacts with Greenough during the search in the summer of 1881, see Ware to Rogers, September 4, 1881, Rogers Papers (MC 1), box 8, folder 120, MCM-Ar. There is confirmation of M.I.T.'s interest in Greenough in his 1884 obituary, written by an unidentified "younger architect, who had known him well in Paris": "The scheme which he conceived for the ideal training of an architect was without precedent in this community, ... but the value of the example set, and of the results attained, were recognized when our leading School of Architecture offered him a professor's chair. This was declined, lest it should interfere with proposed active practice, for which even the most theoretical studies had been undertaken. But it cannot be doubted that Greenough would have finally accepted a position, for which no one else in this country could have been found so perfectly fitted." Sixth Report of the Secretary of the Class of 1865 in Harvard College (Cambridge, 1885), 24-25. [Copies at DLC, MBAt, MH-Ar] For more on Greenough, see Chapter 2, n. 34.

30. W.P.P. Longfellow (1836-1913) had taught drawing and other subjects peripheral to architecture at M.I.T. in 1866-67 during Ware's absence abroad. In the later 1870s he served as Editor of the American Architect and Building News and national Corresponding Secretary of the A.I.A. Between about May 1880 and August 1881, Longfellow had been traveling in Europe. For more on Longfellow's early career, see Chapter 1, n. 143.

31. George Fletcher Babb (1843-1916) began working for Russell Sturgis in about 1867 and was given some responsibility for supervising student draftsmen. William R. Mead, who studied in the Sturgis office between July 1868 and 1871, later recalled: "I went into this office as a paid student for instruction in architecture, and was put directly under the guidance of the late George Fletcher Babb...." Charles McKim also studied briefly in the Sturgis office, between June and August of 1867, when he went on to the Ecole. Babb also worked for McKim, Mead and White, before forming his partnership with Walter Cook (1846-1916) in 1880. They were joined by M.I.T. alumnus Daniel W. Willard (1849-) in 1883. See Leland M. Roth, McKim, Mead & White, Architects (New York: Harper and Row, 1983), 12.

32. Theodore Minot Clark (1845-1909) kept an office in downtown Boston while working as Richardson's superintendent in the mid-1870s. Clark assumed the duties of A.I.A. Corresponding Secretary while Longfellow was in Europe. By 1881, he had demonstrated his interest in technical matters by numerous articles in the AABN during 1879-80, and by various papers delivered before professional meetings: "Legal Responsibilities of Architects" (A.I.A. Convention, November 1878, published in AABN 4 (1878), 190-94); "Plumbing in a First-Class Boston House" (A.I.A. Convention, November 1878, published in AABN 5, March 8/15, 1879, 75, 85); "Contracts" (B.S.A. meeting, March 7, 1879); and "A Sanitary House" (A.I.A. Convention, November 1879, published in AIA Proc...1879, 75-81). Clark would serve as Professor of Architecture at M.I.T. until 1888 (when he was succeeded by Francis Ward Chandler), and from 1888 until his death, he was an Editor for the AABN. See Twelfth Secretary's Report of the Class of 1866 of Harvard College (Boston, 1911), 21-22. His publications include Rural School Architecture, U.S. Bureau of Education Circular, 1880, no. 4 (Washington: Government Printing Office, 1880); Building Superintendence [articles first published in the AABN] (Boston: Ticknor & Co., 1883); and Architect, Owner and Builder before the Law (New York: Macmillan, 1894).

33. Robert Griffith Hatfield (1815-1879) and Oliver Perry Hatfield (1819-1891) had been in practice together since 1857. Robert F. Hatfield joined them in 1876 and continued in practice with his uncle until 1884.

34. John Pickering Putnam (1847-1917) had spent part of 1870 at the Ecole des Beaux-Arts, until he left for Berlin at the outbreak of the Franco-Prussian War. The Open Fireplace (Boston: J.R. Osgood, 1881) was a gathering of articles which had originally appeared in the AABN in 1878-80. See "John Pickering Putnam (1847-1917), Visionary in Boston": Part I, Deborah A. Fulton, "A Systematic Approach to Apartment House Design;" Part II, Rebecca Zurier, "The Charlesgate as Housing in a Nationalistic Utopia," Abstracts of Society of Architectural Historians Annual Meeting, April 1984.

35. Clark to Edward Atkinson, August 25, 1881. Rogers Papers (MC 1), box 7, folder 119. Charles Herbert Moore (1840-1930) began teaching drawing and watercolor rendering at Harvard's Lawrence Scientific School in 1871 and from 1873 or 1874 taught the principles of design, painting, sculpture, and architecture under Charles Eliot Norton in the undergraduate college. The occasion of Moore's "absence" was his 1876-77 trip to Italy with John Ruskin. DAB 13, 117.

36. Rogers, notes of interviews with Longfellow, August 10, 1881. Rogers Papers (MC 1), box 7, folder 118, MCM-Ar. At the August 17 meeting of the M.I.T. Committee on the School, Rogers commented on this meeting and on a conversation with Ware concerning Longfellow and Clark. The President made a particular point of "the practical tendency of Mr. C[lark] as shown in his writings in the Architect." Rogers memo, August 17, 1881. Rogers Papers (MC 1), box 7, folder 119, MCM-Ar.

37. On Runkle's earlier opinions, see Chapter 2, pp. 1020-04. Runkle to Rogers, August 22, 1881. Rogers Papers (MC 1), box 7, folder 119, MCM-Ar.

38. Longfellow to Rogers, August 30, 1881, Rogers Papers (MC 1), box 7, folder 119, MCM-Ar. Longfellow observed that the number of faculty was larger and the number of students smaller in the architecture school at Zurich, which he had visited in the spring of 1881.

39. Ware, circular letter to students, September 10, 1881. Rogers Papers (MC 1), box 8, folder 120, and Ware Papers (MC 14), box 1, folder 3, MCM-Ar.

40. Ware to Rogers, September 4, 1881. Rogers Papers (MC 1), box 8, folder 120, MCM-Ar. Ware suggests that the scheme "merely gives definite shape to the programme which I suggested to the Committee in the spring at the meeting to which I was invited."

41. AABN 10 (September 17, 1881), 128. Ware's summary of the new curriculum reflects much of the rhetoric of the five-month search, and his mood of vindication probably has as much to do with his recall of his views in early April as with his attentiveness to the arguments of others during the intervening months.

42. Longfellow was appointed at an annual salary of $1000 to teach at M.I.T. one day a week for 25 weeks. He declined to continue as an adjunct member of the faculty beyond 1881-82. A summary of the department budget, dated January 5, 1882, lists [George R.] Tolman as instructor in Sketching, with an annual salary of $200. Tolman had worked as a draftsman for the AABN since about February 1881.

43. The budget provided $200 for a total of ten lectures. See M.I.T. Corporation, Records of the Committee on Instruction, vol. 1, 1866-87, 201, MCM-Ar. These lectures in the allied arts were a major concession to the B.S.A. and provided the opportunity for Van Brunt and Cummings, who in the summer of 1881 had been so interested in the future of the M.I.T. department, to serve as adjunct lecturers. In his September 4 letter to Rogers, Ware had not yet arrived at the idea of a coherent series of lectures dealing with "ornament and the decorative arts." On that date,

he simply listed various members of the profession who might take some part in the teaching of the department. In addition to Van Brunt, Cummings, and Rotch, he listed John H. Sturgis, J. Pickering Putnam, and a group who "would be asked to do their share in treating the practical & scientific side of the subject:" William G. Preston, Henry W. Hartwell, Nathaniel J. Bradlee, and John D. Philbrick. The idea of a lecture series including "Furniture" (Cummings), "Decoration" (Rotch), and "Colored Glass and Mosaic" (Sturgis) was set two days later, by the time of the September 6 meeting of the Committee on the School. Rogers memo, September 6, 1881, Rogers Papers (MC 1), box 8, folder 120. Sturgis had been replaced by Longfellow and Van Brunt added by the time of Ware's September 10 circular letter.

44. Ware's September 17 announcement in the AABN made a special point of assuring everyone that relations between M.I.T. and the M.F.A. would be continued. The alliance would be secured by the naming of Longfellow to succeed Ware as Secretary of the M.F.A. School.

45. Clark would teach Greek and Roman history in 1881-82, and perhaps Renaissance history, which was offered in alternate years with Medieval history. In the 1882-83 spring term, he gave a series of lectures on Medieval history for the Lowell Institute, and it is likely that he used material prepared concurrently for his regular history lectures at M.I.T.

46. Hooker would also teach the course in Shades and Shadows. He would receive an annual salary of $400. Records of Committee on Instruction, vol. 1, 1866-87, 201, MCM-Ar. Hooker had been enrolled as a Special Student in 1880-81, taking courses in Mathematics, Chemistry, English, and Drawing. In 1881-82 he would take courses in Architecture, Physics, and English. AC...1880-81, 17; AC...1881-82, 18. In the September 4 letter, Ware described him as "the only person who has any knowledge of the collections," and also mentioned the assistance he had given in correcting the student exercises on the orders during 1880-81. Hooker had "had considerable office-experience" before coming to M.I.T. and would go on to a career in New York as an architectural engineer.

47. AABN 10 (September 17, 1881), 128.

48. Frank Eugene Kidder (1859-1905) had received a B.S. in Civil Engineering at Maine State College (Orono) in 1879 and had been enrolled as a special student at M.I.T. in 1880-81. He would maintain an architectural practice in Boston until 1888, when he moved his office to Denver. Kidder is best known for his Architects' and Builders' Pocket-Book/Handbook (18 editions, 1885-c.1948) and Building Construction and Superintendence (9 editions, 1896-c.1926). See AABN 88 (1905), 145; AIA Proc...1905, 259; AIA Quarterly Bulletin 6 (1905), 173. Few details have been found concerning the architectural lab. Clark wrote to Rogers at the start of the 1881-82 year that "Mr. Kidder has prepared an admirable scheme for his experiments in the Architectural Laboratory, and has shown me the notes of the lectures which he proposes to give in connection with them." Clark to Rogers, October 3, 1881, Rogers Papers (MC 1), box 9, folder 121, MCM-Ar. Kidder is listed in the January 5, 1882 departmental budget with an annual salary of $200. The 1882 Visiting Committee of the M.I.T. Committee on the School gave a brief account of

work observed in the lab involving bricks, cements, and mortars, and gave a summary of a practical problem on pile driving. M.I.T. Alumni Association, Records, 1870-1909 (AC 10), folder 18, MCM-Ar. The M.I.T. Annual Catalogues for 1881-82 and subsequent years make no mention, though, of the lab, but continue to carry descriptions of the work in Theoretical and Applied Mechanics required of third- and fourth-year students in architecture. This work was supervised by Prof. Gaetano Lanza, who had as his assistants a succession of M.I.T. architecture graduates: Charles Mason Wilkes (S.B. 1881, Assistant in Applied Mechanics, 1881-82); Edward Francis Ely (S.B. 1882, Assistant in Applied Mechanics, 1882-83, then Instructor in Architecture 1883-85); and John George Eppendorff (S.B. 1883, Assistant in Applied Mechanics 1883-84).

49. Ware to Rogers, September 4, 1881.

50. Ibid.

51. Ibid.

52. Ibid.

53. Ibid.

54. See Chapter 2, pp. 96-98. Between 1878-79 and 1882-83, the Annual Catalogues gave no details on semester hours, making it impossible to calculate the amount of time allotted to particular subjects. During those five academic years, the additions and deletions in course listings in architecture were minor, though.

55. M.I.T. Alumni Association, Records, 1870-1909 (AC 10), folder 18, MCM-Ar.

56. See Appendix B.

57. Minutes of April 18, 1882 meeting of Committee on the School. M.I.T. Corporation, Committee on Instruction, vol. 1, 1866-87, 203, MCM-Ar.

58. Ely, an 1882 architecture graduate, had served as an Assistant in Theoretical and Applied Mechanics in 1882-83. His 1883-84 salary as Instructor in Architecture was $900. He also taught an elementary mechanics course for Special Students in Architecture. He would have the same teaching responsibilities in 1884-85.

59. AC...1883-84, 33. Ware's open-door policy, which had attempted to meet the needs of a wide range of part-time and short-term students, was finally brought to an end. To enforce the rigor of the Special Course, special students were required, beginning in 1882-83, to pass the regular M.I.T. first-year entrance exams--not merely recommended to do so, as they had been the year before. The entrance exams covered Arithmetic, Algebra, Plane Geometry, French, English Grammar and Composition, History, and Geography. See AC...1881-82, 56; AC...1882-83, 60-61; AC...1883-84, 60.

60. Notes of Visiting Committee, M.I.T. Alumni Association Records, 1870-1909 (AC 10), folder 19, MCM-Ar. The Committee, appointed in October

1884, consisted of three members of the M.I.T. Corporation: Eliot C. Clarke, Henry P. Kidder, and Alexander S. Wheeler. Eliot Channing Clarke (1845-1921) had an undergraduate education at Harvard ('67) and one year of training in Civil Engineering at M.I.T. He then went into practice as a civil engineer. WWW I, 226.

One deleted passage in the report was preoccupied with the familiar rhetoric about the fine arts: "... the art of comfort and convenience is entirely modern; architecture is not merely a fine art yet tradition prescribes that it shall be taught merely as a fine art, and we believe that the Institute has yielded to the influence of this tradition to a far greater extent than is wise." Another deleted passage concerned the adequacy of the preparation offered by M.I.T.: "The architectural course deservedly stands the lowest in general estimation, because the majority of the men it turns out each year are not capable of assuming the responsibility of house building. We are pleased to say that since Mr. Ely has been in charge of the drawing room a degree of order hitherto unknown has prevailed among the students." In October 1885, Henry P. Kidder was replaced on the Visiting Committee by Frederick Lothrop Ames (1835-1893), Richardson's patron in North Easton. In February 1886, the Committee was augmented by Arthur Rotch (1850-1894), an alumnus of M.I.T. and the Ecole. The next report of the Visiting Committee, dated April 14, 1886, has not yet been located. In 1886-87, the Visiting Committee remained the same: Ames, Clarke, Rotch, and Wheeler. In 1887-88, Thornton K. Lothrop replaced Wheeler, but otherwise, the Visiting Committee remained the same through 1889-90. On the makeup of the Committee, see M.I.T. Corporation: Government, Records, vol. 3, 1873-87, 234, 246, 253, 255; and Annual Catalogues.

61. O'Grady taught or assisted in a wide range of subjects: History, the Orders, History of Ornament, Fine Art, Shades and Shadows, Perspective, and Elementary Mechanics.

62. The founding of the Architectural Society is discussed in the Technology Architectural Review 1 (May 1907), 16-17. The students meeting on October 20, 1886 to organize the Society were Henry D. Bates (M.I.T. 1884-88), Joseph B. Gay (M.I.T. 1883-87), and Frank A. Moore (M.I.T. 1884-88). They may have been influenced by the Architectural League, founded in New York in 1881. (See n. 92.)

63. On their publication, see Chapter 3, p. 141.

64. Visiting critics for 1887-88 were A.W. Longfellow, Jr. Thomas O'Grady, Jr., Arthur Rotch, C. Howard Walker, and Edmund M. Wheelwright. Visiting critics for 1888-89 were John A. Fox, A.W. Longfellow, Jr., Robert S. Peabody, and C. Howard Walker. Visiting critics for 1889-90 were Clarence H. Blackall, Robert S. Peabody, and R. Clipston Sturgis.

65. For more on Chandler, see Chapter 2, n. 24 and 26. On the occasion of Chandler's appointment, the editors of the American Architect remembered, probably more than rhetorically, the old feud: "As an adjunct of a school of applied science the department is out of place; it ought rather to be associated with the School of Drawing and Painting at the Museum of Fine Arts. Mr. Chandler has our hearty good wishes and sympathy, and we feel he will need this, for we cannot believe that he

shares the belief of the authorities of the Institute that architecture is only 'an industrial art.'" AABN 24 (August 4, 1888), 46.

66. Catherine Clinton Howland Hunt, Manuscript Biography of Richard Morris Hunt (c.1907), 161-62, American Architectural Archive, NNC-A. On the time Ware and Van Brunt spent as students in Hunt's Tenth Street Studio, see Chapter 1, pp. 26-27.

67. AABN 10 (August 6, 1881), 61-62.

68. Ibid. Ware linked these three branches of study to the three European traditions of architectural education: "But a school cannot so narrow its range, and although, in fact, the French courses of study are mainly artistic, and the German scientific, and the English practical, they all, from this very fact, fail to furnish the model we should wish to follow."

69. Ibid. Ware's letter, addressing the question "whether, architecture being counted among the fine arts, it does not belong in a school of art rather than in a school of science," was written a whole month before this issue entered the discussions in the search for his successor at M.I.T. The letter was published the same week that the first actual candidates emerged--all of whom would be swept into the late summer debate over fine arts vs. science of construction, among M.I.T. officials and Boston architects.

70. Ibid.

71. Ibid.

72. Ibid.

73. Ibid.

74. Schermerhorn was Treasurer and Director of the First Avenue Trade School. In 1889-90 and probably other years, third- and fourth-year architecture students were working there on carpentry, plastering, and painting.

75. For general surveys of the development of the architecture program at Columbia, see Theodor Karl Rohdenburg, A History of the School of Architecture, Columbia University (New York: Columbia University Press, 1954); Richard Oliver, ed., The Making of an Architect, 1881-1981: Columbia University in City of New York (New York: Rizzoli, 1981). Essays in the latter volume with particular bearing on the Ware years, 1881-1903, are: Steven M. Bedford, "History I: The Founding of the School;" David G. DeLong, "William R. Ware and the Pursuit of Suitability;" and Steven M. Bedford, "History II: 1881-1912."

76. School of Mines Quarterly 3 (November 1881), 56.

77. The Columbia Spectator 11:5 (November 29, 1882), 64.

78. Schermerhorn to Cornelius R. Agnew (fellow-Trustee of Columbia College), April 3, 1883. C.R. Agnew Collection, NNC-RBMs.

79. Ibid. Schermerhorn wrote, "Prof. Ware in one of his letters to me expressed a diffidence in assuming control of a course embracing these studies as he declared he was not versed in them." Schermerhorn was emphatic that training architects in Sanitary Engineering "was my principal reason for wishing to establish the course [in architecture]."

80. By 1902, Schermerhorn, still a Trustee, had become completely sympathetic to the idea of moving the School of Architecture into a Faculty of Fine Arts. (This was done in 1906.) Yet he thought back to the days of the establishment of architecture as a course of study appended to the School of Mines, and of his years of dealings with Ware: "The finances of the College did not then admit of our starting a full-fledged Department of Architecture, were barely sufficient indeed to support one 'chair' even without assistants or assistance and we were forced to utilize such instruction as was already in existence in mathematics, engineering, &c, &c. Prof. Ware was always in doubt about, if not averse to, such a system and as time went on found many difficulties in so carrying it on and consequently as he found he was enabled so to do drew apart and as he was able to obtain the necessary assistance gave the special mathematical & engineering instruction within his own department & under his own supervision. In this he has been helped by myself as far as I have been able to do so by giving him funds from time to time to pay for such assistance as he found most important." Schermerhorn to Nicholas Murray Butler, June 3, 1902, Central Files, Office of the Secretary, Columbia University.

81. Alfred Dwight Foster Hamlin (1855-1926) earned his undergraduate degree at Amherst and studied with Ware at M.I.T. in 1876-77. While at M.I.T. he taught a course in history and drawing at Worcester High School, and the following year, he taught a drawing course at Miss Porter's School. Between October 1878 and July 1880, Hamlin studied in Paris, in the atelier Guadet, with about one year of full-time work at the Ecole. For most of 1882, Hamlin worked for McKim, Mead and White. He started at Columbia in the spring term of 1882-83, was promoted to Instructor in 1887 and to Assistant Professor in 1889. Hamlin managed the department during Ware's foreign tour in 1889-90, and was named Adjunct Professor in 1890. In addition to teaching history of ornament and directing upper level studios, Hamlin taught freehand drawing to all four years of architecture students, and occasionally, modern architectural history. Ware wrote of Hamlin's other activities during the 1880s: "During all this time he has to a certain extent continued the private practice of his profession, executing a number of works in this city and in the country, and making for me all the drawings for the School of Classical Studies in Athens, in 1887. This work has been done at his room in the school (where he has sometime employed a draftsman), so that its prosecution has not prevented his being almost constantly in personal attendance. Besides this he has done some private teaching, and has given courses of lectures occasionally in Schools, in Brooklyn and in Connecticut." Ware to Seth Low, December 30, 1890, Ware Papers (MC 14), folder 5, MCM-Ar; and Rohdenburg, A History of the School of Architecture, 94. Although a loyal follower of Ware, Hamlin by the turn of the century recognized the need to make the School

of Architecture more responsive to the students, the trustees, and the profession-at-large. After Ware's breakdown in the spring in 1902, Hamlin and others saw his resignation as imminent and began to work with the Columbia administration toward a redefinition of responsibilities within the School of Architecture, yet as Ware's protege, he was never given an unqualified mandate to carry on as his successor. After Charles F. McKim declined in 1904 to take over as head of the School, Hamlin was named Executive Head. He served in this capacity until Austin W. Lord was named Director in 1912, and continued to teach until his death in 1926.

82. Grenville Temple Snelling (1861-1920) completed the full four-year course at M.I.T. in 1882 and came to New York to work as construction superintendent for Charles Coolidge Haight (1841-1917), architect of most of Columbia's buildings erected in the 1870s and 1880s. In 1885 he went on to the Ecole, studying in the atelier Daumet, and working in 1888-89 as a designer on the staff of the 1889 Exposition Universelle. Snelling was hired as Assistant in Architecture in 1889. He was promoted to Tutor in 1891, Instructor in Architecture in 1892, and Instructor in Architectural Engineering in 1895. During the later 1890s, he maintained a practice with Howard Nott Potter (Columbia '92). Snelling left Columbia in 1907 to devote himself to his practice. Information in this and in notes 83 through 88 from letter of Ware to Low, December 30, 1890, and Rohdenburg, A History of the School of Architecture, 94-98.

83. Frank Dempster Sherman (1860-1916) was accepted as a member of Ware's first class in architecture at Columbia in the fall of 1881 but chose to work for McKim, Mead and White during that year, entering school with advanced standing in the fall of 1882 and graduating with the first class in architecture in 1884. In 1884-85 he enrolled in the sophomore class at Harvard to study Greek, Latin, Italian, History, and Philosophy. Ware hired him in February 1887, and for two years, he took responsibility for the analytical geometry and calculus taught to architects. He was promoted to Instructor in 1889, to Adjunct Professor in 1891, and to Professor of Graphics [Architecture] in 1904 and served until his death in 1916. Most of Sherman's teaching was devoted to descriptive geometry, perspective, shades and shadows, stereotomy, and graphical analysis. For a number of years, he also taught the elements of architecture and medieval architectural history.

84. Charles Alonzo Harriman (1860-1930) had been a special student at M.I.T. (1878-80). Ware first hired him as a draftsman and clerk in the Department of Architecture in 1884 to prepare diagrams for use in teaching. Harriman served as Instructor in Architecture, 1891-95; Instructor in Architectural Drawing, 1895-1906; Instructor in Architecture, 1906-09; Associate in Architecture, 1909-11; as Assistant Professor of Architecture, 1911-30. Most of his teaching was devoted to the introductory work in architectural drawing and rendering.

85. Maximilian K. Kress (1859-) was born in Vienna and came with his family to New York in 1866. He worked as a clerk in an insurance office until 1883, when Ware recommended him to Hamlin as a student draftsman. In addition to caring for the department collections, Kress prepared lecture diagrams, taught German, and from time to time lectured on archaeology and ancient architectural history. He was promoted to Curator

in 1889, to Curator and Lecturer in 1895, and to Adjunct Professor in 1904. He served at Columbia until 1903.

86. McKim to Hunt, April 2, 1892. McKim Papers, Diary Letterbook 1, 137, DLC-Ms.

87. Constant-Desire Despradelle (1862-1912) entered the Ecole in 1882 as a student of Pascal and earned the Diplome in 1887. He shared the Second Grand Prix in 1889--a year in which no first Grand Prix was awarded.

88. Charles Peck Warren (1868-1918) earned his bachelor's degree in architecture at Columbia in 1890, then stayed on another two years to take a master's degree, with concentration in architectural engineering. He served as Assistant, 1893-94; Lecturer, 1894-95; Tutor, 1895-1906; Instructor, 1906-09; Adjunct Professor, 1909-10; and as Assistant Professor, 1910-18. See his article, "The Course in Architectural Practice," SMQ 21 (July 1900), 337-49.

89. George Oakley Totten, Jr. (1866-1939) graduated from Columbia in 1891 and stayed on to earn his master's degree in 1892 and work as Assistant in Architecture during 1892-93. In 1893 he won the second McKim Travelling Fellowship and studied for two years in Paris, perhaps as a student at the Ecole. He worked for the Supervising Architect (1895-97) before beginning private practice in Washington.

90. John Russell Pope (1874-1937) graduated from Columbia in 1894 and won the third McKim Travelling Fellowship and Rome Prize in 1895. He spent two years at the American Academy in Rome and three years at the Ecole des Beaux-Arts (atelier Deglane) before returning to New York in 1900 to start his practice.

91. Henry Fred Hornbostel (1867-1961) graduated from Columbia in 1891, and after two years in the office of George C. Palmer (Columbia '86), went on to the Ecole (atelier Ginain). For his facility in drawing he was called "l'homme perspectif," and while in Paris, he worked for Charles-Louis Girault and Victor-Auguste Blavette on drawings for the 1900 Exposition Universelle. Hornbostel returned to New York to work with Palmer, and he also did rendering for McKim, Mead and White and Carrere and Hastings. After leaving Columbia in 1903, he won the 1904 competition for the campus of the Carnegie Technical Schools (later, Carnegie Institute of Technology), which opened in 1905. Its School of Applied Design included a Department of Architecture, founded by Hornbostel in 1905. He taught in the department until 1935, while continuing his practice in Pittsburgh and New York.

92. William T. Partridge graduated from Columbia in 1887 and went on to work in Boston, where he won the Rotch Travelling Scholarship in 1890. After studying in Paris, perhaps at the Ecole, he returned to New York. He worked in the office of McKim, Mead and White, and McKim called him "one of the best draughtsmen in the country." (McKim to Charles Moore, August 14, 1901. McKim Papers, Diary Letterbook 4, 164-65, DLC-Ms.) Consequently, McKim hired him as supervisor of drawings for the McMillan Commission's presentations on the plan for Washington, D.C.

93. Atterbury, Gumaer, and Hastings had studied at Columbia. All but Gumaer were alumni of the Ecole. Van Pelt had been teaching design at Cornell during the late 1890s. The Ateliers' Committee on Design supervised all the work of the Columbia studios until the arrival of Austin W. Lord as Director of the School of Architecture in 1912. See Rohdenburg, A History of the School of Architecture, 20-23; and Bedford, "History II," 42-48.

94. Proceedings of the Architectural League of New York, from Organization to January 1889 (New York: Engineering and Building Record Press, 1889); Roger Riordan, "The Architectural League of New York," Century Magazine 25 (March 1883), 698-708.

95. Clarence H. Blackall, A History of the Rotch Travelling Scholarship, 1883-1938 (Boston: Anchor Linotype Printing Co., 1938).

96. William Robert Ware, "The Study of Architectural History at Columbia College," School of Mines Quarterly 17 (November 1895), 58.

97. William Robert Ware, "The Instruction in Architecture at the School of Mines," School of Mines Quarterly 10 (November 1888), 37-38.

98. Ware, "The Study of Architectural History at Columbia College," 61.

99. During the later 1890s, architectural history and "Historical Design" occupied as much as 75 percent of a student's time in the spring semesters of both the sophomore and junior years.

100. Ware, "The Instruction in Architecture at the School of Mines," 40.

101. Ware, "The Study of Architectural History," 59-60.

102. Ibid., 61.

103. The establishment of American collegiate schools of architecture has been outlined by Arthur Clason Weatherhead, in The History of Collegiate Education in Architecture in the United States [Ph.D. dissertation, Columbia University, 1942] (Los Angeles: private printing, 1941).

104. The beginnings of architectural education at Cornell and the University of Illinois are discussed at greater length on pp. 186-97.

105. Thomas Webb Richards (1836-1911) had been teaching drawing at the University of Pennsylvania since 1869. The Department of Science, organized in 1872, originally included courses in Analytical and Applied Chemistry and Mineralogy, Geology and Mineralogy, Civil Engineering, and Mechanical Engineering. It became the Towne Scientific School in 1875. See Book of the School, Department of Architecture, University of Pennsylvania, 1874-1934 (Philadelphia: University of Pennsylvania, 1934); Edward Potts Cheyney, History of the University of Pennsylvania, 1740-1940 (Philadelphia: University of Pennsylvania, 1940).

106. William LeBaron Jenney (1832-1907) studied civil engineering at Harvard's Lawrence Scientific School before going on to the Ecole Centrale

des Arts et Manufactures (1853-56). After a year as a civil engineer for a Mexican railway, he returned to study in several Paris ateliers. After the Civil War, Jenney established an office in Chicago in 1868. Daniel H. Burnham worked briefly for Jenney in 1868, as did Louis Sullivan in 1873-74, before going on to the Ecole des Beaux-Arts. William Holabird worked for Jenney (1875-80) along with his future partner Martin Roche (1872-81). With Sanford E. Loring, Jenney was the co-author of Principles and Practice of Architecture... (Chicago: Cobb, Pritchard & Co., 1869)--a work which helped to introduce "the French system of apartment houses" to this country. On Jenney's early career, see MEA 2:494-96; and Theodore Turak, "The Ecole Centrale and Modern Architecture: The Education of William LeBaron Jenney," JSAH 29 (March 1970), 40-47. More needs to be learned about Jenney's teaching at the University of Michigan. One of his students in 1876-77, William A. Otis, went on to the Ecole (1877-81) before returning to Chicago to work with Jenney (1882-89, as partner 1886-89). In 1889 Otis joined Louis J. Millet, another Ecole alumnus, in introducing the teaching of architecture at the Art Institute of Chicago. In 1895, their architecture course was expanded, in cooperation with Armour Institute of Technology, and a four-year professional degree program was established.

107. Princeton's School of Science was established in 1872, and a course in Civil Engineering was created in 1875. Edward Delano Lindsey (1841-1915) was born in New Bedford, Massachusetts, and graduated from Harvard in 1862, in the same class as Ware's brother, Charles P. Ware. He entered the Ecole des Beaux-Arts in 1863 and remained there until July 1865, during which time he worked in the atelier Andre, alongside Richardson. Lindsey worked for N.J. Bradlee in Boston from 1865 to 1867, when he set up his own practice in New York. His work on the Equitable Life Insurance Building brought him into contact with several officers of the company, who also served as trustees of Princeton University. He was invited to fill the new chair in architecture in the fall of 1876, and reported the following year: "I lecture on art from the aesthetic point of view to the seniors in the academic branch as well as those in the school [of Science]." He also shared the responsibilities of administering the treasurer's office of the university and designed "some six or eight structures for the college." He resigned in August 1880 in the midst of assertions that his neglect of the college sewage system may have contributed to the outbreak of a typhoid epidemic on campus in the spring of 1880. Lindsey returned to his architectural practice in New York, remaining active until about 1899. See Class of 'Sixty-Two, Harvard University: Fiftieth Anniversary (Cambridge: Harvard University, 1912), 46-48.

108. The precursors of the architecture course at Washington University were the School of Design (Primary, Antique and Life Classes) and the School of Engineering (Civil and Mechanical), which were part of the O'Fallon Polytechnic Institute, the Practical Department of the university. In 1868 the Institute merged with the Scientific Department, becoming the Practical and Scientific School of Washington University. Between 1871 and 1878, Frederick William Raeder (1832-) was nominally the Professor of Architecture at Washington University. Raeder had been trained in Germany and arrived for St. Louis about 1870. During the 1870s, he maintained a private practice, while working as architect to the St. Louis School Board, but probably did little actual teaching.

Beginning about 1880, Thomas B. Annan (1837-1904) served as Instructor in Architecture, with responsibility for the junior and senior year professional curriculum. See Regina Marie Jerzewiak, "History of the O'Fallon Polytechnic Institute, 1855-1868: The Practical Department of Washington University" (M.A. thesis, Washington University, 1940).

109. John Ferguson Weir (1841-1926) was the son of Robert Walter Weir, Professor of Drawing at West Point, and began working as a painter in the 10th Street Studio Building in New York. On returning from several months in Europe in 1869, Weir was named Director of the Yale School of the Fine Arts. See Theodore Sizer, ed., The Recollections of John Ferguson Weir, Director of the Yale School of the Fine Arts, 1869-1913 (New York: New York Historical Society, 1957). In the fall of 1878, he invited Ware to come to Yale to lecture on a subject of his choice. Ware gave a lecture on Gothic architecture, with an emphasis on vaulting systems, on January 29, 1879. In December 1879, Ware, who was also Secretary of the Boston Museum of Fine Arts School of Drawing and Painting, wrote to Weir for details on the budget of the Yale art program. In the spring of 1893, it appears that Weir wrote to Ware at Columbia, inviting him to accept a faculty appointment in the School of Fine Arts at Yale. Ware, who had suffered a stroke in 1890 and had been unable to work full-time in 1892-93, declined the offer: "I have been trying to persuade myself to accept the invitation conveyed in your note, for it is just what I should like to do to put into shape the outcome of my twenty-five years of school-keeping. But I have been for the past year, and am still, so unfit for continuous labor of any sort that I shrink from undertaking any such obligation." See letters of Ware to Weir, January 25, 1879; December 11 and 13, 1879; May 1, 1893. Weir Collection, CtY-Ms.

110. Syracuse University, founded in 1871, opened its College of Fine Arts in September 1873, under the direction of George Fisk Comfort (1833-1910). The Departments of Architecture and Painting were the first to be established, and the first two professors of architecture were Horatio Nelson White and Archimedes Russell. White resigned at the end of the first semester, and was succeeded early in 1874 by his office assistant, Joseph Lyman Silsbee. Russell, a Syracuse architect, continued to teach until 1881. Silsbee, a Harvard graduate, had studied at M.I.T. in 1869-70 and worked with Ware and Van Brunt and William Ralph Emerson, and he had traveled in Europe before arriving in Syracuse in October 1873. He taught until 1878 and continued in practice there until 1882, when he moved to Chicago. Several noted architects began as draftsmen in Silsbee's Chicago office: Frank Lloyd Wright (1887), George Elmslie (1888), George F. Maher (1888), and Cecil Corwin. See Alumni Record and General Catalogue of Syracuse University, 1872-99 (Syracuse: Syracuse University, 1899); William Freeman Galpin, Syracuse University: The Pioneer Days (Syracuse: Syracuse University, 1952).

111. For more on Sturgis, see n. 127. With a year of teaching behind him, Sturgis spoke to the 1879 annual convention of the A.I.A. about the program at C.C.N.Y. He emphasized that the two-year course in architecture "was not a professional one, ... but was one of the elective or optional studies of the undergraduate curriculum." The junior year was devoted to architectural drawing, with exercises in producing orthographic drawings from perspectives, discussions on the structural logic of various

architectural elements, and lectures on "the decoration of buildings." The senior year was devoted to a wider range of lectures on "the history and theory of art," and students made drawings form sculpture casts and from examples of Greek vases. Sturgis, after leaving C.C.N.Y., spent the rest of his career on architectural history and criticism and on gathering information for his Dictionary of Architecture and Building (1901). The account of his 1879 remarks to the A.I.A. shows that Sturgis was already stressing the importance of the vocabulary of architecture: "Technical terms he took pains to insist upon; to understand the whole scope and bearing of the common technical terms used in building was to understand a great deal about building itself. To know all that is implied in the words 'archivolt,' 'entablature,' 'architrave,' and the like, was to understand a great deal about the edifices in which those members are found, and the styles of architecture which chiefly employ them." AIA Proc...1879, 28-31.

112. The McMicken School of Drawing and Design was one of the first departments established in the McMicken University (established in 1859 and chartered as the University of Cincinnati in 1870). The School consisted of three Departments: Painting, Drawing and Design; Wood Carving; and Sculpture. Its aim was to promote the application of drawing and design to manufactures, as well as to promote these arts in their own right. Special studies in the Department of Painting, Drawing and Design were offered in "Architecture, its principles and history; also architectural designs, including plans, elevations and perspective drawings for buildings; working drawings for the guidance of mechanics, &c." Circular of the University of Cincinnati for 1875-76 (Cincinnati, 1875), 11-12. The School was under the direction of the painter Thomas Satterwhite Noble (1835-1907), and is best remembered for the wood carving and furniture design taught by Benn Pitman, and for the painters who began their studies there in the 1870s: Robert Blum, Kenyon Cox, Lewis Meakin, Elizabeth Nourse, Edward Potthast, and John Twachtman. The design school was transferred from the University of Cincinnati to the Cincinnati Museum Association in 1884, when the Art Academy of Cincinnati became an adjunct of the Cincinnati Art Museum. See Reginald C. McGrane, The University of Cincinnati: A Success Story in Urban Higher Education (New York: Harper and Row, 1963); and Cincinnati Art Museum: Art Palace of the West (Cincinnati: Cincinnati Art Museum, 1981).

113. On the regional orientations of the three major architecture schools, see also Chapter 5, pp. 231-35. The twenty-five largest cities in the 1880 U.S. Census were: (1) New York, (2) Philadelphia, (3) Chicago, (4) Boston, (5) St. Louis, (6) Baltimore, (7) Cincinnati, (8) San Francisco, (9) New Orleans, (10) Cleveland, (11) Pittsburgh, (12) Buffalo, (13) Washington, (14) Newark, (15) Louisville, (16) Jersey City, (17) Detroit, (18) Milwaukee, (19) Providence, (20) Albany, (21) Rochester, (22) Indianapolis, (23) Richmond, (24) New Haven, and (25) Worcester.

114. Architectural instruction would not be resumed at the University of Michigan until 1906, when Emil Lorch (M.I.T. 1890-92) was named Professor of Architecture, in the Department of Engineering.

115. Howard Crosby Butler, who had studied archaeology at Princeton and architecture under Ware at Columbia, began lecturing on architecture at Princeton in 1895, but a School of Architecture was not established until 1919. See Howard Crosby Butler, 1872-1922 (Princeton: Princeton University Press, 1923).

116. The professional curriculum in architecture at Washington University was not resumed until 1902.

117. After the McMicken School of Design left the University to become affiliated with the Cincinnati Art Museum, there would be no instruction in architecture at the university until 1922.

118. Between 1908 and 1916, Richard Henry Dana, an Ecole alumnus, served as Instructor of Design at Yale. In 1913, when John F. Weir was succeeded by William Sergeant Kendall as Dean of the School of Fine Arts, a full professional course in architecture was established.

119. On the early curriculum at Syracuse, see Galpin, Syracuse University, 106-07. After the 1870s, Russell and Silsbee were succeeded by Edgar Morse Buell, one of their students, about 1881; by Arthur Bridgman Clark, in 1884; by Albert L. Brockaway, an Ecole alumnus, in 1893; and by Edwin H. Gaggin, another student in Paris, in 1896.

120. The summary of the curriculum at the University of Pennsylvania is based on the 1879-80 annual catalog. In October 1890, Philadelphia architect Theophilus Parsons Chandler (1845-1928) was brought to Penn to organize a full-fledged School of Architecture. Richards resigned as Professor of Drawing and Architecture in 1891, and after a year of helping to organize the program, Chandler stepped aside to make way for Warren Powers Laird (1861-1948), a Cornell alumnus who had worked in Minneapolis, Boston, and New York and studied in Paris. In 1898 he was joined by Thomas Nolan (1857-1926), one of the first graduates of Ware's program at Columbia, who had studied in the atelier Daumet during 1889.

121. I have not yet located an inventory of White's library. In July 1867, in the midst of preparations for the opening of Cornell University, A.D. White declined the invitation to become the first director of the Yale School of the Fine Arts, which opened under the direction of John F. Weir in 1869. See n. 109.

122. See Edgar R. Dethfelson, "William Henry Miller, Architect" (M.A. thesis, Cornell University, 1957).

123. Ware to White, October 11, 1869, Andrew Dickson White Papers, NIC-Ms.

124. Ware to White, June 10, 1871, Andrew Dickson White Papers, NIC-Ms.

125. Peter Bonnett Wight (1838-1925) earned his B.A. in 1855 in the classical course of study at New York's Free Academy (later C.C.N.Y.). He spent another year at the Free Academy studying drawing, before going to work in the offices of New York architects Thomas R. Jackson and Isaac G. Perry. Wight spent part of 1858-59 in Chicago, then returned to New York.

In 1863 he won the competition for the National Academy of Design, and in 1864, he designed Street Hall, the fine arts building at Yale University. In October 1871, Wight moved to Chicago to join in the rebuilding of the city after the fire, and he practiced there for the rest of his life. See Sarah Bradford Landau, P.B. Wight: Architect, Contractor, and Critic, 1838-1925 (Chicago: Art Institute of Chicago, 1981).

126. Robert Griffith Hatfield (1815-1879) was trained as a carpenter but came to be recognized as an expert in "the theory and technicalities of construction. [W.P.P. Longfellow, "The Death of Mr. R.G. Hatfield," AABN 5 (March 1, 1879), 65.] He served as president of the New York Chapter of the A.I.A. from 1870 to 1873. He was the author of the popular manual, The American House Carpenter (New York: Wiley and Putnam, 1844), which would go through approximately twenty editions/printings by 1895. The changes in its subtitles would reflect the professionalizing tendencies in architectural practice and the development of the Hatfield brothers' building research over five decades. The work also more than doubled in length between the 1840s and 1880s, some measure of the expansion and differentiation of the technical information necessary for architects. Hatfield's other major work was The Theory of Transverse Strains and Its Application in the Construction of Buildings (New York: John Wiley, 1877), which would go through three editions by 1889. During the 1878-79 academic year at M.I.T., a group of architecture students volunteered to meet regularly to discuss Hatfield's Transverse Strains. See AC...1879-80, 43.

127. Russell Sturgis (1836-1909) graduated from the Free Academy the year after his close friend P.B. Wight. Sturgis worked for a year in the office of Leopold Eidlitz before going to Munich for further study at the Academy of Fine Arts and Sciences. He returned to New York in 1862 and worked in loose partnership with Wight from 1863 to 1868. In 1869-70, Sturgis designed several buildings for Yale University.

128. Ware's comments to White on the first alternative--the lecture series--are discussed in the context of the role of A.I.A. Chapters in architectural education later in this chapter, pp. 204-05.

129. Ware to White, June 10, 1871.

130. "The President's Report," Cornell University Register, 1871-1872.

131. William Fogerty (1829-1899) traveled in the United Sattes in 1875 and returned to England with unfavorable impressions of American architecture and architectural practice. His observations were published in the Building News (March 11, 1876), 45; and also "On Conditions and Practice of Architecture in the United States," Van Nostrand's Eclectic Engineering Magazine 14 (January 1876), 64; "Hints from American Architectural Practice," Van Nostrand's 15 (September 1876), 246.

132. Charles Babcock (1829-1913) graduated from Union College in 1847 and worked as an apprentice with Richard Upjohn from 1848 to 1853. During this period he earned a master's degree from Union College (1850) and married Upjohn's daughter (1852). Between 1853 and 1858, Babcock was a full partner of Upjohn. He was one of the founding members of the

American Institute of Architects on February 23, 1857, and on October 20, 1857, he delivered a paper to this group on "The Ways and Means of Accomplishing the Elevation of the Architects' Profession," summarized in The Crayon 4 (December 1857), 371-72. In 1860 Babcock was ordained a deacon of the Protestant Episcopal Church, and in 1864 he was ordained a priest. During the 1860s he combined his architectural practice with his ministry, in Dutchess County, and later Orange County, New York. In his first years at Cornell, Babcock designed Sage College (now Sage Graduate Center) and Sage Chapel (1872)--both works in a High Victorian Gothic style which Ware had cautioned White about when referring to P.B. Wight and Russell Sturgis. Babcock's own account of his teaching, given before the Eighth General Conference of Architects, R.I.B.A., was published as "A Course of Instruction in Architecture," Builder 52 (May 7, 1887), 695-96. On Babcock's diverse career, see Ethel Sara Goodstein, "Charles Babcock: Architect, Educator and Churchman" (M.A. thesis, Cornell University, 1979).

133. The design teaching at Cornell did not make much of an impression on Warren Powers Laird (1861-1948), a student during the mid-1880s, who later went on to study in Europe: "In 1885 ... what I most craved and certainly needed was training in design, but Prof. Babcock believed it was his duty to teach what we might now call an industrial course, looking to its practical value in the practice of architecture. So design was not taught and I got none until later in Paris." Laird to Prof. George Young, June 14, 1939. Babcock Student Materials, NIC-Ms. Laird was the Director of the School of Architecture at the University of Pennsylvania from 1891 to 1932.

134. These figures are based on the 1880-81 annual catalog, where the credit hours for each course are listed. There were far fewer changes during the 1870s in the Cornell curriculum than in the M.I.T. curriculum.

135. Vaults (Boston: J.R. Osgood, 1884), and Elementary Architecture (New York: D. Appleton, 1876). Babcock's book contains plates of constructional and historical details, intended for instruction in architectural drawing. It was part of a Supplementary series of advanced drawing books, prepared to follow Krusi's Primary, Analytic, and Perspective series of instructional materials in drawing. The book on Textile Designs in Krusi's series was prepared by Charles Kastner, Director of M.I.T.'s School of Practical Design. For more on Krusi and the origins of American art education, see Chapter 2., n. 113.

136. Charles Babcock to A.D. White, January 7, 1876. Andrew Dickson White Papers, NIC-Ms. Goodstein, "Charles Babcock," 117-19.

137. Cornell student designs were published in AABN 3 (April 3, 1878) and AABN 14 (October 6, 1888).

138. Charles Francis Osborne (-1913) published some of the material he developed in his teaching as Notes on the Art of House Planning (New York: William T. Comstock, 1888). He left Cornell in the mid-1890s and later taught at the University of Pennsylvania.

139. Clarence A. Martin (1862-1944) graduated from Cornell in 1888 and went on to practice in Philadelphia. He would serve as Dean or Acting Dean at Cornell, 1904-19 and 1931-32.

140. Alexander Buel Trowbridge (1868-1950) graduated from Cornell in 1890 and went on to the Ecole (atelier Lambert), 1893-95. He remained at Cornell until 1902. Already in 1896, John V. Van Pelt (1874-) had come to Cornell to teach design. He had earned the Diplome at the Ecole after five years of study in the ateliers Douillard-Thiery/Deglane. Van Pelt would remain at Cornell until 1904, with the exception of 1901-02, when he returned to practice in New York. In 1905, he became the assistant director of the Thomas Hastings atelier, one of the official ateliers of Columbia University's School of Architecture.

141. The best general account of the founding of the architecture program at the University of Illinois (then known as Illinois Industrial University) is the pamphlet by Alan K. Laing, Nathan Clifford Ricker, 1843-1924, Pioneer in American Architectural Education (Champaign-Urbana: University of Illinois, 1973). Also useful is the article by Turpin C. Bannister, "Pioneering in Architectural Education ... Nathan Clifford Ricker," AIAJ 20 (July 1953), 3-8. All information in this section is taken from these two sources and from the annual catalogs of the Illinois Industrial University.

142. Ricker had lived and worked in southern Maine until the winter of 1866-67, when he departed to visit an uncle in western Illinois. By the time he was ready to consider a formal university education three years later, the Department of Architecture at M.I.T.--a long way "back East"--was only three semesters old and still had very little visibility outside of New England. The Illinois Industrial University, just 150 miles east of the town where Ricker was working, was his closest opportunity for pursuing the study of architecture.

143. The divisions among the schools were outlined in a report by Regent John Milton Gregory to the Trustees of the Illinois Industrial University on May 7, 1867. One of the Trustees was John Van Osdel (1811-1891), who had come west from New York in 1837 to become the first architect in practice in Chicago. His role in defining the early architecture curriculum is not known.

144. Ricker studied under Bellangee for a year and a half, until Bellangee, who had been doing graduate work in mathematics, went on to become Professor of Mathematics at the Nebraska State Normal School.

145. Ricker studied drawing, design, and rendering under Hansen for less than a year, and it was a year interrupted by National Guard duty in Chicago following the fire in October 1871. He then took a leave of absence in March 1872 to work in the Chicago office of John W. Roberts, returning to the University in the fall of 1872.

146. Ware's time in Paris in the summer of 1867 coincided with Pres. Rogers' time there as U.S. Commissioner to the Paris Exposition. Similarly, Ricker traveled to Europe in 1873 with Regent Gregory, who was on his way to serve as U.S. Commissioner to the Vienna Exposition. The

opportunity to confer with a senior educator while studying European institutions and teaching methods must have been particularly important to both Ware and Ricker. And while Ware was acknowledging the tradition in which his teacher Hunt had been trained in associating himself with a Paris atelier, Ricker was acknowledging the tradition in which Hansen had been trained in associating himself with the Bauakademie. Ricker's itinerary included the following cities: Glasgow, London, Harwich, Brussels, Cologne, Berlin (by April 1), Vienna (10 days in July), Prague, Dresden, Berlin, Cologne, Paris, Rouen, London, York, Edinburgh, and Glasgow.

147. Ware's service as a member and sometime chairman of this committee during the 1870s is discussed on pp. 211-15. What is surprising, though, is that P.B. Wight, who had moved from New York to Chicago in October 1871 but served with Ware on the Committee on Education from the fall of 1872 through the fall of 1876, did not manage to direct attention any sooner to the teaching at Illinois.

148. AIA Proc...1879, 48.

149. Ricker to S.H. Peabody, September 25, 1881. Rogers Papers (MC 1), box 9, folder 122, MCM-Ar.

150. AIA Proc...1881, 30-42. Ricker mentions that a similar letter sent to Ware in the fall of 1880 had arrived too late to be included in that year's report of the Committee on Education.

151. Ibid., 58-61.

152. Ibid., 31.

153. Ibid., 34.

154. Ibid., 33.

155. Ibid., 32. Ricker's shopwork program was based on the "Russian System" which he had observed at the Vienna Exposition in 1873. This part of the curriculum is more fully discussed in Winton U. Solberg, The University of Illinois, 1867-1894: An Intellectual and Cultural History (Champaign-Urbana: University of Illinois, 1968), 141-42, 149. See also n. 166.

156. Included in PR...1875, 175-99.

157. The process is described in AIA Proc...1881, 37. Ricker began this effort of printing lecture notes for distribution in 1879. No sets of these notes have yet been examined.

158. See Thomas E. O'Donnell, comp., "The Writings and Translations of Dr. N. Clifford Ricker," (typescript, University of Illinois, 1926); Thomas E. O'Donnell, "The Ricker Manuscript Translations," Pencil Points 7 (October 1926), 621-22.

159. The continuing reliance on the German architectural literature in the Midwest can be seen in the titles and ads in Henry E. Haferkorn's Handy Lists of Technical Literature, Parts V and VI: Fine Arts and Architecture (Milwaukee: Haferkorn, 1893).

160. See Bruce Sinclair, Early Research at the Franklin Institute (Philadelphia: Franklin Institute, 1966) and Idem, Philadelphia's Philosopher Mechanics (Baltimore: Johns Hopkins University Press, 1974).

161. The Maryland Institute was incorporated in 1826, with Robert Cary Long and J.H.B. Latrobe among its founders. It flourished until 1835, then was reorganized in 1847. The School of Design included a four-year course in architectural drawing and a two-year course in the building trades. William Minifie (1805-1880), trained in Devonshire as a carpenter and ship joiner, came to Baltimore in 1828, where he continued in these trades, worked as an architect-builder, ran an art supply store, and taught drawing in the Central High School. In 1852, he was appointed Professor of Drawing at the Maryland Institute. His Textbook of Geometrical Drawing, Perspective and Shadows (1849) had sold 15,000 copies by 1878. Also in 1852, the Maryland Institute hired David Acheson Woodward (1823-1909) as Instructor of Drawing. Woodward, with training in painting at the Pennsylvania Academy, would serve as Principal of the Drawing Department at the Maryland Institute, 1853-60, and of its reorganized School of Art and Design, 1860-80. He would be succeeded in 1880 by Hugh Newell (of the Pittsburgh School of Design for Women), and Newell would be succeeded in 1884 by Otto Fuchs (who had succeeded Walter Smith as Director of the Massachusetts State Normal Art School). As early as 1858-59, the architecture students at the Maryland Institute were not only copying plans and elevations, they were also modifying existing designs and doing original designs. See Biographical Cyclopedia of Representative Men of Maryland and the District of Columbia (Baltimore: National Biographical Publishing Co., 1879), 158, 510; and annual catalogs of the Maryland Institute.

162. Peter Cooper (1791-1883) wrote in 1858 that he hoped to establish a "polytechnic school of the most thorough character and the highest order, based as nearly as possible upon the model of L'Ecole Centrale at Paris." Not being able to interest either the New York Board of Education or Columbia College in the project, he established the Cooper Union School of Science and Art on his own. See Edward C. Mack, Peter Cooper: Citizen of New York (New York: Duell, Sloan and Pearce, 1949), 262-69. In the second year (1860-61), the evening architectural drawing classes were supervised by Clarence Cook and F.J.M. Derrick. There were 144 students--62 of them carpenters. See The Crayon 8 (July 1861), 152. Ten years later, enrollment in the architectural drawing class was about the same: 131 students--50 of them carpenters and cabinetmakers, 19 of them masons and builders. (This class still accounted for less than ten percent of the total enrollment in the evening courses.) P.B. Wight gave one lecture on "Architecture in its relation to the needs of the present day." See Report of the Commissioner of Education (Washington: U.S. Department of the Interior, 1870), 519-25.

163. The only record I have found of Ware's teaching in Worcester is an entry on November 17, 1870, in M.I.T. Corporation, Records, vol. 2,

1866-73, 206. The Worcester County Free Institute of Industrial Science (later Worcester Polytechnic Institute) was founded in May 1865 by two local mechanic-entrepreneurs. C.O. Thompson, a chemist trained at Dartmouth, M.I.T., and Dresden, served as the first director, before going on to Rose Polytechnic Institute in Terre Haute, Indiana. The main purpose of the Worcester Free Institute was the training of mechanical engineers, who received the degree of B.S. after a three-and-a-half-year course of study. See "Worcester Free Institute and Its Manufactures," Manufacturer and Builder 3 (January 1871), 8; George L. Alden, "Technical Training at the Worcester Free Institute," Transactions of the American Society of Mechanical Engineers (1884-85), 510-56.

164. The "Free Courses of Instruction" were first proposed in a letter of John Amory Lowell to Pres. Rogers of M.I.T. on October 26, 1865, in M.I.T. Corporation: Government, vol. 1, 1862-66, 254-55. Other benefactions of Lowell at M.I.T. were the Lowell School of Practical Design--a school of textile and wallpaper design, primarily for women, established in 1872; and the School of Mechanic Arts--a program in shopwork for non-collegiate young men, established in 1876. See H.K. Smith, History of the Lowell Institute, Boston (Boston, 1898). The School of Mechanic Arts was influenced by exhibits of the Moscow and St. Petersburg Imperial Technical Schools, which Pres. John D. Runkle had seen at the Philadelphia Centennial Exhibition. See John D. Runkle, "The Russian System of Shop Work Instruction," PR...1876, 124-45. Ware served on the first faculty committee evaluating the School of Mechanic Arts in the spring of 1877. Not until his final year at M.I.T. did a few of his architecture students begin doing some shopwork--one of whom had transferred from the School of Mechanic Arts into Architecture.

165. AC...1873-74, 62.

166. Ibid.

167. Only the prospectus for the 1875-76 course on perspective survives, PR...1876, 67-68.

168. On the A.I.A.'s proposal for a national school, see Chapter 1, p. 54.

169. A circular dated June 27, 1870 outlines the classification scheme for the architectural museum: I. Materials; II. Building Appliances; III. Decoration and Fittings; IV. Examples of Skilled Workmanship; V. Construction Models; VI. Art Models; VII. Relics. In A.I.A. Office Files: Secretary: Miscellaneous: Scrapbook, 1857-1874 (RG 801, SR1.2), box 1, folder 4, DAIA-Ar. Notice of the museum also appeared in EMJ 10 (August 16, 1870), 105-06.

170. The Cincinnati Junior Chapter was organized in January 1871 with Leroy S. Buffington as president. Senior and junior members soon realized that a meeting time agreeable to both groups would be difficult to find, because most of the senior members lived in the suburbs and wanted to start for home immediately after work. The junior members, therefore, organized themselves to meet anyway, every other Monday evening, to critique designs prepared according to a set program and to have a

question-and-answer session with one of the senior members invited to take his turn meeting with the group. After hearing the report of the Cincinnati Chapter at the 1872 A.I.A. convention, Ware likened the junior organization to the Architectural Association in London. AIA Proc...1872, 30-31. It has not yet been determined how long the Cincinnati Junior Chapter lasted. The only design programs yet discovered are: "A Village Church in the Decorated Gothic style" (January 1871) and "A Club-house" (February 1871). See Cincinnati Daily Times, February 7 and March 7, 1871. In the spring of 1876, the Cincinnati Chapter discussed "the advisability of forming a department of Architecture in the Cincinnati University," but nothing more is known about the relations between the Chapter and the School of Design at U.C. Minutes of April 18, 1876 meeting, American Institute of Architects, Cincinnati Chapter: Minutes, 1870-1901, box 1, OCH.

171. The "nucleus of a Museum of Archaeological relics and building appliances" had already been formed by 1870, and additional solicitations followed, yet these collections would remain secondary to the collections of the chapter library. AIA Proc...1870, 24.

172. A.I.A. Office Files: Secretary: Miscellaneous: Scrapbook of New York Chapter (RG 801, SR 1.2), DAIA-Ar; AIA Proc...1870, 24-25.

173. AIA Proc...1868, 14; AIA Proc...1870, 23.

174. AIA Proc...1872, 17.

175. AIA Proc...1875, 17.

176. AIA Proc...1871, 15; AIA Proc...1875, 17.

177. AIA Proc...1872, 16. A.I.A. Office Files: Secretary: Correspondence, Incoming, 1857-1876 (RG 801, SR 1), box 1, DAIA-Ar.

178. See n. 111.

179. AIA Proc...1872, 17.

180. AIA Proc...1870, 25. In December 1870 the Philadelphia Chapter announced that it had organized an architectural reading room on the third floor of the Athenaeum, "for the use of Architects, Students of Architecture, Amateurs, Draughtsmen, Modellers, and all who are in any way connected with the arts of design, either as patrons or operatives." Scrapbook of New York Chapter, DAIA-Ar. The Boston and Cincinnati Chapters cooperated with the local public libraries in recommending architectural books for purchase.

181. The New York Chapter headquarters was at 925 Broadway, 1869-72, and 128 Broadway, 1873-80. A.J. Bloor, A.I.A. national Secretary, wrote to Prof. Babcock in response to his inquiry about jobs for Cornell graduates, the first of whom began to enter the market in the spring of 1874: "... I shall be glad if any of the young men who may decide to come to New York will consider our rooms their down-town headquarters while waiting, like our friend Mr. Micawber, for something to turn up." Bloor to Babcock,

June 26, 1874. A.I.A. Office Files: Secretary: Correspondence, Outgoing, 1864-1876 (RG 801, SR 1.1), box 1, letterbook 3, DAIA-Ar. See also AIA Proc...1871, 16; AIA Proc...1872, 17.

182. "Circular of New York Chapter, Committee on Education, Russell Sturgis, Chm." [Fall 1870]. In Scrapbook of New York Chapter, DAIA-Ar.

183. From one to dozen students attended throughout the spring. One of Wight's lectures drew 200 people. AIA Proc...1871, 15-17.

184. Ware to White, June 10, 1871. Andrew Dickson White Papers, NIC-Ms. See pp. 186-89.

185. Prof. John F. Weir of Yale (n. 109) gave a series of six lectures in New York in November and December of 1874, on the Arts of Design. The New York Tribune, December 10, 1874, reported on his lecture on "The Art of Architecture." Lecture series were also sponsored by A.I.A. Chapters in Boston (Spring 1875 and 1876) and Philadelphia (1879). The Philadelphia lectures consisted of technical papers prepared "by different members of the several building trades." AIA Proc...1879, 17. The 1870 charter of the Philadelphia Chapter provided for a class of Non-Professional members (amateurs in the fine arts, attorneys), who could join in all chapter activities and deliberations--the assumption being that the cause of professionalization would be advanced more by regular exchanges between architects and non-architects than by relatively infrequent lecture series open to the public.

186. AIA Proc...1874, 15. In 1869, an organization of architectural and mechanical draftsmen, calling itself the New York Draughtsman's Association, had held a competition for the design of a column capital. The designs were judged by Emlen T. Littell, John Davis Hatch, and Arthur Gilman, all members of the A.I.A. national Committee on Education. July 8, 1869 clipping, in Scrapbook of New York Chapter, DAIA-Ar. Nothing more has been found on this organization.

187. Programs were given on a Circular of January 13, 1877. Judging was reported in the New York World, February 24, 1877. Both are in Scrapbook of New York Chapter, DAIA-Ar.

188. On the founding of the B.S.A., see Chapter 2, pp. 73-74.

189. Ware gives an account of his acquisitions in PR...1872, 35-37.

190. E.C. Cabot, W.R. Ware, H.W. Hartwell, and E.D. Harris were appointed on June 30, 1870 as a committee "to take steps towards establishing a 'Museum of Building Materials, particularly Stones and Clays.'" Nothing came of this. Van Brunt, in his December 2, 1870 report to the B.S.A. on the annual A.I.A. Convention, mentioned the proposed Philadelphia Chapter Museum of Building Appliances. William Downes Austin, A History of the Boston Society of Architects in the Nineteenth Century (From 1867 to January 4, 1901) (3-vol. typescript, August 1942), Chapter 5, pp. 20-21, MBAt.

191. Ibid., Chapter 3, p. 9.

192. A full list of the topics discussed during the 1870s is included in n. 196.

193. Between April 5, 1872 and July 1, 1875 the B.S.A. met in the space it rented at 9 Pemberton Square, in the midst of that concentration of architects' offices which persisted in that locality from the late 1860s to the mid-1870s. The dates of the B.S.A. office in Pemberton Square are taken from Austin, History of the B.S.A., Chapter 5, p. 26; Chapter 7, pp. 1, 34--who had access to original B.S.A. records. These dates differ significantly from those given by the Boston directories, which show the B.S.A. at 9 Pemberton Square from 1874 through 1877--a two-year lag at both ends. From 1871 to 1885 the directories also show that Cummings and Sears had their office at 9 Pemberton Square. Charles A. Cummings was Secretary of the B.S.A. from October 1871 to October 1877. After 1875, however, the B.S.A. went back to meeting at M.I.T.

194. Austin, History of the B.S.A., Chapter 5, p. 21. Austin records only a few such presentations of members' work. (See n. 196.) It is possible that much of the interest in current work was diverted to the Portfolio Club, a group of "younger members of the profession in Boston" (most of them B.S.A. members), organized about 1871, "for mutual improvement through criticism of each other's work." Drawings were laid out and critiqued at the Club meetings, and a half-hour sketch problem was worked on. See AABN 1 (December 9, 1876), 394. The lasting contribution of the Portfolio Club was the Architectural Sketch-Book, consisting of a set of four unbound lithographed plates published each month by James R. Osgood & Co., July 1873 (vol. 1, no. 1) through December 1876 (vol. 4, no. 6). The Architectural Sketch-Book (Boston) was soon followed by a companion Osgood publication, the New York Sketch Book, published form January 1874 (vol. 1, no. 1) through December 1876 (vol. 3, no. 12), and edited by Charles F. McKim. A prototype publication, consisting of plates of current work and competition projects, was the Croquis d'Architecture, directed by the Intime Club of Paris, from May 1866 to December 1898. The Architectural Association Sketchbook (London, 1867-1893; 1895-1917; 1923) consisted almost entirely of archaeological sketches, as did the Spring Gardens Sketch Book (London, c.1867-c.1890), a publication of the pupils of George Gilbert Scott. The Boston and New York Sketch-Books were continued by Osgood & Co. during the first year of that firm's American Architect and Building News (begun January 1, 1876). The Sketch-Books were then discontinued, and all the efforts of the publisher and of professionals (particularly in Boston) were concentrated on assuring the success of the American Architect and Building News. See Mary Norman Woods, "The 'American Architect and Building News' 1876-1907" (Ph.D. dissertation, Columbia University, 1983).

195. Van Brunt motion, January 7, 1876. Austin, History of the B.S.A., Chapter 8, p. 2.

196. A partial listing of members' presentations from 1868 through 1881 has been compiled from Austin, History of the B.S.A., passim. Among the papers and discussions on architectural education were: The Study and Practice of the Profession of Architecture in the Kingdom of Prussia (Louis Weissbein, April 2, 1869); Architectural Education (Ware, November 19, 1869); Charcoal Drawing (Ware, March 5, 1875); The Qualifying of

Architects (W.P.P. Longfellow, April 5, 1878, published in AABN 3, April 20/27, 1878, 134-35; 142-44, 203 [John A. Fox reply]). On professional practice: Competitions (T.M. Clark, February 5, 1869); Metric System (J.P. Putnam, November 5, 1875); Professional Practice (December 3, 1875); Contracts (T.M. Clark, March 7, 1879). (Other discussions on professional practice were held in connection with various reports of special committees.) On building technology: Warming and Ventilating of churches with Open Timbered Roofs (Van Brunt, December 17, 1867; January 7, 1868; January 28, 1868); Stained Glass (Ware, July 7, 1868); Drains and Drainage [Municipal Sewer Systems] (H. Floyd Faulkner, March 5, 1869); Elevators (Clemens Herschel, March 19, 1869); Artificial Stones (W.G. Preston, May 7, 1869); Building Materials on the [Northeast] Coast (N.S. Shaler, June 3, 1870); [Efflorescence on] Brickwork (James Dana, October 6, 1871); Plaster Block Hollow-Core Flooring (Ware, January 3, 1873); School Ventilation (A.C. Martin, March 7, 1874); Creosote Treatment of Timber (E.R. Andrews, December 7, 1877). (Other topics were discussed from time to time in connection with contemporary works or samples brought to meetings for examination.) On architectural history: Charles Bulfinch (Rev. S.G. Bulfinch, January 19, 1869); Influence of Monastic Orders on Architecture (A.C. Martin, February 19, 1869); Destruction of the Old New England Houses ... the Only Truly American Architecture Which Has Yet Existed (W.R. Emerson, May 21, 1869); Roman Baths (Van Brunt, reading from Viollet-le-Duc, April 1, 1870), Rock Cut Temples of India (Charles Brigham, January 6, 1871); Theatres from Early Greek to Modern Times (E.C. Cabot, March 3, 1871); Villard de Honnecourt (W.P.P Longfellow, January 2, 1874); Indian Architecture of Twelfth and Thirteenth Centuries (Walback, May 4, 1877); Colonial Architecture (May 8, 1878, published in AABN 3, May 11, 1878, 167); Pisa Cathedral (Goodyear, January 2, 1880); Doric Temples in Asia Minor (Joseph T. Clarke and Francis H. Bacon, January 7, 1881). On decorative and fine arts: Interior Decoration (W.P.P. Longfellow, December 15, 1868); Interior Decoration (Van Brunt, February 5, 1875); The Growth of the Conscientious Spirit in the Arts of Decoration (Van Brunt, February 8, 1878, published in AABN 3, February 16, 1878, 57); Relation between the Painter and the Architect (Frederic Crowninshield, December 10, 1880). The most numerous papers and discussions were on contemporary European and American architecture. In the following chronological list, sessions marked (#) were organized around a display of current drawings; sessions marked (*) were the on-site critiques of recent Boston buildings. Royal Theatre at Dresden (Semper article, translated by Karl Heinzen, read by Charles Follen, January 28, 1868); Life and Works of Sir Charles Barry (C.A. Cummings, December 1, 1868); Law Courts Competition (Ware, January 5, 1869); Louvre and Tuileries (Ware, April 16, 1869); #Museum of Fine Arts (Sturgis and Brigham, December 6, 1872); #Memorial Hall (Ware and Van Brunt, December 5, 1873); City Dwelling Houses (W.G. Preston, January 8, 1875); #Providence City Hall (S.J.F. Thayer, March 5, 1875); Planning of Churches (C.A. Cummings, substituting for H.H. Richardson, April 2, 1875); Revival in England of Queen Anne Style (February 2, 1877); *New Old South Church (February 4, 1876); *Memorial Hall (April 7, 1876); *Brookline Town Hall (May 15, 1876); *Museum of Fine Arts (June 2, 1876); *Moody and Sankey Tabernacle (January 5, 1877); *Trinity Church (April 6, 1877, published in AABN 2, April 28, 1877, 133); Queen Anne Architecture (R.S. Peabody, April 6, 1877, published in AABN 2, April 28, 1877, 133-34); *Harvard Library Wing (June 1, 1877); American Architecture with Precedent and without (W.P.P. Longfellow, January 3, 1879, published in AABN 5,

January 11, 1879, 14); Construction of Small Theatres (John A. Fox, April 4, 1879).

197. See pp. 198-99.

198. AIA Proc...1875, 22. The topics of the eight principal lectures, delivered from March 3 to April 21, 1875 were: Modern English Architecture (C.A. Cummings); Modern German Architecture (J.P. Putnam); Modern French Architecture (W.P.P. Longfellow); The Use of Precedent (R.S. Peabody); Mosaic and Terra Cotta (J.H. Sturgis); Stained Glass (W.R. Ware); Decorative Sculpture (W.R. Emerson); Furniture and Interior Decoration (H. Van Brunt). Two additional lectures, whose authors are not known, were: Pottery of China and Japan; and Methods of Study Pursued in the Architectural Department of the School of Fine Arts in Paris. See A.I.A. Scrapbook, 1857-1874, A.I.A. Office Files, Secretary: Miscellaneous (RG 801, SR 1.2), box 1, folder 9, DAIA-Ar. The fact that someone other than Ware gave the lectures on modern English, German, and French architecture is a further indication that Ware's acquaintance with contemporary architects and their works, beginning with the 1866-67 European trip, was more casual than systematic or sustained. A series of six B.S.A. lectures on Italian, French, and English Renaissance architecture, proposed to be given at M.I.T. during the spring of 1876, was not delivered. See Austin, History of the B.S.A., Chapter 8, p. 3.

199. AIA Proc...1876, 53. On this institution, see n. 163.

200. Austin, History of the B.S.A., Chapter 5, pp. 15-16. On the programs for design problems of 1868-69, see Appendix I.

201. Austin, History of the B.S.A., Chapter 5, pp. 18-19. Edward C. Cabot, President of the B.S.A., wrote to M.I.T. in February 1870, that the prizes were being offered "as evidence of their [B.S.A.'s] sympathy with the course adopted by the Institute, and as an acknowledgment of the courtesy shown to the Society in granting access to the collections and drawings, and in the use of their rooms for the meetings of the Society." M.I.T. Corporation: Government, Records, vol. 2, 1866-1873, 178, MCM-Ar. Five years later, the B.S.A., in retrospect, reported to the annual A.I.A. Convention, that the prizes had been created in recognition of "the advantage to the whole profession of having at its doors a well-established, fully-equipped and wisely-conducted School of Architecture, turning out every year a number (constantly increasing) of architectural students, with trained eyes and hands, ready to take their places in the offices of this or other cities, and able to bring to their work there the enthusiasm of students, added to the technical and historical knowledge which the hurry of an office leaves little opportunity to acquire." AIA Proc...1874, 19.

202. No rigorous criteria of significance are intended here, and the estimates should be sufficiently loose to allow the simple conclusion that the selective judgments of the B.S.A. during the 1870s were eventually vindicated.

203. W.R. Emerson, "Destruction of the Old New England Houses," B.S.A. meeting, May 21, 1869; and Richard Upjohn, "The Colonial Architecture of

New York and the New England States," A.I.A. Convention, November 16, 1869 (in AIA Proc...1869, 47-51). On measured drawing at M.I.T., see Chapter 2, p. 114. Another episode in the emerging interest in colonial architecture was Robert S. Peabody's trip with Arthur Little along the coast north of Boston in July 1877, which resulted in Peabody's paper on "Colonial Architecture," at the A.I.A. Convention, October 18, 1877, and Little's Early New England Interiors (published 1878 but completed by December 1877). See Wheaton Arnold Holden, "Robert Swain Peabody of Peabody and Stearns in Boston, The Early Years, 1870-1886" (Ph.D. dissertation, Boston University, 1969), 82; AIA Proc...1877, Appendix, 16-19. McKim, Mead, Bigelow and White also toured the area north of Boston in the summer of 1877. At its November 1879 Convention, the A.I.A. appointed a Special Committee on Colonial Architecture, consisting of McKim, Peabody, George T. Mason, W.P.P. Longfellow, and J.C. Cady. AIA Proc...1879, 65. The result was a paper delivered by Mason at the November 1880 Convention. See William Bertolet Rhoads, "The Colonial Revival" (Ph.D. dissertation, Princeton University, 1974), 48-81; Leland M. Roth, McKim, Mead & White, Architects (New York: Harper and Row, 1983), 44-47.

204. See AABN 5 (April 12, 1879), 119 and (May 17, 1879), 153.

205. See Austin, History of the B.S.A., Chapter 8, p. 15.

206. AABN 2 (February 17, 1877), 53.

207. The Committee on Education was dominated by New York interests during its first four years, during which time the A.I.A. annual conventions were still being held in New York, and the Committee remained dedicated to the idea of establishing a national school of architecture in or near New York, under the auspices of the A.I.A. For three years, Ware was the only non-New York member of the Committee. He missed the first annual convention in October 1867, staying in Europe until December of that year. Ware would serve as Chairman of the Committee from 1870 through 1876, then again in 1879-80, and he would continue as a member (except for 1896-98) until 1904, the year after his retirement from Columbia. For the full membership of the Committee on Education, see Appendix L. Ware also served as A.I.A. Corresponding Secretary (i.e., Secretary for Foreign Correspondence) for three years, from 1868 through 1870, allowing him to report on the professional and educational activities of organizations and individuals he had become acquainted with while in Europe. Concurrent with his chairmanship of the Committee on Education, Ware also served as Chairman of the Committee on Professional Practice (1870-76), addressing such issues as competitions, professional fees, and professional standards.

208. A.J. Bloor, A.I.A. Secretary (1874-77; 1881-82; 1887-89), also ran the New York Chapter headquarters, and he once mentioned that student draftsmen, considering some form of instruction in architecture, found Ware's Committee on Education reports useful in understanding the limitations of studying in a working office. AIA Office Files, Secretary: Correspondence, Outgoing, 1864-1876 (RG 801, SR 1.1), box 1, letterbook 4, 102-03.

209. AIA Proc...1871, 13-15. Ware was considerably more optimistic about the evolution of diverse collegiate programs than he had been only five months before, when writing President White of Cornell about the prospects for a collegiate course of architectural instruction in Ithaca. An enrichment of art and architectural education in Boston was expected from two recent developments--the recent arrival of Walter Smith from the South Kensington Schools of Design, to head the art education programs in the city and the state; and the impending arrival of Eugene Letang from the Ecole des Beaux-Arts to head the design studio at M.I.T. Walter Smith gave the closing address at the Boston convention of the A.I.A. in November 1871. See Chapter 2, pp. 109.

210. AIA Proc...1872, 14.

211. AIA Proc...1873, 36.

212. AIA Proc...1872, 15.

213. AIA Proc...1876, 59-60.

214. AIA Proc...1872, 15. For elaborations on the pivotal role of collegiate schools in the lifelong education of a class of professional architects, see AIA Proc...1873, 38-39; AIA Proc...1874, 24-25.

Chapter 5: Notes

1. The number of bona fide architecture students of Prof. Ware is closer to 227, after deducting the 4 who switched to other majors at M.I.T. (Emery, Saltmarsh, Woods, Young), and three who later became prominent architects (Cobb, Eyre, Peabody) but had taken only the first-year course of general studies at M.I.T. In order to maintain the full context of Ware's teaching, in relation to students of variable status, the full count of 234 alumni has been used throughout this chapter as the denominator whenever percentages are calculated.

2. The biographical documentation of students' careers is naturally richer than the documentation of their educational and family backgrounds prior to M.I.T. Even so, the Annual Catalogues published by M.I.T. give us a record of the geographical origins (i.e., hometowns) of all the architecture students during the Ware years. The 46 architecture students with prior collegiate educations are often more fully documented in the alumni records of other schools. The family backgrounds of 70 students have thus far been documented, by tracing a father's name, as given in the M.I.T. Registrar's records, in city directories, and other biographical sources. While M.I.T. Annual Catalogues and Registrar's records have provided a good basis of documentation on student backgrounds, the documentation of alumni careers has depended heavily on alumni classbooks (for universities other than M.I.T. when students had prior collegiate educations), on city directories (mostly for Boston, but for many other cities, as well), and on obituaries in newspapers and architectural journals. The early careers of these alumni (their first ten years after leaving M.I.T.) are in almost half the cases unknown, despite extensive research. Even the later careers of about 30 percent of the architecture alumni have not yet been documented. It has been possible to demonstrate that one alumnus in ten went into a career outside architecture: 18 left the field within their first ten years after M.I.T., and another 10 left the field in later years. Taking these matters into consideration, the number of alumni who actively worked in the field of architecture during their first ten years after M.I.T. is reduced to 103, and the number who can be followed into their later architectural careers is reduced to 125. (Architectural careers are broadly defined to include architecture, architectural publishing and education, contracting and building, building materials fabrication and supply, and landscape architecture. In addition to the 18 who were working outside of architecture within their first ten years out of M.I.T., there were 10 who died within that first decade. Of these, 5 had short early careers that have been documented.)

3. Half a dozen studies in the social history of American higher education have suggested dimensions worth accounting for in a collective biography of students before and after college. The functions and values associated with the liberal arts college and those associated with the emerging departmentalized and professionally oriented university are discussed in: George E. Peterson, The New England College in the Age of the University (Amherst: Amherst College Press, 1964); Laurence R. Veysey, The Emergence of the American University (Chicago: University of Chicago Press, 1965); Colin B. Burke, "The Quiet Influence: The American Colleges

and Their Students, 1800-1860," (Ph.D. dissertation, Washington University, 1973); David F. Allmendinger, Jr., Paupers and Scholars: The Transformation of Student Life in Nineteenth-Century New England (New York: St. Martin's Press, 1975); Burton J. Bledstein, The Culture of Professionalism: The Middle Class and the Development of Higher Education in America (New York: W.W. Norton, 1976); Colin B. Burke, American Collegiate Populations: A Test of the Traditional View (New York: New York University Press, 1982). A review of Allmendinger's book provides the best bibliographic essay on recent research on this topic: David B. Potts, "Students and the Social History of American Higher Education," HEQ 15 (Fall 1975), 317-27. Burke, Allmendinger, and Potts himself have been particularly interested in the demographics of higher education and have developed extensive biographical files on American college and university students during the nineteenth century. (See note 5 in Potts' 1975 review essay.) There are as yet no studies of the social history of technical education in America to compare with those on technical education in Europe. See especially John Hubbel Weiss, The Making of Technological Man: The Social Origins of French Engineering Education (Cambridge: MIT Press, 1982), for an analysis of the student milieu at the Ecole Centrale des Arts et Manufactures (presented throughout in comparison with the Ecole Polytechnique).

4. Sullivan's reminiscences of M.I.T. in The Autobiography of an Idea [1924] (New York: Dover Publications, 1956), 183-89, are well-known. He felt he was being subjected to "a sort of misch-masch of architectural theology," and "he could see no future there." At best, M.I.T. gave "but a polite introduction to the architectural Art." Gilbert, though he won first place in the Boston Society of Architects Prize judging in the spring of 1879, was disillusioned by the way that the judging had been carried out and generally discouraged by a year of perpetual disagreements and reconciliations with Letang. See letters from Cass Gilbert to Clarence H. Johnston, January 5 and May 29, 1879, in Clarence H. Johnston Collection, MnHi.

5. Shepley, Rutan and Coolidge could also be mentioned, though Charles A. Coolidge did not come to M.I.T. until 1881-82, after Ware's departure for New York. George F. Shepley, who studied with Ware during the professor's last year in Boston, stayed on at M.I.T. for the 1881-82 year.

6. Shepley and Coolidge were both working for H.H. Richardson two years after leaving M.I.T., and Richardson's death in April 1886 hastened the formation of their partnership in June 1886, four years after leaving school. Heins and LaFarge also formed an early partnership in 1886, four years out of school.

7. Antoinette J. Lee is at work on Architects to the Nation: Office of the Supervising Architect. Drawings from the Supervising Architect's office are included in Bates Lowry, Building a National Image: Architectural Drawings for the American Democracy, 1789-1912 (Washington, D.C.: National Building Museum, 1985), and Chapters 6 and 7, pp. 58-88 give a summary of the Supervising Architect's office from 1866 to 1912. The confrontations of the 1890s between the architectural profession and the Supervising Architect's Office over the awarding of commissions for public buildings are summarized in Andrew Saint, The Image of the

Architect (New Haven: Yale University Press, 1983), 91-94. Little work has yet been done on state and municipal architects. The office of City Architect in Boston was created in 1874 and abolished in 1895, when a system of departmental architects was introduced. See Francis W. Chandler, Municipal Architecture in Boston, from Designs by Edmund M. Wheelwright (Boston: Bates & Guild Co., 1898), vol. 1, pp. 1-15.

8. See Mary Norman Woods, "The 'American Architect and Building News' 1876-1907" (Ph.D. dissertation, Columbia University, 1983).

9. The Southern Architectural Review was a short-lived publication, September 1910 through October 1911. Dewson was editor from November 1910 through October 1911.

10. Kidder's Architects' and Builders' Pocket-book went through 16 editions between 1885 and 1916. It was thereafter published as the Architects' and Builders' Handbook, under the editorship of Thomas Nolan (1857-1926), one of Ware's first students at Columbia, and Harry Parker (1887-).

11. See n. 53, below.

12. On the publishing activities of Bicknell and Comstock and the need to reassess the opposition of "high-style" and "vernacular" see Michael A. Tomlan, "Popular and Professional American Architectural Literature in the Late Nineteenth Century" (Ph.D. dissertation, Cornell University, 1983), 148-88; 360-61.

13. The average for the thirteen years that Ware was department chairman was only 4 percent. See Appendix B for a complete summary of the enrollment figures cited in this discussion.

14. There had been 14 degrees awarded in the general scientific course, 5 in physics, 4 in natural history, and 1 in metallurgy.

15. The only notable students who left M.I.T. just short of completing the regular course were William B. Bigelow in 1871 (later of McKim, Mead and Bigelow), and Alfred B. Harlow in 1878 (later of Longfellow, Alden and Harlow).

16. Boyden managed the Philadelphia office of Cabot and Chandler from 1880 to 1884; Furber managed the St. Louis office of Peabody and Stearns from 1883 until his death in 1893. Both briefly held partnerships in their respective firms.

17. By 1880-81, Cornell's Department of Architecture, which encouraged a regular course of study more than M.I.T., had graduated about 33 students (one out of every three who matriculated, compared to one out of every fifteen at M.I.T.). Even so, 36 percent of those who earned Cornell architecture degrees were working in other fields within ten years.

18. Twenty more students, who had begun at M.I.T. under Ware, finished by 1883, making up the total of 234 students from the Ware years.

19. By 1880-81, Ware had accepted 33 students with undergraduate degrees, 9 transfer students, and 4 whose undergraduate status has not yet been determined. One in every four of the short-term special students in architecture was, in fact, a graduate or transfer student. The largest concentration of students with prior collegiate backgrounds were the 19 Harvard alumni; 4 came from Dartmouth; 3 from Amherst; 2 each from Cornell, Washington University, and M.I.T. (as returning students); and 1 came from each of the following institutions: Brown, Grinnell, Iowa State, Macalester, Owen College (Manchester, England), Pennsylvania State, R.P.I., U.S. Naval Academy, University of Maine, University of Minnesota, University of Pennsylvania, University of the South, Washington and Lee, and Yale.

20. A student's place of origin (taken from Appendix D) is the hometown listed in the M.I.T. Annual Catalogue for the year he or she entered. This is not necessarily a place of birth and is not necessarily the place where a student resided while at M.I.T. The number of families who moved while their children were students at M.I.T. is insignificant. The New England and Boston concentration increases still more if we substitute the location of his undergraduate college for his hometown. By this count, there were 172 New England students, 119 of them from the Boston area.

21. An additional 11 students came from parts of the rural Midwest not clearly in the hinterland of any major city. Altogether, the Midwest accounted for half of the non-New England students at M.I.T. The increasing representation of students from the Midwest in the later 1870s may be related to the fact that the depressed building cycle in western North Central cities began to recover in 1878 while recovery in eastern North Central cities and those in the Mid-Atlantic region was delayed until 1879. In the New England region, recovery in the building industry did not start until 1880.

22. Similar regional orientations can be seen in the student populations of the other major architecture programs during the 1870s--Cornell and the University of Illinois--as well as in the student populations of the smaller architecture programs at Syracuse and the University of Pennsylvania. Complete data are available only for Cornell at this point. Cornell drew 41 of its 94 architecture students from 1871-72 through 1880-81 from upstate New York. The 18 students from metropolitan New York represent a much smaller percentage of Cornell's student body (19 percent) than the 48 percent of M.I.T.'s student body which came from metropolitan Boston. But considering that 18 New York students went to Cornell and only 11 to M.I.T., it is clear that, before the establishment of the Department of Architecture at Columbia, Cornell was the architecture school most favored by students from Manhattan, Brooklyn, and surrounding cities of Long Island and northern New Jersey. Combining the numbers of metropolitan and upstate New York students, we see that about six out of every ten Cornell architecture students came from the university's own proper domain--a proportion comparable to the seven out of every ten M.I.T. students who came from New England. Cornell attracted only half as many students from the Midwest as M.I.T., but they constituted about the same proportion of the student population (19 percent for Cornell, 14 percent for M.I.T.). Fewer Cornell students came from major cities in the Midwest; more from small towns. The number of New England students

who went to Cornell instead of M.I.T. (8, including 2 from metropolitan Boston) was just about equal to the number of upstate New York students (9) who went to M.I.T. instead of Cornell. While the exchange may have been equal, it should be emphasized that regional bias prevailed. About 93 percent of all the approximately 175 New England students known to have attended any collegiate school of architecture in the 1870s went to M.I.T. About 68 percent of the approximately 60 upstate New York students went to Cornell (and another 15 percent to Syracuse). A similar bias prevailed at the University of Illinois, which attracted about 68 percent of all architecture students of the period from Illinois and neighboring Indiana, Wisconsin, and Missouri.

23. Heins had only taken two years of general studies at Penn. He was admitted to the three-year course in architecture at M.I.T. and earned his S.B. degree in 1882. For more on the early architecture program at Penn, see Chapter 4, pp. 183, 186.

24. Shepley had completed two years of general studies when he left Washington University in 1879. Where he spent 1879-80 is not yet known. Alfred F. Rosenheim was a year ahead of Shepley at Washington University. Rosenheim may have begun third-year studies in St. Louis and may have gone on to M.I.T. as early as the middle of the 1878-79 academic year. For more on the early architecture program at Washington University, see Chapter 4, n. 108, 116.

25. William S. Larned also transferred from Cornell to M.I.T. in 1874. The only known case of an architecture student transferring from M.I.T. to another school was Charles Terrell, who was a classmate of Cornell transfer students Wicks and Larned at M.I.T. in 1874-75 and who went on to Cornell for a single term in 1875-76. For more on the early architecture program at Cornell, see Chapter 4, pp. 186-92.

26. Three Indianapolis students (Louis H. Gibson, George R. Mann, and Bernard Vonnegut) went east to M.I.T. rather than west to the University of Illinois, only 125 miles away, and all but one came home to practice. Among the three Chicago students bypassing the University of Illinois to go to M.I.T. was Henry A. Phillips, who would become M.I.T.'s first architecture graduate in 1873, three months after Nathan Clifford Ricker had graduated in architecture from the University of Illinois. (The other Chicagoans were Normand S. Patton, who had done his undergraduate work at Amherst, and Emil Frommann.)

27. For New England students who chose to go to Cornell, see note 22. The career of Clarence H. Blackall is anomalous in several respects. He was raised in New York but was living in Chicago when he chose to go to the University of Illinois in 1874. From there he went on to the Ecole des Beaux-Arts--one of the few Illinois students to go to Paris in these early years. Instead of returning to New York or Chicago when he left the Ecole, Blackall went to Boston, where he worked for Peabody and Stearns from 1882 to 1884. In 1884, he won the first Rotch Travelling Scholarship (when Ralph Adams Cram withdrew from the competition). Blackall spent two more years in Europe, then returned to establish his practice in Boston.

28. The problem of multiple counting becomes evident as we concentrate on the various destinations of students from a single place. A single student, who moved from one place to another during his career, is counted once in each region where he chose to locate.

29. Louis H. Sullivan, The Autobiography of an Idea [1924] (New York: Dover Publications, 1956), 185-86. Sullivan's recollection of the number of architecture students during 1872-73 matches exactly with the roster of students as reconstructed in Appendix H. At 16, Louis Sullivan was probably the youngest student in the class, where the average age was about 20. The "university graduates" and their ages in 1872-73 were Curtis (26), Merrick (23), Rotch (22), and Ware (24). There were seven "advanced students" taking course work at the fourth-year level. Arthur Rotch and William Rotch Ware were beginning their second and final year as special students in architecture. George Ferry, like Sullivan himself, would spend only one year at M.I.T. (At the time he was a student, Ferry's home was Springfield, Massachusetts. Not until about 1880 did he move to Milwaukee.) The family backgrounds of Sullivan's 29 classmates are still largely unknown, but to the list of "rich men's sons" might be added at least Colt, Curtis, Merrick, and Read. All of these but Curtis gave up the practice of architecture within three years of leaving M.I.T. Curtis and Rotch had promising but short careers as architects in Boston, dying in their early 40s.

30. The fathers whose occupations have been documented constitute only 30 percent of the total. The names of another 44 fathers are known (for an additional 19 percent), but more work with city directories and genealogies needs to be done to determine their occupations. The names of 120 fathers are still completely unknown (51 percent of the total). Fathers who were living at the time their sons entered M.I.T. are counted with their occupation in that year. Fathers who had died before are counted with their last known occupation.

31. All of these men (with the case of Frommann uncertain) joined, and later succeeded, their fathers in practice. Aside from the building trades, no other working class occupations have yet been documented among the fathers of M.I.T. architecture students.

32. Hammond is known to have joined his father in practice.

33. Duker is known to have joined, and later succeeded, his father in business.

34. I am not yet aware of any other studies of M.I.T. students from other departments during the nineteenth century, so a wider range of hypotheses concerning the social context of professional education at M.I.T. is not yet possible.

35. There are still 18 men with prior collegiate educations for whom we know the father's name but not his occupation. It is likely that these fathers can eventually be documented, giving us a full profile of the 46 architecture students at M.I.T. who had prior collegiate backgrounds. Relatively little has been discovered, however, about the secondary school backgrounds of M.I.T. students. The early schooling of only 51

students--only one in five--has yet been documented. For more on the role of New England secondary schools in the earlier nineteenth century, see Stanley K. Schultz, The Culture Factory: Boston Public Schools, 1789-1860 (New York: Oxford University Press, 1973); and Ronald Story, "Harvard Students, the Boston Elite, and the New England Preparatory System, 1800-1876," HEQ 15 (Fall 1975), 281-98.

36. Woollett, architect's son, had one year at R.P.I.; Longfellow, surveyor's son, and Monks, lumber dealer's son, both completed four years at Harvard.

37. The sons of clergymen all had uniformly sound academic careers and all achieved local, even national, distinction as architects, educators, and publishers by the end of the century: A.D.F. Hamlin, Robert S. Peabody, Joseph L. Silsbee, George T. Tilden, William Rotch Ware, H. Langford Warren, and Edmund R. Willson.

38. Hunt, architect's son; Longfellow, surveyor's son; Monks and Spinning, lumber dealers' sons; and Whidden, mason's son, all went on to the Ecole. Hartwell, architect's son; and Avery, plasterer's son, traveled in Europe.

39. The sample of families whose sons went on from M.I.T. to Europe could, with some additional research, be slightly enlarged. We know the names, but not yet the occupations, of 5 fathers whose sons attended the Ecole. We known the names, yet not the occupations, of 15 more fathers whose sons went to Europe for informal study or travel.

40. The 9 dropouts with family backgrounds in the managerial and commercial occupations apparently were students considering architecture as a respectable accomplishment, if not career. Of these, 3 even earned M.I.T. degrees, and another 2 attended the Ecole. Most went into banking or commerce. One became a painter. The two dropouts from medical backgrounds remained close to the learned professions, eventually becoming administrative secretaries at Harvard and the Bostonian Society.

41. Several early sources on the introduction of blueprinting and stencil duplicating as alternatives to the manual copying of drawings and written documents are: "The 'Blue' Copying Process," AABN 4 (August 3, 1878), 44; George J. Jones, "Electric Blue-Print Making," Scientific American 89 (July 18, 1903), 45-46; J. Norman Jensen, "The Early History of Blueprinting," Arch. Rec. 71 (May 1932), 335; W.B. Proudfoot, The Origin of Stencil Duplicating (London: Hutchinson & Co., Ltd., 1972). An inventory of major collections of architectural records, which accounts for media and reproduction techniques, will make possible a study of technical innovations in architectural offices during any period of interest, leading to new observations on the relation between drafting techniques and ways of conceptualizing and presenting architectural designs and accompanying information.

42. Robert D. Andrews, "Conditions of Architectural Practice Thirty Years and More Ago," Arch. Rev., New Series 5 (November 1917), 237-38. Recollections of this period seem almost formulaic. Ralph Adams Cram, who did not attend M.I.T., but who in 1881 was placed by Prof. Ware in the

newly organized office of Rotch and Tilden, later wrote: "When I began my study of architecture with Rotch and Tilden in 1881, an office that had ten draughtsmen was a big and imposing affair, but its operating methods were primitive in the extreme. There were no blueprints, no typewriters, no telephones. Every drawing had to be traced by hand, sometimes repeatedly; all letters and specifications were written long-hand, and laboriously copied on flimsy paper by the use of water, blotting paper, and a hand press. The office boy ground the India ink in soapstone dishes. All this was quite in the tempo of the age. The Boston of 1881 was wholly of the olden time." Ralph Adams Cram, My Life in Architecture (Boston: Little, Brown & Co., 1936), 41-42. William D. Austin, an observer of architectural practice in Boston from the 1870s through the 1930s, recalled later that Samuel J.F. Thayer (1842-1893) "was probably among the first to use bottled india ink when most architects were still grinding theirs, and to buy rolls of thin, cheap tracing paper for copying full size details thereby avoiding the laborious practice of 'pricking through'. His introduction of lithographed copies of his working drawings, whereby a great saving of time in estimating was gained was another evidence of his alertness." William Downes Austin, A History of the Boston Society of Architects in the Nineteenth Century (From 1867 to January 4, 1901) (3-vol. typescript, August 1942), Chapter 6, p. 8, MBAt. On Thayer, see William H. Jordy and Christopher P. Monkhouse, Buildings on Paper: Rhode Island Architectural Drawings, 1825-1945 (Providence: Brown University, 1982), 235.

43. According to Andrews, "Mr. O.W. Norcross was one of the earliest of our local [Boston] builders to take general contracts. The advantages of the system were so obvious that the practice spread rapidly, and the earlier methods soon became obsolete." Andrews, "Conditions of Architectural Practice," 238.

44. Welles Bosworth, "I Knew H.H. Richardson," AIAJ 16 (September 1951), 115-27. Bosworth was called in to trace working drawings of stair details for the B.H. Warder house. Shepley, Rutan and Coolidge, Richardson's successor firm, called him back to prepare "studies for professors' houses at the Leland Stanford Jr. University, perspectives of railroad stations, furniture designs, color sketches for the interior painting of the Pittsburgh Court House, and quantities of full-size details of the carving, mostly for Romanesque and Byzantine capitals, which I made in charcoal on an easel, and a series of corbels for around the Cincinnati Chamber of Commerce building."

45. H.H. Richardson was the exception, never being a member of the Boston Society of Architects and seldom attending its meetings, keeping his membership in the New York Chapter of the A.I.A. even after moving to Boston. See Andrews, "Conditions of Architectural Practice," 237; and Austin, History of the B.S.A., vol. 2, Chapter 8, p. 13. Other Boston firms employing five or more M.I.T. alumni between the mid-1860s and mid-1880s were: Nathaniel J. Bradlee, Cabot and Chandler, Theodore M. Clark, Cummings and Sears, Emerson and Fehmer, and Sturgis and Brigham. See Appendix F for a complete listing.

46. On Hunt's studio, see Chapter 1, pp. 26-27, 130; on Ware and Van Brunt's office, see pp. 29-31.

47. Tilden reminiscences, in A Master and His Pupils [pamphlet on November 28, 1903 testimonial dinner in honor of Ware] (Boston, c.1903). Chandler reminiscences in "William Robert Ware" [obituary], Technology Review 17 (July 1915), 423. The years 1865 and 1866 were busy ones for Ware and Van Brunt, with Memorial Hall and the First Unitarian Church in the design phase. So the pressures to train serviceable assistants must have at times worked at odds with the commitment to give pupils a broader preparation for office work, and must have convinced Ware of the merits of an academic setting for a systematic architectural education apart from the demands of the working office.

48. Several students (Rich, Underwood, Clymer, Coolidge) were apparently admitted into the office but were persuaded to enroll at M.I.T. concurrently or in the next academic year.

49. William Homer, a Harvard graduate, returned from Paris to work for Ware and Van Brunt in 1872-73. He had been studying in the atelier Coquart since 1868. After 1873, he abandoned the practice of architecture and traveled in Europe.

50. For the M.I.T. alumni in the Peabody and Stearns office, see Appendix F. The non-M.I.T. men included William E. Barry (c.1871), Francis Ward Chandler (c.1871), Warren R. Briggs, (c.1871-72), Theophilus Parsons Chandler (c.1871-72), Joseph Morrill Wells (c.1874-75), George A. Fuller (c.1874-81), Julius A. Schweinfurth (1879-92), Frank E. Wallis (late 1870s), and Clarence Howard Blackall (1882-84). Hubert S. Ripley, with Peabody and Stearns after 1893, had been an M.I.T. student after Ware (1886-90). See Wheaton Arnold Holden, "Robert Swain Peabody of Peabody and Stearns in Boston: The Early Years, 1870-1886" (Ph.D. dissertation, Boston University, 1969), 25, 51, 52, 107, 109, 132.

51. Robert Day Andrews started as an office clerk with Peabody and Stearns in 1874, studied at M.I.T. in 1875-76, and continued with the office until the later 1870s, when he went to Paris, then returned to work for Peabody and Stearns from 1876 to about 1881, and during 1877-78 studied at M.I.T.

52. Robert D. Andrews has already been mentioned. Edmund M. Wheelwright worked for about a year for Peabody and Stearns (c.1877-78), then for McKim, Mead and Bigelow, before going to Paris (c.1881-82). Other men, not from M.I.T., worked for Peabody and Stearns before going on to Paris. Warren R. Briggs worked for Peabody and Stearns (c.1871-72) then went on to Paris. After working for Peabody and Stearns (c.1874-75) and in other Boston offices, Joseph M. Wells went to Paris (c.1879). Frank Wallis may have gone to Paris in 1882-83, after working for Peabody and Stearns (late 1870s) and Cabot and Chandler. Julius Schweinfurth went to Paris (c.1894-95), after working for Peabody and Stearns (1879-1892). However, not one of these men enrolled at the Ecole while in Paris; they simply associated themselves with an atelier.

Several of the Peabody and Stearns draftsmen came into the office after studying in a Paris atelier (without being enrolled at the Ecole). Like Peabody himself, Francis W. Chandler went from Ware and Van Brunt's office to the atelier Daumet (1867-70), then returned to work for Peabody and Stearns (c.1871). Theophilus Parsons Chandler spent some time in the

mid- to late 1860s in the atelier Vaudremer, and he returned to work for Peabody and Stearns (c.1871-72). (His earlier studies had been at the Lawrence Scientific School at Harvard, where Stearns himself had studied.) The only Peabody and Stearns assistant with formal Ecole training was Clarence H. Blackall, who had studied at the University of Illinois before entering the Ecole and the atelier Andre in 1878. He worked for Peabody and Stearns from about 1882 to 1884.

53. See Walter Knight Sturges, "Arthur Little and the Colonial Revival," JSAH 32 (1973), 147-63.

54. See Holden, "Robert Swain Peabody," 83. Other positions of responsibility were held by such non-M.I.T. men as George A. Fuller, who was chief designer and New York office manager (c.1880-82); and Julius A. Schweinfurth, who succeeded him as chief designer until 1892.

55. This count is based on the Ledger (1886-1890) included in the Richardson papers on microfilm at the Archives of American Art (Roll 676). The Ledger shows 21 men who were carried forward from the accounts of H.H. Richardson to the accounts of Shepley, Rutan and Coolidge. Evidence for another 12 men who had passed through the Brookline office before 1886 is gathered from various sources cited by James F. O'Gorman in H.H. Richardson and His Office (Boston: David R. Godine, 1974; Cambridge: MIT Press, 1979), 10, 32-33.

56. John Louis DuFais worked for Richardson at least during the summer of 1876, between his junior year at Harvard and his one year at M.I.T. in 1876-77. DuFais then continued to work for Richardson or on Richardson buildings (Trinity Church and the New York State Capitol) under the direction of LaFarge until the early 1880s. Glenn Brown, who studied at M.I.T. in 1875-76, went to work in 1876-77 for Richardson's contractor, O.W. Norcross, and served as carpenter and clerk of works on Trinity Church and the Cheney Building.

57. Ware describes this work in a letter of October 25, 1879, to William B. Rogers: "The arrangements we were proposing for Mr. Letang and Mr. Richardson have been satisfactorily made. He spends the morning at the Institute [M.I.T.] and the afternoon at Brookline and though the afternoons at this time of year are pretty short he manages to meet Mr. Richardson's needs. The work put into his hands is monumental work, mainly upon the Albany Capitol, and is just what Mr. Letang is specially fitted for." Rogers Papers, MCM-Ar, box 6, folder 94. Letang's experience with Richardson did not lead to the introduction in the M.I.T. studio of programs for building types identified with Richardson. While M.I.T. students did pay attention to Richardson's new work of the 1870s, their emulation of his buildings was not encouraged until Ware left M.I.T. and was replaced by Richardson's protege, T.M. Clark. (Note 1882 and 1883 thesis titles in Appendix J.)

58. DuFais has already been mentioned. Herbert Langford Warren, who finished two years of study at M.I.T. in 1879, may have begun to work for Richardson sometime in 1879, and he stayed in the office until 1884. Herbert Jaques (M.I.T. 1875-77) worked for Richardson from about 1880 to

1883, and Frank E. Alden (M.I.T. 1875-79) worked for Richardson from about 1880 to 1887.

59. See Appendix F. Assistants trained at M.I.T. between 1881-82 and 1885-86 include Edward R. Benton, Charles A. Coolidge, Alfred O. Elzner, John Galen Howard, Christopher Grant LaFarge, Edward F. Maher, and T. Henry Randall.

60. In a staff of 21 assistants working in the office in the spring of 1886, 10 received raises between 1886 and 1888. Six M.I.T. men received raises averaging $38 (highest: $70; lowest: $15). Four non-M.I.T. men received raises averaging $30 (highest: $50; lowest: $5). Our only measure of the relative importance of the men in the firm immediately after Richardson's death is the monthly payroll, 1886-88, for which we have records beginning in May 1886 (Ledger Book, H.H. Richardson Papers, Archives of American Art, Roll 676). The three principals, Shepley, Rutan, and Coolidge, earned $250 per month. For the remaining 18 employees definitely in the office at the time of Richardson's death, the median salary was $60 per month, and the salaries ranged from $125 to $30. Frank E. Alden, an M.I.T. man, was the highest-paid assistant, at $125. Four non-M.I.T. men made $100. James S. Rogers (M.I.T.) made $80 (raised to $100 later in 1886). Two non-M.I.T. men made $75 and $65. Alfred O. Elzner and T. Henry Randall (both M.I.T.) made $60 (raised to $75 and $80, respectively, later in 1886). One other man (non-M.I.T.) made $60. In the lower half of the payroll were two non-M.I.T. men, at $50; two non-M.I.T. men at $35 and $30; and, finally, three M.I.T. men, also earning $30. (These included Edward F. Ely, who was raised to $65 later in the year; John Galen Howard, who was raised in three steps to $100 by 1887; and Edward F. Maher, who stayed at $30.) There were three men, not on the payroll in May 1886, but probably associated with Richardson before his death: David Campbell Hale (M.I.T., who was earning $100 per month in 1887-88); Richard Gustave Schmid (M.I.T., who started at $10 in 1886 and was raised to $80 by 1888); and Welles Bosworth (not M.I.T., who was raised from $10 to $40 in 1887-88). No records of personnel and salaries in the Richardson office before 1886 have yet been found. For anecdotal accounts of the office in the spring of 1886 and afterward, see Bosworth, "I Knew H.H. Richardson."

61. See "H.H. Richardson's Men," anonymous undated typescript, H.H. Richardson Papers, Archives of American Art, Roll 643, frames 473-75. O'Gorman suggests that Richardson's "atelier on Cottage Street was an extension of the ecole at M.I.T." H.H. Richardson, 10. The study of architecture in the Brookline studio differed from the Ecole-atelier relationship in Paris and the Ware and Van Brunt-M.I.T. relationship, c.1865-75, in that no Richardson students were enrolled concurrently at M.I.T. In any case, the studio teaching described in the passage quoted flourished in the last five years of Richardson's life--after the time that Ware was teaching at M.I.T.

62. These counts are based on the "Office Roll of McKim, Mead and White," Appendix II in Charles Moore's The Life and Times of Charles Follen McKim [1929] (New York: DaCapo, 1969), 327-37.

63. These were William M. Whidden, who entered the Ecole in 1878 (atelier Vaudremer); A.D.F. Hamlin, who had entered the Ecole in 1879 (atelier Guadet); and William E. Chamberlin, who had worked for McKim in 1879 before going on to the Ecole later that year (atelier Vaudremer). The firm's only Ecole alumnus prior to 1882 was another M.I.T. man, William B. Bigelow (Ecole 1873, atelier Pascal). In these early years, the McKim office was less a starting point for men who would go on to Paris than the Peabody and Stearns firm of the 1870s or the McKim firm of the 1890s. Besides Chamberlin, only Edmund R. Willson is known to have worked for McKim (c.1879) before going on to the Ecole later in the year (atelier Vaudremer). Edmund M. Wheelwright left McKim about 1879 to work in Albany and eventually went on to Paris (c.1881-82), but not to study at the Ecole or in any particular atelier.

64. Newman W. Gardner joined McKim in 1883; Ion Lewis in 1885; and Arthur G. Everett in 1887.

65. I know of no Cornell men in either office prior to 1886. Frank D. Sherman, one of Ware's first students in New York, was the only Columbia man with McKim before 1887. I have not yet been able to obtain complete student lists for the Universities of Illinois or Pennsylvania.

66. All but two of these were students under Prof. Ware between 1868 and 1881. (Peabody, a draftsman in Ware's office, took some general course work at M.I.T. the year Ware was on his European tour, 1866-67; Perkins came to M.I.T. two years after Ware left, 1883-84.) The enumeration of American students at the Ecole is based upon a four-page photocopy of a typescript entitled "Ecole Nationale des Beaux Arts. Prix de Reconnaissance des Architects Americains," located in the vertical files of the Frances Loeb Library, Graduate School of Design, Harvard University. This listing of Paris alumni was apparently prepared in 1886, in connection with a proposal to establish an American prize for French students at the Ecole in appreciation of the privileges of study accorded to Americans over the years. The list was at one time among the Ware material available to Dean William Emerson and Librarian Caroline Shillaber of M.I.T. in the course of their research into the early history of the M.I.T. architecture department, but Ware's role in compiling the list is unknown. My thanks to Mardges Bacon for directing me to this list. During the early 1880s, Edmund M. Wheelwright and William W. Northend, both M.I.T. alumni, and Ambrose S. Russell, may also have been studying informally in Paris, and even Prof. Ware, in the fall of 1867, may have been associated briefly with one of the ateliers. Richard Chafee is in the course of research which should clarify the careers of American students in Paris. This section represents, therefore, only a series of preliminary findings based on documentation available in the United States.

67. Also notable in the list of Americans in Paris before 1868 are several Boston men without Harvard (nor, of course, M.I.T.) affiliations, whose preparation was entirely in architects' offices: William G. Preston, Walter T. Winslow, Francis W. Chandler, and J. Foster Ober.

68. Edward D. Lindsey, Edmund Quincy, and Douglas Smyth worked with Hunt; John Ames Mitchell and Robert S. Peabody, with Ware and Van Brunt; Charles

McKim with Russell Sturgis. (Quincy also worked for Gridley Bryant in Boston after leaving Hunt's New York studio in 1857 and before going to Paris.) Quincy, Mitchell, and McKim had attended Harvard's Lawrence Scientific School, not the undergraduate college.

Additional research may show that the time lag between a student's graduation from Harvard and arrival in Paris was filled by an apprenticeship. But for J. Pickering Putnam, Theophilus P. Chandler, Walter Cook, and John Stewardson, the apparent absence of an apprenticeship was no more of a hindrance in gaining admission to the Ecole than it was for Richardson.

69. See Appendix F for an indication of the Boston and New York offices in which M.I.T. students worked prior to going to Paris.

70. Joseph A. Pond received the B.S.A. design prize in 1870, after only a year at M.I.T.; Frank Spinning received the prize in 1871 at the end of three years of study.

71. Henry P. Clark and George H. Wetherell worked with Bradlee, and the latter would return from Paris to become one of Bradlee's junior partners. George T. Tilden and Thomas P. Rich worked with Ware and Van Brunt, Tilden actually before and during his time at M.I.T.

72. Francis Allen and A.D.F. Hamlin were Amherst men.

73. Exceptions were the Americans whose plans were disrupted by the Franco-Prussian War. George R. Shaw, arriving in Europe at the outbreak of the war, spent about a year at the South Kensington Schools of Design and a year at the Munich Polytechnic before proceeding to the Ecole. Several Harvard students, already mentioned, had their educational plans affected by this war, and as a result, had educational experiences that went beyond Paris. Walter Cook went to the Munich Polytechnic before the Ecole; Robert Gould Shaw left the Ecole for Munich; and J. Pickering Putnam left the Ecole for the Berlin Bauakademie. (Two M.I.T. students pursued a further education in Europe completely apart from Paris and the Ecole. Benjamin Silliman studied in Stuttgart and Berlin; Bernard Vonnegut at the Hanover Polytechnic.)

74. Ware and Van Brunt employed Peabody, whose general studies at M.I.T. came during the year Ware was abroad, and they later employed William Rotch Ware, the Professor's nephew. Sturgis and Brigham took in Monks and Willson, who went on to work for McKim, Mead and White before leaving for Paris. Curtis worked with Peabody and Stearns; Longfellow with Cabot and Chandler; and Perkins with H.H. Richardson.

75. The ateliers in which Americans studied are fully documented in Richard Chafee's forthcoming book on American architecture students in Paris. The following summary is based on the listing of ateliers and their successive patrons included in the notes to Chafee's essay, "The Teaching of Architecture at the Ecole des Beaux-Arts," in Arthur Drexler, ed., The Architecture of the Ecole des Beaux-Arts (New York: Museum of Modern Art, 1977), 500-01. The principal strains of influence in the ateliers attracting American students from the 1860s through the 1880s can be traced back to the atelier of a tenacious neoclassicist,

Louis-Hippolyte Lebas, or to a rationalist atelier, directed in succession by Abel Blouet, Emile-Jacques Gilbert, and Charles-Auguste Questel. Lebas (1782-1867), himself a student of A.-L.-T. Vaudoyer and Charles Percier, conducted his atelier from about 1832 to 1864, and his most productive teaching was done during his sixties and seventies. In addition to directing his atelier, Lebas served as Professor of the History of Architecture at the Ecole from 1840 to 1863. Lebas would train the patrons Leon Ginain (who would succeed Lebas as patron), Alexis Paccard, Jules Andre, Constant Moyaux, and Ernest-Georges Coquart; and the architects Leon Vaudoyer, Theodore Labrouste, Theodore Ballu, and Charles Garnier. Ginain (1825-1898, Grand Prix, 1852) succeeded to the atelier Lebas and conducted it from 1864 to 1880, when he took over the atelier officiel of Laisne. Ginain directed this atelier until 1898, training about 200 students in the 18 years remaining until his death. Paccard (1813-1867, G.P. 1841) conducted an atelier officiel from 1863 until his death. Andre (1819-1890, G.P. 1847), who had been directing the remnant of the atelier libre of Labrouste since 1856, took over Paccard's atelier officiel in 1867 and directed it until his death in 1890. In the 23 years that Andre directed his atelier officiel, he taught about 500 students. He was succeeded by Moyaux (1835- , G.P. 1861), who directed the atelier until 1908. (I have not yet determined in what capacity Moyaux was teaching during the 1870s and 1880s.) Coquart (1831-1902, G.P. 1858) established an atelier in 1867 to accommodate those students of Andre who did not follow him into his atelier officiel. Coquart conducted this atelier until 1882, training about 80 students in 15 years. Andre, in turn, would train the patrons Julien Guadet and Alphonse Gerhardt. Guadet (1834-1908, G.P. 1864) succeeded to the atelier officiel of Constant-Dufeux in 1871 and conducted it until 1894, training some 400 students in his 23 years as chef d'atelier. In 1894 he was appointed as Professor of the Theory of Architecture at the Ecole, a position he held until his death. Gerhardt (1843- , G.P. 1865) succeeded to the atelier libre of Coquart in 1882 and directed it until 1891. Blouet (1795-1853, 1821) had studied with P.-J.-N. Delespine, whom he succeeded as chef d'atelier in 1826. He would conduct the atelier until his death, and from 1846 to 1853 would also serve as Professor of the Theory of Architecture at the Ecole. Gilbert (1793-1874, G.P. 1822) had studied with J.-N.-L. Durand in 1811-13 before transferring to the Ecole des Beaux-Arts. He directed Blouet's atelier for only a few years, 1853-55. Gilbert was succeeded in 1856 by Questel (1807-1888), who would conduct the atelier until 1872, training some 300 students in 16 years. Questel had studied with Blouet in 1826-28 and worked for both Lebas in 1830-31 and Duban in the 1840s. Blouet, Gilbert or Questel would train the patron-architects Emile Vaudremer, Honore Daumet, Jean-Louis Pascal (who would succeed Questel as patron), Francois and Michael Douillard, and Eugene Train; the architects Arthur-Stanislas Diet, Henri Labrouste, and Paul Nenot, and Emmanuel Brune, influential Professor of Construction at the Ecole des Beaux-Arts. Vaudremer (1829-1914, G.P. 1854) conducted his atelier from 1860 to 1880. Daumet (1826-1911, G.P. 1855) conducted his atelier from 1862 to 1894. Pascal (1837-1920, G.P. 1866) took over Questel's atelier in 1872 and conducted it until his death, training about 300 students in 48 years. L.-F. Douillard (1823-1897) and his brother M.-L.-M. Douillard (1829-1888) conducted an atelier from 1860 to 1889. The dates of the atelier of Train (1832-1903) have not yet been

documented. Brune (1836-1886, G.P. 1863) was Professor of Construction from 1871 until his death. See also Chapter 1, n. 198.

In the ferment between the disbanding of Henri Labrouste's atelier in 1856 and the reorganization of the Ecole des Beaux-Arts in 1863, the disciples of Lebas and of Blouet/Gilbert would have many occasions to align themselves in various ways. Jules Andre began his architectural career as inspecteur for Henri Labrouste on the Bibliotheque Nationale in the mid 1850s and carried on the atelier for those of Labrouste's students who did not go on to study with Viollet-le-Duc. Guadet, who had begun his studies with Labrouste and continued with Andre, and Pascal, a student of Gilbert/Questel, were both leaders in the student opposition to Viollet's reforms of 1863, and both began their careers as assistants to Garnier on the Paris Opera. The atelier officiel (1863-79) of Jean-Charles Laisne, who had worked for both Questel and Viollet-le-Duc, was merged into the atelier Ginain in 1880. In their atelier instruction, both Andre and Vaudremer would convey a strong intuitive sense of design, while Ginain, Coquart, Moyaux, Daumet, and Pascal would convey a disciplined academic classicism. By the late 1890s, many of the mid-century issues of medievalism, rationalism, and purist classicism would be synthesized by Guadet in his teaching and writing as Professor of the Theory of Architecture at the Ecole des Beaux-Arts. On the teaching of Andre, see Mariana Griswold Van Rensselaer, Henry Hobson Richardson and His Works [1888] (New York: Dover Publications, 1969), 128, n. 1; and Kenneth H. Cardwell, Bernard Maybeck: Artisan, Architect, Artist (Santa Barbara: Peregrine Smith, 1977), 17-18. On the teaching of Vaudremer, see Chapter 2 of this present study, pp. 83-84. On the academic classicism of the other designer-teachers, see Drexler, The Architecture of the Ecole des Beaux-Arts; and Robin Middleton and David Watkin, Neoclassical and Nineteenth Century Architecture (New York: Abrams, 1980). On Guadet's later teaching and writing (especially Elements et theorie de l'architecture), see Egbert, The Beaux-Arts Tradition, 65-66.

76. Pierre-Jerome-Honore Daumet would conduct his atelier for over three decades, from 1862 until 1894. Students of Daumet won the Grand Prix in 1872, 1876, 1880, 1882, and 1884, but never again after that. While it is possible that this atelier came to be regarded by Americans during the later 1870s and early 1880s as a place for French students to prepare for the Grand Prix rather than as a general teaching atelier, it should be noted that the atelier Andre had even more Grand Prix winners and a continuous influx of American students. Andre taught eleven Grand Prix winners (some of whom actually won the prize under the direction of Moyaux, Andre's successor): in 1864, 1865, 1873, 1878, 1881, 1883, 1885, 1886, 1888, 1890, and 1893.

77. I am not aware of any instances in which McKim, Peabody, Chandler, or Ware recommended to any of their draftsmen to go to Paris to study with Daumet.

78. Henry P. Clark went to study with Andre about 1874.

79. Joseph-Auguste-Emile Vaudremer, like Daumet, had studied with Blouet and Gilbert in the early 1850s. Vaudremer won the second Grand Prix in 1854, and Daumet won the Grant Prix in 1855. After their time at the French Academy in Rome, they traveled together through Greece in 1858.

Vaudremer opened his atelier in 1860 and Daumet in 1862, both as new ateliers unattached to predecessors. Vaudremer may have been joined in conducting the atelier as early as 1875 by Gustave Raulin (1837-), who would succeed him as chef d'atelier in 1880 and conduct the atelier until about 1903 or 1907. For more on the design methods and teaching of Vaudremer, see Chapter 2, pp. 83-84.

80. Alfred Greenough and Douglas Smyth went to work with Vaudremer about 1868, Theophilus P. Chandler and George T. Tilden about 1869, and J.B.N. Wyatt about 1873. Tilden had studied at M.I.T. in 1868-69 and Wyatt in 1870-71, before Letang arrived. After 1874, the only non-M.I.T. student in the atelier Vaudremer was Walter Cook.

81. Louis A. Sonrel also enrolled at the Ecole, but his career after Paris is unknown. Of the non-Ecole students of Vaudremer, Edgar C. Curtis died young, William B.S. Clymer left the field, and Edward H. Greenleaf is unaccounted for.

82. Cass Gilbert to his mother, February 1, 1880. Cass Gilbert Collection, box 2, DLC-Ms.

83. "The Old Paris Crowd" photograph was found in the C. Howard Walker folder at MCM-Mu. William M. Whidden, another Vaudremer student of this period, was absent from the photograph but represented by a blank silhouette. Joseph M. Wells is not known to have been associated with the Ecole or any atelier. Other Americans in Paris around the year 1880 (but not identified with "The Old Paris Crowd") were: Charles I. Berg (atelier Andre/EdBA), Clarence H. Blackall (Univ. of Ill./atelier Andre/EdBA), John M. Carrere (atelier Ginain/EdBA), A.D.F. Hamlin (Amherst/M.I.T./atelier Guadet/EdBA), and Thomas Hastings (atelier Andre/EdBA).

Conclusion: Notes

1. Louis H. Sullivan, The Autobiography of an Idea [1924] (New York: Dover Publications, 1956), 189.

2. A.D.F. Hamlin, "William Robert Ware" [obituary], AIAJ 3 (August 1915), 382-86, 383. For more on Hamlin, see Chapter 4, n. 81.

3. "William Robert Ware--1832-1915" [tributes], Technology Review 17 (July 1915), 422-30, 423.

APPENDIX A

William Robert Ware: European Itinerary, 1866-67

Town*	Approximate Date
Liverpool	mid August 1866
Chester	mid August-early October
Bristol	"
London (?)	"
Oxford	"
Winchester	"
Salisbury	"
Chichester	"
Rochester	"
Norwich	early-mid October
Ely	"
Peterborough	"
Lincoln	"
Southwell	"
York	late October-early November
EDINBURGH	mid November-early December
Glasgow	early December
LONDON	late December 1866-mid February 1867
Amiens	late February-mid March
Paris	"
Nimes	"
Genoa	"
Parma	late March
Bologna	"
Florence	"
Rome	"
Naples	late March-early April
Pompeii	"
Paestum	"
ROME	mid April-early May
Terni	early May
Assisi	"
Perugia	"
Arezzo	"
Florence	mid-late May
Siena	"
Orvieto	"
Bologna	"
Ravenna	"
Parma	"
Padua	late May-early June
Venice	"
Trieste	"
Milan	early June

* Towns CAPITALIZED are places Ware stayed for two weeks or more.

Lugano	mid-late June
Lucerne	"
Strasbourg	"
Heidelberg	"
Mannheim	"
Speyer	"
Worms	"
Mainz	"
Cologne	"
LONDON	early-mid July
PARIS	mid July-late October 1867

APPENDIX B

M.I.T. Students, 1865-81: Class Sizes

Year	A Total MIT stud.	B Total MIT R	C R % Tot. C=B/A	D Total MIT S	E S % Tot. E=D/A	F Total Arch. stud.	G Arch. % MIT G=F/A	H Arch. R	I Arch. R % Arch. I=H/F	J Arch. R % MIT R J=H/B	K Arch. S	L Arch. S % Arch. L=K/F	M Arch. S % MIT S M=K/D	N New Arch.	O New % Arch. O=N/F	P Return Arch.	Q Return % Arch. Q=P/F	R Finish Arch.	S Finish % Arch. S=R/F
1865-66	72	64	89	8	11														
1866-67	137	110	80	27	20														
1867-68	167	124	74	43	26														
1868-69	172	105	61	67	39	7	4.0	0	0	0	7	100.0	10.4	5	71.4	2	28.6	5	71.4
1869-70	206	125	71	81	29	15	7.3	0	0	0	15	100.0	18.5	13	86.7	2	13.3	9	60.0
1870-71	224	143	64	81	36	13	5.8	1	7.7	0.7	12	92.3	14.8	8	61.5	5	38.5	12	92.3
1871-72	261	180	69	81	31	17	6.5	2	11.8	1.1	15	88.2	18.5	15	88.2	2	11.8	10	58.8
1872-73	348	235	68	113	32	27	7.8	3	11.1	1.3	24	88.9	21.2	20	74.1	7	25.9	22	81.5
1873-74	276	182	66	94	34	19	6.9	3	15.8	1.6	16	84.2	17.0	14	73.7	5	26.3	10	52.6
1874-75	248	170	69	78	31	31	12.5	9	29.0	5.3	22	71.0	28.2	21	67.7	10	32.3	23	74.2
1875-76	255	182	71	73	29	32	12.5	10	31.3	5.5	22	68.7	30.1	24	75.0	8	25.0	20	62.5
1876-77	215	134	62	81	38	35	16.3	13	37.1	9.7	22	62.9	27.2	23	65.7	12	34.3	23	65.7
1877-78	194	117	60	77	40	28	14.4	7	25.0	6.0	21	75.0	27.3	16	57.1	12	42.9	17	60.7
1878-79	188	103	55	85	45	32	17.0	5	15.6	4.9	27	84.4	31.8	21	65.6	11	34.4	20	62.5
1879-80	203	110	54	93	46	29	14.3	8	27.6	7.3	21	72.4	22.6	18	62.1	11	37.9	10	34.5
1880-81	253	140	55	113	45	46	18.1	8	17.4	5.7	38	82.6	33.6	26	56.5	20	43.5	31	67.4

R = Regular Students.
S = Special Students.
Arch. = Architecture Students.

APPENDIX C

M.I.T. Architecture Students, 1865-81: Alphabetical List

Name of Student	Born-Died	At MIT
Aiken, William Martin	1855-1908	1877-79*
Alden, Frank E.	1859-1908	1875-79*
Allen, Francis Richmond	1843-1931	1876-77*
Allen, Robert Henry	1854-1876	1872-75
Anderson, Joseph L.	? - ?	1870-71
Andrews, Robert Day	1857-1928	1875-76*
Atkinson, Richard S.	1855- ?	1871-75*
Austin, William Downes	1856-1944	1872-75*
Avery, George Alden	1841-1912	1869-71*
Bacon, Francis H.	1856-1940	1874-76*
#Baker, Charles Morrill	1857-1918	1874-78*
Bancroft, James Merritt	1858-1905	1877-78
Barnard, Edward Herbert	1855-1909	1872-74*
#Beal, John Williams	1855-1919	1873-77*
Beebe, Franklin H.	1853-1932	1876-77
Berry, Abraham Hun	1843-1915	1869-71*
Bicknell, Frederick A.	? - ?	1871-73
Bigelow, William B.	1852- ?	1869-71*
Blanchard, Frank S.	1854- ?	1874-75
Borland, John, Jr.	1856- ?	1875-76
#Boyden, Amos Josiah	1853-1903	1870-75*
Brackett, Albert Clinton	1860- ?	1878-82*
Brandt, Oscar Emil	1858- ?	1878-79
Briggs, John L(ynde?)	? -1922	1871-73
Brown, Glenn	1854-1932	1875-76*
Brown, James Merrill	1853- ?	1873-75
Brown, Samuel Joseph	1853-1926	1872-73*
Bruce, Charles T.	? - ?	1872-73
Brunner, Arnold William	1857-1925	1877-79*
Burgess, William Phillips	1857-1883	1879-81
Burnham, William Appleton	1852-1922	1875-76*

# Indicates students who received the degree of Bachelor of Science in Architecture.

* Indicates students for whom transcripts of Registrar's records, showing courses taken at M.I.T., are available at the Institute Archives, M.I.T.

I am grateful to Helen Slotkin, Institute Archivist, and Ronald P. Smith, Associate Registrar, for arranging for biographical data on the early architecture students to be checked by the M.I.T. Office of the Registrar, and to Josephine Eisner and her assistants in the Registrar's Office for doing the actual work.

Burns, Silas R.	1855-1940	1878-79
Bush, Samuel Dacre	1849-1936	1871-72*
#Capen, George Walter	1853-1925	1873-77*
Chadwick, Francis Brooks	1850-1943	1871-72
#Chamberlin, William E.	1856-1911	1873-77*
Channing, Giovanni E.	? -1921	1871-72
Chappell, Raymond D.	1852- ?	1876-77
Chase, Charles Medcalf	1859- ?	1879-81
Clark, Henry Paston	1853-1927	1870-71*
Clough, James A.	1850-1917	1875-76
Clymer, William Branford Shubrick	1855-1903	1877-78
Cobb, Henry Ives	1859-1931	1876-77;1881-82*
Cochran, Charles H.	1854- ?	1873-74
Cochran, Frederic B.	1860-1916	1878-80
Colt, Samuel Pomeroy	1852-1921	1870-73
Cook, Charles B.	1850-1893	1873-74*
Corser, Frederic G.	1849-1924	1875-77
Cram, Arthur Balch	1853-1953	1878-80
Crowell, Samuel	1857-1929	1876-79
Curtis, Edgar Corrie	1846-1886	1872-73*
Dabney, William H., Jr.	1855-1897	1871-75*
Damon, C. Willis	? - ?	1869-71
Darling, Elmer A.	? -1931	1869-71*
Darrow, Alfred Lyman	1858- ?	1878-81
Dewson, Edward W.	1852- ?	1868-69;1874-75*
Dexter, Walter M.	? -1929	1871-72
Dodd, Arthur Hooper	1854-1901	1872-74
#Dowse, William Baldwin	1853-1917	1870-74*
DuFais, John Louis (Lewis?)	1855-1935	1876-77*
Duker, Herman H.	1859-1930	1878-80
Earle, Stephen C.	1839-1913	1868-69*
#Eaton, Charles Sumner	1856-1917	1874-78*
Eaton, Frederick S.	? - ?	1874-75
Elliot, George Buxton	? -1930	1870-73
#Ely, Edward Francis	1858-1920	1880-82*
Emery, Francis F., Jr.	1860- ?	1878-79
#Eppendorff, John George	1862-1941	1879-83*
Everett, Arthur Greene	1855-1925	1873-75*
Eyre, Wilson, Jr.	1858-1944	1875-76*
Fairbanks, Warren Edwin	1854- ?	1872-75
Fairfield, William	1859- ?	1876-77
Falt, Joseph P.	? - ?	c.1871-72
Faxon, John Lyman	1851-1918	1873-74
Ferry, George Bowman	1851-1918	1872-73*
Foote, Orlando Knox	1854-1930	1878-80
Ford, Frank H.	1859-1892	1877-78
Freeman, George Alfree (Alfero?), Jr.	1859-1934	1875-77
Frommann, Emil Henry	1860- ?	1880-81

Frost, Charles Sumner	1856-1931	1877-78*
#Furber, Pierce Powers	1853-1893	1875-77*
Gardner, Newman W.	? - ?	1872-73
Gibson, Louis Henry	1854-1907	1872-73;1874-75*
Gilbert, Cass	1859-1934	1878-79*
Gilbert, Robert Williams	1854- ?	1880-81
Goodman, A.J.	1856- ?	1875-76
Gracea, Joseph J.	1858-1897	1876-78
Greenleaf, Edward Hale	? -1930	1869-73*
Greenough, Walter C.	1856- ?	1873-75
Grover, George Calvin	1856-1881	1875-78
Hackett, Jean A.	? -1898	1880-81
Hale, David Campbell	1861-1896	1880-82*
Hamlin, Alfred Dwight Foster	1855-1926	1876-77*
Hammatt, Edward S.	1854-1907	1875-77*
Hammond, Edgar B.	1854-1937	1869-70
Hannaford, Harvey Eldrige	1857-1923	1880-81
Hapgood, Everett Emerson	1856- ?	1872-76*
Harlow, Alfred Branch	1857-1927	1875-78*
Harriman, Charles Alonzo	1860-1930	1878-80*
#Hartwell, Ernest Greenleaf	1858-1889	1875-79*
#Heins, George Lewis	1860-1907	1879-82*
#Higgins, Alfred Sawyer	1858- ?	1874-78*
Hill, Arthur Eaton	1860-1925	1879-81
Hill, Frederick Elmer	1860-1929	1880-81
Holman, Frank L.	? - ?	1871-72
Hooker, Henry Daggett	1859-1924	1880-82*
Hoppin, Howard	1856-1940	1874-76*
Howard, Thomas Howard	1862-1904	1880-82
Howe, Frank Maynard	1849-1909	1868-69*
Hubbard, Ervin S.	? -1921	1872-73
Hunnewell, Henry Sargent	1854-1931	1875-76*
Hunt, Richard Howland	1862-1931	1880-82*
Hunting, Walter Channing	1861-1926	1879-81
Ilsley, Samuel Marshall	1863-1946	1880-84
Jaques, Herbert	1857-1916	1875-77*
Johnston, Clarence Howard	1859-1936	1878-79*
Jones, Harry Wild	1859-1935	1880-82
Josselyn, Henry Saville	1849-1934	1876-77*
Kauffman, William	? - ?	1879-81*
Kendall, Henry Hubbard	1855-1943	1872-73
Kendall, William Mitchell	1856-1941	1876-78*
Kidder, Frank Eugene	1859-1905	1880-81*
Kilby, John Quincy	1854-1931	1873-74
King, Herbert Graham	1851-1920	1873-75*
Larned, William Sylvanus	1854-1918	1874-75
Lewis, Abraham Jarratt	1861-1940	1879-81
#Lewis, Edwin James, Jr.	1859-1937	1877-81*

Lewis, George Wilton	c.1845-1928	1872-73
Lewis, Ion	1857-1933	1876-77*
Lewis, William Whitney	1850-1933	1868-69*
Little, Arthur	1853-1925	1870-75*
Longfellow, Alexander Wadsworth, Jr.	1854-1934	1876-78*
McColl, Frank P.	1861- ?	1879-81
McCombs, Frank M.	1852- ?	1877-79
McMaster, George A.	? - ?	1870-71
Mann, George Richard	1856-1939	1875-76
Marble, Albion Merton	1859-1909	1878-80
Means, James	1863- ?	1880-82
Merrick, William	1849-1887	1871-73
Minot, Francis	1854-1883	1877-78
Monks, Henry Grafton	1846-1893	1875-76
Morgan, Richard H.	1856-1921	1875-77
Morse, Henry Hazen	? -1916	1869-70;1871-72
Neff, Harry Musser	1861-1912	1879-81
Newell, Charles H.	1855- ?	1873-75*
Nichols, Edward	1864-1933	1880-81
Nichols, Kingman S.	1856- ?	1873-74
Norris, Wilfred Addison	1848- ?	1878-79
Northend, William Wheelwright	1857-1894	1880-81
O'Grady, Thomas, Jr.	1858-1891	1877-80*
Orvis, Christel	1848- ?	1866-69
Paddock, Benjamin Squires	1861- ?	1879-83
Page, George W., Jr.	? - ?	1869-70
Paine, Walter J.	? - ?	1872-74
Patton, Normand Smith	1852-1915	1873-74
Peabody, Henry Greenwood	1855-1951	1876-77
Peabody, Robert Swain	1845-1917	1866-67*
Perkins, Willard B.	? -1896	1870-71
Pester, Richard	1862- ?	1879-80
Peters, William Morgan	1856-1924	1873-76
#Phillips, Henry Ayling	1852-1926	1869-73*
Pond, Joseph A.	? -1882	1868-70*
Pratt, William L.	? -1882	1872-73
Prentice, Arthur Bidwell	1857- ?	1880-82
Ramsden, Albert Holdsworth	1856-1888	1880-81
Read, Charles French	1853-1937	1870-73
Reed, Charles A.	1857-1911	1878-79*
Rich, Charles Edward	1859-1921	1880-81
Rich, James Rogers	1847-1910	1870-71*
Rich, Thomas P.	? - ?	1869-70
Richards, Henry	1848-1949	1869-71*
Richardson, William Cummings	1854-1935	1873-75*
Riley, John	1857-1929	1875-76
Rogers, James Smith, Jr.	? -1921	1879-81
Rollins, Theodore B.	1857-1890	1873-76

Rosenheim, Alfred Faist	1859-1943	c.1878-82*
Rotch, Arthur	1850-1894	1871-73*
Saltmarsh, Ernest Olmsted	1849- ?	1865-69
Sanders, Charles Henry	1851- ?	1875-76
Sargent, Sullivan Amory	1861-1921	1876-80
Schwab, Emil	1851-1923	1870-72
Seabury, B. Hammett	1856- ?	1877-79
Shaw, George Russell	1848-1937	1869-70*
Shepley, George Foster	1860-1903	1880-82*
Shope, Henry Brengle	1862-1929	1880-81
Silliman, Benjamin, Jr.	1849-1901	1870-71
Silsbee, Joseph Lyman	1848-1913	1869-70*
Skinner, Francis	? -1905	1872-73
Smith, Philip H.	? - ?	1869-70
Smith, Spencer E.	? - ?	1872-73
Smith, Thomas L.	? - ?	1878-79
#Snead, William Reynolds	1861-1902	1877-81*
Snedeker, Charles A.	1860- ?	1879-81
#Snelling, Grenville Temple	1861-1920	1878-82*
Sonrel, Louis Agassiz	1857- ?	1875-78
Spinning, Frank	? - ?	1868-71*
Stebbins, Edward Somersby	1853- ?	1875-76
Stickney, Frederick W.	1854-1918	1873-75*
Stone, Charles S.	? - ?	1871-72
Storer, Frank Addison	1857- ?	1877-78
Sullivan, Louis Henry	1856-1924	1872-73*
Swasey, William Albert	1863- ?	1880-82
Swinburne, Henry H.	1849- ?	1877-78
Symonds, Andrew Henry	1857- ?	1879-80
Taylor, Eugene Hartwell	1853-1924	1876-78*
Taylor, James Knox	1857-1929	1877-79*
Terrell, Charles	1851-1915	1874-75
Teulon, James A.	? -1919	1872-73
Thayer, George F.P.	? - ?	1868-69
Tilden, George Thomas	1845-1919	1868-69*
Tominaga, Fuyouki	? - ?	1871-72
Tryon, Thomas	1858-1920	1878-81
Tuck, Charles E.	1846- ?	1875-76
Tuxbury, Warren	? -1873	1871-72
Underwood, George Frank	1853-1885	1875-76*
Vonnegut, Bernard	1856-1908	1874-76*
Ware, William Rotch	1848-1917	1871-73*
Warren, Herbert Langford	1857-1917	1877-79*
Welch, Edward Martin	1861-1913	1879-81
Wescott, James H.	1859-1909	1879-81
Wetherell, George Homans	1854-1930	1870-71*
Wheelwright, Edmund March	1854-1912	1871-72;1876-77*
Whidden, William Marcy	1857-1925	1873-75*
White, Laura R.	1852- ?	1878-79

Wicks, William Sydney	1854-1919	1874-75
#Wilkes, Charles Mason	1858-1905	1877-81*
Willard, Daniel Wheelock	1849- ?	1866-70;1875-77*
Willson, Edmund Russell	1856-1906	1876-77*
Woods, Harry F.	1862- ?	1879-81
Woollett, William Martin	1850-1880	1868-70*
Wyatt, James Bosley Noel	1847-1926	1870-71*
Young, Joshua Edson	1856- ?	1875-79
Zerrahn, Frank Eduard	1858-1928	1874-75
Zimmermann, William Carbys	1859-1932	1877-80*

APPENDIX D

M.I.T. Architecture Students, 1868-81: Backgrounds

Students Enrolled, 1868-69*	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Dewson, E.W.	1868-69, 1874-75	1R	1	Boston, MA	16						
Pond, J.A.	1868-70	1S	1	Allston, MA	?						
Spinning, F.	1868-71	1R	1	Dayton, OH	?						
Earle, S.C.	1868-69	3S	1.	Worcester, MA	29				Calvert Vaux Own practice	New York, NY Worcester, MA	c.1861-62 1864-65
Howe, F.M.	1868-69	3S	1.	Arlington, MA	19						
Lewis, W.W.	1868-69	1,3S	1.	Boston, MA	18						
Thayer, G.F.P.	1868-69	3S	1.	Boston, MA	?						
Tilden, G.T.	1868-69	3S	1.	Boston, MA	23				Ware & Van Brunt Own practice Emerson & Fehmer	Boston, MA Boston, MA Boston, MA	c.1863-64 c.1865-67 c.1868-69
Woollett, W.M.	1868-70	2,3S	1	Albany, NY	18	R.P.I.	1867-68	----			
Orvis, C.	1866-69	3S	3.	Jamaica Plain, MA	20						
Saltmarsh, E.O.	1865-69	4S	4.	Dorchester, MA	19						

* Includes first- and second-year students in general studies who would become architecture students at M.I.T. or have careers in architecture.

R (in column 3) = Regular Student, preceded by number indicating that student was taking classes at 1st-, 2nd-, 3rd-, or 4th-year level.
S (in column 3) = Special Student, preceded by number indicating that student was taking classes at 1st-, 2nd-, 3rd-, or 4th-year level.
. (in column 4) indicates that student finished at M.I.T. after the number of years given. A number without a period indicates that a student continued for at least another year.
See also general table of Abbreviations.

Students Enrolled, 1869-70	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Greenleaf, E.H.	1869-73	1R	1	Boston, MA	?						
Hammond, E.B.	1869-70	1R	1.	New Bedford, MA	15						
Phillips, H.A.	1869-73	1R	1	Chicago, IL	17						
Bigelow, W.B.	1869-71	2R	1	New York, NY	17						
Avery, G.A.	1869-71	3S	1	Boston, MA	28						
Berry, A.H.	1869-71	3S	1	Lynn, MA	26				H.W. Hartwell	Boston, MA	c.1866-67
Damon, C.W.	1869-71	1,3S	1	Haverhill, MA	?						
Darling, E.A.	1869-71	3S	1	E. Burke, VT	?						
Morse, H.H.	1869-70, 1871-72	3S	1	Dorchester, MA	?				Jonathan Preston	Boston, MA	c.1869
Page, G.W.	1869-70	3S	1.	Boston, MA	?						
Rich, T.P.	1869-70	3S	1.	Boston, MA	?				Ware & Van Brunt	Boston, MA	1869-70
Richards, H.	1869-71	3S	1	Boston, MA	21	Harvard Univ.	1865-69	AB69	Ware & Van Brunt	Boston, MA	c.1864-65, c.1869-71
Shaw, G.R.	1869-70	3S	1.	Parkman, ME	21	Harvard Univ.	1865-69	AB69			
Silsbee, J.L.	1869-70	3S	1.	Salem, MA	21	Harvard Univ.	1865-69	AB69	William R. Emerson	Boston, MA	1869-71
Smith, P.H.	1869-70	2,3S	1.	Hadley Falls, MA	?						
Pond, J.A.	1868-70	3S	2.								
Spinning, F.	1868-71	3S	2								
Woollett, W.M.	1868-70	4S	2.								

Students Enrolled, 1870-71	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Boyden, A.J.	1870-75	1R	1	Foxboro, MA	17						
Colt, S.P.	1870-73	1R	1	Bristol, RI	18						
Dowse, W.B.	1870-74	1R	1	Boston, MA	17						
Elliot, G.B.	1870-73	1S	1	Keene, NH	?						
Little, A.	1870-75	1R	1	Boston, MA	17						
Read, C.F.	1870-73	1S	1	Boston, MA	17						
Wetherell, G.H.	1870-71	1R/S	1.	Boston, MA	16						
Greenleaf, E.H.	1869-73	2R	2								
Phillips, H.A.	1869-73	2R	2								
Anderson, J.L.	1870-71	3S	1.	Cincinnati, OH	?						
Clark, H.P.	1870-71	3S	1.	Boston, MA	17						
McMaster, G.	1870-71	3S	1.	Watertown, MA	?						
Perkins, W.B.	1870-71	1,2,3S	1.	Lawrence, MA	?						
Rich, J.R.	1870-71	3S	1.	Cambridge, MA	23	Harvard Univ.	c.1866-70	AB72			
Schwab, E.	1870-72	2,3S	1	Hartford, CT	19	Mannheim Univ.	c.1867-70	?			
Silliman, B.	1870-71	3S	1.	New Haven, CT	21	Yale Univ.	1866-70	AB70			
Wyatt, J.B.N.	1870-71	3S	1.	Baltimore, MD	23	Harvard Univ.	1866-70	AB70			
Berry, A.H.	1869-71	3S	2.								
Bigelow, W.B.	1869-71	3R	2.								
Avery, G.A.	1869-71	4S	2.								
Damon, C.W.	1869-71	4S	2.								
Darling, E.A.	1869-71	4S	2.								
Richards, H.	1869-71	4S	2.								
Spinning, F.	1868-71	4S	3.								

Students Enrolled, 1871-72	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Atkinson, R.S.	1871-75	1S	1	Brookline, MA	16						
Dabney, W.H.	1871-75	1R	1	Canary Islands	16						
Wheelwright, E.M.	1871-72, 1876-77	1R	1	Roxbury, MA	17						
Boyden, A.J.	1870-75	2R	2								
Colt, S.P.	1870-73	2R	2								
Dowse, W.B.	1870-74	2R	2								
Elliot, G.B.	1870-73	2S	2								
Little, A.	1870-75	1R	2								
Read, C.F.	1870-73	1,2S	2								
Bicknell, F.A.	1871-73	3S	1	Somerville, MA	?						
Briggs, J.L.	1871-73	3S	1	Springfield, MA	?	Dartmouth Coll.	1869-71	----			
Bush, S.D.	1871-72	3S	1.	Longwood, MA	22	Harvard Univ.	1867-71	AB71			
Chadwick, F.B.	1871-72	3S	1.	Boston, MA	21	Harvard Univ.	1867-71	AB71			
Channing, G.E.	1871-72	1,3S	1.	Brookline, MA	?						
Dexter, W.M.	1871-72	3S	1.	Providence, RI	?						
Falt, J.P.	1871-72	3S	1.	Somerville, MA	?						
Holman, F.L.	1871-72	3S	1.	Newton, MA	?						
Merrick, W.	1871-73	3S	1	Springfield, MA	22	Harvard Univ.	1866-70	AB70			
Rotch, A.	1871-73	3S	1	Boston, MA	21	Harvard Univ.	1867-71	AB71			
Stone, C.S.	1871-72	3S	1.	Cambridge, MA	?						
Tominaga, F.	1871-72	3S	1.	Tokyo, Japan	?						
Tuxbury, W.	1871-72	3S	1.	Saco, ME	?						
Ware, W.R.	1871-73	2,3S	1	Cambridge, MA	23	Harvard Univ.	1867-71	AB71			
Greenleaf, E.H.	1869-73	3R	3								
Morse, H.H.	1869-70, 1871-72	3S	2.								
Phillips, H.A.	1869-73	3R	3								
Schwab, E.	1870-72	2,3,4S	2.								

Students Enrolled, 1872-73	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Allen, R.H.	1872-75	1S	1	Walpole, MA	18						
Austin, W.D.	1872-75	1R	1	Dorchester, MA	16						
Fairbanks, W.E.	1872-75	1R	1	Bellingham, MA	18						
Hapgood, E.E.	1872-76*	1R	1	Hudson, MA	16						
Kendall, H.H.	1872-73	1R	1.	Newton, MA	17						
Atkinson, R.S.	1871-75	1R	2								
Boyden, A.J.	1870-75	1,2R	3								
Dabney, W.H.	1871-75	1,2R	2								
Little, A.	1870-75	2R/S	3								
Barnard, E.H.	1872-74	1,2,3S	1	Belmont, MA	17						
Brown, S.J.	1872-73	1,3S	1.	Cincinnati, OH	19						
Bruce, C.T.	1872-73	3S	1.	Newburyport, MA	?						
Curtis, E.C.	1872-73	3S	1.	Boston, MA	26	Harvard Univ.	1865-69	AB69	Peabody & Stearns	Boston, MA	c.1871
Dodd, A.H.	1872-74	2,3S	1	Boston, MA	18						
Ferry, G.B.	1872-73	2,3S	1.	Springfield, MA	21						
Gardner, N.W.	1872-73	2,3S	1.	Springfield, MA	?						
Gibson, L.H.	1872-73, 1874-75	1,2,3S	1	Indianapolis, IN	18				Archs' offices	Ind'polis, IN	c.1871-72
Hubbard, E.S.	1872-73	1,2,3S	1.	Holden, MA	?						
Lewis, G.W.	1872-73	1,2,3S	1.	Fredonia, NY	27?						
Paine, W.J.	1872-74	3S	1	Fall River, MA	?						
Pratt, W.L.	1872-73	2,3S	1.	W. Newton, MA	?						
Skinner, F.	1872-73	2,3S	1.	Newton, MA	?						
Smith, W.E.	1872-73	1,2,3S	1.	Poultney, VT	?						
Sullivan, L.H.	1872-73	2,3S	1.	Wakefield, MA	16						
Teulon, J.A.	1872-73	1,2,3S	1.	Newton, MA	?						
Colt, S.P.	1870-73	3S	3.								
Dowse, W.B.	1870-74	3R	3								
Elliot, G.B.	1870-73	3S	3.								
Read, C.F.	1870-73	2,3S	3.								

*Thesis submitted 1921.

Students Enrolled, 1872-73 (cont.)	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Bicknell, F.A.	1871-73	2,4S	2.								
Briggs, J.L.	1871-73	4S	2.								
Greenleaf, E.H.	1869-73	4R	4.								
Merrick, W.	1871-73	4S	2.								
Phillips, H.A.	1869-73	4R	4.								
Rotch, A.	1871-73	2,4S	2.								

Students Enrolled, 1873-74	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Beal, J.W.	1873-77	1R	1	Hanover, MA	18						
Capen, G.W.	1873-77	1R	1	Canton, MA	20						
Chamberlin, W.E.	1873-77	1R	1	Cambridge, MA	17						
Greenough, W.C.	1873-75	1R	1	Cambridge, MA	17						
Peters, W.M.	1873-76	1R	1	Jamaica Plain, MA	17						
Rollins, T.B.	1873-76	1R	1	Wellesley, MA	16						
Whidden, W.M.	1873-75	1R	1	Boston, MA	16						
Allen, R.H.	1872-75	2S	2								
Austin, W.D.	1872-75	2S	2								
Fairbanks, W.E.	1872-75	1R	2								
Hapgood, E.E.	1872-76	1,2R	2								
Brown, J.M.	1873-75	1S	1	Northampton, MA	20						
Cochran, C.H.	1873-74	3S	1.	Somerville, MA	19						
Cook, C.B.	1873-74	1,3S	1.	Chillicothe, OH	23						
Everett, A.G.	1873-75	1,3S	1	Roxbury, MA	18						
Kilby, J.Q.	1873-74	1,3S	1.	Boston, MA	19				Wm. W. Lummus Wm. P. Wentworth	Boston, MA Boston, MA	1871 1872-73
King, H.G.	1873-75	2,3S	1	Springfield, MA	22	Dartmouth Coll.	1869-73	SB73			
Newell, C.H.	1873-75	1,3S	1	Springfield, MA	18						
Nichols, K.S.	1873-74	3S	1.	Wakefield, MA	17						
Patton, N.S.	1873-74	3S	1.	Chicago, IL	21	Amherst Coll.	1870-73	AB73			
Richardson, W.C.	1873-75	3S	1	So. Lawrence, MA	19						
Stickney, F.W.	1873-75	3S	1	Lowell, MA	19						
Atkinson, R.S.	1871-75	2,3S	3								
Barnard, E.H.	1872-74	3S	2.								
Boyden, A.J.	1870-75	3R	4								
Dabney, W.H.	1871-75	3R	3								
Little, A.	1870-75	3S	4								
Paine, W.J.	1872-74	3S	2.								
Dodd, A.H.	1872-74	4S	2.								
Dowse, W.B.	1870-74	4R	4.								
Faxon, J.L.	1873-74	4S	1.	Brookline, MA	22						

Students Enrolled, 1874-75	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Baker, C.M.	1874-78	1R	1	Boston, MA	17						
Eaton, C.S.	1874-78	1R	1	Lowell, MA	18						
Higgins, A.S.	1874-78	1R	1	Boston, MA	16						
Rollins, T.B.	1873-76	1R	2								
Beal, J.W.	1873-77	2R	2								
Capen, G.W.	1873-77	2R	2								
Chamberlin, W.E.	1873-77	2R	2								
Fairbanks, W.E.	1872-75	2R	3.								
Greenough, W.C.	1873-75	2S	2.								
Peters, W.M.	1873-76	2R	2								
Whidden, W.M.	1873-75	2,3S	2.								
Bacon, F.H.	1874-76	2S	1	Biddeford, ME	18						
Blanchard, F.S.	1874-75	3S	1.	Winona, MN	20						
Eaton, F.S.	1874-75	3S	1.	Reading, MA	?						
Hoppin, H.	1874-76	3S	1	Pomfret, CT	18						
Larned, W.S.	1874-75	3S	1.	Nashville, TN	20	Montgomery Bell Coll.	?				
						Cornell Univ.	1872-74				
Vonnegut, B.	1874-76	3S	1	Indianapolis, IN	18						
Wicks, W.S.	1874-75	3S	1.	Trenton, NY	20	Cornell Univ.	1872-74				
Zerrahn, F.E.	1874-75	3S	1.	Boston, MA	16						
Allen, R.H.	1872-75	3S	3.								
Atkinson, R.S.	1871-75	2,4S	4.								
Austin, W.D.	1872-75	3S	3.								
Brown, J.M.	1873-75	4S	2.								
Dewson, E.W.	1868-69, 1874-75	3S	2.			M.I.T. (1st yr)	1868-69		W.P.P. Longfellow	Boston, MA	1874
Everett, A.G.	1873-75	2S	2.								
Gibson, L.H.	1872-73 1874-75	3S	2.								

Students Enrolled, 1874-75 (cont.)	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Hapgood, E.E.	1872-76	3R	3								
King, H.G.	1873-75	2,4S	2.								
Little, A.	1870-75	3S	5.								
Newell, C.H.	1873-75	1S	2.								
Richardson, W.C.	1873-75	4S	2.								
Stickney, F.W.	1873-75	1S	2.								
Boyden, A.J.	1870-75	4R	5.								
Dabney, W.H.	1871-75	4R	4.								
Terrell, C.	1874-75	3,4R	1.	Oxford, OH	23	U.S. Naval Academy	1867-71	----			

Students Enrolled, 1875-76	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Alden, F.E.	1875-79	1R	1	W. Roxbury, MA	16						
Eyre, W.	1875-76	1R	1.	Newport, RI	17						
Grover, G.C.	1875-78	1S	1	Dedham, MA	19						
Harlow, A.B.	1875-78	1R	1	Middleboro, MA	18						
Hartwell, E.G.	1875-79	1R	1	Boston, MA	17						
Morgan, R.H.	1875-77	1R	1	New Bedford, MA	19						
Young, J.E.	1875-79	1R	1	Groton, MA	19						
Baker, C.M.	1874-78	2R	2								
Eaton, C.S.	1874-78	2R	2								
Higgins, A.S.	1874-78	2R	2								
Rollins, T.B.	1873-76	2R	3.								
Sonrel, L.A.	1875-78	2R*	1	Winchester, MA	18						
Andrews, R.D.	1875-76	2,3S	1.	Hartford, CT	18				Peabody & Stearns	Boston, MA	1874-83
Borland, J.	1875-76	1,2,3S	1.	Boston, MA	19						
Brown, G.	1875-76	2,3S	1	Alexandria, VA	21	Washington & Lee Univ.	1872-74	----			
Burnham, W.A.	1875-76	3S	1.#	Boston, MA	23	Harvard Univ.	1870-75	AB74			
Clough, J.A.	1875-76	4S	1.	Holyoke, MA	25						
Corser, F.G.	1875-77	2S	1/2	Rochester, NY	26						
Freeman, G.A.	1875-77	3S	1	New York, NY	16						
Goodman, A.J.	1875-76	3S	1.	Collinsville, CT	19						
Hammatt, E.S.	1875-77	1S	1	Rochester, NY	21						
Hunnewell, H.S.	1875-76	2,3S	1.	Boston, MA	21	Harvard Univ.	1871-75	AB75			
Jaques, H.	1875-77	1,2,3S	1	Boston, MA	18						
Mann, G.R.	1875-76	3S	1.	Goshen, IN	19				William H. Brown	Ind'polis, IN	c.1874-75
Monks, H.G.	1875-76	3S	1.	Boston, MA	29	Harvard Univ.	1863-67	AB67	Sturgis & Brigham	Boston, MA	c.1874-75
Riley, J.	1875-76	3S	1.	Boston, MA	18						
Sanders, C.H.	1875-76	1,3S	1.	Fisherville, NH	24	Dartmouth Coll.	1870-71	----			
Stebbins, E.S.	1875-76	4S	1.	Troy, NY	22						
Tuck, C.E.	1875-76	3S	1.	Salem, MA	29						
Underwood, G.F.	1875-76	2,3S	1.	Boston, MA	22				Ware & Van Brunt	Boston, MA	c.1874-75
Willard, D.W.	1875-77	S	1	Brookline, MA	26	M.I.T. (ME)	1866-70	SB70			

* 2nd yr Regular student in Civil Engineering
\# Returned in 1879-80, as 3rd-year Special student

Students Enrolled, 1875-76 (cont.)	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Bacon, F.H.	1874-76	2,3,4S	2.								
Beal, J.W.	1873-77	3R	3								
Capen, G.W.	1873-77	3R	3								
Chamberlin, W.E.	1873-77	3R	3								
Furber, P.P.	1875-77	3R	1	Cottage Grove, MN	22	Carleton Coll. Univ. of Minnesota (CE)	1867-69 1872-75	? ?			
Hoppin, H.	1874-76	4S	2.								
Peters, W.M.	1873-76	3R	3.								
Vonnegut, B.	1874-76	4S	2.								
Hapgood, E.E.	1872-76	4R	4.								

Students Enrolled, 1876-77	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Cobb, H.I.	1876-77, 1881-82	1R	1*	Brookline, MA	17						
Crowell, S.	1876-79	1R	1	Dennis, MA	19						
Sargent, S.A.	1876-80	1R	1	Boston, MA	15						
Alden, F.E.	1875-79	2R	2								
Grover, G.C.	1875-78	2S	2								
Harlow, A.B.	1875-78	2R	2								
Hartwell, E.G.	1875-79	2R	2								
Morgan, R.H.	1875-77	2R	2.								
Sonrel, L.A.	1875-78	2R	2								
Young, J.E.	1875-79	2R	2#								
Allen, F.R.	1876-77	3S	1.	Boston, MA	33	Amherst Coll.	c.1861-65	AB65			
Beebe, F.H.	1876-77	3S	1.	Boston, MA	23						
Chappell, R.D.	1876-77	3S	1.	Norwich, CT	24						
DuFais, J.L.	1876-77	3S	1.	New York, NY	21	Harvard Univ.	1873-76	AB88	H.H. Richardson	New York, NY	c.1876
Fairfield, W.	1876-77	1,3S	1.	Malden, MA	17						
Gracea, J.J.	1876-78	1,3S	1	Westfield, MA	18						
Hamlin, A.D.F.	1876-77	2,3S	1.	Worcester, MA	21	Amherst Coll.	1871-75	AB75			
Josselyn, H.S.	1876-77	3S	1.	Independence, IA	27						
Kendall, W.M.	1876-78	3S	1	Cambridge, MA	20	Harvard Univ.	1872-76	AB76			
Lewis, I.	1876-77	3S	1.	Lynn, MA	19						
Longfellow, A.W.	1876-78	2,3,4S	1	Portland, ME	22	Harvard Univ.	1872-76	AB76			
Peabody, H.G.	1876-77	2,3,4S	1.	St. Louis, MO	21	Dartmouth Coll.	1872-76	AB76			
Taylor, E.H.	1876-78	1,2,3S	1	Grinnell, IA	23	Grinnell Coll.	1873-76	BS76			
Willson, E.R.	1876-77	3S	1.	Salem, MA	20	Harvard Univ.	1871-75	AB75			

* Returned in 1881-82 as 3rd yr Special Student in Architecture
\# Transferred to M.I.T. Dept. of Practical Design, 1877-79

Students Enrolled, 1876-77 (cont.)	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Baker, C.M.	1874-78	3R	3								
Corser, F.G.	1875-77	3S	1 1/2.								
Eaton, C.S.	1874-78	3R	3								
Freeman, G.A.	1875-77	4S	2.								
Hammatt, E.S.	1875-77	2S	2.								
Higgins, A.S.	1874-78	3R	3								
Jaques, H.	1875-77	2,4S	2.								
Wheelwright, E.M.	1871-72, 1876-77	2S	2.			M.I.T. (1st yr) Harvard Univ.	1871-72 1872-76	--- AB76			
Willard, D.W.	1875-77	2S	2.								
Beal, J.W.	1873-77	4R	4.								
Capen, G.W.	1873-77	4R	4.								
Chamberlin, W.E.	1873-77	4R	4.								
Furber, P.P.	1875-77	4R	2.								

Students Enrolled, 1877-78	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Emery, F.F.	1877-81	1R	1	Boston, MA	17						
Lewis, E.J.	1877-81	1R	1	Dorchester, MA	18						
Snead, W.R.	1877-81	1R	1	Louisville, KY	16						
Wilkes, C.M.	1877-81	1R	1	S. Manchester, CT	19						
Zimmermann, W.C.	1877-80	1R/S	1	Thiensville, WI	18						
Crowell, S.	1876-79	2R	2								
Sargent, S.A.	1876-80	2S	2								
Aiken, W.M.	1877-79	3S	1	Charleston, SC	22	Univ. of the South	1872-74	BA74			
Bancroft, J.M.	1877-78	3S	1.	Bradford, MA	19						
Brunner, A.W.	1877-79	3S	1	New York, NY	20						
Clymer, W.B.S.	1877-78	3S	1.	Washington, DC	22	Harvard Univ.	1872-76	AB76	Ware & Van Brunt	Boston, MA	1876-77
Ford, F.H.	1877-78	3S	1.	Bradford, MA	18						
Frost, C.S.	1877-78	2,3S	1.	Lewiston, ME	21				Peabody & Stearns	Boston, MA	1876-81
McCombs, F.M.	1877-79	3S	1	St. Louis, MO	25						
Minot, F.	1877-78	3S	1.	Roxbury, MA	23	Harvard Univ.	1872-77	AB76			
O'Grady, T.	1877-80	1S	1	Boston, MA	19						
Seabury, B.H.	1877-79	3S	1	Newport, RI	21						
Storer, F.A.	1877-78	3S	1.	Newport, RI	20						
Swinburne, H.H.	1877-78	3S	1.	Newport, RI	28						
Taylor, J.K.	1877-79	3S	1	St. Paul, MN	20				E.P. Bassford	St. Paul, MN	1876-77
Warren, H.L.	1877-79	3S	1	Roxbury, MA	20	Owen's Coll., Manchester, ENG.	1871-75	?	William Dawes	Manchester, ENG.	1875-76
Alden, F.E.	1875-79	3R	3								
Gracea, J.J.	1876-78	4S	2.								
Grover, G.C.	1875-78	3S	3.								
Harlow, A.B.	1875-78	3R	3.								
Hartwell, E.G.	1875-79	3R	3								
Kendall, W.M.	1876-78	4S	2.								
Longfellow, A.W.	1876-78	4S	2.								
Sonrel, L.A.	1875-78	3S	3.								
Taylor, E.H.	1876-78	1,4S	2.								
Baker, C.M.	1874-78	4R	4.								
Eaton, C.S.	1874-78	4R	4.								
Higgins, A.S.	1874-78	4R	4.								

Students Enrolled, 1878-79	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Brackett, A.C.	1878-82	1R	1	Newton, MA	18						
Darrow, A.L.	1878-81	1R	1	Boston, MA	20						
Snelling, G.T.	1878-82	1R	1	New York, NY	17						
Emery, F.F.	1877-81	2S*	2								
Lewis, E.J.	1877-81	2R	2								
Snead, W.R.	1877-81	2R	2								
Wilkes, C.M.	1877-81	2R	2								
Brandt, O.E.	1878-79	3S	1.	Cincinnati, OH	20						
Burns, S.R.	1878-79	3S	1.	Troy, OH	23						
Cochran, F.B.	1878-80	1S	1	Boston, MA	18						
Cram, A.B.	1878-80	3S	1	Detroit, MI	25	Penn State Univ.	1866-70	BS70	Civil Engineering Architecture	Detroit, MI vic. Detroit, MI	1870-76 1877
Duker, H.H.	1878-80	3S	1	Baltimore, MD	19						
Foote, O.K.	1878-80	3S	1	Morrisville, NY	24						
Gilbert, C.	1878-79	3S	1.	St. Paul, MN	19	Macalester Coll.	?	----	A.M. Radcliff	St. Paul, MN	1876-78
Harriman, C.A.	1878-80	3S	1	Boston, MA	18						
Johnston, C.H.	1878-79	3S	1/2.	St. Paul, MN	19				A.M. Radcliff	St. Paul, MN	c.1875-78
Marble, A.M.	1878-80	3S	1	Fall River, MA	19						
Norris, W.A.	1878-79	3S	1.	Chelsea, MA	30						
Reed, C.A.	1878-79	3S	1.	Avon, NY	21						
Rosenheim, A.F.	1878-82#	2S	1	St. Louis, MO	19	Washington Univ.	c.1876-79	----			
Smith, T.L.	1878-79	S	1.	Watertown, WI	?	Iowa State Univ.	c.1873-77	BS77			
Tryon, T.	1878-81	3S	1	Hartford, CT	19						
White, L.R.	1878-79	3S	1.	Manchester, KY	26						

* Took various courses, but no Architecture, in 1879-80, 1880-81
# Registration intermittent

Students Enrolled, 1878-79 (cont.)	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Aiken, W.M.	1877-79	4S	2.								
Brunner, A.W.	1877-79	4S	2.								
Crowell, S.	1876-79	3S	3.								
McCombs, F.M.	1877-79	4S	2.								
O'Grady, T.	1877-80	3S	2								
Sargent, S.A.	1876-80	3S	3								
Seabury, B.H.	1877-79	4S	2.								
Taylor, J.K.	1877-79	4S	2.								
Warren, H.L.	1877-79	4S	2.								
Zimmermann, W.C.	1877-80	1S	2								
Alden, F.E.	1875-79	4S	4.								

Students Enrolled, 1879-80	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Eppendorff, J.G.	1879-83	1R	1	Brooklyn, NY	17						
Lewis, A.J.	1879-81	1S	1	Boston, MA	18						
Paddock, B.S.	1879-83	1R	1	Omaha, NE	18						
Woods, H.F.	1879-81	1R	1	San Francisco, CA	17						
Brackett, A.C.	1878-82	2R	2								
Darrow, A.L.	1878-81	2R	2								
Heins, G.L.	1879-82	2R	1	Philadelphia, PA	19	Univ. of Pennsylvania	1877-79	----			
Neff, H.M.	1879-81	2R	1	Denver, CO	18						
Snelling, G.T.	1878-82	2R	2								
Burgess, W.P.	1879-81	3S	1	Dedham, MA	22	Amherst Coll.	1875-79	----			
Chase, C.M.	1879-81	3S	1	Lowell, MA	20						
Hill, A.E.	1879-81	3S	1	Andover, MA	19						
Hunting, W.C.	1879-81	3S	1	Boston, MA	18						
Kauffman, W.	1879-81	3S	1	Bellefontaine, OH	?						
McColl, F.P.	1879-81	3S	1	Newton, MA	18						
Pester, R.	1879-80	3S	1.	Brooklyn, NY	17						
Rogers, J.S.	1879-81	3S	1	Baltimore, MD	?						
Snedeker, C.A.	1879-81	3S	1	Brooklyn, NY	19						
Symonds, A.H.	1879-80	3S	1.	Gardner, MA	22						
Welch, E.M.	1879-81	3S	1	Hartford, CT	18						
Wescott, J.H.	1879-81	3S	1	Saratoga Spr., NY	20						
Cochran, F.B.	1878-80	2S	2.								
Cram, A.B.	1878-80	4S	2.								
Duker, H.H.	1878-80	4S	2.								
Foote, O.K.	1878-80	4S	2.								
Harriman, C.A.	1878-80	4S	2.								
Lewis, E.J.	1877-81	3R	3								
Marble, A.M.	1878-80	4S	2.								
O'Grady, T.	1877-80	4S	3.								
Rosenheim, A.F.	1878-82	3S	2								
Snead, W.R.	1877-81	3R	3								
Tryon, T.	1878-81	4S	2								
Wilkes, C.M.	1877-81	3R	3								
Zimmermann, W.C.	1877-80	2S	3.								
Sargent, S.A.	1876-80	S	4.								

Students Enrolled, 1880-81	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Ilsley, S.M.	1880-84	1R	1	Milwaukee, WI	17						
Eppendorff, J.G.	1879-83	2R	2								
Lewis, A.J.	1879-81	4S	2.								
Paddock, B.S.	1879-83	S	2								
Woods, H.F.	1879-81	S	2.								
Ely, E.F.	1880-82	3R	1	Providence, RI	22	Brown Univ.	1875-79	AB79			
Frommann, E.H.	1880-81	3S	1.	Chicago, IL	20						
Gilbert, R.W.	1880-81	3S	1.	St. Johns, NB	26	Washington Univ.	?	?			
Hackett, J.A.	1880-81	3S	1.	Boston, MA	?						
Hale, D.C.	1880-82	3S	1	Ellsworth, ME	19						
Hannaford, H.E.	1880-81	3S	1.	Cincinnati, OH	23				Samuel Hannaford	Cincinnati, OH	c.1878
Hill, F.E.	1880-81	3S	1.	Red Wing, MN	20						
Hooker, H.D.	1880-82	1S	1	Providence, RI	21	Brown's Bus. Coll., Brooklyn	?	?			
Howard, T.H.	1880-82	3S	1	Newport, RI	18						
Hunt, R.H.	1880-82	3S	1	New York, NY	18						
Jones, H.W.	1880-82	3S	1	Shelburne Fls, MN	21	Brown Univ.	1878-80	AB03			
Means, J.	1880-83	S	1	Boston, MA	17						
Nichols, E.	1880-81	3S	1.	Cohasset, MA	16						
Northend, W.W.	1880-81	3S	1.	Salem, MA	23	Bowdoin Coll.	1876-77	----			
Prentice, A.B.	1880-82	3S	1	W. Killingly, CT	23						
Ramsden, A.H.	1880-81	3S	1.	Lawrence, MA	24						
Rich, C.E.	1880-81	3S	1.	Boston, MA	21						
Shepley, G.F.	1880-82	3S	1	St. Louis, MO	20	Washington Univ.	1877-79	----			
Shope, H.B.	1880-81	3S	1.	Staten Island, NY	18						
Swasey, W.A.	1880-82	3S	1	New York, NY	17						

Students Enrolled, 1880-81 (cont.)	Years at M.I.T.	Registration Status This Year	Cumulative Years at M.I.T.	Hometown	Age on Entering M.I.T.	Previous Collegiate Education			Previous or Concurrent Office Experience		
						Institution	Years	Degree	Name of Firm	Location	Years
Brackett, A.C.	1878-82	3S	3								
Burgess, W.P.	1879-81	4S	2.								
Chase, C.M.	1879-81	4S	2.								
Darrow, A.L.	1878-81	3S	3.								
Heins, G.L.	1879-82	3R	2								
Hill, A.E.	1879-81	4S	2.								
Hunting, W.C.	1879-81	4S	2.								
Kauffman, W.	1879-81	4S	2.								
McColl, F.P.	1879-81	4S	2.								
Neff, H.M.	1879-81	3S	2.								
Rogers, J.S.	1879-81	4S	2.								
Rosenheim, A.F.	1878-82	S	3								
Snedeker, C.A.	1879-81	4S	2.								
Snelling, G.T.	1878-82	3R	3								
Tryon, T.	1878-81	4S	3.								
Welch, E.M.	1879-81	4S	2.								
Wescott, J.H.	1879-81	4S	2.								
Kidder, F.E.	1880-81	4R	1.	Bangor, ME	21	Univ. of Maine Cornell Univ.	1875-78 1878-79	BCE79 ----			
Lewis, E.J.	1877-81	4R	4.								
Snead, W.R.	1877-81	4R	4.								
Wilkes, C.M.	1877-81	4R	4.								

APPENDIX E

M.I.T. Architecture Students, 1868-81: Careers

Students Finishing, 1868-69	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Earle, S.C.	1868-69	30	Earle & Fuller, Worcester, MA, 1866-77; Boston branch office, 1872-86	Earle & Fisher, Worcester, 1881-1903; d.1913
Howe, F.M.	1868-69	20	dftsm., Ware & Van Brunt, Boston, 1869-77; dftsm., J.P. Putnam, Boston, 1878-79	Howe & Dodd, Boston, 1880-81; Van Brunt & Howe, Boston, KC, 1881-1903; Howe, Hoit & Cutler, KC, 1903-09; d.1909
Lewis, W.W.	1868-69	19	dftsm., Cummings & Sears, Boston, c.1871-75; arch., Boston, 1876-c.1917	arch., Boston/Cohasset, MA; d.1933
Orvis, C.	1866-69	21	dftsm., B.F. Dwight, Boston, c.1870-91	arch., Boston/Wellesley, MA
Thayer, G.F.P.	1868-69	?	not known	not known
Tilden, G.T.	1868-69	24	Paris: Vaudremer, c.1869-70; dftsm./arch., Boston, c.1870; Putnam & Tilden, Boston, 1873-74; arch., Boston, 1875-76; Hartwell & Tilden, Boston, 1877-78; arch., Boston, 1878-80	Rotch & Tilden, Boston, 1880-94; ret.1915; d.1919

EdBA:[Name of atelier] used for students officially enrolled at the Ecole des Beaux-Arts.
Paris:[Name of atelier] used for students living in Paris and associated with an atelier, but not officially enrolled at the Ecole. (See also Appendix H.)
See also general table of Abbreviations.

Students Finishing, 1869-70	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Hammond, E.B.	1869-70	16	Caleb Hammond & Son, bldrs., New Bedford, MA	arch., New Bedford; d.1937
Page, G.W.	1869-70	?	dftsm., Boston, 1870-84: w. Sturgis & Brigham, 1870-72	(w. G.A. Avery, Boston, 1881-84)
Pond, J.A.	1868-70	?	Paris: Daumet, 1872-?	not known; d.1882
Rich, T.P.	1869-70	?	Paris: Daumet, 1872-?	not known
Shaw, G.R.	1869-70	22	design stud., S. Kensington, London, 1870-71; Munich Polytech., 1871-72; Ecole: Daumet, 1874; arch., Boston, 1875-82	Shaw & Hunnewell, Boston, 1883-1902; arborist/botanist, Boston, 1904-37; d.1937
Silsbee, J.L.	1869-70	22	dftsm., Ware & Van Brunt, W.R. Emerson, Boston, 1870-71; travel in Eur., 1871-72; arch., Syracuse, 1872-82	arch., Chicago, 1882-1913; d.1913
Smith, P.H.	1869-70	?	not known	not known
Woollett, W.M.	1868-70	20	w. W.L. Woollett, Albany, 1870-74; arch. & author, Albany, 1874-80; d.1880	--------

Students Finishing, 1870-71	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Anderson, J.L.	1870-71	?	not known	not known
Avery, G.A.	1869-71	30	arch., Boston, c.1877-1908	(w. G.W. Page, Boston, 1881-84); d. 1912
Berry, A.H.	1869-71	28	dftsm./CE, Boston & Lowell RR; CE, Boston, c.1876-80	CE, Boston, 1883-86; fan manufacturer, Waltham, MA, 1887+
Bigelow, W.B.	1869-71	19	EdBA: Pascal, 1873-74; w. McKim & Mead, NYC, 1874-77; McKim, Mead & Bigelow, NYC, 1877-79	arch., NYC, 1880-1900; Bigelow, Wallis & Cotton, NYC, 1900-?
Clark, H.P.	1870-71	18	dftsm, N.J. Bradlee (?), Boston, 1871-74; Paris: Andre, c.1874-75; arch., Boston, 1875-88	Clark & Lewis, 1882-83; w. Henry Vaughan, Boston, c.1889-91; Clark & Russell, Boston, 1892-1927; d.1927
Damon, C.W.	1869-71	?	not known	not known
Darling, E.A.	1869-71	?	not known [did at least one M.I.T. studio project, spring 1872]	not known, NYC
McMaster, G.	1870-71	?	not known	not known
Perkins, W.B.	1870-71	?	not known	not known; d.1896
Rich, J.R.	1870-71	24	EdBA: Daumet, 1872-74; arch. & decorator, Boston, c.1875-76; painting stud., 1877	landscape painter, Boston; d.1910
Richards, H.	1869-71	23	travel in Eur., 1871-72; dftsm., Peabody & Stearns, Boston, 1872-76; arch. & paper mfr., Gardiner, ME, 1876+	arch. & paper mfr., Gardiner, ME; d.1949
Silliman, B.	1870-71	22	travel in Eur., 1871; arch. stud., Stuttgart & Berlin, 1871-73; w. Calvert Vaux, NYC, 1873-76; arch., NYC, 1876; Silliman & Farnsworth, NYC, 1876-83	arch., NYC, 1883-1901; d.1901
Spinning, F.	1868-71	?	Paris: Coquart 1872-?	not known
Wetherell, G.H.	1870-71	17	dftsm, N.J. Bradlee, Boston, c.1872-76; Paris: Pascal, c.1876-79; arch. w. N.J. Bradlee, 1879-88	Bradlee, Winslow & Wetherell, Boston, 1884-88; Winslow & Wetherell, Boston, 1888-98; Winslow, Wetherell & Bigelow, Boston, 1898-1900; arch., Boston, c.1901-17; d.1930
Wyatt, J.B.N.	1870-71	24	Paris: Vaudremer, c.1873-74; w. arch., Baltimore, c.1875; Wyatt & Sperry, Baltimore, 1876-86	Wyatt & Nolting, Baltimore, 1886-1926; d.1926

Students Finishing, 1871-72	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Bush, S.D.	1871-72	23	dftsm., Ware & Van Brunt, Boston, 1873; cotton buyer, Boston, c.1875+	cotton buyer, Boston; d.1936
Chadwick, F.B.	1871-72	22	painting stud., Paris, 1872-76; in Boston, 1876-78; painter, Paris, 1878-?	painter; d.1943
Channing, G.E.	1871-72	?	not known	Treas. Dept. agent, Seattle; d.1921
Dexter, W.M.	1871-72	?	arch., Providence, c.1877+	CE & surveyor, Providence; d.1929
Falt, J.P.	c.1871-72	?	dftsm., Boston, 1873-75; stone contractor, Boston, 1881-83	stone contractor, Springfield, MA, c.1885+
Holman, F.L.	1871-72	?	not known	not known
Morse, H.H.	1869-70 1871-72	?	dftsm., Boston, 1871-1916: w. W.R. Emerson, c.1871,1875-77; w. Howe & Dodd, 1880	dftsm. w. E.N. Boyden, c.1887-93; w. Boston Elev. Rwy. Co., c.1901-09; d.1916
Schwab, E.	1870-72	21	dftsm., Boston, c.1873-83; language teacher, Boston, 1877-80	life insurance agent, Boston, 1883+; publications ed., John Hancock Life Ins. Co., Boston; d.1923
Stone, C.S.	1871-72	?	not known	not known
Tominaga, F.	1871-72	?	not known	not known
Tuxbury, W.	1871-72	?	not known; d.1873	--------

Students Finishing, 1872-73	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Bicknell, F.A.	1871-73	?	not known	not known
Briggs, J.L.	1871-73	?	not known	not known; d.1922
Brown, S.J.	1872-73	20	dftsm., Ware & Van Brunt, Boston, c.1873-74; dftsm., Cummings & Sears, Boston, c.1875-76; dftsm., Boston, c.1877; asst. to Boston City Arch., c.1878-82	dftsm., Van Brunt & Howe, Boston, 1883-85; arch., Boston, Hingham, MA, 1886-1917; ret.1917; d.1926
Bruce, C.T.	1872-73	?	not known	not known
Colt, S.P.	1870-73	21	stud., Columbia Law School, 1874-76; RI Legislature, 1876-79; Atty. Gen. office, RI, 1879-85	chief executive, National India Rubber Co., Bristol, RI, 1888-92, U.S. Rubber Co., NYC, 1892-1921; d.1921
Curtis, E.C.	1872-73	27	Paris: Vaudremer, 1874-78; arch. & decorator, Boston, 1878-86; w. T.M. Clark, 1882	Curtis & Kidder, Boston, 1886; d.1886
Elliot, G.B.	1870-73	?	arch. & engr., Boston, c.1873-79; real estate agent, Boston/Winthrop, MA	real estate agent; d.1930
Ferry, G.B.	1872-73	22	w. N.W. Gardner, Springfield, MA, c.1878-79; arch., Milwaukee; Ferry & Clas, Milwaukee, 1890-?	Ferry & Clas; d.1918
Gardner, N.W.	1872-73	?	dftsm., Springfield, c.1874-75; w. G.B. Ferry, Springfield, MA, c.1878-79	dftsm., McKim, Mead & White, c.1883; Hawkins Iron Works, Springfield, MA, c.1883+
Greenleaf, E.H.	1869-73	?	Paris: Vaudremer, 1875-?	not known; d.1930
Hubbard, E.S.	1872-73	?	not known	dftsm., Supv. Arch., Washington, c.1885-90; dftsm., War Dept.; d.1921
*Kendall, H.H.	1872-73	18	dftsm., W.G. Preston, Boston, c.1874-76; dftsm., Supv. Arch., c.1879-89	arch., Boston, 1890; Kendall & Stevens, Boston, 1891-97; Kendall, Taylor & Stevens, Boston, 1898-1908; Kendall, Taylor & Co., Boston, 1908-43; d.1943
Lewis, G.W.	1872-73	27	arch., Boston, c.1874-90	Lewis & Paine, Boston, 1891-93; arch., Boston/Malden, c.1894-1916; d.1928
Merrick, W.	1871-73	24	engr. stud., Springfield, MA; w. Springfield Gas Light Co.; banker & estate mgr.	banker & estate mgr.; d.1887
Phillips, H.A.	1869-73	21	dftsm., Chicago, 1873-74; EdBA: Coquart, 1875-76; travel in Eur., 1877; CE for various railroads, 1878-83; CE stud., M.I.T. 1883-84	CE for bridges and railroads, 1884-89; arch. & engr., Boston; d.1926

*First-year student in course of general studies, who would have later career in architecture

Students Finishing, 1872-73 (cont.)	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Pratt, W.L.	1872-73	?	not known; d.1882	--------
Read, C.F.	1870-73	20	arch., H. & J.E. Billings, Boston, 1874-77; merchant, Boston, c.1878-99	Clerk & Treas., Bostonian Soc., 1899-1932; d.1937
Rotch, A.	1871-73	23	EdBA: Vaudremer, 1874-80; Rotch & Tilden, Boston, 1880-94	Rotch & Tilden; d.1894
Skinner,F.	1872-73	?	not known	not known; d.1905
Smith, S.E.	1872-73	?	not known	not known
Sullivan, L.H.	1872-73	17	dftsm., Frank Furness, Phila., 1873; dftsm., W.L. Jenney, Chicago, 1873-74; EdBA: Vaudremer, 1874-75; dftsm., Chicago, 1875-82	Adler & Sullivan, Chicago, 1883-95; arch., Chicago, 1895-1924; d.1924
Teulon, J.A.	1872-73	?	not known	not known, Bradford, PA; d.1919
Ware, W.R.	1871-73	25	travel in S. Amer., 1873; dftsm., Ware & Van Brunt, Boston, c.1873-74; EdBA: Vaudremer, 1874-76; Asst. Ed., AABN, 1880	Ed., AABN, 1883-1907; d.1917

Students Finishing, 1873-74	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Barnard, E.H.	1872-74	19	MFA School, Boston, 1877; stained glass designer, Boston (?), c.1882-86	art student, Paris, 1886-89; landscape painter, Belmont, MA; drawing instr., Bradford Acad., 1892-1903; d.1909
Cochran, C.H.	1873-74	20	not known	not known
Cook, C.B.	1873-74	24	not known	not known; d.1893
Dodd, A.H.	1872-74	20	dftsm., Boston; w. J.P. Putnam, Boston, 1876-79; Howe & Dodd, Boston, 1880-81; arch., Boston, 1882+	arch., Boston; d.1901
Dowse, W.B.	1870-74	21	bank clerk, Boston, 1874-76; w. Chauncy Rubber Co., Boston, c.1876-87	Metropolitan Rubber Co., Boston/NYC, 1887-1917; d.1917
Faxon, J.L.	1873-74	23	Faxon Bros., Boston, 1874-76; arch., Boston, 1877-1918	arch., Boston; d.1918
Kilby, J.Q.	1873-74	20	dftsm., Boston, 1874; steamship clerk, 1882	treas., Boston Theatre, 1883-1901; writer; d.1931
Nichols, K.S.	1873-74	18	not known	not known
Paine, W.J.	1872-74	?	arch., Fall River, MA, c.1879+	electrical contractor, Boston, 1884-89; Lewis & Paine, Boston, 1891-93; arch., Boston/Newtonville, 1894+
Patton, N.S.	1873-74	22	arch., Chicago, 1874-77; dftsm., Supv. Arch., Washington/ Chicago, c.1877-83; arch., Chicago, 1883+	Patton & Fisher/ Patton, Fisher & Miller/ Patton & Miller/ Patton, Holmes & Flynn, Chicago, 1885-1915; d.1915

Students Finishing, 1874-75	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Allen, R.H.	1872-75	21	not known; d.1876	--------
Atkinson, R.S.	1871-75	20	Paris: Pascal, c.1877-78; dftsm., Boston, c.1878-88; Cabot & Chandler, c.1878-79; W.P. Wentworth, c.1880,1882	dftsm., arch., designer, metal worker, Boston, c.1888-1925
Austin, W.D.	1872-75	19	dftsm., Ware & Van Brunt, Boston, c.1876-80; w. Carl Fehmer, F.E. Zerrahn, Boston, c.1882-85	dftsm., Boston, 1886-89; Chamberlin & Austin, Boston, 1890-91; Stickney & Austin, Boston/ Lowell, 1892-1917; ret.1930; d.1944
Blanchard, F.S.	1874-75	21	photo engraver, dftsm., Chicago	dftsm., Chicago
Boyden, A.J.	1870-75	22	dftsm., Stone & Carpenter, Providence, c.1875-79; arch., Boston, 1879-80; w. Cabot & Chandler, Boston/Phila., 1880-84	arch., Phila., 1884-92; Boyden & Taylor, Phila., 1892-95; arch., Phila. & Indianapolis, 1896-1903; d.1903
Brown, J.M.	1873-75	22	dftsm., Boston: Ware & Van Brunt, 1879-80; Peabody & Stearns, 1881-82; arch., Boston, 1883-1906	arch., Chicago, c.1907; arch., Seattle, c.1912-15
Dabney, W.H.	1871-75	20	dftsm., Boston, 1875-78; dftsm., Boston Mfrs. Mutual Fire Ins. Co., c.1878-89	Ball & Dabney, Boston, 1890-96; Dabney & Hayward, Boston, 1896-97; d.1897
Dewson, E.W.	1874-75	?	dftsm. & furniture designer, Boston, c.1876-92	arch., CE & landscape architect, Houston, c.1910-19
Eaton, F.S.	1874-75	?	not known	not known
Everett, A.G.	1873-75	20	w. N.J. Bradlee, Boston, c.1875-81; w. E.P. Treadwell, Albany, c.1882-83; arch., Boston, 1884-87; w. McKim, Mead & White, Boston, 1887-88	Cabot, Everett & Mead, Boston, 1889-1901; Everett & Mead, 1901-07; Boston Bldg. Commr., 1909-14; d.1925
Fairbanks, W.E.	1872-75	21	not known	shoe manufacturer; wholesale woolen merchant
Gibson, L.H.	1872-73 1874-75	21	arch. & author, Indianapolis	arch. & author, Indianapolis; d.1907
Greenough, W.C.	1873-75	19	not known	not known
King, H.G.	1873-75 1874-75	24	w. Shepley, Rutan & Coolidge, Brookline, MA, c.1886-88	dftsm., Solvay Process, Detroit, c.1896-1908; arch., Detroit, c.1910-20; d.1920
Larned, W.S.	1874-75	21	cashier, Buffalo, 1877-85; in Oxanna, AL, c.1885	w. Woodward Lumber Co., Atlanta; d.1918
Little, A.	1870-75	22	travel in Eur.; dftsm., Peabody & Stearns, Boston, 1877-78; arch., Boston, 1878-89	Little & Browne, Boston, 1889-?; d.1925
Newell, C.H.	1873-75	20	not known	not known

Students Finishing, 1874-75 (cont.)	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Richardson, W.C.	1873-75	21	travel in Eur., 1875-76; dftsm., Ware & Van Brunt, Boston, c.1876-78; dftsm., Cabot & Chandler, Boston, c.1878-80; Hartwell, Richardson & Driver, Boston, 1881-1922	Hartwell, Richardson & Driver/ Hartwell & Richardson, 1922-30; d.1935
Stickney, F.W.	1873-75	21	dftsm., O.A. Merrill, Lowell, MA, 1875; dftsm., Boston, 1876-79: w. H.W. Hartwell, c.1876-78, 1880-81; w. Ware & Van Brunt, 1879; arch., Boston/Lowell, 1882-90	arch., Lowell, 1890-92; Stickney & Austin, Lowell/Boston, 1892-1917; arch., Lowell, 1918; d.1918
Terrell, C.	1874-75	24	stud., Dept. of Arch., Cornell, 1875-76; arch., Dewitt Co., TX	clerk/computer, Supv. Arch., Washington, DC, c.1887-?; Des Moines, IA; d.1915
Whidden, W.M.	1873-75	18	EdBA: Vaudremer, 1878-82; w. McKim, Mead & White, NYC, c.1882-85	Chamberlin & Whidden, Boston, 1885-89; w. McKim Mead & White, Portland, OR, 1889; Whidden & Lewis, Portland, OR, 1890-1920; d.1925
Wicks, W.S.	1874-75	21	arch., Trenton, NY, c.1878; Green & Wicks, Auburn, NY, c.1882-83; Green & Wicks, Buffalo, c.1883-1917	Green & Wicks, Buffalo; d.1919
Zerrahn, F.E.	1874-75	17	dftsm., George Tilden, Boston, c.1876; dftsm., Hartwell & Tilden, Boston, c.1877-78; designer, Boston, 1880-81; dftsm., Carl Fehmer, Boston, c.1882; dftsm., W.D. Austin, Boston, 1883-84	partn., Thomas O'Grady, Boston, 1885-87; arch., Boston, c.1888-1905, c.1918-19, c.1926-28; d.1928

Students Finishing, 1875-76	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Andrews, R.D.	1875-76	19	dftsm., Peabody & Stearns, Boston; Cummings & Sears, H.H. Richardson, Brookline, c.1876-83; Andrews & Jaques, Boston, 1883-89	Andrews, Jaques & Rantoul, Boston, 1889-1916; Andrews, Jones, Biscoe & Whitmore, Boston; d.1928
Bacon, F.H.	1874-76	20	arch., NYC, 1876-78; travel in Eur., 1878-79; w. McKim, Mead & White, NYC, 1879-80; w. Herter Bros., NYC, 1880; Assos Exped., 1881-82; dftsm., H.H. Richardson, Brookline, 1884-85	designer, A.H. Davenport & Co., Boston, 1895-1908; decorator, Boston, c.1908-30; d.1940
Borland, J.	1875-76	20	Paris: Pascal, 1877-?	not known
Brown, G.	1875-76	22	supt., O.W. Norcross, Boston, Hartford, 1876-77; arch., Washington, DC, 1877-?	arch., Washington; Secy. Treas., AIA, 1899-1913; d.1932
Burnham, W.A.	1875-76	24	EdBA: Moyaux, 1877-79; M.I.T. (not Arch.), 1879-80; estate executor, Boston, c.1880+	estate executor, Boston; d.1922
Clough, J.A.	1875-76	26	arch., Holyoke, MA, c.1882-1911	arch., Holyoke, MA; d.1917
*Eyre, W.	1875-76	18	w. James P. Sims, Phila., 1876-82; arch., Phila., 1882-?	Eyre & McIlvaine, 1912-39; d.1944
Goodman, A.J.	1875-76	20	not known	not known
Hapgood, E.E.	1872-76	20	not known	contractor, Allston, Wellesley, MA
Hoppin, H.	1874-76	20	dftsm., Stone & Carpenter, Providence	Hoppin & Ely, Providence, 1895-1907; Hoppin & Field, Providence, 1907-24; d.1940
Hunnewell, H.S.	1875-76	22	EdBA: Moyaux, 1877-81; Shaw & Hunnewell, Boston, 1883-1902	Shaw & Hunnewell; ret.1902; d.1931
Mann, G.R.	1875-76	20	w. McKim, Mead & White, NYC, 1876-77; Mann & Stebbins, Minneapolis, 1877-78; arch., Kansas City, St. Joseph, MO	arch., St. Joseph, St. Louis, MO, Little Rock, AR; d.1939
Monks, H.G.	1875-76	30	travel in Eur., c.1877-78; in Calif., 1878-80; Paris: Gerhardt, c.1880-87	travel in Eur.; d.1893
Peters, W.M.	1873-76	20	furniture designer, Boston, 1879-85	designer of business furniture, Chicago, Cincinnati, St. Louis, Boston; d.1924
Riley, J.	1875-76	19	arch., Boston, c.1878; w. Herter Bros., NYC, c.1880	not known; d.1929
Rollins, T.B.	1873-76	19	not known	not known; d.1890
Sanders, C.H.	1875-76	25	not known	merchant, Penacook, NH
Stebbins, E.S.	1875-76	23	arch., Saratoga Springs, 1876-77; Mann & Stebbins, Minneapolis, 1877-78	Stebbins & Hardy, Minneapolis
Tuck, C.E.	1875-76	30	not known (w. McKim, Mead & White, NYC, 1882+?)	not known
Underwood, G.F.	1875-76	23	dftsm., Boston, 1876; Instr. in Arch., M.I.T., 1877-79; dftsm., Boston; d.1885	--------
Vonnegut, B.	1874-76	20	Hanover Polytechnic Institute; w. George B. Post, NYC	Bohn & Vonnegut, Indianapolis, c.1888-1908; d.1908

*First-year student in course of general studies, who would have later career in architecture

Students Finishing, 1876-77	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Allen, F.R.	1876-77	34	Paris: Vaudremer, c.1877-79; Allen & Kenway, Boston, 1880-91	arch., Boston, 1891-1928: Allen & Vance, 1897-1902; Allen & Collens, 1903-25; d.1931
Beal, J.W.	1873-77	22	dftsm., R.M. Hunt; McKim, Mead & Bigelow, NYC, c.1877-79; travel in Eur.; arch./dftsm., Hanover/Boston, MA, c.1879-87	arch., Boston, 1887-?; d.1919
Beebe, F.H.	1876-77	24	not known	arch. (?), arboriculturalist, Boston; d.1932
Capen, G.W.	1873-77	24	dftsm., J.P. Rinn, Boston, 1877-81; travel in Eur., 1881; arch., Boston, 1881-1910	arch., Boston/Canton, MA; d.1925
Chamberlin, W.E.	1873-77	21	dftsm., Sturgis & Brigham, Boston, c.1877-79; McKim, Mead & White, NYC, 1879 & 1882; EdBA: Vaudremer, 1879-81; arch., Boston, 1883-85	Chamberlin & Whidden, Boston, 1885-89; Chamberlin & Austin, Boston, 1890-91; arch., Cambridge, 1893-1900; d.1911
Chappell, R.D.	1876-77	25	not known	not known
Corser, F.G.	1875-77	28	arch., Minneapolis, c.1880-1924	arch., Minneapolis; d.1924
DuFais, J.L.	1876-77	22	w. H.H. Richardson, John LaFarge, NYC/Boston/Albany, c.1876-81	designer w. John LaFarge; George B. Post; McKim, Mead & White; Cass Gilbert; Louis Tiffany, NYC, c.1882-1909; arch., Newport, RI, 1909-?; d.1935
Fairfield, W.	1876-77	18	not known	not known
Freeman, G.A.	1875-77	18	arch., NYC, c.1880-83; Price & Freeman, 1883-84; arch., NYC, 1885-?	arch., NYC; Stamford, CT; Sarasota, FL; d.1934
Furber, P.P.	1875-77	24	dftsm./supt., Peabody & Stearns, Boston, 1877-78, 1880-83; arch., Minneapolis, 1879-80; mgr., St. Louis office, Peabody & Stearns, 1883-93	Peabody, Stearns & Furber, 1889-93; d.1893
Hamlin, A.D.F.	1876-77	22	teacher, 1877-78; EdBA: Guadet, 1879-80; dftsm., McKim, Mead & White, 1882-83; asst. in Dept. of Arch., Columbia, 1883-87	Instr./Prof. of Arch., Columbia, 1887-1926; d.1926
Hammatt, E.S.	1875-77	23	dftsm., Ober & Rand, Frank Weston, Ware & Van Brunt, Boston, 1877-79; dftsm., J.B. Snook, Napoleon LeBrun, H.J. Hardenbergh, NYC, 1879-81; w. A.W. Fuller, Albany, 1881-82; arch., Davenport, IA, 1883-1907	arch., Davenport; d.1907
Jaques, H.	1875-77	20	w. Snell & Gregerson, Boston, 1877-79; w. H.H. Richardson, 1880-83; Andrews & Jaques, Boston, 1883-89	Andrews, Jaques & Rantoul, Boston, 1889-1916; d.1916

Students Finishing, 1876-77 (cont.)	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Josselyn, H.S.	1876-77	28	travel in Eur.; dftsm., Chicago, Des Moines; Josselyn & Taylor, Cedar Rapids, IA, 1882-1924	Josselyn & Taylor; d.1934
Lewis, I.	1876-77	20	dftsm., Boston, 1878-81: Peabody & Stearns, c.1880-81; Clark & Lewis, Boston, 1882-83; arch., Chicago, c.1883-84; w. McKim, Mead & White, NYC/Portland, OR, 1885-90	Whidden & Lewis, Portland, OR, 1890-1920; arch., Portland, 1920-33; d.1933
Morgan, R.H.	1875-77	21	not known	not known, Plymouth, MA; d.1921
Peabody, H.G.	1876-77	22	w. Western Electric Co., NYC, Chicago, 1877-85; photographer, Boston, 1886-93	photographer, Boston, 1893-1900, Pasadena, 1900+; d.1951
Wheelwright, E.M.	1876-77	23	dftsm., Peabody & Stearns, Boston, 1877-78; dftsm., McKim, Mead & Bigelow, 1878-79; dftsm., E.P. Treadwell, Albany, 1879-81 & 1882-83; travel in Eur., 1881-82; arch., Boston, 1883-89	Boston City Architect, 1891-95; Wheelwright & Haven, Boston, 1888-1911; Wheelwright, Haven & Hoyt, 1912; d.1912
Willard, D.W.	1875-77	28	w. Herter Bros., NYC, 1878-79; dftsm., NYC, 1879-80; w. McKim, Mead & White, NYC, 1881-83; Babb, Cook & Willard, NYC, 1883-93	arch., Redlands, CA, 1894-?
Willson, E.R.	1876-77	21	w. Sturgis & Brigham, Boston, 1877-79; w. McKim & Mead, 1879; EdBA: Vaudremer, 1879-81; Stone, Carpenter & Willson, Providence, 1882-1906	Stone, Carpenter & Willson; d.1906

Students Finishing, 1877-78	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Baker, C.M.	1874-78	21	commission merchant, Boston, 1879-84; broker, Boston, 1884-1918	broker, Boston; d.1918
Bancroft, J.M.	1877-78	20	dftsm., Bradford/Boston, MA, c.1880-86; Perkins & Bancroft, archs., Haverhill, MA, c.1887-1905	Perkins & Bancroft, Haverhill, MA; d.1905
Clymer, W.B.S.	1877-78	23	Paris: Vaudremer, c.1877-80; stud., Washington, DC, 1880-82; Instr. in Engl., Harvard, 1883-90	d.1903
Eaton, C.S.	1874-78	22	Merrill & Eaton, Lowell, MA, 1879-80; pharmacist, Boston, 1880-84; restaurant owner, Boston, 1885-1917	restaurant owner, Boston; d.1917
Ford, F.H.	1877-78	19	dftsm., F.W. Stickney, Boston/Lowell, 1884-90	Ford & Phillips, Lowell, 1891; arch., Lowell, 1892; d.1892
Frost, C.S.	1877-78	22	w. Peabody & Stearns, Boston, 1876-81; arch., Chicago, 1882-83; Cobb & Frost, Chicago, 1884-98	Cobb & Frost; Frost & Granger, Chicago, 1898-1910; d.1931
Gracea, J.J.	1876-78	20	dftsm., Sturgis & Brigham, Boston, c.1879-86; head dftsm., Charles Brigham, 1886-97	head dftsm., Charles Brigham; d.1897
Grover, G.C.	1875-78	22	dftsm., T.M. Clark, Boston, c.1878-79; d.1881	--------
Harlow, A.B.	1875-78	21	w. Cabot & Chandler, Boston, 1878-81; w. McKim, Mead & White, NYC/Newport/Boston, 1881-86; Longfellow & Harlow, Boston, 1886-87	Longfellow, Alden & Harlow, Boston/Pittsburgh, 1888-96; Alden & Harlow, Pittsburgh, 1896-1908; d.1927
Higgins, A.S.	1874-78	20	dftsm., Peabody & Stearns, 1879-80; restaurant operator & oyster dealer, Boston, 1881+	restaurant operator & oyster dealer, Boston
Kendall, W.M.	1876-78	22	w. Carl Fehmer, Boston, c.1878-79; w. George B. Post, NYC, c.1879-81; travel in Eur., 1881-82; w. McKim, Mead & White, NYC, 1882-1941	McKim, Mead & White (partner, 1906-41); d.1941
Longfellow, A.W.	1876-78	24	dftsm., Cabot & Chandler, 1878-79; EdBA: Vaudremer, 1880-81; dftsm., H.H. Richardson, 1882-86; Longfellow & Harlow, Boston, 1886-87	Longfellow, Alden & Harlow, Boston/Pittsburgh, 1888-96; arch., Boston, 1896-1934; d.1934
Minot, F.	1877-78	24	w. Peabody & Stearns, W.R. Emerson, Boston; d.1883	--------
Sonrel, L.A.	1875-78	21	EdBA: Vaudremer, 1878-?	not known
Storer, F.A.	1877-78	21	not known	not known
Swinburne, H.H.	1877-78	29	not known	arch. & decorative designer, NYC, c.1890s
Taylor, E.H.	1876-78	25	Josselyn & Taylor, Cedar Rapids, IA, 1882-1924	Josselyn & Taylor; d.1924

Students Finishing, 1878-79	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Aiken, W.M.	1877-79	24	dftsm., W.W. Lewis, H.H. Richardson, Ware & Van Brunt, W.R. Emerson, Boston, 1879-84; travel in N. Amer., Eur.; w. James McLaughlin, Cincinnati, c.1885-86; arch., Cincinnati/NYC, c.1886-95	Supervising Architect, 1895-97; arch., NYC, 1897-1908; d.1908
Alden, F.E.	1875-79	20	dftsm., T.M. Clark, Boston, 1879; w. H.H. Richardson, 1880-87	Longfellow, Alden & Harlow, Pittsburgh, 1888-96; Alden & Harlow, Pittsburgh, 1896-1908; d.1908
Brandt, O.E.	1878-79	21	dftsm., J.P. Rinn, Boston, c.1880-81	arch., NYC, c.1898-?
Brunner, A.W.	1877-79	22	dftsm., G.B. Post, NYC; Brunner & Tryon, NYC, c.1884-98	Brunner & Tryon, NYC; arch., NYC, 1898-1925; d.1925
Burns, S.R.	1878-79	24	dftsm., Dayton, OH, c.1879-81; Peters & Burns, Dayton, 1881-87	Hunt, Burns & Eager, LA, 1907-10; Hunt & Burns, LA, 1910-30; d.1940
Crowell, S.	1876-79	22	Harvard Medical School, c.1881-85; med. stud., Vienna	physician, Boston; d.1929
Gilbert, C.	1878-79	20	travel in Eur., 1880; w. McKim, Mead & White, NYC/ Baltimore/St. Paul, 1880-83; Gilbert & Taylor, St. Paul, 1884-92	arch., St. Paul, 1883-98; arch., St. Paul/NYC, 1898-1910; arch., NYC, 1910-34; d.1934
Hartwell, E.G.	1875-79	21	dftsm., organ bldr., Boston, 1879-83; w. Hartwell & Richardson, 1883-89; d.1889	--------
Johnston, C.H.	1878-79	20	dftsm., St. Paul, 1879-80; w. Herter Bros., NYC, 1880-?; arch., St. Paul, 1883	arch., St. Paul; Minn. State Arch., 1901-30; d.1936
McCombs, F.M.	1877-79	27	not known	salesman, Phila.
Norris, W.A.	1878-79	31	not known	arch., Watertown, MA
Reed, C.A.	1878-79	22	not known	Reed & Stem, NYC; d.1911
Seabury, B.H.	1877-79	23	Richmond & Seabury, Springfield, MA, c.1883-90	arch., Springfield, MA
Smith, T.L.	1878-79	?	not known	not known
Taylor, J.K.	1877-79	22	dftsm., Bruce Price, C.C. Haight, NYC, 1879-82; arch., St. Paul, 1882-92: Gilbert & Taylor, 1884-92	arch., Phila., 1892-95; Supervising Architect, 1898-1912; Prof. of Arch., M.I.T., 1912-14; arch., 1914-28; d.1929
Warren, H.L.	1877-79	22	w. H.H. Richardson, 1879-84; stud., Fine Arts, Harvard, 1883-84; travel in Eur., 1884-85; arch. & ed., NYC, 1886-87; Warren, Smith & Briscoe, Boston/Troy, NY, 1885-1917	Instr./Prof. of Arch., Harvard, 1893-1917; d.1917
White, L.R.	1878-79	27	Ecole Centrale d'Architecture, Paris, early 1880s	teacher, Louisville

Students Finishing, 1879-80	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Cochran, F.B.	1878-80	20	not known	stock broker, NYC; d.1916
Cram, A.B.	1878-80	27	arch., Detroit, 1881-1935	arch., Detroit; d.1953
Duker, H.H.	1878-80	21	w. Otto Duker & Co., Lumber & Millwork, Baltimore, c.1880-1917	Otto Duker & Co.; Henry & Herman Duker, Lumber & Millwork, Baltimore, 1917-1930; d.1930
Foote, O.K.	1878-80	26	dftsm., McKim Mead & White, 1882-?	Foote & Carpenter, Rochester, NY; d.1930
Harriman, C.A.	1878-80	20	dftsm. & clerk, Dept. of Arch., Columbia, 1840-90	Instr./Asst. Prof. of Arch., Columbia, 1890-1930; d.1930
Marble, A.M.	1878-80	21	arch., Fall River, MA, 1882+	arch., Fall River; d.1909
O'Grady, T.	1877-80	22	arch., Boston, c.1882-?; partn., Frank Zerrahn, Boston, 1885-87; Instr. in Arch., M.I.T., 1886-87	arch., Boston, d.1891
Pester, R.	1879-80	18	not known	arch., NYC, c.1899-?
Sargent, S.A.	1876-80	19	dftsm., Clarence Luce, Newport, RI, 1881-82; vocal music teacher, Newport, Boston, 1882-?	vocal music teacher, Boston; d.1921
Symonds, A.H.	1879-80	23	not known	not known
Zimmermann, W.C.	1877-80	21	dftsm., Burnham & Root, Chicago, c.1880-86; Flanders & Zimmermann, Chicago, 1886-98	Flanders & Zimmermann, Chicago; ret.1925; d.1932

Students Finishing, 1880-81	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Burgess, W.P.	1879-81	24	cattle rancher, Texas, c.1880-83; d.1883	--------
Chase, C.M.	1879-81	22	dftsm., Ware & Van Brunt/Van Brunt & Howe, Boston, 1881-84	not known
Darrow, A.L.	1878-81	23	dftsm., T.M. Clark, Boston, 1882; w. other firms, Boston, 1883-84; w. W.G. Preston, Boston, 1885-91	arch., Boston, 1892-c.1931
Frommann, E.H.	1880-81	21	arch., Chicago, 1882; Frommann & Jebsen, Chicago, 1883-1916	Frommann & Jebsen, Chicago; arch., Chicago, 1916+
Gilbert, R.W.	1880-81	27	dftsm., Boston, 1881-88; Means & Gilbert, Boston, 1889-91	not known, NYC?
Hackett, J.A.	1880-81	?	dftsm., Boston, c.1882-98	dftsm., Boston; d.1898
Hannaford, H.E.	1880-81	24	dftsm., Supv. Arch., Cincinnati, c.1883; w. Samuel Hannaford, Cinti., 1885-87; Samuel Hannaford & Sons, 1887-?	Samuel Hannaford & Sons; d.1923
Hill, A.E.	1879-81	21	w. Merrill & Cutler, Lowell, MA; w. Peabody & Stearns, Boston; w. Gould & Angell, Walker & Sawtelle, Providence	arch., Providence; d.1925
Hill, F.E.	1880-81	21	dftsm., McKim, Mead & White, 1882-?	arch., Washington; NYC; d.1929
Hunting, W.C.	1879-81	20	not known	dftsm., H.J. Hardenbergh, NYC, c.1890-1901; d.1926
Kauffman, W.	1879-81	?	Kauffman & Butz, Pittsburgh, c.1888-90	arch., Pittsburgh, c.1890-1933
Kidder, F.E.	1880-81	22	arch. & CE, Boston, 1882-88; w. E.C. Curtis, 1886; arch. & CE, Denver, 1888-91	author; d.1905
Lewis, A.J.	1879-81	20	stud., 1883-88; mgr., AT&T, Boston, 1889-93	Treas., Boston Board of Fire Underwriters, 1894-1916; jeweller, 1918-38; d.1940
Lewis, E.J.	1877-81	22	dftsm., Peabody & Stearns, Boston, 1881-86; arch., Boston, 1887+	arch., Boston; d.1937
McColl, F.P.	1879-81	20	not known	not known
Neff, H.M.	1879-81	20	not known	not known; d.1912
Nichols, E.	1880-81	17	dftsm., A.H. Dodd, Boston, 1883-84; dftsm./arch., Arthur Little/ Little & Browne, c.1886-1923	arch., Boston; d.1933
Northend, W.W.	1880-81	24	dftsm., Hartwell & Richardson, Boston, c.1881-82; in Paris, c.1882-83; dftsm., Cobb & Frost, Chicago, c.1883-84; arch., Salem, MA, c.1884-85	Wheeler & Northend, Lynn, MA, 1886-93; arch., Lynn, 1893-94; d.1894
Ramsden, A.H.	1880-81	25	not known; d.1888	--------
Rich, C.E.	1880-81	22	journalist, Boston, c.1883-88; journalist, NYC, 1888+	journalist, NYC; d.1921

Students Finishing, 1880-81 (cont.)	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
Rogers, J.S.	1879-81	?	w. H.H. Richardson, Brookline, MA, c.1886-87; Rogers & MacFarlane, Detroit, c.1887-1910	Rogers & Bonnah/ Rogers, Bonnah & Chaffee, Detroit, c.1910-21; d.1921
Shope, H.B.	1880-81	19	arch. stud., Columbia, 188?-85	dftsm., Hunt & Hunt, NYC; d.1929
Snead, W.R.	1877-81	20	Snead & Co. Architectural Iron Works, Louisville, 1882-1901	Snead & Co. Arch. Iron Works, Jersey City, 1901-02; d.1902
Snedeker, C.A.	1879-81	21	not known	not known
Tryon, T.	1878-81	22	arch., NYC, c.1885; Brunner & Tryon, NYC, 1886-98	Brunner & Tryon, NYC; arch., NYC, 1898-?; d.1920
Welch, E.M.	1879-81	20	not known	not known; d.1913
Wescott, J.H.	1879-81	22	arch., Springfield, MA, c.1879+	arch., NYC, c.1890-?; d.1909
Wilkes, C.M.	1877-81	23	TA, M.I.T., 1881-82; CE, Boston, St. Paul, 1882-89	Civ./Mech./Sanit. Engr., Chicago; d.1905
Woods, H.F.	1879-81	19	not known	not known

Students Finishing after 1880-81*	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
1881-82				
Brackett, A.C.	1878-82	22	dftsm., Boston, c.1883-93	real estate agent, Boston, Newton, c.1894+
Cobb, H.I.	1876-77 1881-82	23	Lawrence Scientific School, 1877-80; dftsm., Peabody & Stearns, Boston, c.1881-82; Cobb & Frost, Chicago, c.1883-98	Cobb & Frost; arch., NYC, 1902-31; d.1931
Ely, E.F.	1880-82	24	TA/Instr., M.I.T., 1882-85; dftsm., H.H. Richardson/ Shepley, Rutan & Coolidge, Brookline/Boston, 1885-87; dftsm., Andrews & Jaques, Boston, 1887-88; dftsm./arch., Providence, NYC, c.1888-95	Hoppin & Ely, Providence, 1895-1907; d.1920
Emery, F.F.	1877-81	21	not known	not known, Spokane, WA, c.1915
Hale, D.C.	1880-82	21	dftsm./supt., H.H. Richardson/Shepley, Rutan & Coolidge, Brookline/Boston, c.1882-96	supt./chief dftsm., Shepley, Rutan & Coolidge; d.1896
Heins, G.L.	1879-82	22	dftsm., L.S. Buffington, Minneapolis, 1882-83; arch., NYC, 1884-86; Heins & LaFarge, NYC, 1886-1907	Heins & LaFarge; NY State Architect, 1899-190?; d.1907
Hooker, H.D.	1880-82	23	architectural engineer, NYC, c.1884-?	arch. & engr., NYC, New Haven; d.1924
Howard, T.H.	1880-82	20	not known	supt., Vanderbilt estate, Hyde Park, NY; d.1904
Hunt, R.H.	1880-82	20	w. R.M. Hunt, 1882-84; EdBA: Daumet, 1885-87; partner w. R.M. Hunt, NYC, 1887-95	arch., NYC, 1895-1901; Hunt & Hunt, NYC, 1901-c.1925; d.1931
Jones, H.W.	1880-82	23	arch., Minneapolis	arch., Minneapolis; Prof. Arch., Univ. Minn., c.1890-94; d.1935
Prentice, A.B.	1880-82	24	not known	arch., Norwich, CT
Rosenheim, A.F.	1878-82#	23	dftsm., Boston, 1881-84; dftsm./arch., St. Louis, c.1884-1903	Link, Rosenheim & Ittner/ Link & Rosenheim, St. Louis, 1895-97; arch., LA, c.1903-35; d.1943
Shepley, G.F.	1880-82	22	dftsm., Van Brunt & Howe, c.1882-84; dftsm., H.H. Richardson, Brookline, 1884-86; Shepley, Rutan & Coolidge, Brookline/Boston, 1886-1903	Shepley, Rutan, Coolidge; d.1903
Snelling, G.T.	1878-82	21	Asst. in Dept. of Arch., Columbia, 1882; w. C.C. Haight, NYC, 1882-85; EdBA: Daumet, 1885-87; arch., Paris Expos., 1888-89; Instr. in Arch., Columbia, 1889-1907	Instr. in Arch., Columbia; Snelling & Potter, NYC, 1895-190?; Snelling & Metcalfe, NYC; d.1920
Swasey, W.A.	1880-82	19	not known	arch., NYC

* Only those students who began at M.I.T. during Ware's tenure are listed here.
# Registration intermittent during time at M.I.T.

Students Finishing after 1880-81* (cont.)	Years at M.I.T.	Age on leaving M.I.T.	First 10 Years after M.I.T.	Later Career
1882-83				
Eppendorff, J.G.	1879-83	21	TA, M.I.T., 1883-84; w. J.C. Cady, NYC, 1884; w. Bruce Price, NYC, 1885; w. Green & Wicks, Buffalo, 1886; interior decorator, Buffalo & Chicago, 1887-93	decorator, Buffalo, 1894-1915; dept. store mgr., Buffalo, 1915+; d.1941
Means, J.	1880-83	20	arch., Boston, c.1885-88; Means & Gilbert, Boston, 1889-91	not known, Boston, Manchester, MA, 1892+
Paddock, B.S.	1879-83	21	not known	not known, Rocky Ford, CA
1883-84				
Ilsley, S.M.	1880-84	21	not known	arch., Santa Barbara, 1899+; d.1946

APPENDIX F

Firms Employing M.I.T. Architecture Students

NAME OF FIRM [with dates of firm]

Name of Student	Student's Years at M.I.T.	Student's Years in Office

1. Boston Area Firms Employing M.I.T. Students

ANDREWS AND JAQUES [1883-89], Boston

Edward F. Ely	1880-82	1887-88

WILLIAM DOWNES AUSTIN [c.1882+], Boston

Frank E. Zerrahn	1874-75	1883-84

HAMMATT AND JOSEPH E. BILLINGS [c.1845-75], Boston

Charles F. Read	1870-73	1874-77

NATHANIEL J. BRADLEE [1852-88]/
BRADLEE, *WINSLOW AND *WETHERELL [1884-88]/
*WINSLOW AND *WETHERELL [1888+], Boston

#Henry Paston Clark (?)	1870-71	1871-74
#*George H. Wetherell	1870-71	1872-76;1879+
Arthur G. Everett	1873-75	c.1875-81
*Richard S. Atkinson (?)	1871-75	c.1881;1886;1888
Jean A. Hackett (?)	1880-81	1882-83;1895-96
Christel Orvis (?)	1866-69	1883
Albert C. Brackett (?)	1878-82	c.1884

GRIDLEY J.F. BRYANT [1837-91], Boston

#Robert S. Peabody	1866-67	<1866

< Indicates student in office before going to/finishing at M.I.T.
\# Indicates student in office before going to Paris/Ecole.
* Indicates alumnus of Ecole or a Paris atelier.
(?) Indicates that presence of student in office is unconfirmed.
Underlined name indicates M.I.T. alumnus.

CABOT AND *CHANDLER [1875-87], Boston

*Richard S. Atkinson	1871-75	c.1878-79
Alfred B. Harlow	1875-78	1878-81
#Alexander W. Longfellow	1876-78	1878-79
William C. Richardson	1873-75	c.1878-80
Amos J. Boyden	1870-75	1880-84

THEODORE MINOT CLARK [c.1873-82], Boston

Edward Dewson (?)	1874-75	1876
Frank E. Alden	1875-79	1879
George C. Grover	1875-78	c.1878-79
*Edgar C. Curtis	1872-73	1882
Alfred L. Darrow	1878-81	1882

CUMMINGS AND SEARS [c.1867-90], Boston

William Whitney Lewis	1868-69	c.1871-75
Edward H. Barnard (?)	1872-74	c.1875-76
Samuel J. Brown	1872-73	c.1875-76
#Richard S. Atkinson (?)	1871-75	1876
Robert D. Andrews	1875-76	c.1880
Jean A. Hackett (?)	1880-81	1885

ARTHUR H. DODD [1882+], Boston

Edward Nichols	1880-81	1883-84

BENJAMIN F. DWIGHT, Boston

Christel Orvis	1868-69	c.1870-91

WILLIAM RALPH EMERSON [c.1862-67]/
EMERSON AND FEHMER [1867-73], Boston
(see also CARL FEHMER)

#George T. Tilden	1868-69	<1868-69
Joseph Lyman Silsbee	1869-70	<c.1869-71
Henry Hazen Morse	1869-70;1871-72	c.1871;1875-77
William Martin Aiken	1877-79	c.1880
Francis Minot	1877-78	c.1880

CARL FEHMER [c.1874+], Boston (see also EMERSON AND FEHMER)

William M. Kendall	1876-78	c.1878-79
William Downes Austin	1872-75	1882
Frank E. Zerrahn	1874-75	c.1882

HENRY W. HARTWELL [c.1856-68]/
HARTWELL AND SWASEY [1869-76]/
HARTWELL AND *TILDEN [1877-78] (see also GEORGE TILDEN)/
HENRY W. HARTWELL [1880-81]/
HARTWELL AND RICHARDSON [1882+], Boston

A. Hun Berry	1869-71	<1866-67
Frederick W. Stickney	1873-75	c.1876-78;1880-81
Frank E. Zerrahn	1874-75	c.1877-78
William W. Northend	1880-81	c.1878-79 or 1881-82
Ernest G. Hartwell	1875-79	1883-89

WILLIAM WHITNEY LEWIS [c.1876+], Boston

William Martin Aiken	1877-79	c.1879

ARTHUR LITTLE [1878+], Boston

Edward Nichols	1880-81	c.1886-1923

WILLIAM P.P. LONGFELLOW [c.1860-79], Boston

Edward Dewson	1874-75	<1874

CLARENCE S. LUCE [c.1874+], Boston

Sullivan A. Sargent	1876-80	1881-82

WILLIAM W. LUMMUS [c.1866+], Boston

John Quincy Kilby	1873-74	<1871

MOFFETTE AND TOLMAN [c.1872+], Boston

Emil Schwab	1870-72	1873

*OBER AND RAND [c.1876-80], Boston

Edward S. Hammatt	1875-77	c.1877-79

*PEABODY AND STEARNS [1870-1917], Boston

#Edgar C. Curtis	1872-73	<c.1871
Edward Dewson (?)	1874-75	<1872
Henry Richards	1870-71	1872-76
Robert D. Andrews	1875-76	<1874-83
Charles S. Frost	1877-78	<1876-81
John Riley (?)	1875-76	c.1876-77
Arthur Little	1874-75	1877-78
Edmund M. Wheelwright	1876-77	1877-78
Pierce P. Furber	1875-77	1878-79;1880-83+
Alfred S. Higgins	1874-78	1879-80
Ion Lewis	1876-77	c.1880-81
Francis Minot	1877-78	c.1880

J. Merrill Brown	1873-75	1881-82
Henry Ives Cobb	1876-77;1881-82	1881-82
Edwin J. Lewis	1877-81	1881-86
Arthur E. Hill	1879-81	1880s

FRED POPE [c.1871+], Boston

G. Wilton Lewis	1872-73	1874

JONATHAN PRESTON [until 1875]/
*WILLIAM G. PRESTON [c.1861-1910], Boston

Henry Hazen Morse	1869-70;1871-72	<c.1869
Henry H. Kendall	1872-73	c.1874-76
Alfred L. Darrow	1878-81	1885-91

*JOHN PICKERING PUTNAM [c.1875-1917], Boston

Arthur H. Dodd	1872-74	1876-79
Frank M. Howe	1868-69	1878-79

GAMBRILL AND *RICHARDSON [1867-78], New York, Brookline/
*HENRY HOBSON RICHARDSON [1878-86], Brookline/
SHEPLEY, RUTAN AND COOLIDGE [1886-1915], Brookline, Boston

John L. DuFais	1876-77	<c.1876;1877-81
Herbert Langford Warren	1877-79	1879-84
Frank E. Alden	1875-79	1880-87
Herbert Jaques	1875-77	1880-83
William Martin Aiken	1877-79	c.1882-84
Robert D. Andrews	1875-76	c.1882-83
David C. Hale	1880-82	c.1882-96
*Alexander W. Longfellow	1876-78	1882-86
Francis H. Bacon	1874-76	1884
Charles A. Coolidge	1881-82	c.1884-1936
George F. Shepley	1880-82	c.1884-1903
Edward F. Ely	1880-82	1885-87
Herbert G. King	1873-75	c.1886-88
James S. Rogers	1879-81	c.1886-87

J. PHILLIP RINN [c.1874+], Boston

George Walter Capen	1873-77	1877-81
Oscar E. Brandt	1878-79	c.1880-81

SNELL AND GREGERSON [1850-93], Boston

Herbert Jaques	1875-77	1877-79

FREDERICK W. STICKNEY [c.1881+], Boston/Lowell

Frank H. Ford	1877-78	1884-90

STURGIS AND BRIGHAM [1866-88], Boston

#Henry G. Monks	1875-76	<c.1874-76
George W. Page	1869-70	1870-72
#William E. Chamberlin	1873-77	c.1877-79
#Edmund R. Willson	1876-77	1877-79
Joseph J. Gracea	1876-78	c.1879-97
George C. Grover (?)	1875-78	1879

*GEORGE T. TILDEN [c.1872-73]/
*PUTNAM AND *TILDEN [1873-74]/
HARTWELL AND *TILDEN [1877-78]/
*ROTCH AND *TILDEN [1880-94], Boston

Frank E. Zerrahn	1874-75	c.1876
Robert W. Gilbert (?)	1880-81	c.1882-88

*WARE AND VAN BRUNT [1863-81]/
VAN BRUNT AND HOWE [1881-1909], Boston, Kansas City

M.I.T. Students in Ware and Van Brunt office:

#George T. Tilden	1868-69	<c.1863-64
Henry Richards	1869-71	<c.1864-65;1869-71
#Robert S. Peabody	1866-67	<1866-67
Frank M. Howe	1868-69	1869-77
#Thomas P. Rich	1869-70	<1869-70
Joseph Lyman Silsbee	1869-70	1870-71
Samuel J. Brown	1872-73	c.1873-74;1883-85
Samuel Dacre Bush	1871-72	1873
#William Rotch Ware	1872-73	c.1873-74
Goerge F. Underwood	1875-76	<c.1874-75
William Downes Austin	1872-75	c.1876-80
#William B.S. Clymer	1877-78	<1876-77
William C. Richardson	1873-75	c.1876-78
Edward S. Hammatt	1875-77	c.1877-79
J. Merrill Brown	1873-75	1879-80
Frederick W. Stickney	1873-75	1879
William Martin Aiken	1877-79	c.1880
Charles M. Chase	1879-81	1881-84
Charles A. Coolidge	1881-82	<1881
George F. Shepley	1880-82	1882-84

Non-M.I.T. Draftsmen in Ware and Van Brunt office:

John M. Allen	-------	c.1863
#John Ames Mitchell	-------	c.1863
John Goddard Stearns	-------	1863-70
#Francis W. Chandler	-------	c.1864-67
John A. Fox	-------	c.1865-67
George A. Matthews	-------	c.1865
Charles B. Atwood	-------	c.1867-69

Frank Loring	-------	c.1867
*William Homer	-------	1872-73
J.H. Chapman	-------	c.1880

FRANK W. WESTON [c.1876+], Boston

Edward S. Hammatt	1875-77	c.1877-78

WILLIAM P. WENTWORTH [c.1870+], Boston

John Quincy Kilby	1873-74	<1872-73
*Richard S. Atkinson	1871-75	c.1880;1882

2. New York Firms Employing M.I.T. Students

JOSIAH CLEVELAND CADY [c.1864+]

John G. Eppendorff	1879-83	1884

CHARLES COOLIDGE HAIGHT [c.1867+]

#Grenville T. Snelling	1878-82	1882-85

HENRY JANEWAY HARDENBERGH [c.1871+]

Edward S. Hammatt	1875-77	c.1879-81
Walter C. Hunting	1879-81	c.1890-1901

HERTER BROTHERS (FRANCIS W. & PETER HERTER)

Daniel W. Willard	1875-77	1878-79
Francis H. Bacon	1874-76	1880
John Riley	1875-76	c.1880
Clarence H. Johnston	1878-79	c.1880

*RICHARD MORRIS HUNT [1856-95]

John Williams Beal	1873-77	c.1877-79
#*Richard Howland Hunt	1880-82	1882-84;1887-95

NAPOLEON E.H.C. LE BRUN [c.1864-1901]

Edward S. Hammatt	1875-77	c.1879-81

*CHARLES FOLLEN MCKIM [1872-77]/
*MCKIM, MEAD AND BIGELOW [1877-79]/
*MCKIM, MEAD AND WHITE [1879+]

*William B. Bigelow	1869-71	c.1874-79
George R. Mann	1875-76	1876-77

John L. DuFais	1876-77	1880s (?)
Edmund M. Wheelwright	1876-77	1878-79
Francis H. Bacon	1874-76	1879-80
John Williams Beal	1873-77	c.1877-79
#*William E. Chamberlin	1873-77	1879, 1882
#Edmund R. Willson	1876-77	1879
Cass Gilbert	1878-79	1880-83
Alfred B. Harlow	1875-78	1881-86
Daniel W. Willard	1875-77	1881-83
Charles E. Tuck	1875-76	c.1882
Orlando K. Foote	1878-80	c.1882
*A.D.F. Hamlin	1876-77	1882-83
Frederick E. Hill	1880-81	1882+
William M. Kendall	1876-78	1882-1941
*William M. Whidden	1873-75	c.1882-85; 1889
Newman W. Gardner	1872-73	c.1883
Ion Lewis	1876-77	1885-90
Arthur G. Everett	1873-75	1887-88
GEORGE BROWNE POST [1867-1913]		
William M. Kendall	1876-78	c.1879-81
Arnold W. Brunner	1877-79	c.1880
John L. DuFais	1876-77	1880s
Bernard Vonnegut	1874-76	1880s
BRUCE PRICE [c.1878-1903]		
George A. Freeman	1875-77	1883-84
John G. Eppendorff	1879-83	1885
JOHN BUTLER SNOOK [c.1857-1901]		
Edward S. Hammatt	1875-77	c.1879-81
CALVERT VAUX [1856-95]		
Stephen C. Earle	1868-69	<c.1861-62
Benjamin Silliman	1870-71	1873-76

3. Other U.S. Metropolitan Firms Employing M.I.T. Students

E.P. BASSFORD, St. Paul		
Clarence H. Johnston	1878-79	<c.1877-78
WILLIAM H. BROWN, Indianapolis		
George R. Mann	1875-76	<c.1874-75

LEROY S. BUFFINGTON [1873-1931], Minneapolis

George Lewis Heins	1879-82	1882-83

BURNHAM AND ROOT [1873-91], Chicago

William C. Zimmermann	1877-80	c.1880-86

COBB AND FROST [c.1883-98], Chicago

William W. Northend	1880-81	c.1883

ALBERT W. FULLER [c.1880-1923], Albany

Edward S. Hammatt	1875-77	1881-82

FRANK FURNESS [1867-1912], Philadelphia

#Louis H. Sullivan	1872-73	1873

GREEN AND WICKS [c.1883-1917], Buffalo

John G. Eppendorff	1879-83	1886

SAMUEL HANNAFORD [1870-96], Cincinnati

Harvey E. Hannaford	1880-81	1885+

WILLIAM LE BARON JENNEY [1868-1905], Chicago

#Louis H. Sullivan	1872-73	1873-74

JAMES W. MC LAUGHLIN [c.1856-1912], Cincinnati

William Martin Aiken	1877-79	c.1885-86

ORLANDO W. NORCROSS [1868-1920], Springfield, MA

Glenn Brown	1875-76	c.1876-77

ABRAHAM M. RADCLIFF, St. Paul

Cass Gilbert	1878-79	<c.1876-78

JAMES P. SIMS [c.1871-82], Philadelphia

Wilson Eyre	1875-76	1876-82

STONE AND CARPENTER [1882-83]/
STONE, CARPENTER AND WILLSON [1883-1907], Providence

Amos J. Boyden	1870-75	c.1875-79
Howard Hoppin	1874-76	1880s
*Edmund R. Willson	1876-77	1882-1906

SUPERVISING ARCHITECT, U.S. TREASURY DEPARTMENT, Washington

Henry H. Kendall	1872-73	c.1879-89
Normand S. Patton	1873-74	c.1877-83
Harvey E. Hannaford	1880-81	c.1883

E.P. TREADWELL, Albany

Edmund M. Wheelwright	1876-77	1879-81; 1882-83

WILLIAM LEE WOOLLETT [c.1845-74], Albany

William M. Woollett	1868-70	1870-80

APPENDIX G

Partnerships Formed by M.I.T. Architecture Alumni

NAME OF FIRM [with dates of firm] / Name of Student	Student's Years at M.I.T.
ALDEN AND HARLOW (see LONGFELLOW AND HARLOW)	
#ANDREWS AND JAQUES [1883-89]/ ANDREWS, JAQUES AND Rantoul [1889-1916], Boston	
Robert Day Andrews	1875-76
Herbert Jaques	1875-77
#AVERY AND PAGE [1881-84], Boston	
George A. Avery	1869-71
George W. Page	1869-70
BOYDEN AND TAYLOR [c.1892-95], Philadelphia	
Amos J. Boyden	1870-75
James Knox Taylor	1877-79
#BRUNNER AND TRYON [c.1886-98], New York	
Arnold W. Brunner	1877-79
Thomas Tryon	1878-81
#CHAMBERLIN AND WHIDDEN [c.1885-89], Boston	
William E. Chamberlin	1873-77
William M. Whidden	1873-75
#CHAMBERLIN AND AUSTIN [1890-91], Boston	
William E. Chamberlin	1873-77
William Downes Austin	1872-75
CLARK AND LEWIS [1882-83], Boston	
Henry Paston Clark	1870-71
Ion Lewis	1876-77

# Indicates M.I.T. classmates, or students who had at least one-year overlap at M.I.T.

COBB AND FROST [c.1883-98], Chicago

Henry Ives Cobb	1876-77
Charles Sumner Frost	1877-78

CURTIS AND KIDDER [1886], Boston

Edgar Corrie Curtis	1872-73
Frank Eugene Kidder	1880-81

#FERRY AND GARDNER [c.1878-79], Springfield, MA

George Bowman Ferry	1872-73
Newman W. Gardner	1872-73

#GILBERT AND TAYLOR [1883-92], St. Paul

Cass Gilbert	1878-79
James Knox Taylor	1877-79

#HEINS AND LA FARGE [1886-1907], New York

George Lewis Heins	1879-82
Christopher Grant LaFarge	1881-82

HOPPIN AND ELY [1895-1907], Providence

Howard Hoppin	1874-76
Edward F. Ely	1880-82

HOWE AND DODD [1880-81], Boston

Frank M. Howe	1868-69
Arthur H. Dodd	1872-74

#JOSSELYN AND TAYLOR [1882-1924], Cedar Rapids

Henry S. Josselyn	1876-77
Eugene Hartwell Taylor	1876-78

#LEWIS AND PAINE [1891-93], Boston

George Wilton Lewis	1872-73
Walter J. Paine	1872-74

#LONGFELLOW AND HARLOW [1886-87], Boston/
#LONGFELLOW, ALDEN AND HARLOW [1888-96], Boston, Pittsburgh/
#ALDEN AND HARLOW [1896-1908], Pittsburgh

Frank E. Alden	1875-79
Alfred B. Harlow	1875-78
Alexander W. Longfellow	1876-78

#MANN AND STEBBINS [c.1877-79], Minneapolis

George R. Mann	1875-76
Edward S. Stebbins	1875-76

#MEANS AND GILBERT [1889-91], Boston

James Means	1880-82
Robert W. Gilbert	1880-81

O'GRADY AND ZERRAHN [1885-87], Boston

Thomas O'Grady	1877-80
Frank E. Zerrahn	1874-75

ROTCH AND TILDEN [1880-94], Boston

Arthur Rotch	1871-73
George T. Tilden	1868-69

SHAW AND HUNNEWELL [1883-1902], Boston

George Russell Shaw	1869-70
Henry Sargent Hunnewell	1875-76

#SHEPLEY, Rutan AND COOLIDGE [1886-1915], Boston

George Foster Shepley	1880-82
Charles Allerton Coolidge	1881-82

#STICKNEY AND AUSTIN [1892-1917], Boston, Lowell

Frederick W. Stickney	1873-75
William Downes Austin	1872-75

WHIDDEN AND LEWIS [1890-1920], Portland, OR

William M. Whidden	1873-75
Ion Lewis	1876-77

APPENDIX H

American Architecture Students in Paris, 1845-85

Prior Education*	STUDENTS ENROLLED IN ECOLE (CAPITALIZED) Only (Lower Case)	Students in Atelier Atelier @	Hometown	Years in Atelier
	RICHARD MORRIS HUNT	1845-<u>46</u>-52	Brattleboro	Lefuel
H	ARTHUR DEXTER	1851-<u>52</u>-53	Boston	Lefuel
	FRANCIS PEABODY	c.185<u>2</u>-?	Salem, MA	Lefuel
H	HENRY HOBSON RICHARDSON	1859-<u>60</u>-65	New Orleans	Andre
	Maurice Fornachon	1860-?	New York	Andre
	William Gibbons Preston	1861-?	Boston	Douillard
H	EDWARD DELANO LINDSEY	1862-<u>63</u>-65	New Bedford	Andre
	ALFRED H. THORP	c.186<u>4</u>-?	New York	Daumet
HLSS	John Ames Mitchell	186<u>4</u>-70	Boston	Andre
HLSS	Edmund Quincy, Jr.	1864-68	Boston	Andre
	Walter T. Winslow	1864-?	Boston	Andre
H	George Burder Thayer	1865-69	Boston	Andre, Coquart
	Francis Ward Chandler	1867-69	Boston	Daumet
H,LSS	William Robert Ware	1867	Boston	Daumet (?)
	MORRIS BELKAPS	c.186<u>8</u>-?	?	Laisne
H	ALFRED GREENOUGH	186<u>8</u>-81	Boston	Vaudremer
HLSS	CHARLES FOLLEN MCKIM	1867-<u>68</u>-70	New York	Daumet
H,MIT	ROBERT SWAIN PEABODY	1867-<u>68</u>-70	Boston	Daumet
H	DOUGLAS SMYTH	186<u>8</u>-70	New York	Vaudremer
	SIDNEY V. STRATTON	c.186<u>8</u>-?	Natchez	Coquart
H	William Homer	1868-72	Boston	Coquart
	J. Foster Ober	1868-?	Boston	Davioud
HLSS	Theophilus P. Chandler	1869-71	Boston	Vaudremer
H	Robert Gould Shaw	c.1869-70	Boston	Coquart
MIT	George Thomas Tilden	c.1869-70	Boston	Vaudremer
H	JOHN PICKERING PUTNAM	187<u>0</u>	Boston	Andre, Pillet
	LUSK WEBSTER	c.187<u>0</u>-?	?	Triquet

* H = Harvard College (undergraduate); HLSS = Lawrence Scientific School, Harvard University; MIT = Massachusetts Institute of Technology.

@ Year in which student was admitted to Ecole is underlined.

	JEAN-JULES DESPRAS	c.1872-?	New Orleans	Train
H,MIT	JAMES ROGERS RICH	c.1872-74	Boston	Daumet
MIT	Joseph A. Pond	1872-?	Boston	Daumet
MIT	Thomas P. Rich	1872-?	Boston	Daumet
MIT	Frank Spinning	1872-?	Dayton, OH	Coquart
MIT	WILLIAM B. BIGELOW	1873-74	New York	Questel, Pascal
H,MIT	James Bosley Noel Wyatt	c.1873-75	Baltimore	Vaudremer
	HENRY OGDEN AVERY	1872-74-79	New York	Andre
H	WALTER COOK	1874-76	New York	Vaudremer
	GEORGE LOUIS HEALY	c.1874-?	Chicago	Train, Coquart
	LOUIS J. MILLET	c.1874-?	New York	Train
H,MIT	ARTHUR ROTCH	1874-80	Boston	Vaudremer
H,MIT	GEORGE RUSSELL SHAW	1874	Boston	Daumet
MIT	LOUIS HENRY SULLIVAN	1874-75	Chicago	Vaudremer
MIT	Henry Paston Clark	1874-75	Boston	Andre
H,MIT	Edgar Corrie Curtis	1874-78	Boston	Vaudremer
MIT	HENRY AYLING PHILLIPS	1875-76	Boston	Coquart
H,MIT	WILLIAM ROTCH WARE	1874-75-76	Boston	Vaudremer
	Warren Richard Briggs	1875-?	Bridgeport	Andre
MIT	Edward Hale Greenleaf	1875-?	Boston	Vaudremer
	Joseph C. Hornblower	1875-76	Washington	Pascal
	F.W. Kirby	1875-?	Boston	Pascal
	C.H. Stillson	1875-?	New Haven	Andre
	Edward S. Thacher	1875-?	New Haven	Daumet
	HOLLAND C. ANTHONY	c.1876-?	Brooklyn	Andre
	ELLIOT BASSETT	c.1876-?	New York	Moyaux
	LIND(S)LEY JOHNSON	c.1876-?	Philadelphia	Moyaux
	J. HARRISON LINDSLEY	c.1876-?	New Haven	Andre
	ALBERT PISSIS	c.1876-?	San Francisco	Guadet
	John M. Donaldson	1876-?	Detroit	Andre
	Warren B. Dunnell	1876-?	St. Paul	Moyaux
	George Homans Wetherell	c.1876-79	Boston	Pascal
H,MIT	WILLIAM APPLETON BURNHAM	1876-77-79	Boston	Moyaux
H,MIT	HENRY SARGENT HUNNEWELL	1876-77-79	Boston	Moyaux
MIT	Francis Richmond Allen	c.1877-79	Boston	Vaudremer
MIT	Richard S. Atkinson	1877-78	Boston	Pascal
MIT	John Borland	1877-?	Boston	Pascal
	George Bowe	1877-?	New York	Guadet
	Edward A. Kent	1877-?	Buffalo	Pascal
	CHARLES I. BERG	c.1878-80	New York	Andre
	CLARENCE HALL BLACKALL	c.1878-80	New York	Andre
	JOHN MERVEN CARRERE	c.1878-82	New York	Laisne/Ginain, Ruprich-Robert
MIT	LOUIS AGASSIZ SONREL	1878-?	Boston	Vaudremer
MIT	WILLIAM MARCY WHIDDEN	c.1878-82	Boston	Vaudremer
H,MIT	William B.S. Clymer	c.1878-80	Washington	Vaudremer
	Leon W. Robinson	1878-80	New Haven	Andre

MIT	WILLIAM E. CHAMBERLIN	1879-81	Boston	Vaudremer
MIT	A.D.F. HAMLIN	1878-79-80	Boston	Guadet
	WILLIAM AUGUSTUS OTIS	c.1879-81	New York	Laisne/Ginain
MIT	EDMUND RUSSELL WILLSON	1879-81	Boston	Vaudremer
	THOMAS HASTINGS	1880-83	New York	Andre, Laloux
H,MIT	ALEXANDER W. LONGFELLOW	1879-80-81	Boston	Vaudremer
	A.J. Finkle	c.1880-?	New Orleans	Pascal
	Charles Young	c.1880-?	Salt Lake C.	Guadet
	FRANK LOUIS FASSITT	c.1881-?	Philadelphia	Pascal
	ALFRED GOULD	c.1881-?	Boston	Guadet
	AMBROSE J. RUSSELL	c.1881-84	Kansas City	Guadet
H	JOHN STEWARDSON	1879-81-82	Philadelphia	Pascal
H,MIT	Henry Grafton Monks	c.1881-87	Boston	Gerhardt
H,MIT	Edmund M. Wheelwright	c.1881-82	Boston	?
	BERNARD RALPH MAYBECK	1881-82-86	New York	Andre
	William W. Northend	c.1882	Boston	?
	ARTHUR LYMAN TUCKERMAN	c.1883-?	New York	Guadet
H	William York Peters	1883-85;86-88	Boston	Guadet
H	FRANK C. HUIDEKOPER	1883-84	Meadville	Guadet
MIT	RICHARD HOWLAND HUNT	1884-85-87	New York	Daumet
H,MIT	CHARLES BRUEN PERKINS	1885-90	Boston	Daumet
MIT	GRENVILLE T. SNELLING	c.1885-91	New York	Daumet
	Samuel W. Mead	c.1885-?	Boston	Daumet
	Whitney Warren	c.1885-95	New York	Daumet, Girault, Esquie

SOURCES:

"Prix de Reconnaissance des Architectes Americains," AABN 22 (September 3, 1887), 113-15

Ecole Nationale des Beaux-Arts, "Prix de Reconnaissance des Architectes Americains," [photocopy of typescript, MH-GSD: VF.NA 2350.Fran.P. Annotated, upper right: "In Ware folder/loaned by/Mr. Emerson/ Miss Shillaber confirms this/ written in 1886"]

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APPENDIX I

M.I.T. Design Problems, 1868-81

Group I: Non-Ecole Problems

Subject of Problem	Style	Years When Used
Small Cottage		1869-70
Set of Church Furniture		1869-70
Half-timbered House		1869-70
#School and Library Building	Gothic	1869-70
---	---	---
Mantle-piece		1871-72
School-house		1873-74
Dwelling House/Gardener's Cottage		1873-74,74-75(?),75-76(?)
Chimney-piece		1873-74,74-75(?)
$#Memorial Library	Classical	1874-75,73-74(?)
$#Memorial School-house	Classical	1874-75,73-74(?)
Farm Barn		1874-75,75-76(?)
Country House [with large stair hall]		1876-77
$#Railroad Station	Gothic	*1877
$#Steam Fire-engine House	Gothic	*1877(2)
$#Town Hall	Gothic	*1877
$#Town Hall	Classical	*1878
$#Scientific Academy	Classical	*1878
#Public Library	Classical	*1879
$#Bank Building	Classical	*1881

A summary of the number of programs in each Group is given in Table 3.1, in the text of Chapter 3.

Explanation of Symbols:

Subjects enclosed in [brackets] are shortened or summarized from lengthy program statements. Otherwise, subject titles are given as they appear on drawings or in published materials of the period.

Drawings, original or published, known to exist.

$ Program text, thesis abstract, or thesis text known to exist.

* Thesis project. (See also Appendix J.)

------ Problems above line issued before arrival of Letang in January 1872; problems below line issued after arrival of Letang.

Group II: Problems in the Manner of the Ecole
(no specific analogous programs yet identified)

Subject of Problem	Style	Years When Used
Bridge		1868-69
$[Chapel in a Church]		1868-69,70-71
Balcony		1868-69,71-72
Honeysuckle Frieze		1868-69
Corinthian Capital		1868-69
Summer House between Two Bridges		1869-70
[Iron Fence Gate]		1870-71
[Ventilating Panel]		1870-71
$[Fountain in a Garden]		1870-71
$[Iron Flower Stand, in Corinthian Order]		1870-71
$Porch		1871-72,73-74,74-75(?), 75-76(?)
Carthusian Cloister		1871-72
#Village Church	Classical	1872-73
Pavilion between Two Bridges		1872-73,73-74(?),74-75(?), 75-76(?)
#School of Chemistry	Classical	1872-73,73-74(?),74-75(?)
Lamp-post		1872-73,73-74,74-75,75-76
$#Water Works in a Public Park	Classical	*1873,*1875
Arch		1873-74
Vestibule		1873-74,74-75(?)
#Wrought-iron Gate		1873-74,74-75(?),75-76(?), 77-78(?),78-79
$School of Architecture		1873-74,74-75(?),75-76(?)
[Window and Balcony on Brackets]		1877-78
#Museum of Fine Arts and Library	Classical	*1878

Group IIIA: Paraphrased Ecole Problems

Subject of Problem (with similar Ecole problems in parentheses)%	Style	Years When Used
Triumphal Arch (Arc de Triomphe:1R,1865)		1868-69
Campanile (Campanile:1E,12-68)		1869-70,72-73,73-74(?), 74-75(?),75-76(?)
Hospital and Alms House for Forty Pensioners (Hospice de Refuge pour la Viellesse:2R,10-68)		1869-70
$Porte-cochere (Porte-cochere:2E,12-68)		1871-72,73-74,74-75(?)
$Peristyle (Peristyle:2R,03-69)		1871-72,73-74,74-75(?)
#Casino (Casino:2R,12-68,08-71)	Classical	1871-72,72-73,73-74(?), 74-75(?)
#Artist's House (Habitation d'un peintre d'histoire:2R,10-66; Habitation d'un statuaire: 2R,03-71,05-72)	Classical	1872-73,73-74(?),74-75(?), 75-76(?)
Monumental Chapel (Chapelle rurale:2E,10-66; Chapelle jardinale:2E,12-69)		1872-73,73-74(?),74-75(?)
$#Employment of Four Columns (Emploi de 16 colonnes: 2E,11-75; Portique musee: 1E,01-71)	Classical	1872-73,73-74(?),74-75(?), 75-76(?)
$#Grand Staircase (Grand escalier:2R,12-69)	Classical	1872-73,73-74,74-75(?), 75-76(?)
$Billiard Room and Boat House (Salle de billard:1E,12-65; Exedre joint a une salle de billard:2E,01-67)		1873-74,74-75(?),75-76(?)
$Monumental Bridge (Pont en pierre:2E,07-68; Pont limitrophe:1R,11-70)		1873-74,74-75(?)
$#Temple Tomb (Tombeau de famille: 1E,02-68; 2E,05-71)	Classical	1873-74;75-76
$Cafe-chantant (Cafe-concert:1R,06-72; 2E,12-72)		1873-74

% 2E = Second Class: Esquisse; 2R = Second Class: Projet rendu; 1E = First Class: Esquisse; 1R = First Class: Projet rendu. Dates based on Croquis d'Architecture and may not include other instances when program was used at Ecole.

Fountain (Fontaine d'arrosement public:1E,02-69; Fontaine publique:2E,05-73)		1873-74,74-75(?),75-76(?)
Small Museum (Petit musee:2R,05-69)		1873-74,74-75(?)
$#Bridge in a Park (Pont dans un jardin d'agrement:2E,06-66)	Classical	1875-76

Group IIIB: Modified Ecole Problems
(adapted from analogous Ecole programs)

Subject of Problem (with analogous Ecole problem in parentheses)	Style	Years When Used
Mausoleum (Restauration du Tombeau de Mausole:2R,05-75)		1868-69
Swimming Bath (Chateau d'eau et des bains publics:1R,1866)		1868-69
$[Studio and Billiard Room]		1870-71
Portico in a Garden (Pavillon de plaisance dans un parc:2R,05-67; Pavillon d'agrement sur un etang: 1E,04-72)		1871-72,73-74
Monumental Column (Colonne rostrale:1E,12-67; 2E,03-73)		1872-73
$#Railway Station (Station de chemin de fer: 2E,05-69)	"Stick"	*1873,72-73,73-74,74-75(?), 75-76(?)
#Private Museum of Painting and Sculpture (Maison de campagne pour un amateur:2R,03-68; Musee pour le chef-lieu d'un departement:1R,03-68)	Classical	1872-73
#Natural History Building (Amphitheatre d'histoire naturelle:2R,12-67)	Classical	1872-73
#Soldiers' and Sailors' Tomb (Tombeau pour 2 freres: 2E,01-71)	Classical	1872-73
#Restoration of Pompeian House (Restauration du Tombeau de Mausole:2R,05-75)	Classical	1873-74,74-75(?),75-76(?), 78-79

[Iron Flower Stand/Kiosk] (Marche aux fleurs:1E,02-72)		1873-74,74-75(?)
Catholic Church Temple Protestant:1R,02-76)		1873-74,74-75(?),75-76(?)
School of Medicine (Academie de medecine:2R,12-73)		1873-74,74-75(?)
Summer House (Maison de campagne:1R,12-66)		1874-75,75-76(?)
Monumental Doorway (Porte interieure d'un musee d'artillerie:2E,11-71)	Classical	1874-75,75-76(?)
$Small Theatre (Theatre:1R,1865)		*1881
$Country Opera House (Theatre pour une ville de 2eme ordre,07-69)		*1881

APPENDIX J

M.I.T. and Cornell Thesis Projects, 1873-83

1. M.I.T.: Original Designs and Explanatory Texts

1873

Henry Ayling Phillips	$#"Water Works in a Public Park"

1874

William Baldwin Dowse	#"Railway Station"

1875

Amos Josiah Boyden	$"Water Works in a Public Park"

1876

None

1877

John Williams Beal	#"Steam Fire-engine House"
Goerge Walter Capen	$#"Town Hall"
William E. Chamberlin	$#"Steam Fire-engine House"
Pierce Powers Furber	$#"Railroad Station"

1878

Charles Morrill Baker	$#"Town Hall"
Charles Sumner Eaton	$#"Scientific Academy"
Alfred Sawyer Higgins	#"Museum of Fine Arts and Library"

1879

Ernest Greenleaf Hartwell	#"Public Library"

Drawings in collection of M.I.T. Museum.
$ Thesis text in collection of Institute Archives, M.I.T.

1880

None

1881

Edwin James Lewis	$"Country Opera House"
William Reynolds Snead	$"Small Theatre"
Charles Mason Wilkes	$#"Bank Building"

1882

Edward Francis Ely	$"Romanesque Church"
George Lewis Heins	$"Church and Vestry"
Grenville Temple Snelling	$"Large Romanesque Church"

1883

John George Eppendorff	$#"Country Rail Road Station"

2. Cornell University: Historical and Technical Essays

1873

John Raymond Schoonover	"The Adaption of Buildings to Their Location"

1874

Francis Woodworth Cooper	[No title]
Benedict Willis Law	"Utilitarianism in American Architecture"
William Morton Jackson Rice	[No title]
Bryon Erastus Shear	"The Principles of Gothic Architecture"
Sereno Edwards Todd, Jr.	[No title]

1875

Almon Wheeler Bulkley	"Sculpture and Its Relations to Architecture"
Augustus Howe, Jr. (B.S. 1888)	"Gothic Architecture"
Isaac Edgar Hutton	"Ventilation"
Charles Cyrus King	"Domestic Architecture"
Ehrick Kensett Rossiter	"Sir Christopher Wren"

1876

George Holt Berry (B.S. 1874)	"Leading Principles of Architectural Design"
Jeremiah Kiersted Cady	"The Cottage Architecture of Switzerland"
Herman MacClure Hadley	"Beauty in Architecture"
William Henry Parker	"The Development of Romanesque"
Charles Fenner Saunders	"Monumental Antiquities"
Herman Barker Seely	"English Architecture of the Nineteenth Century"
John Berry Tarleton	"The Gothic Architecture of Italy"

1877

Albert Franklin Balch	"The Architecture of Athens"
William Lloyd Deming	"The Utility of Iron as a Building Material"
David Woodbury King	"Windows"
Charles Town Mould	"Modern Architecture"
Theodore Barnard Peck	"Canterbury Cathedral"
Howland Russel	"Brunelleschi's Dome"
Arthur Ludwig Karl Volkmann	"Ecclesiastical Gothic Architecture"

1878

Edward Broadhead Green	"An Original Style in Architecture"
Quintiniano Nery Ribeiro	"Swiss Architecture"

1879

Albert C. Buchman	"Sculpture as Applied to Architecture"
Adolph Fleischman	"The Progress of Civilization as Shown in Architecture"
Noriyuki Kozima	"Sanitary Precautions in House Building"
Frank Ayres Wright	"Symmetry and Symbolism in Architecture"

1880

Irving Washington Kelley	"On Cements"
John Neal Tilton	[No title]
Margaret Hicks Volkmann	"Tenement Houses: A Social Problem in Architecture"

1881

None

1882	
Frederick Lord Brown	"School Architecture"
1883	
Frances Rhodes	"The Beauties of Northern Gothic Architecture"
Frederick Louis Roehrig	"Sanitary Precautions in House Building"

APPENDIX K

Boston Society of Architects Prizes, 1870-81

Date	Winner and Category	Years at M.I.T.@
1870*	Joseph A. Pond, Design	(1868-70)
	William M. Woollett, Construction	(1868-70)
	William M. Woollett, Design (Hon. Men.)	(1868-70)
	Elmer A. Darling	(1869-71)
1871	Frank Spinning, Design	(1868-71)
	[Construction not awarded]	
1872	Samuel D. Bush, Design	(1871-72)
	William Rotch Ware, Construction	(1871-73)
1873	Henry A. Phillips, Design	1869-73
	[Construction not awarded]	
1874	Edward H. Barnard, 1st Prize (?)	(1872-74)
	Charles B. Cook, 2nd Prize (?)	(1873-74)
1875	Frederick W. Stickney, 1st Prize (?)	(1873-75)
	William C. Richardson, 2nd Prize (?)	(1873-75)
1876	Francis H. Bacon, 1st Prize (?)	(1874-76)
	Robert D. Andrews, 2nd Prize (?)	(1875-76)
1877	Daniel W. Willard, 1st Prize (?)	1866-70;(1875-77)
	William E. Chamberlin, 2nd Prize (?)	1873-77
1878	Alfred S. Higgins, 1st Prize	1874-78
	Alexander Wadsworth Longfellow, 2nd Prize	(1876-78)
	George C. Grover, Hon. Men.	(1875-78)
1879#	Arnold W. Brunner, 1st Prize	(1877-79)
	Cass Gilbert, 2nd Prize	(1878-79)
	Oscar E. Brandt, Hon. Men.	(1878-79)
	Ernest G. Hartwell, Hon. Men.	1875-79
	Thomas O'Grady, Jr., Hon. Men.	(1877-80)
	Herbert Langford Warren, Hon. Men.	(1877-79)
1880	Thomas O'Grady, Jr., 1st Prize (?)	(1877-80)
	William C. Zimmermann, 2nd Prize (?)	(1877-80)
1881	Edwin J. Lewis, 1st Prize	1877-81
	William Kauffman, 2nd Prize	(1879-81)

@ Years as Special Student in parentheses.

* 1870 Design Jury: E.C. Cabot, C.A. Cummings, H. Van Brunt;
1870 Construction Jury: C. Brigham, H.G. Hartwell, W.G. Preston.

1879 Jury: E.C. Cabot, C.A. Cummings, H. Van Brunt.

APPENDIX L

A.I.A. Committees on Education, 1867-82

1. A.I.A. National Committee on Education

1866-67: New York -- New York*

Leopold Eidlitz, Chairman	New York
Robert G. Hatfield	New York
Emlen T. Littell	New York
Samuel A. Warner	New York
William Robert Ware	Boston

1867-68: New York -- New York #

Leopold Eidlitz, Chairman	New York
Robert G. Hatfield, Secretary	New York
Arthur D. Gilman	New York
Samuel A. Warner	New York
William Robert Ware	Boston

1868-69: New York -- New York

Emlen T. Littell, Chairman	New York
John Davis Hatch	New York
Arthur D. Gilman, Secretary	New York
Josiah Cleveland Cady	New York
William Robert Ware	Boston

1869-70: New York -- Philadelphia

Emlen T. Littell, Chairman	New York
John Davis Hatch	New York
George W. Hewitt	Philadelphia
Josiah Cleveland Cady	New York
William Robert Ware	Boston

1870-71: Philadelphia -- Boston $

William Robert Ware, Chairman	Boston
Thomas Ustick Walter	Philadelphia
John McArthur	Philadelphia
George W. Hewitt	Philadelphia
Samuel Sloan	Philadelphia

---

* Committee elected in 1866, in New York, to report in 1867, at Annual Convention in New York.

No report given at Convention in latter year.

$ Nominating Committee in Philadelphia had proposed slate of W.R. Ware, Chairman; Emlen T. Littell; George W. Hewitt; Edwin Anderson; Henry G. Isaacs. Russell Sturgis proposed changing the slate.

1871-72: Boston -- Cincinnati

William Robert Ware, Chairman	Boston
Thomas Ustick Walter	Philadelphia
Russell Sturgis	New York
N.H. Hutton	Baltimore
James McLaughlin	Cincinnati

1872-73: Cincinnati -- Chicago

William Robert Ware, Chairman	Boston
Thomas Ustick Walter	Philadelphia
Peter Bonnett Wight	Chicago
N.H. Hutton	Baltimore
Albert G. Nash	Cincinnati

1873-74: Chicago -- New York

William Robert Ware, Chairman	Boston
Thomas Ustick Walter	Philadelphia
Peter Bonnett Wight	Chicago
N.H. Hutton	Baltimore
Albert G. Nash	Cincinnati

1874-75: New York -- Baltimore #

William Robert Ware, Chairman	Boston
Thomas Ustick Walter	Philadelphia
Peter Bonnett Wight	Chicago
N.H. Hutton	Baltimore
Albert G. Nash	Cincinnati

1875-76: Baltimore -- Philadelphia

William Robert Ware, Chairman	Boston
Thomas Ustick Walter	Philadelphia
Peter Bonnett Wight	Chicago
Albert G. Nash	Cincinnati

1876-77: Philadelphia -- Boston # *

Carl Pfeiffer, Chairman	New York
Frederick G. Thorn	Philadelphia
Alfred Stone	Providence
Edmund G. Lind	Baltimore
Albert G. Nash	Cincinnati

No report given at Convention in latter year.

* Ware had been listed as Chairman by the Nominating Committee, but he withdrew from the Committee on Education in order to continue as Chairman of the Committee on Professional Practice, a position he had held since his election at the 1870 Philadelphia Convention.

1877-78: Boston -- New York # $

Carl Pfeiffer	New York
William A. Potter	New York
Richard M. Hunt	New York
Robert G. Hatfield	New York
Charles F. McKim	New York

1878-79: New York -- New York

William Robert Ware, Chairman (?)	Boston
William A. Potter	New York
Charles F. McKim	New York
Henry Van Brunt	Boston
James K. Wilson	Cincinnati

1879-80: New York -- Philadelphia

William Robert Ware, Chairman	Boston
Russell Sturgis	New York
Nathan Clifford Ricker	Champaign-Urbana
H.H. Richardson	Brookline
W.P.P. Longfellow	Boston
Joseph M. Wilson	Philadelphia

1880-81: Philadelphia -- Washington

Russell Sturgis, Chairman	New York
William Robert Ware	Boston
Nathan Clifford Ricker	Champaign-Urbana
Henry Van Brunt	Boston
Alfred Stone	Providence

1881-82: Washington -- Cincinnati

William Robert Ware	New York
Nathan Clifford Ricker	Champaign-Urbana
Henry Van Brunt	Boston
Alfred Stone	Providence
William A. Potter	New York

Ware remained on the Committee on Education through 1895-96. He returned to the Education and Publication Committee in 1898-99 and served through 1903-04.

$ A.I.A. Circular, October 22, 1877 (3 days after close of Convention), listed P.B. Wight, Chairman; Carl Pfeiffer; Albert G. Nash; Henry Van Brunt; Joseph M. Wilson.

2. New York Chapter Committee on Education

1869-70

Russell Sturgis
George B. Post

1870-71

Russell Sturgis, Chairman
Alfred H. Thorp
Henry R. McLane

1871-72

Henry R. McLane, Chairman

1872-73

Emlen T. Littell
Alfred H. Thorp
James Renwick (Chapter President, ex officio)

1873-74

Carl Pfeiffer
William A. Potter
Robert G. Hatfield (Chapter President, ex officio)

1874-75

Carl Pfeiffer
William A. Potter
Richard M. Hunt

1875-76

Carl Pfeiffer
Richard M. Hunt
George Hathorne
Alfred J. Bloor
William T. Hallett

1876-77

Carl Pfeiffer
Richard M. Hunt
George Hathorne
Alfred J. Bloor
William A. Potter

1877-78

Carl Pfeiffer
Richard M. Hunt
William A. Potter
Robert G. Hatfield
Charles F. McKim

1878-79

Carl Pfeiffer
Richard M. Hunt
William A. Potter
Robert G. Hatfield
Charles F. McKim

1879-80

William A. Potter
Emlen T. Littell (Chapter President, ex officio)
Henry J. Hardenbergh
Henry Hudson Holly
Robert H. Robertson

1880-81

William A. Potter
Emlen T. Littell (Chapter President, ex officio)
Henry J. Hardenbergh
Henry Hudson Holly
Robert H. Robertson

1881-82

William A. Potter
Emlen T. Littell (Chapter President, ex officio)
Henry J. Hardenbergh
Henry Hudson Holly
Robert H. Robertson

3. Philadelphia Chapter Committee on Education

The following architects served for various periods of time on the local committee, between 1871-72 and 1879-80:

Charles M. Burns
Theophilus P. Chandler
Thomas C. Clark
Frank Furness
Addison Hutton
Alonzo B. Jones
John McArthur
George T. Pearson
Henry A. Sims
John Stewart
Frederick G. Thorn
Thomas Ustick Walter
T.R. Williamson
Joseph M. Wilson

4. Cincinnati Chapter Committee on Education

The following architects served for various periods of time on the local committee, between 1869-70 and 1875-76:

Edwin Anderson
Arthur Bate
Charles Crapsey
James W. McLaughlin
Albert C. Nash
Louis Picket
Solomon Willard Rogers
William Tinsley
James K. Wilson

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