The Transformation of the Schoolhouse: American Secondary School Architecture and Educational Reform, 1880-1920


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## Abstract

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This dissertation examines American secondary school buildings between 1880 and 1920, recasting the traditional story of progressive educational reform by including the actual school buildings where reform policies became real for the students, teachers and administrators. It focuses on the transformation of the school building from a simple collection of similar rooms, described by contemporaries as the "school house," to the complex, differentiated modern school plant that drew comparisons to the ideal factory. The thesis is that social, cultural and architectural factors combined to change the nineteenth-century schoolhouse into the modern school plant by 1920. These factors can be grouped into three general categories: (a) organizational and curricular reforms in the educational system; (b) an increased societal emphasis on the health and hygiene of school-aged children; and (c) education's changing role in American society.

School architecture reform during this period engaged both architectural and social issues. Administrators and architects were inspired by advances in technology and medicine to find the safest and most efficient ways to meet changing educational requirements. Lighting, ventilation and fireproofing concerns moved to the forefront of school design. As enrollments grew and the curriculum expanded to include manual and vocational training, specialized rooms became necessary and architects faced new problems of rational arrangement and circulation. And auditoriums and gymnasiums

enhanced the building's role as a social and cultural center. Underlying all of these factors were notions of efficiency and economy adopted from American businesses. This study examines the way such issues as health and safety, education, economy and efficiency principles, style and symbolism, and the high school's emerging role as the leading agent for social and vocational training either influenced or resulted from the architectural transformation of the schoolhouse, using St. Louis and Chicago as case studies.

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This project began, unconsciously, during countless hours spent in a beautiful 1936 school building designed by George Grant Elmslie in Hammond, Indiana. My father was the principal of that school and he gave me the run of the building until my late teens. Unfortunately, that wonderful building is now gone forever. But it lives on in my memory and serves as the backdrop for most of my dreams. The dissertation itself is the culmination of a long, difficult process that began as the crazy dream of a frustrated attorney. That dream would never have been realized if not for the help of four people: Richard Guy Wilson, whose hastily scribbled postcard in the Spring of 1994 changed my life; Dan and Jayne Gyure, whose emotional and financial support have carried me through this life transition; and, most of all, my wife Jan, who allowed me to pursue this dream and encouraged me even when I had doubts.

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# INTRODUCTION

> We are no longer satisfied with the buildings of twenty years ago. This is the age of great activities in education, and the extended use of the school plant both day and night, and for all sorts of social betterments. Manual-training and technical courses are being introduced, demanding power plants and special equipment; the playground is in demand for constant use; in almost every community movements for educational and social betterment are under way, and the school, being the logical center for such activities, must improve and enlarge to meet the greater demand.
>
> William B. Ittner, 1912[1]

> It must be realized that the old school, even that of five years ago, has passed just as surely as the little red schoolhouse that once stood on the hill. In its place has already appeared the new, throbbing, spirited institution, receiving its impulse from the heart of industry, commerce, and society, which, in turn, are looking to the school for practical aid in the solving of their accumulating problems of trade, employment, and American citizenship.
>
> John J. Donovan, 1921[2]

The school building is a vitally important yet largely invisible component of American culture. Almost every American child attends school for some part of his or her life. From age five or six to approximately eighteen, the average American child probably spends more time in a school building than any other single place outside the home. The school building's importance cannot be overestimated in a society like ours where education is not only compulsory but is also part of our national self-image. Freedom, democracy and education have been linked for centuries in the United States, from Thomas Jefferson's belief in an educated electorate as the foundation of a democratic republic to the Civil Rights movement of the 1960s.

Given education's salient position in American culture, one might think that the school building would be the object of historical curiosity and analysis. This is simply not true. American school buildings have attracted scant historical attention and even less critical commentary. Neither educational nor architectural historians have begun to piece together the development of school architecture in this country. This dissertation will rectify such scholarly neglect by focusing on one particular moment in the history of educational architecture. I critically examine the transformation of American high school architecture between 1880 and 1920. During that period, significant and permanent changes occurred in the high school that precipitated its transformation from an elite academy for middle and upper class children to a job training school for the masses. This search for institutional identity affected school architecture. There was a fundamental shift in the conception of how schools should be designed. For the first time, an architectural discourse developed that considered aspects like curriculum, health and safety, and symbolism – but not pedagogy. My thesis is that social, cultural and architectural factors combined to change the nineteenth-century schoolhouse into the modern school plant by 1920. These factors can be grouped into three general categories: (a) organizational and curricular reforms in the educational system; (b) an increased emphasis on health and hygiene for school-aged children; and (c) education's changing role in American society. A common thread runs through all of these concerns, uniting them and connecting them with a larger social and cultural movement occurring across the United States. That thread involves notions of efficiency and scientific management, discipline and social control.

My examination of American public school architecture between 1880 and 1920 describes a building type in transformation, driven by social and cultural changes that emphasized efficient bodies and machines. Bodies became increasingly important in the late nineteenth century for a number of reasons. As industrialization and urbanization began to replace America's traditional agrarian and rural culture, people felt alienated from physical, manual labor. The new machine age was also blamed for a number of physical and mental illnesses. T.J. Jackson Lears has documented an antimodern impulse (the search for "authentic experience") during the time period that is directly related to feelings of disconnectedness intensified by the new market economy.[3] Handcrafted items (whether real or illusory) were seen by many in the middle- and upper-classes as an antidote to the new impersonal social order. Emphasizing handcraft included a concomitant emphasis on manual production. A belief in the curative/restorative power of manual labor led to the widespread establishment of manual training programs in late nineteenth-century schools. Manual training required students to use their bodies, as did physical education, which also became popular during this time. For the first time, a concerted effort was made to engage students' bodies in physical activities as part of a physically and morally healthy lifestyle. The benefits of such a life were often promoted in the efficiency language that dominated the era. A healthy body was an efficient body. In the same vein, healthy students were more efficient learners. Anything that improved students' health was therefore conducive to the educational process. Tales of weak eyes caused by poor classroom lighting and sickly children exacerbated by unventilated rooms led to a nationwide focus on the importance of proper school design. Thus the schoolhouse, with its ability to provide a healthy and safe environment for students, came to play an important role in the educational process.

Alongside the body's rising importance was a growing movement to evaluate all human activity by the standards of efficiency. This discourse was born of the machine age and spurred by the rise of a hierarchical, bureaucratic society modeled on the

American corporation.[4] Urban school systems in the late nineteenth century mirrored larger social developments by moving toward centralized authority structures, mid-level managers and specialized teachers in an attempt to make education more efficient. The influence of the "age of efficiency" also affected school architecture in two important ways. First, schoolhouse design became the province of specialists – architects who often devoted their entire practice to designing school buildings (which were low on the hierarchical ladder of prestige commissions) and sometimes held full time positions with urban school boards. This was necessitated in part by the school building's increasing complexity. Larger enrollments, more sophisticated methods of heating and ventilation, and changing curricular requirements meant that the old cubical or rectangular buildings stuffed with identical box-like rooms would no longer suffice. The willingness to configure a building to take these factors into account comprised the second manner in which architecture intersected with the efficiency movement. School buildings were designed with an eye toward segregating areas within the building based on the subjects to be taught within their spaces. In the process, the school building began to resemble the mass production factory, with different activities taking place in different areas. This change was reflected in terminology. In the 1880s, "schoolhouse" was ubiquitous, but by the 1920s the phrase "school plant" had become widespread as educators and architects often made analogies between the factory and the school.

Society's interest in efficient bodies and machines combined with education's expanding importance in American culture to transform the schoolhouse in the late nineteenth and early twentieth centuries. The school, especially the high school, became an important social agency. School buildings became social centers whose auditoriums, playgrounds, gymnasiums, swimming pools and classrooms were increasingly available to the neighborhood adults at night and on weekends for entertainment and education. Schools were the places where Anglo-Saxon Protestant values were taught to immigrant children and their parents in "Americanization" programs and hygiene. Sociologist Edward A. Ross perceptively wrote of the period, "As the state shakes itself loose from the church it reaches out for the school."[5] All of these activities and more raised the profile of American high schools in their communities. The school's new prominence was reflected in both the size and appearance of high school buildings. Once designed simply as larger versions of popular domestic architecture, school buildings began to command more attention in the urban landscape due to their greater presence and increasingly monumental exteriors. Yet school architecture also began to mirror some of the anxieties of the larger educational system. As the curriculum advanced from the traditional academic course of study, building facades retreated into historicism; as the buildings' function began to control their layout, their exteriors increasingly masked the interiors; as education began to focus on the individual over the group, architecture became more standardized across the country; and while the language of science and rationalism became more prominent in school design, pedagogical practices within the school's walls remained primitive. Contradictions such as these, which appear throughout the period, helped to shape the development of the new school building.

My study focuses on urban high school buildings, particularly those in St. Louis and Chicago. I have chosen urban schools for a number of reasons. Urban schools were the places where architectural experimentation and transformation was initiated in most cases. American cities grew at an unprecedented rate during this period as society shifted from agriculturally based to industrially based.[6] More jobs in America's cities attracted more people from rural areas and foreign countries. The influx of urban dwellers, coupled with progressive legislative measures designed to limit child labor and mandate public school enrollment, forced educational systems to find new architectural solutions for increasingly crowded schools. Nineteenth-century schoolhouses proved inadequate and unable to adapt to growing enrollments and changing curriculums. These pressures, faced more squarely by urban schools than their rural counterparts, forced new architectural ideas in the cities; the trends then "trickled down" to smaller and rural communities at varying rates through the process of standardization I briefly describe in Chapter Four. For example, as late as 1910, when the modern school building that I describe below had essentially been established in America's larger cities, there were almost 400 log school buildings in Virginia, and 66% of the state's schools had no indoor toilets. The second reason for choosing urban schools is that smaller towns and rural communities tended to have schools that combined grades, usually kindergarten through high school, in the same building. In order to trace the changes that were specific to high school architecture it was necessary to examine separate high schools, which were most common in urban areas.

I have chosen these particular cities for a variety of reasons, including availability of contemporary information. Literature from 1880 to 1920 overwhelmingly identifies New York, Boston, Chicago and St. Louis as the leading educational systems in the country; not coincidentally, the school designers from these cities were considered the best in their field.[7] The two cities I have chosen to examine in detail – St. Louis and Chicago – also demonstrate unique characteristics. The St. Louis school system was highly-regarded during this period, the legacy of William Torrey Harris, an important nineteenth-century educator; the city was also home to William B. Ittner, a nationally-known school architect who served in an official capacity for the city for seventeen years and eventually designed over 400 school buildings across the country. Chicago was a large city with a weaker educational system that faced enrollment problems that were probably second only to New York. These two cities also have a wealth of secondary literature on their educational histories.[8]

I began this study with two simple questions. First, why did a 1920 school building appear different from an 1880 school? Second, did the unprecedented educational changes of this period have any effect on the architectural spaces? The dissertation attempts to answer those questions by examining nationwide trends through the use of specific local examples. I take a broad look school architecture, addressing such issues as how they were designed, who designed them, what factors influenced their design, how they were used, and what their role was in the educational system and American society. I have organized the study into two parts. Part One, comprising Chapters 1-3, looks at "Buildings and Builders." Chapter One examines the historical background of high school architecture through the 1880s. It describes typical post-bellum school buildings, relates the salient architectural concerns of educators and administrators and provides examples of how nineteenth-century architects approached the problem of school design. During this discussion trends which later came to dominate the field of school architecture are observed in their nascence. Chapter Two outlines the secondary school architecture of St. Louis and Chicago between 1880 and 1920 as examples of the nationwide transformation. Chapter Three studies Board of Education architects in those two cities and provides a national context for the development of the professional school architect.

Part Two investigates various social, cultural and educational influences effecting secondary school architecture during this period; it also examines related issues like building use, the spread of design ideas, and the high school's symbolic message . The following quote by Leonard P. Ayres, which represents a typical reformist attitude of the period, provides the framework: "The school building policy of the American people is being shaped by five watchwords of progress: Education, Economy, Safety, Health, and Happiness."[9] The fourth chapter ("Health" and "Safety") reviews issues related to the health and well being of school children. Special attention is given to the place of lighting and ventilation in school design, two topics that really rose to the forefront of design concerns by the end of the nineteenth century. In its purest form, school architecture by the 1910s consisted of designing a room to specific standards of air circulation and light quality, and then combining a number of these rooms in some way to form a whole. In the architectural literature, ventilation and lighting were without question leading influences on school design. The chapter also looks at the hygiene and physical education movements and how they affected education. It concludes with a discussion of fireproofing school buildings. Chapter Five – "Education" – begins to uncover the educational issues that directly affected the schoolhouse's architectural transformation. Changes in high school curriculums (most notably the movement away from a limited, classical, humanistic course of study to multiple courses heavily weighted toward vocational training), compulsory education laws, a growing emphasis on manual training, and the rise of education's importance in American society are all discussed as factors which placed new demands on the school building. The sixth chapter – "Economy" – examines the influence that American's obsession with efficiency and scientific management in the early twentieth century had on education and architecture. Progressive political ideas led to the centralization of educational systems across the country; this was accomplished through altering the size and composition of school boards and changing the organizational structure of the administration. Societal models of the efficiency expert were extremely influential in education during this time. In school architecture, this emphasis is reflected in three areas: the movement to design buildings as "efficient factories," the increased number of architects hired to official positions with school systems and municipalities, and the standardization of school design plans and formulas that spread across the country by 1920. Efficiency is addressed by looking at educators' and architects' attitudes toward schoolhouse efficiency, culminating in the story of the Gary, Indiana school system of the early 1900s – the epitome of progressive/efficient schooling. Chapter Seven – "Happiness" – has a more flexible agenda than the previous chapters. It examines issues that clearly affected school architecture but do not fit into the previous categories. Auditoriums are analyzed as a specific example of architectural transformation, and the schoolhouse's growing role as a community social center are discussed. An examination of architectural styles and symbolism – in particular, its evolution from the school as "house" metaphor to the school as "factory" or "plant" –concludes the chapter.

The purpose of this study is to demonstrate the inextricable links and reciprocal influences between architecture, education and society during a formative period in history. I do not imply that there is a simple cause and effect relationship between architectural and social influences and architectural design. However, one cannot deny that certain issues like health and scientific management were on the minds of educators and architects, while others (like a changing curriculum) *had* to be dealt with in a new way. I intend to examine these issues to see how and why they were related to architecture. In doing this I address a significant gap in both architectural and educational history. School buildings have been neglected in both fields, more so in the former than the latter. This neglect is puzzling when one considers two factors: education's importance in American society and the amount of coverage school buildings received in the early twentieth-century popular and specialized press. A rich body of literature on Progressive Era education, including benchmark studies by Lawrence Cremin and David Tyack, has increased our understanding of administrative and curricular issues, but no work has sought to connect educational reform with school architecture.[10] Educational historians have made some progress in attempting to chart the history of school architecture, which includes recognizing that changes occurred in school buildings between 1880 and 1920 as a result of increasing emphases on student health and educational necessity.[11] William Cutler has gone a step further by actually examining some of these changes. In "A Preliminary Look at the Schoolhouse: The Philadelphia Story, 1870-1920," he presented a capsule history of school architecture in one city, while in his article "Cathedral of Culture: The Schoolhouse in American Educational Thought and Practice since 1820," Cutler extensively analyzed the American school building's iconographic role.[12] Lucian Szlizewski's dissertation "Schoolhouse Architecture in America from 1830-1915" investigated the technological advances influencing nineteenth-century school architecture, but failed to link them with societal or educational developments.[13] Works by Mary Hoffschwelle, James Anderson, and Robert Taggart discuss architecture in the context of rural school building programs of the 1920s and later.[14] None of these studies, however, confront the issue of school architecture as a function of societal, cultural and institutional change.

Architectural historians have also largely ignored school architecture as an area of study. A modernist bias against historicist architecture rejected any school building designed before 1940 as inadequate and outdated, which made scholarship on Progressive Era schools difficult to find. School buildings are passed over in survey texts and left out of most architectural guidebooks. In the 1980s, the voluminous New York 1900 by Robert Stern, et. al., did include a brief discussion of *fin du siècle* schools and their importance in the urban fabric.[15] However, the neglect of school architecture continued into the 1990s with two notable exceptions. Dell Upton provided a brief but intriguing study of the relationship between school architecture and societal conceptions of public space in the Early Republic in his article "Lancasterian Schools, Republican Citizenship, and the Spatial Imagination in Early Nineteenth-Century."[16] Although his study does not deal with the Progressive Era, it does provide a model for investigating how school design incorporates and promotes societal priorities. Amy Weisser's dissertation "Institutional Revisions: Modernism and American Public Schools From the Depression Through the Second World War," is the most intensive study of any aspect of twentieth century-school architecture, but she oversimplifies early twentieth-century buildings by claiming that the architects merely applied a set of "established design rules that ensured efficient use of light and space."[17] A more detailed analysis of this period demonstrates that school architecture, rather than being strictly determined by technological formulas, was a complex construct that engaged architectural, educational, social and cultural issues.

My goal in this work is to account for the differences between an 1880 high school building and one built in 1920 by looking not just at the buildings themselves but also at the educational system that utilized the buildings and the society that gave rise to and supported the educational system. My hope is that these buildings will provide a way to engage the educational, social, cultural, and racial history of America during this period. I also aim to provide a model for examining how an institution's architectural spaces are shaped by architectural and non-architectural factors. This type of cultural analysis has only recently appeared, most notably in studies by Dell Upton, Abigail Van Slyck and Dan Bluestone.[18] I am particularly attracted to Upton's concept of viewing architecture as "a means for shaping American society and culture and for 'annotating' social action by creating appropriate settings for it."[19] Throughout this investigation I have tried to keep in mind that the creation of architecture is always a *social act* – by people and for people. To determine the true nature of such acts, we need to know what a particular society felt was important or relevant in order to understand the architecture of a given time. In this case, such an analysis involves examining societal attitudes toward children, their well being, and their role in society, as well as the place of education as a whole. I examine all of these issues, keeping in mind the following observation by Larry Cuban:

> Embedded within teacher-centered instruction were assumptions about the social and economic role of schools, knowledge, children, and learning consistent with the profound changes occurring at the turn of the century in the larger society.[20]

These same assumptions found material form in the places where teacher-centered instruction took place – the school building.

[1] William B. Ittner, "School Architecture," Journal of the Proceedings and Addresses of the 50th Annual Meeting of the National Education Association (Ann Arbor, MI: National Education Association, 1912): 1208-1209.

[2] John J. Donovan, et. al., School Architecture: Principles and Practices (New York: The Macmillan Company, 1921), vii.

[3] T.J. Jackson Lears, No Place of Grace: Antimodernism and the Transformation of American Culture, 1880-1920 (Chicago and London: University of Chicago Press, 1981). For a related study of the shift from a nineteenth century "culture of imitation" to a twentieth century "culture of authenticity," see Miles Orvell, The Real Thing: Imitation and Authenticity in American Culture, 1880-1940 (Chapel Hill and London: The University of North Carolina Press, 1989).

[4] Robert H. Wiebe, The Search for Order 1877-1920 (New York: Hill and Wang, 1967); Alan Trachtenberg, The Incorporation of America: Culture and Society in the Gilded Age (New York: Hill and Wang, 1982); Olivier Zunz, Why the American Century? (Chicago and London: University of Chicago Press, 1998).

[5] Quoted in Joel H. Spring, The American School 1642-1985 (New York: Longman, 1986), 155.

[6] For an overview of this transition and its effects, see Robert H. Wiebe, The Search for Order.

[7] See e.g., William Estabrook Chancellor, "Schoolhouse Accommodations," American School Board Journal 38 (April 1909): 3-4, 20; A.D.F. Hamlin, "Consideration in Schoolhouse Design," in Modern School Houses (New York: The Swetland Publishing Co., 1910); "A Retrospect," American School Board Journal 42 (April 1911): 12; Thomas E. Tallmadge, The Story of Architecture in America (New York: W.W. Norton & Co., 1927).

[8] New York also meets the criteria listed above, but the school system was so vast and the problems of overcrowding so incredible during this time period that an architectural history of New York's schools deserves its own treatment.

[9] Leonard P. Ayres and May Ayres, Cleveland School Building Survey: School Buildings and Equipment (Cleveland: The Survey Committee of the Cleveland Foundation, 1916): 12-13.

[10] See e.g., Lawrence A. Cremin, The Transformation of the School: Progressivism in American Education, 1876-1957 (New York: Alfred A. Knopf, 1961); David B. Tyack, The One Best System: A History of American Urban Education (Cambridge: Harvard University Press, 1974).

[11] See for example, Kate Rousmaniere, City Teachers: Teaching and Social Reform in Historical Perspective (New York and London: Teachers College Press, 1997).

[12] William W. Cutler, III, "A Preliminary Look at the Schoolhouse: The Philadelphia Story, 1870-1920," Urban Education 8 (January 1974): 381-399; idem, "Cathedral of Culture: The Schoolhouse in American Educational Thought and Practice since 1820." History of Education Quarterly 29 (Spring 1989): 1-40.

[13] Lucian August Szlizewski, "Schoolhouse Architecture in America from 1830-1915" (Ph.D. diss., Miami University, 1989). Other dissertations that examine school architecture are Mohamed Ageli Hammad, "The Impact of Philosophical and Educational Theories on School Architecture (The British and American Experience 1820-1970)" (Ph.D. diss., University of Pennsylvania, 1984); Jean L. Harchelroad, "The Evolution of Public Elementary School Architecture in Pittsburgh, Pennsylvania, 1835-1915: An Analysis of Changing Styles and Functions" (Ph.D. diss., University of Pittsburgh, 1988); Lisa B. Reitzes,

"Moderately Modern: Interpreting the Architecture of the Public Works Administration" (Ph.D. diss., University of Delaware, 1989).

[14] Mary S. Hoffschwelle, Rebuilding the Rural Southern Community: Reformers, Schools, and Homes in Tennessee, 1900-1930 (Knoxville: University of Tennessee Press, 1998); James D. Anderson, The Education of Blacks in the South, 1860-1935 (Chapel Hill: University of North Carolina Press, 1988); Robert J. Taggart, Private Philanthropy and Public Education: Pierre S. du Pont and the Delaware Schools 1890-1940 (Newark: University of Delaware Press, 1988).

[15] Robert A.M. Stern, Gregory Gilmartin and Robert Montague Massingale. New York 1900: Metropolitan Architecture and Urbanism, 1890-1915. (New York: Rizzoli, 1983).

[16] Dell Upton, "Lancasterian Schools, Republican Citizenship, and the Spatial Imagination in Early Nineteenth-Century America," Journal of the Society of Architectural Historians 55 (September 1996): 238-253.

[17] Amy Suzanne Weisser, "Institutional Revisions: Modernism and American Public Schools From the Depression Through the Second World War" (Ph.D. diss., Yale University, 1995): 27.

[18] See e.g., Dell Upton, Holy Things and Profane: Anglican Parish Churches in Colonial Virginia (New Haven and London: Yale University Press, 1997); Abigail A. Van Slyck, Free to All: Carnegie Libraries & American Culture 1890-1920 (Chicago and London: University of Chicago Press, 1995); Daniel Bluestone, Constructing Chicago (New Haven and London: Yale University Press, 1991).

[19] Dell Upton, Architecture in the United States (Oxford and New York: Oxford University Press, 1998), 11.

[20] Larry Cuban, How Teachers Taught: Constancy and Change in American Classrooms 1890-1990 (New York and London: Teachers College Press, 1993), 38.

Chapter One

## THE TRANSFORMATION OF THE SCHOOLHOUSE

> Every school-house should be a temple, consecrated in prayer to the physical, intellectual, and moral culture of every child in the community, and be associated in every heart with the earliest and strongest impressions of truth, justice, patriotism, and religion.
>
> Henry Barnard, 1848[1]

In an 1881 letter to the American Journal of Education, John D. Philbrick, former Superintendent of the Boston schools, described the newly-opened Boston Latin and English High School as "by far the best specimen of school architecture in the country, – the first conspicuous example of a *new type* ... " (fig. 1.1).[2] Philbrick's boast was not without merit since the building contained many architectural aspects previously unknown in American schools, such as interior light courts, a military drill hall, and toilets on every floor, as well as rarely-used features like a gymnasium and an assembly hall large enough to hold the entire student body.[3] The Boston Latin and English High School signified the beginning of a transformation in American high school architecture. In the period just before and after the Civil War, neither educational nor social circumstances necessitated a sophisticated high school building outside of a few rare examples in the largest cities. By the late 1880s, however, high schools were increasingly the subject of architectural and educational interest, as social and technological forces combined to shape a new institution with new architectural requirements. This chapter will examine the American high school and its architecture before and after the Boston Latin and English High School, providing a general account of the transition from the decades before 1880, when the high school was a fledgling institution and the school building had not yet matured, to the 1910s, when school buildings had become complex, multifunctional instruments of education.

The Early High School

High school architecture in the mid-nineteenth century was influenced by secondary education's limited role in American society. That role remained nebulous for over fifty years after the opening of Boston's English Classical School (1821), the country's first public high school.[4] In the early years a spirited debate took place over the high school's proper mission. Secondary schooling was considered a luxury for most American families who could ill-afford to keep their children out of the labor market. Before the public high school developed, secondary school meant a private academy for middle- and upper class children preparing for college. It was the highest level of a non-universal education system; as such, high schools were often perceived as elitist institutions with no appeal for the general population. Historian Richard Hofstadter pointed out that, "Before the mass public high school emerged [in the twentieth century], American practice in secondary education was less in keeping with our democratic theory than with the selective European idea."[5] At the same time, many communities provided free education to indigent children. Those who championed a nationwide public high school system thus faced dual discriminations: while some Americans perceived secondary education as undemocratic and catering to the upper classes because of its roots in the private academy, others associated free public schooling with charity. Even after the high school became an established public institution in the early twentieth century, the elitist perceptions persisted. Such objections to secondary education, along with the prevalence of child labor in the late nineteenth century and a lack of compulsory education laws, combined to keep high school enrollments low. In 1870, for instance, there were approximately 16,000 graduates of public *and* private high schools, or only about two percent of the country's seventeen-year-old population.[6] As late as 1893, an important National Education Association committee report on secondary schooling recognized the high school's restrictive nature by describing its function as

> to prepare for the duties of life that small proportion of all the children in the country – a proportion small in number, but very important to the welfare of the nation – who show themselves able to profit by an education prolonged to the eighteenth year, and whose parents are able to support them while they remain so long as school ...[7]

Fledgling public high schools were also affected by societal attitudes toward childhood and adolescence in the second half of the nineteenth century. Before the "invention" of childhood and the "discovery" of adolescence in the early 1900s sharpened the divisions between children and adults, children were valuable wage earners, farmhands or caregivers for all but the wealthiest families.[8] Children's important economic role in the family often overrode any personal benefit they might receive from education. Society recognized this by allowing – and even encouraging – children to work. Child labor was prevalent, especially in urban areas among immigrant families. The first U.S. Census to investigate child labor in 1870 found (and surely underestimated) that over thirteen percent of all American children between the ages of ten and fifteen employed.[9] Compulsory education laws, designed in part to get children out of the workplace and into the schoolhouse, did not become widespread before the

1870s; when enacted they tended to be lightly enforced. For these and other reasons, high school enrollment in the post-bellum era was extremely small.[10]

The public high school before 1880 was a unique creature whose role in the American educational system, as well as society as a whole, was ill defined. Theodore Sizer notes that even in the 1890s educators were unable to agree on the scope and content of secondary education; "high schools varied markedly in terms of size, quality, course offerings, and even aims," while there was confusion over the proper demarcation between primary schools, high schools and colleges.[11] This lack of uniformity concerned both college administrators and high school educators. In an attempt to solve the problem, the National Education Association eventually formed the influential Committee on Secondary School Studies in 1893 to investigate college entrance requirements.[12]

Despite curricular diversity, high school curriculums were united to some degree in reflecting the institution's rather select nature. Students were required to pass rigorous entrance examinations in most cities before being accepted for secondary study. Courses of study were generally limited to two paths, neither of which was oriented toward practical applications. "Classical" courses emphasized Latin and Greek while "standard" or "general" courses offered German or French (or sometimes English) as alternatives. Algebra, geometry, English literature, grammar, and history requirements were common to both paths. Minimal instruction was offered in basic sciences like chemistry and geology. Vocational training was almost non-existent. Overall the nineteenth century high school curriculum was designed to develop the mind rather than train the student for any future profession. The efficacy of this "mental discipline" approach would be challenged in the last decades of the nineteenth century.[13]

The Mid-Century Schoolhouse

Urban schoolhouses in the mid-nineteenth century were small and simple. In larger cities before the Civil War, and in rural areas throughout the century, high school classes were often taught alongside primary classes in the same building, or wherever space was available.[14] Cleveland opened the first public high school west of the Alleghenies in 1846 in a church basement.[15] St. Louis's first high school in 1853 held classes in a primary school room for two years before a separate building was constructed.[16] High schools could exist under such circumstances because low enrollments and narrow curricular and pedagogical requirements reduced the need for specialized spaces. Students were taught all subjects in the same classroom. Their tasks were to memorize large quantities of information and recite them upon command (some schools included small recitation rooms for this purpose to avoid interfering with the other students' studying). Children sat on benches or at desks bolted to the floor in neat, orderly rows facing the teacher's desk, which was often raised on a platform. Class sizes varied, but in bigger cities they ranged from thirty to seventy students.

Some larger school systems began to build separate high school buildings by the 1850s. Boston's 1821 English Classical School was the first. Philadelphia's initial high school building was constructed in 1838. Chicago, Cleveland and St. Louis built their first separate high school buildings between 1855 and 1856. The Chicago Central High School was typical of this first generation; it was a three-story building with ten same-sized classrooms and an assembly hall on the top floor that was essentially two classrooms without a dividing wall (figs. 1.2-1.3). Other than staircases and small closets, the building contained nothing else.[17] Its pseudo-Gothic exterior resembled the 1856 Cleveland High School. Both of these schoolhouses, and many others across the country, shared similarities in room types and uses and in overall arrangement. Examining the St. Louis Central High School in detail will demonstrate some of these characteristics.

The St. Louis public school system was created in 1838, but the Board of Education did not establish its first high school until 1853. For two years, high school students received their lessons in a room of the Benton Primary School. Meanwhile the Board and its Superintendent, John Tice, fought perceptions that public schools were only for indigent children. Tice complained in an 1855 annual report that public schools were still viewed as "the synonyme [sic] of pauper education, because in the middle, southern and western States, twenty-five years ago, public money was only paid for the education of those who were unable to pay … ".[18] Partially as an attempt to court middle and upper class families, the Board authorized the construction of a high school building in 1855. Architect William Rumbold designed the building as a lavish mock-Gothic castle (fig. 1.4). A rectangular block of three floors and a basement, the building had a main entrance on one short side and secondary entries on the long sides. Octagonal towers over 100 feet high, topped by onion domes, stood in the four corners. A square tower marking the main entrance was even taller. Pinnacles and battlements provided visual complexity. The imposing appearance of this "magnificent edifice" belied a simple interior that was typical of contemporary high school buildings.[19] The first and second stories were identical in plan (fig. 1.5-1.6). A T-shaped corridor connecting the three entrances separated each floor into four rooms. On the first floor was a reception room at the main entrance, three classrooms, a recitation room, and wardrobes (coat closets) in each octagonal tower. The second floor layout differed only in the inclusion of a narrow staircase up to the third floor. One of the second floor classrooms was used as a planetarium, and a library occupied the square tower. A "Great Hall" capable of seating 600 filled the top floor, with small committee rooms in the corner towers. The basement contained storage, heating apparatus, and a "philosophical and chemical lecture room." Essentially, then, the St. Louis High School consisted of six classrooms, a recitation room, an assembly hall and a science laboratory. The classrooms were roughly square in shape, capable of accommodating seventy students apiece. Students sat in orderly rows of desks screwed to the floor facing a teacher's platform. Windows in two walls lighted each room. These were all standard components of a well-appointed urban high school at mid-century.

The St. Louis High School demonstrates a number of characteristic features of the mid-nineteenth century high school building. These schools tended to be square or rectangular and one- to four stories in height (figs. 1.7-1.8). If the building had an assembly hall – none could legitimately be called an auditorium – it was almost always on the top floor. Basements held heating apparatus, storage, wardrobes and washrooms. Above were nearly identical floors, divided into equal-sized classrooms (figs. 1.9-1.10). Classrooms among schools varied widely in size and slightly in shape. Most, however, were rectangular or square with windows in all exterior walls. Cramming students into rooms of this size without adequate ventilation could have disastrous results.[20] In recognition of this potential health problem, some of the earliest attention paid to any aspect of school architecture was directed toward ventilation systems.[21] Some school buildings also contained offices for the principal and/or superintendent, small recitation rooms, and occasionally a "special" room for science experiments. The plans of these buildings tended to fall into one of three categories. One group of smaller schools (which might be thought of as the "stuffed box" plan) had no internal corridors; access to the individual rooms on upper floors was provided through staircases and landings. The second group had a single corridor running across the building, usually lengthwise if the building was rectangular. The third group, like the St. Louis High School, had cross-shaped or T-plan corridors. All of these plans shared common characteristics: they were not designed with circulation, ventilation or lighting as an important consideration, and they generally consisted of three types of rooms – classroom, assembly room and office. Occasionally a classroom was altered by introducing scientific equipment, or removing walls to increase its size, but as a whole there were no specially designed rooms in the schoolhouse. On the exterior, high school buildings of all types reflected the popular architecture of the period. Contemporary published sources show a strong preference for Gothic before 1860, followed by a proliferation of "Victorian" or Romanesque styles (fig. 1.11).[22]

The pre-1880 high school building was designed without much emphasis on rational arrangement or symbolic/iconographic message. This lack of theoretical engagement was not limited to school architecture; in the post-bellum era, it was typical of most public architecture.[23] School buildings were not specially designed; instead, they appeared more like enlarged houses (fig. 1.12). As John Crosby Freeman points out, schoolhouse designs from pattern books of the period are almost indistinguishable from domestic designs.[24] Neither architects nor educators attempted to manifest in the school's built form any symbolic statements about education or its role in American society. Writings from the time similarly fail to address such issues, being content to suggest a particular style (usually Greek or Gothic) or to promote "stately" or "handsome" buildings. Although there was no intentional symbolism, school buildings *did* communicate a message to the community through their mere presence. Expensive, attractive schoolhouses advertised the high school to the white middle class at a time when secondary schooling had yet to prove its worth to a large portion of society. The St. Louis High School, for example, proved successful in its effort to attract new students. Enrollment from the city's wealthiest sections increased immediately.[25] Superintendent Tice saw this as justification for this "model school edifice." He felt that a high school building should be more than a place to teach students; instead

> A splendid edifice is not without its uses to the community in which it stands. It is an expression of the refinement, public spirit, and taste of that community. The old behold it with pleasure, because it lights up their fancies with brilliant images; and the young with both pleasure and profit, because it speaks to them of grandeur and elevation, which shadow forth an ideal beauty that they are to copy in their lives: for vice and immortality have their roots in the gross hearts and perverted tastes of men.[26]

In addition to attracting middle class students, a handsome building may have traded on the public's elitist associations to a certain extent by signaling that the high school was a place where culture reigned. Universal schooling was nonexistent in the nineteenth century, so the high school was only for a select few. A distinctive building could express this unique position to the middle class public in a positive way.

The Architectural Discourse

It is worth noting that the first article on the St. Louis High School, and the John Tice quote cited above, appeared in the American Journal of Education. Henry Barnard founded the Journal in 1855 to promote the intelligent discussion of educational issues and to spread his personal pedagogical theory. That theory included an important place for school architecture. Barnard was a prominent educator and the author of the first important American book on the subject, School Architecture, or Contributions to the Improvement of School-Houses in the United States. The book began in 1838 as the reprinted text of a Barnard speech and was eventually published in various editions until 1870. School Architecture provided the first comprehensive guide to designing American schoolhouses. Barnard was interested in all aspects of school architecture. He wrote about topics ranging from proper room arrangements and ventilation systems to the school's symbolic and pedagogical aspects. Barnard believed the schoolhouse "should be a temple, consecrated in prayer to the physical, intellectual, and moral culture of every child," and that

> No public edifice more deserves, or will better repay, the skill, labor, and expense, which may be necessary to attain this object, for here the health, tastes, manners, minds, and morals of each successive generation of children will be, in a great measure, determined for time and eternity.[27]

These sentiments were manifested in the American Journal of Education through drawings and articles on prominent school buildings from around the country (figs. 1.13-

1.14).[28] Indeed, William Reese has perceptively noted that "Barnard's journal provided models for educators who demanded respectable schools for the respectable classes."[29]

While educators like Barnard and Tice may have recognized the promotional value of an eye-catching schoolhouse, its architectural fitness and contribution to students' health and happiness tended to be less prominent concerns. Henry Barnard's interest in the well-designed school building was unique, and his American Journal of Education was one of the few professional magazines to address the issue before the 1880. In general, the architectural discourse on school architecture was limited. In the 1870s, however, a mounting concern for schoolhouse design and its specialization as a branch of architecture was evident in the increased attention given to the topic in educational and architectural journals. While Barnard's Journal had featured some architecture in almost every issue since its inception in 1855, the articles on school buildings became more detailed in the 1870s. Earlier coverage of school architecture often appeared in articles devoted to school systems (e.g., St. Louis High School, Chicago Central High School); now, entire articles were devoted to descriptions of high school buildings with floor plans and perspective drawings prominently featured.[30] The nation's most important architectural journal of the decade, The American Architect and Building News, began from its founding in 1876 to include schoolhouses among the types of buildings illustrated. Substantive articles in The American Architect and Building News were rare, however, an exception being an 1877 essay on schoolhouse heating and ventilation.[31]

Adding to the budding architectural discourse on schoolhouses in the 1870s were numerous specialized books. There were more books published on school architecture during the decade than at any previous time. These books tended to be pattern books offering plans and elevations without discussing design or engineering issues.[32] Typical school plans were characterized by identical classrooms, stairways, and little else; exteriors resembled the popular domestic architecture of the period (figs. 1.15). How the architects conceived these designs, or what they thought of school architecture in general before 1870, is a mystery given the pattern books' lack of explanations and the fact that architectural journals provided only limited coverage of school architecture until the early twentieth century. There were no discussions of the interrelationship between architecture and curriculum and little regard for the building's effects on the students' health, safety and well-being. The designs in the pattern books were rarely for high schools.

During the 1870s, school architects began to expand the scope of their expertise as enrollments increased and school buildings became more sophisticated. One of the most popular authors in the field was James Johonnot, who published Country School-houses: Elevations, Plans, and Specifications in 1859, followed by School-Houses in 1871.[33] Like Henry Barnard, Johonnot was an educator and not an architect.[34] Nonetheless, his books went beyond the typical picture-filled pattern book to include discussions of school architecture. School-Houses, for example, contained far more text than illustrations, with only eleven school designs (by architect S.E. Hewes) in the entire book. Johonnot examined such areas as external arrangements (site, lot, and entrances), internal arrangements, lighting, heating and ventilation, architectural style, furnishings, apparatus, outbuildings, and decoration of the grounds. His guiding principles for designing schools were "health, comfort, convenience, and cost," in that order.[35] His approach was evident in the section on classroom size. No specific guidelines were provided for room size other than the dictum that "Every pupil should have sufficient room to sit and move about without being confined or jostled. There should be sufficient space in the room for a large reservoir of air."[36] The rationale was simple: "Every child has a right to his own personality and his own share of uncontaminated air, and whatever deprives him of these becomes an outrage."[37] This common-sense attitude is in marked contrast to the scientific specificity that architects would use to define proper room sizes within twenty-five years. Johonnot did provide some precise guidance, however: classrooms should have a square shape with ceiling heights of twelve feet in smaller rooms and sixteen in larger buildings. In the chapter on lighting, Johonnot's instructions were guided by the realization that "Too little attention is given to admitting light into school-rooms ... the thought that the admission of light exerts an important influence upon the health and comfort of pupils seems rarely to occur to the builders of school-houses."[38] He advocated classrooms arranged so no student looked directly into a window or had to contend with "cross-lights" – two lighting sources at right angles to each other. Windows in the rear of the room were acceptable if there were none in the side walls. Johonnot's lighting theory was demonstrated by the Hewes designs in School-Houses, which have windows along the side walls and none in back (fig. 1.16). The reasoning behind Johonnot's lighting advice was twofold: to avoid damage to the students' eyesight and to recognize the healthy effects of sunlight.[39] Both ideas related to the students' health and comfort.[40]

Johonnot discussed the school building's exterior by evaluating the relative merits of Greek and Gothic styles. He recognized that the building's appearance was important and compared it to school architecture of the past. "The old style, or rather, no style, we put out of the question, as its whole object was to provide the cheapest possible shelter, without reference to true utility, and none whatever to beauty," he wrote.[41] The Greek style was castigated as expensive and impractical. It was to be limited to "large and costly buildings." Gothic was also impractical for a school, but Gothic details could often be used to some advantage. Overall, the best school buildings used a "composite" style. These comments from the chapter on "General Construction" were directly related to the book's last chapter, "Architecture an Educational Influence," which despite the promising title merely concentrated on elucidating Vitruvian architectural principles (e.g., proportion, symmetry, variety, harmony and unity).

James Johonnot's School-Houses resurrected Henry Barnard's earlier plea for healthier school conditions. Books and articles devoted to school hygiene and ventilation significantly increased in the 1870s.[42] All of these writings – whether pattern books or journal articles on new school buildings – attest to the growing importance of schoolhouse architecture to educational and architectural professionals. This new emphasis marked the beginning of a movement that would culminate a transformation of the schoolhouse by the early 1900s.

Late Century Design

Despite the increasing attention to schoolhouse architecture demonstrated by books like Barnard's School Architecture and Johonnot's School-Houses, most high school buildings by 1870 were nothing more than enlarged and decorated versions of the mid-century grammar school. One of America's architectural luminaries, Henry Hobson Richardson, proffered a high school design early in his career which demonstrates that even an exemplary architect considered the school's exterior to be more important than its interior arrangements and conveniences.[43] Richardson's Worcester (MA) High School (1869), while a minor work, has been praised by architectural historians for its "complex" plan; in reality, the school was not very different from other contemporary high school buildings.[44] The exterior was symmetrical and topped by an oversized belfry that soared high above a mansard roof (fig. 1.17). Small square towers anchored the building's four corners. The façade was notable for its high wall-to-window ratio and the different fenestration patterns of the first and second floors. In plan, the first and second floors were virtually identical, which rendered the different window groupings as an arbitrary aesthetic device (fig. 1.18-1.19). Similarly, the corner towers contained anterooms, which were unworthy of the architectural emphasis given by Richardson. The building's floor plan was quite standard for the time. The basement contained a "playroom" (gymnasium), toilets and cloakrooms. The first two floors had classrooms, recitation rooms and a library. A longitudinal corridor cut across the building's rectangular form with stairways at each end. In typical nineteenth-century fashion, the hall or assembly room was on the third floor. In sum, Richardson's design demonstrated a common tendency to value appearance over effectiveness. It was clearly not designed around issues of lighting, ventilation, or pedagogy.

By the late 1870s many high school buildings in larger American cities, like Richardson's Worcester High School, became visible monuments capable of vying for attention with courthouses and city halls. Such buildings were designed more for the eye than for the activities or people within. As William Reese observed, "School architecture became one of the clearest expressions of bourgeois social values throughout the nineteenth century. The size, shape, and cost of public facilities revealed dominant attitudes about cultural authority, centralized power, and the special role of high schools in the common system."[45] The Cleveland Central High School was an example of this trend (fig. 1.20). It opened in 1878 with twenty-five rooms on four floors and an auditorium capable of seating 1,000 people. On the day of the dedication ceremony, the building was kept open until 7 p.m. for public inspection.[46] While elaborate ornamented schoolhouses became objects of civic pride for many, others criticized such architectural muscle flexing as extravagant and unwarranted. An anonymous writer for the New England Journal of Education chastised the Cleveland High School for sacrificing "unity and centrality to general ornament."[47] A few years later the President of the St. Louis School Board invoked Cleveland High School as an example of the kind of school building St. Louis did *not* need:

> The objection to the new buildings recently erected in Boston, Cleveland, Hartford and other cities is that, apart from being unsuited to our needs, they seem to be built rather more to affect the passer-by than to serve the immediate purpose of school buildings. It is sincerely to be hoped that the committee will protect the community against what is becoming known as "legislative architecture."[48]

This attitude reveals a backlash against the type of attention-grabbing public school architecture that John Tice promoted in 1856. The public school had outgrown its indigent/pauper associations by the late 1870s. Eye-catching architecture was now viewed by many, like Tice, as contrary to the spirit (and resources) of public education. These critics seemed to be the minority, however, as educators continued to construct elaborate high school buildings in larger cities, perhaps to reinforce the high school's still tenuous position in American society. And the public agreed, for as the New-England Journal of Education writer stated, high schools like Cleveland Central "show the strength of public sentiment in the unanimity of the people in erecting so durable and costly structures."[49]

African-American High Schools

In marked contrast to school buildings like Worcester High School and Cleveland High School, the history of African-American secondary school architecture in America before the 1880s is almost nonexistent. There were very few "colored" high schools in America's segregated school systems before that time. The first African-American public high school was organized in November 1870 in Washington, D.C. The District of Columbia school system had been officially segregated into two systems by an act of Congress in 1864. Six years later, Senator Charles Sumner of Massachusetts sponsored a bill to integrate the city's schools. The bill was defeated, but public pressure led Congress to establish the Preparatory High School for Colored Youth.[50] The school's first location was the basement of the Fifteenth Street Colored Presbyterian Church. Beginning in 1871, the school embarked on a series of gypsy-like moves to various African-American grammar schools around Washington. Eventually a congressional appropriation of $112,000 for a permanent high school building in 1890 would end the constant transit. During the intervening two decades, the school was housed in facilities in these makeshift locations that were inappropriate for secondary education.

The situation in St. Louis was only slightly different. An 1846 Missouri law had forbidden African-Americans from being educated. The state constitution was changed following the Civil War to require public support for African-American education while also allowing for separate systems. St. Louis quickly segregated its schools. In 1875, nine years after segregation, African-Americans demanded a high school under the requirements of the state constitution. The St. Louis School Board decided to open the first African-American public high school west of the Mississippi in response. The Sumner High School began in September in a fifteen-year-old grammar school that formerly housed white students.[51] Sumner was really only a grammar school itself; in 1880, only 15 out of 452 students were listed as being in the ninth grade, and none were higher.[52] African-Americans complained about the school's location near the City Jail and morgue.[53] But Sumner remained in its first location for twenty-two years. A petition was presented to the Board of Education in 1896, signed by 300 black citizens "urging the erection of a new high school in place of the Sumner High School, located in a neighborhood free from the degrading influences which surround the present structure."[54] The Board acceded in 1897 and the school was moved to another former white school inconveniently located in a "shady neighborhood" far from most of the African-American population (fig. 1.21).[55] Since the building had been constructed thirty years before as a grammar school, it lacked an assembly hall and gymnasium. There is also evidence that some members of the white neighborhood were against the move.[56] Sumner did not occupy a building specifically designed for high school studies until 1910.

These examples from two of the earliest African-American high schools are essentially success stories; in other American cities, African-American students were simply denied access to secondary education before the 1880s. The makeshift accommodations that the Washington and St. Louis students were forced to put up with for nineteen and thirty-four years, respectively, demonstrate the typical African-American high school of the period – a grammar school, a church basement, or any other building with extra space. High school buildings for African-American students comparable or equivalent to those for whites would not be built until well into the twentieth century.

Boston Latin and English High School

The beginning of a transformation in high school architecture can be seen in the most important American high school building constructed before 1890 – the Boston Latin and English High School. Boston Latin and English represented the capstone of John Philbrick's career.[57] In 1848, he had been involved in the development of the Quincy School, a landmark endeavor in American educational history that would have important implications for school architecture. Philbrick, who was a principal, not an architect, probably designed the Quincy School; if not, he had significant input into its form. The Quincy School introduced the "graded school" concept, whereby children were separated into classes according to their age and expected to follow a graduated curriculum. This contradicted the previous practice of lumping all students into the same room regardless of their age or ability. The so-called "Quincy Plan" affected school architecture, because the age-graded system required each teacher have a separate room for their particular class. The archetypal one-room schoolhouse was inadequate to contain such a system.[58] The Quincy school was a rarity among urban schools in its size, form, and accommodations. It was four stories high and held twelve classrooms for fifty-six pupils each.[59] Philbrick believed it to be "the first building of the type which, in its essential features, has since been adopted for graded public schools throughout the country."[60]

Philbrick's interest in the school's physical environment continued during his two terms as superintendent of the Boston schools (1857-1874 and 1876-1878). He toured Europe and took particular interest in European school architecture, especially that of Germany and Austria. As Philbrick wrote in a letter to Henry Barnard (printed in the American Journal of Education), he was deeply impressed by the Akademische Gymnasium in Vienna.[61] That school was also included in an important English book of the 1870s, E.R. Robson's School Architecture.[62] The Akademische Gymnasium building was a four-story hollow square with classrooms arranged around the outside of the building and corridors ringing the interior court (figs. 1.22-1.23). Like many German and Austrian schools, it included a gymnasium for physical activities and a grand examination hall for large group instruction, in addition to regular classrooms for forty- to sixty students. There was nothing comparable, in terms of size, layout, and special rooms, anywhere in America.

The Akademische Gymnasium's plan would significantly effect the Boston Latin and English High School. City Architect George A. Clough designed the Boston school in

1877 with probable help from Philbrick. A competition had been held in 1874, but the four entries were found unsatisfactory. At virtually the same time, a series of legislative and administrative acts changed the process of school building in Boston. First, the Massachusetts Legislature passed a new law requiring that plans for all school buildings be approved by the Boston School Board. The Board then decided that the Superintendent must give them his written opinion of any such plans. And the Boston City Council created the office of City Architect in 1873 to oversee the design of all public buildings, including schools. These temporary administrative complications failed to hinder the school's design, as Clough's Latin and English School was universally praised. Boston educators thought so highly of the project that they sent the plans to the Paris Exposition of 1878, where an "international jury on secondary education" awarded the design a gold medal.[63]

The Boston Latin and English High School was unique in many ways. It held a wide variety of specialized rooms for the time beyond classrooms – science lecture rooms, a chemistry laboratory, a military drill hall, a gymnasium, and administrative offices. Other high schools from the period contained many of these rooms, but rarely all of them. Boston Latin and English's salient feature, adapted from the Akademische Gymnasium, was the open interior court (figs. 1.24-1.27). This may have been the first instance of such a plan in an American school.[64] Rooms were arranged around these courts on the outside of a single-loaded corridor, just as in the German and Austrian schools Philbrick admired. As he pointed out in the American Journal of Education article, "The superiority of this *court plan* over what may be called the *solid plan*, which has hitherto prevailed, is found more especially in the advantages it affords for light and air."[65] Arranging classrooms around these open courts allowed light and air to enter the rooms from both the exterior wall and the interior court. Light thus penetrated all corners of the room, while air was free to circulate around the building. The plan also improved students' movement through the school's various spaces. In addition to these innovative features, other factors helped shape the building's design. Health concerns inspired administrators to include a gymnasium. Safety concerns were evident in the state-of-the-art fireproof construction and in the location of the two-story chemistry laboratory in a corner of the building separated from the rest of the school by fireproof walls. And care was taken to appoint the corridors with statuary for the students' aesthetic appreciation. Overall, Philbrick believed there were sixteen characteristics that truly set the school apart from its contemporaries, the most important being the court plan.[66] Some aspects of the design, however, are firmly within nineteenth-century tradition. Room sizes were standardized at 32' x 24', with no spatial differentiation for the subjects taught within them. The auditorium was located on the top floor, indicating that it was for student use only and generally inaccessible to the public. And the exterior of the Boston Latin and English High School reflected common stylistic tastes, appearing somewhat as an enlarged version of an upper class Boston home with its large, sloping roofs and prominent chimneys (fig. 1.1).

The Boston Latin and English High School was an important early milestone in school architecture reform. Twenty years after opening it was still being praised by educators and architects as the first well-designed American high school building.[67] But the advice of early reformers like James Johonnot on the schoolhouse's contribution to students' health and safety, as well as its didactic and inspirational value, seems to have been largely unheeded by the majority of school architects into the 1880s. Urban schoolhouses continued to be built in "egg-crate" fashion – square or rectangular boxes cut into equal size rooms with identical floors stacked one above the other.[68] These designs posed a threat to the safety and well being of that small percentage of American youth that were able to utilize the new secondary system. The buildings would be unable to accommodate the changes in enrollment and curriculum that lay ahead in the next decades. A new type of school building was needed that integrated educational, architectural and social developments. The Boston Latin and English High School provided a model for the modern schoolhouse.

In the mid- to late nineteenth-century schoolhouse, the connection between architecture and education was tenuous – except for rare cases like the Boston Latin and English High School, school architecture was not yet shaped by social, technological, and educational forces. It can be argued that specially designed school buildings were unnecessary given the limitations of a classroom method that emphasized memorization and recitation and the constricted curriculum of the late nineteenth-century high school. But for a few visionaries like John Philbrick, the need was obvious when American schools were compared to their European counterparts. "Vienna knows how to build," wrote Philbrick in 1873;

> The reason of this is, that in Vienna, when a school-house is planned, it is done by the *combined science and wisdom of the most accomplished architects, and the most accomplished pedagogists.* No mere whim of a schoolmaster, and no mere

> whim of an inexperienced and uneducated architect, is allowed to control the design.[69]

English architect E.R. Robson made a similar point in 1874, writing that American school architecture had not yet been "reduced to a science."[70] Robson accurately summarized the state of American school architecture:

> As in England, there is much critical investigation and discussion of education itself, but *no trace that some of the vital points affecting the buildings (and, therefore, indirectly the education), such as the proper amount, distribution, and kind of light, the necessity of "through" – or summer – ventilation, the most wholesome, efficient, and economical kind of artificial ventilation, and others, have, as yet, been sufficiently tackled at close quarters* or in the careful manner common to Germany (italics mine).[71]

By the early 1900s, American school architecture had indeed been "reduced to a science," as school designers developed standard architectural solutions – influenced by the idea of creating efficient bodies and machines – to problems of health and safety, organization and arrangement, and symbolism.

Modern School Plants

The American high school building was changing by the late nineteenth century. The most obvious change was immediately visible – the schools were bigger. Expanded curriculums and increased enrollments necessitated this development. Nationwide high school enrollment grew from 202,963 in 1890 and 1,851,965 in 1920, representing a growth of over 900 percent in four decades, while the general population rose by only 279 percent between 1870 and 1920.[72] From 1890 to 1920, the number of public high schools in America swelled from 2,526 to 14,326.[73] A significant reason for such growth was the institution of child labor and compulsory education laws across the country. By 1918, every state in the Union had passed some form of compulsory education legislation. For the first time, children between the ages of five and fourteen were required to spend most of their days in school. Along with this legislated attendance, the massive influx of immigrant children into larger urban areas like New York, Chicago and Cleveland also pushed enrollment figures higher.

The pressure of growing enrollments exerted a powerful force on school architecture. The first response by school designers was to simply enlarge the old-fashioned schoolhouse. High schools in the 1890s were much bigger than their counterparts of twenty or more years earlier. The buildings began to expand horizontally as well as vertically, taking up more space and requiring larger lots. During this decade, the first truly "modern" schoolhouses were designed and constructed – large-scale fireproof school buildings containing an auditorium, gymnasium and specialized rooms like science laboratories and manual training shops. By the 1910s, urban high school buildings had assumed their modern form. Leonard V. Koos performed a study in 1919 that demonstrated the high school's transformation over the previous decade.[74] Koos analyzed 156 high school floor plans printed in The American School Board Journal between 1908 and 1917. The results showed an amazing variety of rooms – 109 different types. The majority of these school buildings, independent of the size of the community in which they were built, contained at least the following rooms:

> class- or recitation-rooms, a chemical and physical laboratory, with a lecture or demonstration room for these sciences, an assembly room or auditorium with a stage for same, a library room, a gymnasium, an office for the principal, a room for general storage, and boys' and girls' toilets . . . to this meager list may be added some provision for manual training and domestic science . . . for the larger communities we may also add a laboratory for biology, a mechanical-drawing room, boys' and girls' locker-rooms, and a reception- or waiting-room to the principal's office.[75]

Koos advised school administrators to use entire list – or at least the "minimum essentials" listed above – as a guide when contemplating the construction of a new high school. Such diversity and complexity differentiated the modern high school from its earlier counterpart.

Two marquee high schools from Chicago and St. Louis demonstrate the schoolhouse's transformation in its ultimate form – St. Louis' Soldan High School (William B. Ittner, 1909) and Chicago's Senn High School (Alfred H. Hussander, 1912). Both were featured in compilation books as exemplary examples of the modern high school, and Soldan was displayed on the cover of The American School Board Journal's annual "School Architecture" issue for 1912.[76] Soldan was the showpiece of the St. Louis school system (fig. 1.28). It was the third high school built in the city by Commissioner of School Buildings William B. Ittner. Ittner designed the building in an "early English style" to match an adjacent grammar school built two years before. Intended to hold 1,600 students, the building contained a basement and three stories in a generally rectangular floor plan with interior light courts. The exterior brick walls were offset by stone quoins and window surrounds. The main entrance was announced by a central projection, columns around the doorway, and a sculptural group in the pediment. Three cupolas and numerous chimneys emerged from the slightly sloping roof. The two end cupolas acted as skylights for the stairwells beneath them, while the chimneys were exhaust ducts for the mechanical ventilation system. As a whole, the exterior imparted a monumental feeling that expressed the school's importance to the city and the school system.[77] It was also highly regarded by the public; at the time of its opening a local newspaper declared Soldan "the handsomest public school building in St. Louis."[78]

That feeling of importance continued on the inside. A visitor entering the main doors passed through a small vestibule into a lobby facing a cross-corridor and the auditorium. The corridors were wide and flooded with light from interior courts and large windows. The auditorium was lavish, with seating for 1,260 people on the ground floor, 432 in the balcony and 58 in two boxes. It was designed not only for the Soldan students but also for the community at large. In addition to the large auditorium, the building differed from its nineteenth century predecessors in its overall layout and variety of rooms. The building's corridors almost formed a complete square (and did on the third floor) (figs. 1.29-1.32). Stairwells at the elbows of these corridors provided access between floors. The basement contained sex-segregated locker rooms and gymnasiums, a kitchen, a pantry, two lunch rooms, cooking and sewing rooms, shop spaces (forge room, molding room, machine shop, wood working shop and wood turning shop), storage, offices and the heating and ventilating system. On the first floor, in addition to the auditorium, there were eight laboratories for physics, chemistry, physiology and botany arranged around the corridor's exterior; three classrooms; two demonstration rooms; and various offices. The second floor held a reading room over the main entrance, a stack room to the side, a physical laboratory, two commercial rooms, a demonstration room, and nineteen classrooms. A music lecture hall, skylit art and mechanical drawing rooms, and nineteen classrooms occupied the top floor. All classrooms contained windows in one wall only, allowing light to enter the room from a single source.[79]

Senn High School in Chicago contained most of the same elements of Soldan, but on a larger scale (fig. 1.33). Senn was a massive building, roughly 240' x 440'. The original Chicago Central High School of 1856 would have fit within Senn's gymnasium; the outlines of some of the city's 1880s Division High Schools were smaller than Senn's auditorium. Senn was designed by School Board Architect Alfred H. Hussander in a monumental classical style. The gray pressed brick exterior was dominated by uniform rows of windows marching across the façade. The building's main face had a central pavilion with six giant Ionic columns, Ionic pilasters between the windows, and four Ionic columns across each end pavilion. An attic story capped the building and a pediment and lunette window rose above the entry. Hussander preferred monumentality in his school designs and Senn High School gave him an opportunity to exercise his preferences. The school was three stories high with no basement – Hussander felt they were unsanitary and a waste of space.[80] The general plan was a combination of shapes (figs. 1.34-1.36). Stairs were located at the middle and end of each long corridor. The first floor was actually a solid rectangle with the entrance on one of the long sides. Just as in Soldan High School, the entry vestibule opened onto a cross-corridor and auditorium. Also on the first floor was a gymnasium, small gymnasium or calisthenics room, lunch room, wood and machine shops, foundry, forge room, swimming pool, two science rooms, offices and thirteen classrooms. The second floor was U-shaped with a corridor crossing between the arms. A library, bookkeeping, stenography and typing rooms, and twenty-four classrooms occupied the space. The U shape continued on the third floor but the cross-corridor was in the nature of a thin skywalk unsupported from below. The floor contained laboratories for chemistry, physics, zoology, botany and electricity; six rooms for drawing and modeling; four "household arts" rooms; a textile arts and sewing room; a large lecture room; and thirteen classrooms. A small fourth floor penthouse contained a choral room.

Conclusion

Compared to H.H. Richardson's Worcester High School or the Boston Latin and English High School, places like Soldan and Senn were like small communities, with a level of architectural sophistication and integration with the educational program that would have been unthinkable in the earlier schools. A transformation had occurred between the 1870s and 1910s – signaled by Boston Latin and English High School – which changed almost every aspect of the high school building and rendered Victorian fancies like Worcester High School obsolete. This transformation was the product of various architectural, social, and cultural factors. Their combined effects will be examined in the next chapter in the school buildings of Chicago and St. Louis.

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[1] Henry Barnard, School Architecture 2nd ed. (New York: A.S. Barnes & Co., 1848; reprint, ed. Jean and Robert McClintock, New York: Teachers College Press, 1970), 55.

[2] John D. Philbrick, "Boston Latin and English High Schools," American Journal of Education 31 (July 1881): 401.

[3] I refer to the building in the singular because the two schools occupied separate but connected buildings that mirrored each other.

[4] For basic information on the development of the American high school, see William J. Reese, The Origins of the American High School (New Haven and London: Yale University Press, 1995); Edward A. Krug, The Shaping of the American High School (New York: Harper & Row, 1964).

[5] Richard Hofstadter, Anti-Intellectualism in American Life (New York: Vintage Books, 1962), 324.

[6] David B. Tyack, The One Best System: A History of American Urban Education (Cambridge and London: Harvard University Press, 1974), 57.

[7] National Education Association, Report of the Committee of Ten on Secondary Schools (Washington, DC: U.S. Government Printing Office, 1893), in The American Curriculum: A Documentary History, eds. George W. Willis, William H. Schubert, Robert V. Bullough, Jr., Craig Kridel, and John T. Holton (Westport, CT: Greenwood Press, 1993), 92. Enrollment figures support this description; in Chicago, for example, only 731 of Chicago's 185,000 public school students in 1894 were in their last year of high school (0.39%). Mary J. Herrick, The Chicago Schools: A Social and Political History (Beverly Hills and London: Sage Publications, Inc., 1971), 82.

[8] The quotes are from Thomas J. Schlereth, Victorian America: Transformations in Everyday life, 1876-1915 (New York: HarperPerennial, 1991), 275, 277. Chapter 5 will discuss this "discovery" and its implications for American secondary education.

[9] Priscilla Ferguson Clement, Growing Pains: Children in the Industrial Age, 1850-1890 (New York: Twayne Publishers, 1997), 145. Clement notes that the figures underrepresented actual employment.

[10] High school students were also mostly female. Nationally, 57.6 percent of all high school pupils in 1890 were female; the numbers held steady throughout the time period covered by this study (58.4 percent in 1900, 56 percent in 1910 and 1920). Krug, The Shaping of the American High School, 11, 171; Karen Graves, Girls' Schooling During the Progressive Era: From Female Scholar to Domesticated Citizen (New York and London: Garland Publishing, Inc., 1998): 170. In some cities, the discrepancy was even greater. St. Louis's high school population was 58 percent female in 1870, 77 percent in 1893, 65 percent in 1900, 59 percent in 1910 and 54 percent in 1920. Ibid., 163. Girls were also more likely to graduate; the proportion of female graduates was 65 percent in 1890, 63 percent in 1900, and 61 percent in 1910 and 1920. Ibid., 170.

[11] Theodore R. Sizer, Secondary Schools at the Turn of the Century (New Haven and London: Yale University Press, 1964), xiii.

[12] Curriculum development and the Committee of Ten Report will be discussed in greater detail in Chapter 5.

[13] On the "mental discipline" approach, see Herbert M. Kliebard, The Struggle for the American Curriculum, 1893-1958. 2nd ed. (New York, London: Routledge, 1995): 4-8.

[14] Because of the large number of rural schools, even at the turn of the century in states like Illinois and Connecticut only 15% of all high schools were in separate buildings. Sizer, Secondary Schools at the Turn of the Century, 39-40.

[15] Edward M. Miggins, "The Search for the One Best System: Cleveland Public Schools and Educational Reform, 1836-1920," in Cleveland: A Tradition of Reform, eds. David D. Van Tassel and John J. Grabowski (Kent, OH: Kent State University Press, 1986), 139.

[16] St. Louis Public Schools: 160 Years of Challenge, Change, and Commitment to the Children of St. Louis, 1838-1998 (St. Louis: St. Louis Board of Education, 1998), 11.

[17] See W.H. Wells, "Public High Schools in Chicago," American Journal of Education 3 (June 1857): 531-536.

[18] Second Annual Report of the Superintendent of the St. Louis Public Schools for the Year Ending July 1, 1855, cited in Selwyn K Troen, The Public and the Schools: Shaping the St. Louis System, 1838-1920 (Columbia, MO: University of Missouri Press, 1975), 12.

[19] Second Annual Report, 1855, cited in "System of Public Instruction in St. Louis, " American Journal of Education 1 (March 1856): 356.

[20] "No child can do his school work thoroughly and completely when packed in a room whose air is vitiated, corrupt, filled with germs of disease, where the light striking him full in the face, half blinds him and gives rise to headaches and other brain disturbance, where the heating is so imperfect that his head is hot and his feet are cold and where oftentimes the sound waves echo and re-echo through the room distracting his thoughts and preventing him from studying, and yet these very conditions exist in thousands and thousands of school rooms all over the country and they will continue to exist as long as school houses are put up according to the whim of the architect and the ignorance and weakness of the board." "A Good School House: Proper Legislation the Means of Getting Them," The American School Board Journal 6 (April 1894): 2.

[21] The Boston School Committee appointed a Committee on Ventilation in 1846 to investigate conditions in the Boston schools. See Stanley K. Schultz, The Culture Factory: Boston Public Schools, 1789-1860 (New York: Oxford University Press, 1973), 96-100.

[22] For examples, see American Journal of Education, The American Architect and Building News, and The American School Board Journal.

[23] The trend is demonstrated in architectural books of the period. For example, publisher George E. Woodward wrote in the introduction to National Architect (1869): "The drawings are so carefully made and figured as to explain thoroughly their meaning without further description than that found necessary in the specifications, and we have, therefore, carefully avoided all theories, essays, or speculations on the subject, believing we can convey more practical and valuable information by carefully-executed drawings than by whole volumes of descriptive matter." George E. Woodward, National Architect (New York: George E. Woodward, 1869), iii. This pattern book contained one schoolhouse design, and was followed two years later by what appears to be a companion volume also published by Woodward, Samuel F. Eveleth's School-House Architecture (New York: The American News Company, 1870).

[24] John Crosby Freeman, "An Essay on Victorian School-house Architecture," introduction to School-House Architecture, by Samuel F. Eveleth (New York: The American News Company, 1870); reprint, Watkins Glen, NY: The American Life Foundation, 1978), n.p.

25 Troen, The Public and the Schools: Shaping the St. Louis System, 1838-1920, 16.

26 Second Annual Report, in "System of Public Instruction in St. Louis," 356.

27 Barnard, School Architecture, 55-56.

28 Barnard published over 800 woodcuts of school buildings in the Journal during its run (1855-1881) and reprinted most of School Architecture. See Richard Emmons Thursfield, Henry Barnard's American Journal of Education (Baltimore: Johns Hopkins Press, 1949), 249.

29 Reese, The Origins of the American High School, 84.

30 See, e.g., "Plan of Public High School, New Haven, Conn.," American Journal of Education 24, no. 74 (1873): 193-196; "Plan and Description of the Western Female Public High School Building, Baltimore, Maryland," American Journal of Education 24, no. 76 (1873): 633-635.

31 Dr. F. Winsor, "The Ventilating and Warming of Schoolhouses in the Northern United States," The American Architect and Building News 2 (October 13, 1877): 327-30.

32 There has been no research into these early school pattern books other than Barbara Wriston, "The Use of Architectural Handbooks in the Design of Schoolhouses from 1840 to 1860," Journal of the Society of Architectural Historians 27 (October 1963): 155-160, which briefly examines the stylistic aspects of four books. For (non-comprehensive) bibliographies of nineteenth century books on school architecture, see "Bibliography on School Architecture and Hygiene," The American Architect 88 (July 8, 1905): 14-16; Henry-Russell Hitchcock, American Architectural Books: A List of Books, Portfolios, and Pamphlets on Architecture and Related Subjects Published in America before 1895 (Minneapolis: University of Minnesota Press, 1962).

33 James Johonnot, Country School-houses: Elevations, Plans, and Specifications (New York: Ivison and Phinney, 1859); Johonnot, School-Houses (New York: J.W. Schermerhorn & Co., 1871).

34 James Johonnot (1823-88) was an educator and author. Little is known of his life aside from his experiences as Superintendent of schools in Joliet, Illinois (1861-66) and President of the Missouri Normal School (1872-57), and his many educational books. "James Johonnot," Appleton's Cyclopaedia of American Biography, eds. James Grant Wilson and John Fiske (New York: D. Appleton, 1888), 87.

35 Johonnot, School-Houses, 26.

36 Ibid.

37 Ibid.

38 Ibid., 34.

39 "In Germany, late scientific investigation has proved that a large proportion of the pupils of the intermediate and advanced schools have defective sight. In this country the same fact has been noticed ... Sunshine is as necessary to health as air, and besides, it has a direct effect upon the nervous system, allaying irritability, and diffusing a happy spirit through the school, when its summer intensity is properly subdued by blinds or curtains." Ibid., 34-35.

40 Shortly after Johonnot's School-House was published, The American Architect and Building News, in one of its first comments on school architecture, declared that "Repeated experiment has proved that in

schoolrooms lighted by windows on both sides [such as that promoted by Johonnot], the children suffer more or less from injured vision; and so important has the subject been considered in Germany, that a law has been passed forbidding such disposition of windows in schools." "Lighting Schoolrooms," The American Architect and Building News 1 (August 26, 1876): 275.

[41] Johonnot, School-Houses, 55.

[42] The "Bibliography on School Architecture and Hygiene," for example, lists two published books on these topics before 1870 and ten books and reports between 1870 and 1880.

[43] A description with plans and perspective drawing are in "Worcester Classical and English High School," American Journal of Education 23 (1872): 657-662.

[44] Jeffrey Karl Ochsner, H.H. Richardson, Complete Architectural Works (Cambridge and London: MIT Press, 1982), 69; Henry-Russell Hitchcock, The Architecture of H.H. Richardson and His Times (Cambridge and London: MIT Press, 1966), 90.

[45] Reese, The Origins of the American High School, 82.

[46] William J. Akers, Cleveland Schools in the Nineteenth Century (Cleveland: The W.M. Bayne Printing House, 1901), 186. A drawing and plans of the building can be found in The American Architect and Building News (April 21, 1877), plates.

[47] "The Week," New England Journal of Education 8 (October 3, 1878): 212. The commentary was in response to a previous article on the Cleveland High School. "New Central High School, Cleveland," New England Journal of Education 8 (September 26, 1878): 192-193.

[48] Thirty-First Annual Report of the Board of President and Directors of the St. Louis Public Schools (1884-85) (St. Louis: St. Louis Public Schools, 1886): 108-109.

[49] "The Week," 212.

[50] On Washington's first African-American high school, see Antoinette J. Lee, "National Register of Historic Places Nomination Form, Perry School" (Washington, D.C., 1986); idem, "Magnificent Achievements: The M Street High School," CRM, no. 2 (1997): 34-36; Robert N. Mattingly, "Autobiographic Memories 1897-1954, M Street-Dunbar High School" (File Folder – "M Street High School," Archives of the Public Schools of the District of Columbia); J.C. Wright, "Historical Sketch," Dunbar High School Liber Anni (File Folder – "Dunbar High School," Archives of the Public Schools of the District of Columbia).

[51] On Sumner, see Troen, The Public and the Schools: Shaping the St. Louis System, 1838-1920; Lawrence Oland Christensen, "Black St. Louis: A Study in Race Relations 1865-1916" (Ph.D. diss., University of Missouri, 1972); Elinor Mondale Gersman, "Education in St. Louis, 1880-1900: A Case Study of Schools in Society" (Ph.D. diss., Washington University, 1969).

[52] Elinor Mondale Gersman, "The Development of Public Education for Blacks in Nineteenth Century St. Louis, Missouri," The Journal of Negro History 41 (Winter 1972): 43.

[53] "To Move A School," St. Louis Post-Dispatch (March 23, 1896), 3; Commemorative History of the St. Louis Public Schools 1838-1988 (St. Louis: St. Louis Public Schools, 1988), 31.

[54] Printed Record of the Board of Education of the City of St. Louis IX (August 11, 1896), 477.

[55] Commemorative History of the St. Louis Public Schools, 31.

[56] When the school suffered a flood in October, 1897, the St. Louis Commissioner of School Buildings, William B. Ittner, commented, "The people in that neighborhood are somewhat embittered against the board for transforming the Sumner into a colored school, but I do not say they had any knowledge of the affair." "Sumner High School Damage," St. Louis Post-Dispatch (October 30, 1897), 8. See also, Gersman, "The Development of Public Education for Blacks in Nineteenth Century St. Louis, Missouri," 44.

[57] John Dudley Philbrick (1818-1886) was born in New Hampshire, graduated from Dartmouth College and taught in Roxbury and Boston before becoming principal of Boston's Quincy School in 1847. He left Boston to become principal of the Connecticut State Normal School in 1852; the next year, he was appointed state superintendent of schools, a position he held for four years. Philbrick returned to Boston to serve as city superintendent from 1857-74 and 1876-78. Philbrick wrote a number of textbooks and educational books, and became recognized nationwide as a leading school administrator. In 1878, he represented the United States Commissioner of Education at the Paris Exposition. "James Dudley Philbrick," Biographical Dictionary of American Educators, vol. 2, ed. John F. Ohles (Westport, CT and London: Greenwood Press, 1978), 1029-30.

[58] As William Cutler points out, however, the one-room schoolhouse remained ubiquitous in rural America even into the 1920s. William W. Cutler, III, "Cathedral of Culture: The Schoolhouse in American Educational Thought and Practice since 1820," History of Education Quarterly 29 (Spring 1989): 6.

[59] Tyack, The One Best System, 45.

[60] Philbrick, "Boston Latin and English High Schools," 401.

[61] "The characteristics of the best school-houses in this country were well known to me, and I have some knowledge of school architecture abroad; but it was not until I visited the *Akademische Gymnasium*, in Vienna, at the time of the Universal Exposition of 1873, that I was able to picture in my mind the image of such a building as we wanted in Boston for these two schools." Ibid., 407.

[62] E.R. Robson, School Architecture (London: John Murray, 1874; reprint, New York: Humanities Press, 1972).

[63] Philbrick, "Boston Latin and English High Schools," 410.

[64] I have found no other examples in pattern books or articles in the American Journal of Education and The American Architect and Builder's News.

[65] Philbrick, "Boston Latin and English High Schools," 425.

[66] These characteristics are: (1) The court plan; (2) The "perfection" of the individual classrooms; (3) The omission of clothes rooms connected to the classrooms; (4) The military drill hall; (5) The gymnasium; (6) The detached chemistry laboratory; (7) The character of the natural science rooms; (8) The libraries; (9) The many conference rooms for teachers and offices for headmasters and janitors; (10) Toilets on each floor; (11) The treatment of the assembly halls; (12) The spacious drawing rooms; (13) Fireproofing; (14) The iron staircases with rubber-padded steps; (15) The lighting, heating and ventilation; and (16) "The composition of the design." Ibid., 425-429.

[67] "In the Latin and English High School of Boston, begun in 1877, is found the first important application of sound principles of architectural planning to the school buildings of this country." Edmund M.

Wheelwright, "The American Schoolhouse VII," The Brickbuilder 7 (May 1898): 94; "The first high school building which marked distinctively an epoch in school house architecture in this country was the Latin and English high school in Boston, Mass., which was begun in 1877." Gilbert B. Morrison, School Architecture and Hygiene (Albany: J.B. Lyon Company, 1900), 30.

68 The phrase is borrowed from William W. Cutler, III, "A Preliminary Look at the Schoolhouse: The Philadelphia Story, 1870-1920," Urban Education 8 (January 1974): 381-399.

69 Quoted in Philbrick, "Boston Latin and English High School," 408.

70 Robson, School Architecture, 45.

71 Ibid.

72 Tyack, The One Best System, 183; Schlereth, Victorian America, 28, 247.

73 Schlereth, Victorian America, 247.

74 Leonard V. Koos, "Space-Provisions in the Floor-Plans of Modern High-School Buildings," School Review 27 (October 1919): 573-599.

75 Ibid., 593-594.

76 The American School Board Journal 44 (February 1912). See also, Fletcher B. Dresslar, American Schoolhouses (United States Bureau of Education Bulletin No. 5 (Washington: U.S. Government Printing Office, 1911); William C. Bruce, High School Buildings (Milwaukee: The American School Board Journal, 1913); Wilbur T. Mills, American School Building Standards (Columbus: Franklin Educational Publishing Company, 1915).

77 Soldan's impressive quality was commented upon by writers of the time. For example, in his 1914 travelogue, Julian Street devoted three pages to Soldan, which he described as "a building perfect for its purpose . . . the last word in schools; a building for the city of St. Louis to be proud of, and for the whole country to rejoice in. It has everything a school can have, including that quality rarest of all in schools – sheer beauty." Abroad at Home (New York: The Century Co., 1914), 224. Similarly, a December 1914 article in Reedy's Mirror claimed that "Educators turn their eyes to St. Louis for models of school buildings, even as they look this way for patterns of school laws. Visiting architects and casual sightseers alike ask to be shown the famous school structures of St. Louis. All of this fame is due to the genius of one man, William B. Ittner, known all over the world for his designs of this kind. The magazine advertisements show great buildings in other cities, with a note that they were designed by Ittner of St. Louis. A popular writer for a New York weekly is a trifle patronizing in his views of St. Louis as a whole, but he is unable to find words to tell of the beauty and fitness of the Soldan High School, one of Mr. Ittner's latest triumphs." Cited in "Education and Design: The St. Louis Public School Buildings," Landmarks Association of St. Louis, Inc., Landmarks Letter 22 (March/April 1987): 5.

78 "Two Changes in School System To Be Tested," St. Louis Post-Dispatch (September 5, 1909): 2.

79 On Soldan, see William B. Ittner, "The Manual Training High School – II," The Brickbuilder 20 (February 1911): 27-30; Dresslar, American Schoolhouses, 111-115.

80 William C. Bruce, "Some New Schoolhouses in Chicago," The American School Board Journal 43 (November 1911): 24.

## Chapter Two

## ST. LOUIS & CHICAGO: THE TRANSFORMATION OBSERVED

> To the city of St. Louis belongs the credit for having done more during the past twenty (20) years to improve the standard of school buildings, than any other city in America.
> Walter R. McCornack, 1918[1]

> The newest Chicago buildings exhibit four distinct tendencies [utility, safety, beauty of design, and economy] which are difficult to harmonize, but which have been so nicely balanced that the results are as nearly perfect as can be found in any American city.
> William C. Bruce, 1911[2]

The public high school buildings erected in St. Louis and Chicago between 1880 and 1920 provide cogent examples of the schoolhouse's transformation. School systems in both cities faced the same set of problems to different degrees and each attempted similar solutions with somewhat different results. Examining the high school architecture of these cities uncovers patterns that were repeated in urban areas throughout the United States.

### St. Louis

St. Louis began to establish itself in the mid-nineteenth century as a national leader in education. The city established the first public high school west of the Mississippi in 1853, the country's first public kindergarten in 1873, the first public high school for African-Americans west of the Mississippi in 1875, and the nation's first Manual Training School in 1880. St. Louis also boasted two leading figures in American education: William Torrey Harris, philosopher, educational theorist and superintendent from 1867 to 1880 (later United States Commissioner of Education, 1899-1906) and Calvin Woodward, founder of the Manual Training School and the best-known advocate of manual training in America. The city's reputation as a progressive education city was well-established before 1880 and continued to flourish into the twentieth century.[3]

The city's first public high school building (fig. 1.3), described in Chapter 1, had Gothic details such as pinnacles and pointed arches on the exterior and identical box-like compartments inside. The school was overcrowded by the early 1880s, prompting a movement to publicize the need for a new high school building. The Board of Education recognized the problem, stating that "The great want of the High School Department is a building sufficiently large to have the pupils under one roof."[4] Many of the city's most illustrious citizens, who were members of the High School Alumni Association, organized a petition urging new facilities in 1885. The President of the Board of Education authorized a special committee to consider the demand, but no action was taken due to a lack of funds. Later that year the board received a $100,000 bequest which enabled the city to begin looking at potential sites for a new high school. In April 1886, the Board purchased a lot west of downtown, thought by some to be too far from the central population.[5]

Before the plans for the new building were drawn, St. Louis educators had already formed opinions about how it – or any school – should be designed. Central High's Principal H.H. Morgan recorded his thoughts on the matter in the 1884-85 Annual Report. Morgan felt the new building should cover at least 30,000 square feet (150' x 200'), thus "allowing 18 square feet and 300 cubic feet to each pupil – the minimum provision, according to the acknowledged authorities."[6] He also suggested that a suitable lot, with at least 25' of space on each side of the building, was "equally essential."[7]

Morgan was not as concerned with the building's appearance: "The building itself will form a later consideration, but it is to be hoped that the least expenditure will be made in the exterior decoration and the greatest upon the interior."[8] Superintendent Henry Hickman in the same Annual Report also found the school building's physical aspects to have priority over its aesthetic appearance. Hickman included an evaluation of "The Modern School Room" in his section of the report, where he declared, based on a knowledge of contemporary architectural standards, that "The regulation of the size of the school room is twenty-five feet by thirty, with a height of twelve feet. It is lighted by four windows, from the pupils' left, and is heated by a system of direct and indirect radiation, known as the gravity system of steam heating."[9] The architectural knowledge and opinions expressed by Morgan and Hickman were not unique among educators of the time, for the school building had become recognized as an important part of the educational process.

In 1886 the Board of Education invited a number of local architects to prepare plans for the new high school building. Not surprisingly, the winning entry was by current Board of Education Architect H. William Kirchner and his brother August (figs. 2.1-2.2).[10] Excavations were dug and foundations laid, but in the fall of 1887 work ceased after the Board discovered that less than $10,000 remained of the original $271,707 appropriation.[11] The foundations sat for four years as the Board struggled to find money to complete the job and investigated whether the partially built school was properly located. The Kirchner & Kirchner design was discarded and a new contest held for plans to complete the job on the existing foundations. Local architects Furlong & Brown, Alfred M. Baker, Isaac S. Taylor, and Kirchner & Kirchner submitted plans. In April 1891, the Board of Education Building Committee chose Furlong & Brown to design the new high school.[12] Their plans were approved two months later. Board President Richard Bartholdt reflected the mood of renewed optimism when he wrote that the new high school building "will be an ornament to the city, and a monument of that complete system of public instruction, which permits the children of the poor to enjoy the blessings of a higher education as well as those of the rich."[13]

Thomas J. Furlong and Charles W.H. Brown designed a rectangular plan building four stories high that would fit the pre-existing foundations (fig. 2.3). Its exterior was fashioned in a "Romanesque" style in brick, red sandstone and slate that emphasized gables and towers; it looked like an enlarged version of an upper-class house. A local newspaper reporter described the building as "an imposing edifice," while the President of the Board of Education declared it "a proud monument to the liberality and public spirit of the citizens of St. Louis . . ."[14] The new high school contained approximately sixty rooms for its 1,500 students. No plans of the building have been located, but it was erected on the foundations of the aborted Kirchner & Kirchner building and therefore followed its floor plan to a great extent; a Sanborn Map footprint shows that the constructed building followed the outline of the earlier plan (fig. 2.4) The only major difference is in the auditorium's location; Furlong & Brown moved it from a rather awkward position to the very front of the building, eliminating the grand portico and allowing for long hallways on both sides of an interior court. Contemporary accounts exist which describe the following rooms: "class rooms, recitation rooms, chemical laboratories, physical science hall," and eight large study halls (each capable of holding 170-200 students). On the first floor, between the two entries, was an 85' x 80' auditorium with a seating capacity of 1,300. Stairways were located in each of the four corner towers. A 40' x 135' interior light court provided air and light to the corridors. Toilets were in the basement. Somewhere in the building were two elevator shafts that were unfinished at the time of occupancy because, according to the St. Louis Post-Dispatch reporter, the Board did not want to "incur the expense."[15] In 1902, two local citizens donated money for the purchase and placement in the auditorium and vestibules of "well selected copies of masterpieces of sculpture."[16] The 1909 Sanborn Map drawing shows a gymnasium in the center of the building where the open court used to be, and a manual training annex to the rear.

Photographs and drawings of Central High School show a large, bulky building dominated by masses projecting outward and upward from the rectangular block (fig. 2.5). The window patterns are varied across the façade and they do not dominate the building's appearance in the same manner as the next generation of schoolhouse. Based on the descriptions cited above, the Kirchner & Kirchner plan and the Sanborn Map, we can infer that the building had a large interior court with varying-sized rooms arranged around a single-loaded corridor. The light court would have provided valuable light and air to the building's interior, but it is unknown if the classrooms were designed to take advantage of this – in other words, the lack of plans precludes us from knowing if light and air from the corridor was allowed into the classroom through transoms and door-windows, and if the rooms were positioned so that the exterior light entered from the students' left side. It does appear that classrooms approximately 25' x 30' like those suggested by President Hickman in the 1884-85 Annual Report were probably used. What one can discern from the drawings and photos, however, is that there was no adequate means of escape in case of a fire. Photographs from as late as 1900 do not depict fire escapes and reveal only two one-door entries/exits in the rear of the building to complement the two main entries on the front (fig. 2.6).

When the new Central High School opened for classes in September, 1893, there were already complaints that it was too small.[17] Two years later, the Board of Education toughened the high school entrance requirements in an attempt to reduce Central's soaring enrollment. A St. Louis Post-Dispatch reporter criticized this move, claiming that

> Only one High School building, obtained after innumerable delays and scandals, must supply the higher advantages of education to the great population of the city scattered over an enormous territory. It is wholly inadequate for the work, and so the school directors try to hide its inadequacy and their failure to supply proper accommodations by fixing conditions of admission which will cut out hundreds of pupils . . . The money which would build and maintain a branch High School is needed to pay for the fat jobs enjoyed by the friends and relatives of the directors.[18]

Despite this change, Central High School's enrollment continued to climb through the decade. The Board admitted in its 1899 Annual Report that at least two new high schools were needed, but no authorization was given until the 1902.[19] Central remained open until it was destroyed by a tornado in 1927.

The task of designing the new St. Louis high schools fell to William B. Ittner, the recently appointed Commissioner of School Buildings. Ittner ascended to the position during a major reorganization of the St. Louis school administration in 1897.[20] One of his first actions was to undertake a tour of school buildings across the Midwest. On October 12, 1897 – four months after his appointment – Ittner reported on his trip to the Board of Education.[21] Ittner had visited schools in Chicago, Detroit, Milwaukee, Minneapolis and St. Paul, and attended the American Institute of Architects Annual Meeting, where he met school architects from Chicago, Detroit, and Springfield, Illinois. The report provides no clues about Ittner's experience with these school buildings; most of it addresses the buildings in general terms and the report as a whole emphasizes costs, no doubt for the benefit of the Board. But the trip introduced Ittner to a wider range of school architecture, which was important because at the time of his appointment he had been practicing for nine years but had never designed a school.

Ittner's initial forays into school architecture were unremarkable. The Eliot, Monroe and Sherman grammar schools opened in September 1899 (figs. 2.7-2.8).[22] All three were three story brick rectangles above stone basements, with rooms laid out around a longitudinal corridor; the end rooms were placed at right angles to the corridor, forming an "T" shape. Corner rooms had windows in two walls, creating James Johonnot's dreaded "cross-lights".[23] Each floor was virtually identical to the others. The buildings contained no radical innovations over the city's other late-nineteenth century school architecture. Ittner was, however, able to reduce classroom widths and story heights to enhance lighting and ventilation, and all of the buildings were constructed of fireproof materials according to the city's revised building ordinance. Their rather stark exteriors also differed from the "schoolhousey appearance" of many contemporary school buildings.[24] At some point in 1899 Ittner had traveled to Europe to further educate himself in school design. What he saw there changed his architecture. According to accounts written almost thirty years later, Ittner began his journey with a visit to Boston and some other American cities, then went overseas to England, Spain, Italy, France and Germany.[25] In the latter country Ittner first observed the open plan school with single-loaded corridors. Ittner then apparently spent some time in Berlin with City Architect Ludwig Hoffmann studying German school architecture.[26] Ittner's designs upon returning were drastically different. The first generation of primary schools constructed after the trip [Jackson (1900), Field (1901) and Marshall (1901)] was probably in progress before Ittner left and are of the same type as the 1899 schools (fig. 2.9). Beginning in 1901 with the Wyman School, however, Ittner's style and planning changed (figs. 2.10-2.11). The subsequent school buildings all followed the same basic plan: two-story brick buildings of a muted Gothic or English Renaissance design in an "E"-shaped floor plan with rooms generally arranged around a single-loaded corridor, a kindergarten extruded from the center, and dual stairways in the interior angles where the long corridor met the end wings.[27] Ittner later described his new design concept as follows:

> The next important step in the metamorphosis of the old buildings was the abandonment of the old dumb-bell type for the open plan, wherein the light was introduced thruout [sic] the length of the corridor, the building still retaining its three stories.[28]

This new design, probably adapted from school buildings Ittner had seen in Germany, was a major improvement over the old schoolhouse in two respects. First, the plans increased light and airflow to the individual classrooms by using the E-shaped arrangement rather than the solid block. Single-loaded corridors allowed light to penetrate the buildings' deepest recesses.[29] Classrooms were standardized for a maximum of 56 students and measured 25' x 32' with 13 ½' ceilings, thus allowing 200 cubic feet of air space per pupil. These innovations significantly upgraded the lighting and ventilation of the building. The second major improvement was in fire safety. Ittner's reduction of the buildings from three stories to two and his use of dual entrances/exits increased the chances of a safe evacuation in case of fire. Steel girders and floor beams, concrete, metal and tile floors, and granite paving with marble baseboards also made the building safer. The overall design quality of these buildings was higher than those of previous St. Louis schools. S. L. Sherer praised them in The Brickbuilder:

> Commissioner Ittner has endeavored to develop a plan in line with the best and most recent development in school architecture; one that would insure improved hygienic conditions and consequently preserve the health and morals as well as promote the intellectual progress of the pupils, and at the same time invest the buildings with that measure of architectural fitness now recognized as essential in training the minds of the pupils to the perception of the beautiful during the most receptive period of life.[30]

There had been an awareness of health and safety concerns in the St. Louis schools before Ittner became Commissioner of School Buildings. Superintendent Frank Louis Soldan's first Annual Report (1894-95) discussed efforts to change the "old plan for twelve-room buildings" by widening the corridors and stairs, relocating stairways to the ends of the building rather than the center, increasing window space, and improving ventilation systems.[31] The next year, Soldan's section of the Annual Report contained eight pages on school architecture, including an essay on "The Construction of School Rooms."[32] Soldan began his analysis by citing the soon-to-be-effected city ordinance that required all schoolhouses to be fireproof. He recognized that "While this law appears to be wise and beneficial, it will enhance materially the cost of schoolhouses."[33] The subsequent analysis attempted to meld economy with the most recent principles of healthy and safe construction, despite Soldan's claim that "In the construction of schoolhouses, the principles of hygiene should be strictly carried out, and neither economy nor custom should be allowed to stand in their way. The welfare of every child should be the absolute law."[34] Soldan's essay on "The Construction of School Rooms" contains sections on the proper size and form of classrooms, the schoolhouse's location, flooring materials, windows and walls, desks, closets, wardrobes and stairs. Many citations to international sources were included. Soldan's extended examination of schoolhouse architecture was the first such writing in any of the city's Annual Reports. His depth of interest in the school buildings went beyond that of his predecessors, and it reflected a changing attitude toward school architecture's importance to the Board's educational mission.

Superintendent Soldan's interest in school architecture affected the design of St. Louis's next high schools. In the early 1900s, the Board of Education finally decided that Central High School's enrollment had reached a critical point; the desire for manual training facilities (which Central did not have) also spurred the decision to construct two more high schools. Central held 2,860 students during the 1902-03 school year in a building designed for half that number.[35] William Ittner thus received his first opportunity to develop his design philosophy on a larger scale. Before tackling the project, Ittner went on another study tour. This time he and Superintendent Soldan visited high school buildings in Kansas City, Chicago, Dayton, Washington, D.C., New

York, Boston, Springfield (MA), Rochester (NY), Buffalo and Toledo.[36] Ittner also received high school plans from architects in Chicago, Kansas City, New York and other cities. Ittner made no report of this trip, but Superintendent Soldan did, and his observations covered eight important points: (1) Recitation rooms were no longer the principal part of the school as they were ten years earlier – now the laboratory and the workshop were of central importance, with sufficient recitation rooms added; (2) As a rule, high school buildings were designed to accommodate at least 800 students; (3) "More attention is paid in other cities to architectural impressiveness of the new buildings than we have been in the habit of doing in the grammar school buildings of this city" . . . [schools in other cities] "are imposing buildings from an architectural point of view;" (4) Most schools inspected cost $200-300,000; (5) In all schools inspected, the library was more important than ten years ago; (6) Another new feature was the Commercial Department – a large room arranged for banking and commission business and typewriting; (7) Demand has increased with the creation of new facilities; (8) More attention is paid to sanitary conditions of construction. Soldan concluded that Ittner's plan for the new McKinley High School incorporated the best ideas from their tour.[37]

William Ittner's task was to design two manual training high schools, one north of Central High and one south. The Board announced its intentions in the 1902 Annual Report. William McKinley High School and James E. Yeatman High School, when constructed, would be "comprehensive high schools" that would give "complete opportunity to boys and girls for either a purely literary education or for manual training and domestic science combined, with the customary High School studies."[38] This coincided with the Board's expansion of the high school curriculum from five courses of study to nine and the inclusion of manual training.[39] The south side school, named for President William McKinley, opened in January 1904 for just over 1,000 students. Classes began at Yeatman for approximately 800 students in September. The two buildings were virtually identical (figs. 2.12-2.21). Both had three stories (plus a small mechanical drawing room in the attic) in the same form – a rectangle on the first two floors with interior light courts and an I-shape on the second and third floors. Both buildings contained machine shops, a gymnasium, and a lunch room in the basement, an auditorium in the building's center, and various classrooms arranged around the corridors on the upper floors. McKinley and Yeatman shared external characteristics, with red brick facades above rough stone bases, balustraded rooflines, and dual towers flanking the main entrance. They differed only in minor stylistic details – McKinley was Gothic while Yeatman was English Renaissance. Their departure from the previous St. Louis high schools, however, was marked. Neither of the two Central High School buildings had included spaces for manual and vocational training, nor had they been designed around the idea of the open plan. The first Central High had been a compilation of identical rooms; the second contained classrooms, recitation rooms and an auditorium, but nothing else. McKinley and Yeatman were built for a new curriculum and represented the high school's changed status in society; they therefore accommodated a wider range of rooms and made a more significant architectural statement than their predecessors.

Ittner slightly revised his high school prototype for the Frank Soldan High School (1909), but was forced to consider an alternative in his next project. St. Louis' black community had been campaigning for a new high school building almost immediately after the Sumner High School moved into a former white grammar school in 1897. Although the move allowed the high school to occupy its own building for the first time after spending over a decade combined with a grammar school, the accommodations were far from ideal. The Sumner school's new home was a thirty-year-old building inconveniently located away from most black residential areas and lacking in specialized facilities like a gymnasium or library (fig. 1.21). Despite these problems, Sumner's enrollment and graduation rates continued to increase. Twenty-three students graduated in 1900, up from the first graduating class of two in 1885.[40] In 1903 Superintendent Louis Soldan wrote that education at Sumner was equivalent to the white high schools and that students there were provided with science laboratories, a drawing room, and "all other High School conveniences."[41] In reality, Sumner students were offered only one curriculum while their white counterparts were able to choose between nine courses of study. The black curriculum was weighted heavily toward vocational training (manual training for boys, domestic science for girls) but a lack of adequate facilities hindered these programs. After planning unsuccessfully for an addition to Sumner to house an auditorium, gymnasium, lunch room and extra classrooms, the St. Louis School Board decided in 1907 to construct an entirely new building in the black neighborhood of Elleardville.[42]

Ittner's Charles Sumner High School (1910) differed from his previous high school designs in a number of ways (figs. 2.22-2.24). First, it was smaller than the white schools; Sumner's enrollment when the new building opened was only 750, compared to over 1,000 for the four white high schools. Second, the site was 708' long but only 124' wide, necessitating what Ittner called a "shoe-string plan."[43] Because of the long, narrow lot, Ittner could not resort to the rectangular "hollow-box" floor plan. Instead, he turned to his elementary school buildings for inspiration. Like these buildings, Sumner was designed in a straight line along a single-loaded corridor with central and end pavilions. The school contained classrooms, manual and vocational training rooms and offices, but the most significant aspect of the plan was its antiquated placement of the auditorium and gymnasiums on the top floor. Ittner justified the design in a published article on his St. Louis work, stating that "In order to avoid structural complications [imposed by the restricted site], it was necessary to place the auditorium and gymnasiums on the upper floor."[44] There is no further explanation of these "structural complications," however, and a review of over fifty of Ittner's other high school buildings across the country reveals no other examples of top-floor auditoriums and/or gymnasiums. The final difference between Sumner and Ittner's previous high school designs is its colonial style. Ittner tended to favor English Renaissance or Tudor Gothic for his high schools. Sumner High School represents his first use of Colonial Revival; he would not return to it for high school buildings until the late 1920s, with the Longview (WA) High School (1927) and the Roosevelt High School in Gary, Indiana (1930). Interestingly, the latter school, like Sumner, was also for African-Americans. It appears then that Ittner may have felt some appropriate connection between black education and the Colonial Revival's patriotic/nationalistic expression. He made no written comments on Sumner's appearance, but years later in a letter discussing Gary Roosevelt, Ittner wrote "I feel that the Colonial would be *the proper style for this building* and the Colonial calls for a roof over the front and wings at least (italics mine)."[45] In Gary, as in St. Louis, none of the preexisting buildings had been Colonial Revival.

Shortly after William Ittner designed Sumner High School he resigned his position as Commissioner of School Buildings for the St. Louis Board of Education due to the overwhelming amount of work coming from school boards in other cities. The Board thought so highly of him, however, that they created a special Consulting Architect position for Ittner that he held for the next two years while Hans C. Toensfeldt occupied the Commissioner of School Buildings post. Ittner's services in the new job were essentially the same – he contracted to provide architectural services in connection with "all construction, reconstruction, alteration, and repair work" related to the St. Louis schools, but was also allowed to pursue outside work more extensively.[46] In this capacity he designed his last high school in St. Louis, the Grover Cleveland High School, in 1911 (figs. 2.25-2.29).[47] Cleveland High School was simply an expanded and updated version of the McKinley-Yeatman-Soldan model that also borrowed McKinley's Gothic style. Like the other schools, Cleveland had a centralized auditorium flanked by interior light courts, but an odd "tail" was added to the building containing gymnasiums and shop rooms. In addition, the building was outfitted with the latest technological equipment, including a vacuum cleaning system, electric lighting, a telephone system and a generating plant.

The St. Louis Board of Education built three more high schools in the 1920s under the direction of Commissioner of School Buildings Rockwell Milligan – Theodore Roosevelt High School (1925), William Beaumont High School (1926), and Vashon High School (1927). All three were similar and their plans varied only slightly from William Ittner's previous designs, the main difference being that Milligan's schools were larger. These later schools demonstrate that the modern high school building had assumed its ultimate form before 1920 in St. Louis, as in other cities across America. St. Louis was fortunate in that its student population increased rapidly between 1880 and 1920 but did not explode in the same way as other cities, like Chicago, where immigration played a larger part.

Chicago

Chicago's educational system faced pressures unknown by its St. Louis counterpart. Most of the problems were the result the city's sheer size and rapid expansion. The 1900 United States census listed Chicago as the nation's second largest city behind New York, followed by Philadelphia and then St. Louis. But the population discrepancy between the Midwestern rivals was significant. Chicago's had 1,698,975 people in 1900, over three times larger than St. Louis' 575,238.[48] Much of Chicago's overcrowding was caused by a critical influx of immigrants. Educators and architects in this environment struggled to construct enough school buildings to keep up with the growing demand. Another problem was with the system itself. Chicago's educational administration was more politically entangled than that of St. Louis, which affected the cost, location, and quality of school construction as well as the caliber of architects willing to become involved in school design.

Chicago formed its public school system in the early 1830s.[49] The first high school opened in 1856, although various administrators began to call for such a school in the mid-1840s.[50] As the number of advanced students increased, steps were taken to erect a separate building for secondary studies. The new school admitted a class of 114 students in October 1856. It was a comprehensive high school, centrally located and combining three departments – Classical, English and Normal (teacher training). The building itself was a three-story stone and brick construction in the Gothic style; its dimensions were 88' x 52' (fig. 1.2). Inside the building, the three floors were arranged almost identically, with four 23' x 35' rooms around a central stairwell. On the top floor the partition between two of the rooms was removed to form a combination assembly hall/lecture room/study hall. The building cost approximately $50,000.[51]

The Chicago Central High School was built to hold 400 students, but within a decade it had reached its limits. The problem was recognized in the 1867 Annual Report:

> Present indications are that the number hoping to enter the high school in July, 1868, will be at least ten per cent larger than during the past year. We have reached the utmost limits of admission. Further than this, the higher classes are constantly demanding more room.[52]

The city council refused to allocate more funds for expanding the high school, however, so the board of education was forced to implement a system of branch schools in different areas of the city. In 1869, the board established classes for the North, South and West Divisions inside grammar school buildings. Shortly thereafter, a two-story wooden frame building was constructed next to Central High School to handle some of the overflow students.[53] Then the catastrophic Chicago Fire of 1871 changed the complexion of secondary education in the city. Central High School was not damaged by the fire, but for the next few years its enrollment dropped as more students attended Division classes. By 1880 the Central High School building was abandoned.

Rising enrollments forced the Board of Education to construct a series of separate Division high schools during the 1880s. The city's 1,236 high school students in 1881 jumped to 3,527 by 1890.[54] The first school constructed to address this problem was the West Division High School a three-story, fifteen-room brick building built in 1880 (figs. 2.30-2.32). West Division was a plain four-story brick block with an internal T-shaped corridor on the first and second floors. Apart from the heating and ventilating equipment, the only other rooms besides classrooms were a principal's office, teacher's bathrooms and separate boys' and girls' playrooms in the basement. West Division's enrollment in 1881 was 643. Three years later the Julius Ender's North Division High School opened; it was somewhat larger than West Division but similar in appearance (figs. 2.33-2.35). North Division was slightly more sophisticated, with two small recitation rooms, a small library, a tiny laboratory and a third floor assembly hall in addition to classrooms. In 1884, the South Division High School was constructed (figs. 2.36-2.38). Designed by James R. Willett, it was significantly larger than its predecessors, having four full stories above a basement. The plan, however, was nearly identical to the North Division school except for the relocation of stairways from the main axis to the cross-axis and a larger top-floor assembly hall. The exterior was also more visually interesting, with a battered basement story, three entries, a cross-gabled roof and a plethora of chimneys. By 1886, West Division was so overcrowded that a new four-story, twenty-four room building for 1,000 students was erected (figs. 2.39-2.41). On the exterior, the second West Division school was much grander than its predecessors. Board Architect John J. Flanders used banks of windows, central and end projections, oriel windows, Flemish gables, belfries and a sharply pitched roof to give the building a strong picturesque profile. The plan also differed from the previous Division schools in layout if not composition. Flanders arranged the classrooms on either side of a cross-axial hallway with stairways at either end; a third stair was located in the center of the building. In addition to the many classrooms, West Division included a bathroom and tiny recitation room on the first through third floors, a lecture room and laboratory on the third floor, and the entire fourth floor was given over to an assembly hall. Finally, in 1889 the board of education built the North-West Division High School, while a city-wide annexation brought six new high schools into the system. North-West Division included the latest developments in school architecture (figs. 2.42-2.44). The exterior was rather plain compared to West Division High School; it relied on polychromy, rounded corners and an active roofline for visual effects. The plan, however, demonstrated the greatest changes. North-West Division was laid out like an L on its corner plot. It was significantly larger than the other Division schools and contained a much wider variety of rooms. The classrooms were supplemented with a gymnasium (the first ever in a Chicago high school), dressing rooms for each sex, biological, physical and chemistry laboratories, four recitation rooms, a large lecture room, a drawing room, and an assembly room. In keeping with the latest architectural knowledge, all of the classrooms were placed so that light entered only through one wall.

The Division High Schools show an increasing architectural maturation in the short span of a decade. Some aspects remained relatively unchanged; the buildings were generally not fireproof and were heated by steam systems, which were erratic despite educators' boasts.[55] With each successive building, however, their exteriors demonstrated a trend toward more visual complexity and historical references. But the major changes were inside. The first West Division building contained classrooms and little else, ten years later the North-West school included spaces for an extended curriculum. They were also designed for a rising population. In 1881, the North, South and West Division High Schools enrolled 225, 368, and 643 students, respectively; in 1891, the figures had almost doubled, to 409, 611, and 1,006, in addition to over 200 students in the new North-West building.

A new generation of high school building began to take shape in the 1890s in Chicago and other cities. These buildings were designed with more attention to students' health and safety and the school's curriculum than in previous decades. Curriculum expansion was creating more varied courses of study, which in turn necessitated new and different spaces within the schoolhouse. In Chicago, the burden of designing such new spaces fell on the School Board Architect. Like St. Louis, the city had begun to employ an official Board Architect in the 1880s to design public school buildings. The position was very unstable, however, as a variety of architects held that post between 1880 and 1920.[56]

John J. Flanders' Hyde Park High School (1893) epitomized 1890s high school architecture in Chicago. The building was large, containing thirty-four classrooms, science laboratories, a gymnasium and an assembly hall. Its exterior featured bands of ornament, octagonal towers, and an active roofline. The Board of Education was proud of the new school and boasted that

> in architectural beauty [it] will compare favorably with any other public-school building in the country. It is supplied with the most perfect system of steam heating, sanitary ventilation, and electric service. It is the largest high-school building in the city, and in the finish and furnishing throughout is considered to be the most complete and suitably adapted for the purpose of its erection.[57]

Architecturally, Hyde Park High School was similar to St. Louis Central, built at almost the same time. Both schools demonstrated the beginnings of a transition wherein high school buildings demanded different types of spaces on the inside and architects struggled to find an appropriate expression for the expanding size of the building on the exterior.

John J. Flanders designed more public high schools in Chicago than any other Board Architect until William B. Mundie. Mundie – known mostly for his partnership with skyscraper pioneer William LeBaron Jenney – held the position of Board Architect for five-and-a-half consecutive years, longer than any previous person in that position. Mundie's schools had floor plans that were not uncommon for their time, but their Renaissance and classical styles represented a break from the city's earlier school designs. Mundie also introduced an important architectural innovation to the Chicago schools. He placed the assembly hall of the Edward Waller High School (1898) on the first floor, which was significant for social and architectural reasons: socially, the first-floor assembly hall allowed better public access; structurally, a first-floor assembly hall could be larger than if placed on the top floor (fig. 2.45). Mundie did not, however, originate this practice – he was simply following a current trend in school design that had not yet reached the city.

The Board was once again proud of a new high school building and praised Waller in the Annual Report: "The general arrangement of the class rooms and special departments has been very carefully studied, until the convenience and equipment will stand on par with the very best examples in the United States."[58] Mundie followed Waller with two similar designs, William McKinley High School (1900) and Wendell Phillips High School (1902) (figs. 2.46-2.49). All three represent Mundie's mature style. They shared similar plans, tripartite main entrances, slightly projecting central and end pavilions, giant order pilasters, and an active roofline dotted with antefixae. These schools were also larger than the Division high schools. Phillips contained forty-eight rooms, a lunchroom, a gymnasium, an auditorium, and spaces for extracurricular activities for its 1,700 students.[59] Mundie's work was solid if not spectacular. His McKinley High School plan, for instance, incorporates much contemporary thinking about the secondary school – open light courts, single-loaded corridors, multiple stairways and entrances, and a large centrally located auditorium. The American School Board Journal praised him in 1904: "The schools are well planned both as to exterior and interior. They embody many of the best features in the matter of design and orientation and are most practical in the selection of constructive materials."[60]

William Mundie's Phillips High School is important for more than the way it demonstrates the increasingly sophisticated schoolhouse architecture of the early 1900s. Phillips was one the only Chicago high school that had a significant African-American student population during the period between 1880 and 1920; opened in 1902, its black enrollment was 20% by 1914 and 56% by 1920.[61] Unlike St. Louis, which was a very "Southern" city in many ways, Chicago had never segregated its public school students.[62] An 1874 Illinois law in fact prohibited elected officials from excluding children from school on the basis of race. Nor was there a significant African-American population in the city before the 1930s. Black Chicagoans totaled only 1.3% of the city's population in 1890, 1.9% in 1900, 2.0% in 1910 and 4.1% in 1920.[63] In contrast, St. Louis' black population was at least 6% throughout the early 1900s and black students consistently made up approximately 10% of all public school students.[64] African-Americans in Chicago generally lived on the South Side, especially after the "Great Migration" of Southern blacks to Northern industrial cities during the First World War, but many of the city's schools were racially mixed. Phillips black enrollment increased as blacks moved into areas formerly occupied by whites. Because of the low black enrollments, Chicago never created a separate high school for blacks like St. Louis Sumner. The Sumner High School was quite unique – few African-American high school buildings existed in America before 1920.[65]

Dwight Heald Perkins replaced William Mundie as Board Architect in 1905. Perkins was the first Chicago architect to design school buildings specifically around ideas of health and safety and curricular adaptation. He eventually became recognized, with

William B. Ittner, as one of the preeminent school architects in the country.[66] Perkins designed over forty public schools in Chicago before being fired by a corrupt Board President.[67] His major project as Board Architect was to devise a standardized grammar school that could be built for low cost anywhere in the city. Perkins developed two types: an expandable building and a complete building (figs. 2.50-2.51). Both featured what Perkins had enumerated in his first Board Architect report as the most important considerations for Chicago's schools: fireproof construction; twenty-six rooms of standardized size (26 ½' x 33'); an assembly hall on the first floor; gymnasiums on the third floor; manual and domestic training rooms in the basement; toilets on each floor; and abundant playground space outside.[68] Perkins' schools tended toward the abstract in their outward appearance; he prized polychrome brickwork and avoided historicist ornamentation. In a 1912 speech he proclaimed his belief that

> [W]hen the public demands such schools as these it will have become so intelligent that it will no longer permit architects to inflict designs executed in old, dead, and inappropriate styles; that eventually the imperialism of Rome and the debasing sham of American galvanized-iron imitations of Rome will be rejected to be replaced by a style at once direct, honest, modest, sensible, enduring, and beautiful.[69]

Perkins was probably the first Chicago Board Architect to have his work restricted by city ordinances and departmental regulations. During his tenure in office, the Board had adopted a new approach toward school buildings. Board of Education President Clayton Mark explained the new policy in 1904:

> Provisions for the greater safety and comfort of the children have been recently made by the Board of Education. All school buildings in the future over two stories in height are to be constructed entirely of fire-proof material, and equipped with conduits for electric lighting. All assembly halls are to be on the ground

> floor, and all buildings are to be provided with fire escapes and fire alarm boxes, and the pupils thoroughly trained in fire drills.[70]

Along these lines, City of Chicago issued a revised building ordinance in 1910 that provided definite specifications for city school buildings for the first time. The ordinance also required the Board Architect to certify to the city's Commissioner of Buildings that all public school plans conformed to city regulations.[71]

Perkins' inaugural high school for Chicago was Albert Lane Technical High School (1908) (figs. 2.52-2.54). Chicago had embraced the manual training movement with more enthusiasm than other cities. The city's initial manual training school was designed by Solon S. Beman in 1884 (fig. 2.55). The Board opened three more manual training schools in the early 1900s, but Perkins' Lane Tech was designed to be the archetypal manual school for the city. Lane Tech's E-shaped plan placed rooms around the outside of a central corridor and an assembly hall in the center. Heavy equipment was located in the basement; the upper floors were mainly comprised of classrooms. The five-story central portion contained an auditorium and gallery, a lunchroom, a gymnasium and a top story with a small running track and lockers. The building looked somewhat like an abstracted version of a William Mundie school. Perkins followed his predecessor by decorating Lane Tech's roofline with antefixae and uniting multiple stories with giant order pilasters. But Perkins' orders were ahistorical and the pilasters were brick to match the rest of the façade, creating a type of "stripped classicism" that critics found admirable. One contemporary writer described this aesthetic as "plain to severity" without intending this as a criticism.[72] A few years later, Peter Wight praised the building's exteriors as "extremely rational developments of the grand plans in brick and stone, without any attempt to introduce extraneous ornament."[73]

Shortly after becoming Board Architect, Perkins designed a public high school for the south side. Perkins' original drawings for James Bowen High School show some formal resemblance to Frank Lloyd Wright's Larkin Building and Unity Temple with their geometrical massing and lack of ornamentation, though the lighting requirements of a schoolhouse necessitated more window area than those buildings. An early elevation of Bowen shows a low, broad rectangular structure with prominent blanks walls punctuated by recessed fenestration and a projecting entablature/cornice (fig. 2.56). The spandrels between floors receded behind the abstract pilasters, creating a feeling of verticality similar to what Louis Sullivan had done in the Wainwright Building. The Bowen design was conceived in 1906 and published in The Inland Architect and News Record, but was significantly altered before construction began in 1910 (figs. 2.57).[74] As built, the school was the twin sister of Perkins' Carl Schurz High School from the same year. Schurz High School is considered Perkins' most famous work (fig. 2.58). Although it is best-known for its clean geometrical lines, huge sloping roofs, and absence of ornament, Schurz's plan demonstrates the room variety and planning adaptations of the evolving modern schoolhouse. The E-shaped plan included technical shops on the ground floor to minimize disruption from the heavy equipment. The west wing contained the gymnasium and second-story running track. In the final version (not shown), Perkins placed four science laboratories along the front of the building on the second and third floors, while the girls' vocational training rooms (textilemaking, sewing and fitting, domestic science – with model dining room) where all on the third floor. Most of the fourth floor was devoted to rooms for artistic and mechanical drawing. A lunchroom occupied the fifth-floor attic beneath the huge pitched roof (figs. 2.59-2.60).

When Dwight Perkins was ousted from office in 1910, one of his assistants, Alfred F. Hussander, took over as Board Architect. The scandal of Perkins' tenure had residual effects, as demonstrated by Hussander's remarks in his first Annual Report:

> Upon my election to office, the Board, through its Committee on Buildings and Grounds, instituted a most thorough inquiry along practical lines looking to a more economical administration in connection with the erection of buildings, and after many conferences of the committee and the members of the Board of Education, a demand was made for a less expensive type of school building which could be duplicated as necessity required on new sites thereby saving, in the first instance, the cost of making new plans as well as a saving in the cost of construction of the building itself; the new type of building to contain ample light, the most modern heating and ventilating apparatus that can be procured, a thorough school equipment; eliminating nothing that would decrease the safety or limit the comfort of the pupils or impair the educational efficiency of the school plant. The change in style of the building to be along lines of simplicity and strength of construction, keeping in mind, beauty of outline, harmony of color, etc.[75]

The tenor of these remarks seems designed to appease Hussander's superiors, who had charged his predecessor with extravagance in creating "monuments to himself."[76] This makes the last sentence of Hussander's statement particularly ironic, for he rejected Perkins' simple, abstract style, preferring an even more monumental classicism than William Mundie. But Hussander also continued Perkins' exploration of open plans and zoned areas within the school. Increasing enrollments and expanding curriculums necessitated these sprawling buildings. Hussander's first high school, Carter Harrison High School (1912), set the precedent for all of his future work (fig. 2.61). The exterior adopted and accentuated William Mundie's classical language, with a pedimented central pavilion, a large entablature running all the way around the building, and a multitude of Ionic pilasters. Square pavilions with dual entrances anchored the building at the four corners. In plan, the building resembled a hollowed square (figs. 2.62-2.64). The floors were strictly zoned. Classrooms and offices all around the front and sides of the first floor, with shop classes in the rear and a recreational core formed by the auditorium in the center flanked by boys' and girls' gymnasiums and a swimming pool. Stairwells were located in the four corner pavilions and at the interior angles of the auditorium. The second floor was almost completely open on the interior. Science rooms lined the front, classrooms were arranged along the sides, and an immense lunchroom filled the rear. On the third and highest floor, more science rooms, domestic science rooms and classrooms ringed the open court, and drafting and drawing rooms formed a row across the back. A two-story shop annex trailed out from the rear corner of the main block.

Hussander followed Harrison with two very similar high school buildings in succeeding years, Nicholas Senn High School (1912) and Hyde Park High School (1913) (figs. 2.65-2.68). School construction was placed on hiatus during 1917-18 in Chicago as in cities across the country because of World War I. When construction resumed, Hussander produced another building of the same type, Robert Lindblom Technical High School (1918) (fig. 2.69-2.72). All four of Hussander's pre-1920 high school buildings followed the same model and shared formal and planning characteristics – monumental classical exteriors and open plans with strictly zoned areas.

## Conclusion

The high school buildings in St. Louis and Chicago demonstrate the many aspects of the schoolhouse's transformation between 1880 and 1920. Both cities erected simple, Gothic buildings to house their first high school in the mid-1850s. Both cities added schoolhouses through the 1890s that became larger, safer, healthier, more complex, more aesthetically prominent, and contained a wider variety of different spaces than their predecessors. In the twentieth century, the buildings diverged in terms of exterior appearance – St. Louis high schools were designed in Gothic or English Renaissance styles while their Chicago were given an increasingly monumental classical expression (except for the brief tenure of Dwight Perkins). But behind those various facades, schoolhouses continued to evolve. The changes to the Chicago and St. Louis buildings, as well as others across the nation, were the result of a number of social, cultural and architectural factors influencing architects and educators. The factors can generally be grouped into three main categories: (1) the desire to improve students' health and safety; (2) administrative and curricular modifications; and (3) the high school's evolving role in American society.

[1] Walter R. McCornack, "Construction of the St. Louis School Buildings," in Charles H. Judd, Survey of the St. Louis Public Schools (Yonkers-on-Hudson, NY: World Book Company, 1918), 103.

[2] William C. Bruce, "Some New Schoolhouses in Chicago," The American School Board Journal 43 (November 1911): 27.

[3] A comprehensive history of the St. Louis school system can be found in Selwyn K. Troen, The Public and the Schools: Shaping the St. Louis System, 1838-1920 (Columbia, MO: University of Missouri Press, 1975).

[4] Twenty-Eighth Annual Report of the Board of President and Directors of the St. Louis Public Schools (1880-81) (St. Louis: Slawson & Co., Printers, 1883): 112.

[5] "Later events have proved the wisdom of this choice, but at the time the westward movement of the residence portion of our city was much less pronounced, and for a while there was considerable doubt whether the location was not too far west." Fortieth Annual Report of the Board of President and Directors of the St. Louis Public Schools (1893-94) (St. Louis: Buxton & Skinner Stationary Co., 1895): 68.

[6] Thirty-First Annual Report of the Board of President and Directors of the St. Louis Public Schools (1884-85) (St. Louis: Riverside Printing House, 1886): 108. Morgan did not divulge which authorities he relied on to derive this information.

[7] Ibid.

[8] Ibid.

[9] Ibid., 13.

[10] H. William Kirchner served as St. Louis Board of Education Architect from 1881-1883 and 1886-1889; August held the same post from 1892-97. See Chapter 3 for more details.

[11] Fortieth Annual Report of the Board of President and Directors of the St. Louis Public Schools, 68.

[12] Printed Record of the Board of Education of the City of St. Louis VII (1889-92) (St. Louis: Board of Education of the City of St. Louis, n.d.): 583-84.

[13] Thirty-Eighth Annual Report of the Board of President and Directors of the St. Louis Public Schools (1891-92) (St. Louis: The Mekeel Press, 1893): 12.

[14] "New Schools," St. Louis Post-Dispatch (August 27, 1893) 24; Fortieth Annual Report of the Board of President and Directors of the St. Louis Public Schools, 15.

[15] The quotes are from "New Schools." The following are the best descriptions of Central High School: "St. Louis has in course of construction a new high school building, illustration of which is shown above. The height of the edifice is 120 feet, depth 181 feet and has 64 rooms. The architectural design is modern and arranged on the most approved plans. The cost is $300,000. It is supplied with the Johnson system of heat regulation." "New Central High School," The American School Board Journal 5 (February 1893): 7; "It stands back from the street a distance of over 150 feet and is four stories high. The front is finished with brick and read sandstone, the cornices are of copper and the roof of slate. The features of the building as seen from Grand avenue are the broad swell or bay which rises from the foundation to the roof, and the north and south towers which sit back from the front. There are two front entrances of the Gotho-Romanesque style, one on the north and the other on the south side. They sit back 20 feet from the main

front and admit to vestibules 22x30 feet, which are laid in mosaic, as are also the passageways which lead to the grand iron staircases. The building is 132 feet 8 inches wide, 286 feet long and 90 feet to the top of the roof, above which the taller of the two towers rises forty-five feet. There are about sixty rooms, including class rooms, recitation rooms, chemical laboratories, physical science hall, and study halls. On the first floor, facing upon Grand avenue, and between the stairways is the auditorium, a large lecture hall, 85x80 feet in dimensions. A platform is in the west end of the auditorium, and the seats are arranged after the fashion of a theater. A gallery adds to the capacity of the room. A defect in the equipment of the school, which will raise a protest, is the absence of elevators. There is space for two elevators in the rear of the center line of the building, and the iron gratings for them are in place, but the cages and machinery are wanting because the Board of Education did not care to incur the expense. Until other options prevail, the students will have to walk from the third story to the lavatories in the basement." "New Schools," 24; "The building contains sixty rooms of which eight are large study halls, each accommodating from 170 to 200 pupils. In the Auditorium 1300 [sic] students can be seated. In the interior there is a courtyard 40x135 feet, which gives light and air to the corridors 200 feet long and 15 feet wide along which the recitation rooms are located. There is a stairway in each of the four corners of the building; there is also an elevator shaft on each side." Fortieth Annual Report of the Board of President and Directors of the St. Louis Public Schools, 70.

[16] Forty-Ninth Annual Report of the Board of Education of the City of St. Louis, Mo. (St. Louis: Nixon-Jones Printing Co., 1904), 130.

[17] "Full Up Already," St. Louis Post-Dispatch (September 10, 1893): 22.

[18] "Cutting Down High School Pupils," St. Louis Post-Dispatch (January 20, 1896): 4.

[19] Forty-Fifth Annual Report of the Board of Education of the St. Louis Public Schools (1898-99) (St. Louis: Nixon-Jones Printing Co., 1899): 19.

[20] St. Louis' reorganization will be discussed in Chapter 6.

[21] William B. Ittner, "Report of Commissioner of School Buildings on Trip of Inspection," Printed Record of the Board of Education of the City of St. Louis X (1897) (St. Louis: Board of Education of the City of St. Louis, n.d.): 255-256.

[22] The Rock Spring and Simmons Schools, also from 1899, are similar.

[23] Classroom lighting, "tho not entirely unilateral for the corner rooms, was much improved." William B. Ittner, "School Building Progress in St. Louis," The American School Board Journal 52 (March 1916): 18.

[24] Ibid. In this quote, he is specifically referring to the 1895 Columbia School with its high profile, belfry and large dormer windows.

[25] See M.W. Childs, "Interesting St. Louisians: William B. Ittner," St. Louis Post-Dispatch Sunday Magazine (July 27, 1930), 5; Emily Grant Hutchings, "Art and Artists," St. Louis Globe-Democrat (February 9, 1936), page unknown.

[26] Childs, "Interesting St. Louisians: William B. Ittner," 5.

[27] This group consists of Wyman (1901), Emerson and Mann (1902), and Blow and Cote Brilliante (1904). Many of the schools from this series are illustrated in plan and photograph in S.L. Sherer, "Recent School Buildings in St. Louis. I. William B. Ittner, Architect," The Brickbuilder 13 (October 1903): 206-212 and Ittner, "School Building Progress," 18-21, 83.

[28] Ittner, "School Building Progress," 18.

[29] A contemporary writer described the buildings as follows: "Another consideration that has influenced the plan was the endeavor to depart, not only from the conventional type of school building, wherein the central corridor, lined with rooms on each side, was necessarily dark, but to introduce, if possible, outside light into the main corridor on practically its entire length, thus insuring the penetration of sunlight to all parts of the building during some part of the day. This naturally led to a plan grouping the classrooms on three sides of the corridor only, the remaining side being opened its whole length to the light." Sherer, "Recent School Buildings in St. Louis," 208.

[30] Ibid., 206, 208.

[31] Forty-First Annual Report of the Board of President and Directors of the St. Louis Public Schools (1894-95) (St. Louis: Buxton & Skinner Stationary Co., 1897): 27.

[32] Forty-Second Annual Report of the Board of President and Directors of the St. Louis Public Schools (1895-96) (St. Louis: Nixon-Jones Printing Co., 1897): 21-28.

[33] Ibid., 21.

[34] Ibid., 23.

[35] Forty-Ninth Annual Report, page unknown.

[36] Printed Record of the Board of Education of the City of St. Louis XII (1901-03) (St. Louis: A.R. Fleming Printing Co., n.d.): 239.

[37] Ibid., 239-240.

[38] Forty-Eighth Annual Report of the Board of President and Directors of the St. Louis Public Schools (1901-02) (St. Louis: Nixon-Jones Printing Co., 1902): 81.

[39] See Chapter 5.

[40] Elinor Mondale Gersman, "Education in St. Louis, 1880-1900: A Case Study of Schools in Society" (Ph.D. diss., Washington University, 1969), 281.

[41] Quoted in ibid., 282.

[42] A brief description of the "sketch plans" for the Sumner addition is in Printed Record of the Board of Education of the City of St. Louis XIV (1905-07) (St. Louis: Board of Education of the City of St. Louis, Missouri, n.d.): 409.

[43] William B. Ittner, "School Buildings of St. Louis, Missouri. I," The American Architect 106 (September 16, 1914): 168.

[44] Ibid.

[45] William B. Ittner to William A. Wirt, February 17, 1928, William A. Wirt Manuscripts, Lilly Library, Indiana University, Bloomington, Indiana.

[46] Printed Record of the Board of Education of the City of St. Louis XVI (1909-1910) (St. Louis: Board of Education of the City of St. Louis, n.d.), 613.

[47] The Printed Record of the Board of Education of the City of St. Louis XVIII (1911-1912) (St. Louis: Board of Education of the City of St. Louis, n.d.), shows that the building was designed in the fall of 1911, but classes did not begin until September 1915.

[48] Census Bureau figures from www.census.gov/population/www/documentation/twps0027.html. The figures for the relevant time periods are: 1890: Chicago = 1,099,850; St. Louis = 451,770; 1910: Chicago = 2,185,283, St. Louis = 687,029; 1920: Chicago = 2,701,438; St. Louis = 772,897. St. Louis held its place as America's fourth largest city from at least 1870 to 1920, when it slipped to sixth.

[49] For a general history of the Chicago schools, see Mary J. Herrick, The Chicago Schools: A Social and Political History (Beverly Hills and London: Sage Publications, Inc., 1971).

[50] A.T. Andreas, History of Chicago from the Earliest Period to the Present Time (Chicago: A.T. Andreas, Publisher, 1884), 218.

[51] W.H. Wells, "Public High School in Chicago," American Journal of Education 3 (June 1857): 531-536.

[52] Thirteenth Annual Report of the Board of Education of Chicago, 188, cited in John Wesley Bell, The Development of the Public High School in Chicago (Chicago: University of Chicago Libraries, 1939), 27.

[53] Ibid., 28.

[54] Ibid., 20, 90. The figures rose even more dramatically after 1890: 1893-94 = 6,189; 1904 = 12,395; 1914-15 = 25,322. Ibid., 90-91.

[55] "The steam heating apparatus introduced into the two new high school buildings is of the best design and will doubtless make the heating of these buildings very near perfection. Both direct and indirect radiation are used, the means for supply of fresh air and for exit of four air are ample, and the ventilation must necessarily be excellent." Twenty-Ninth Annual Report of the Board of Education of the City of Chicago (1882-83) (Chicago: Jameson & Morse, Printers, 1884), 17.

[56] See Chapter 3 for details.

[57] Fortieth Annual Report of the Board of Education of the City of Chicago (1892-93) (Chicago: The J.M.W. Jones Stationary and Printing Co., 1894), 123.

[58] Forty-Fifth Annual Report of the Board of Education of the City of Chicago (1898-99) (Chicago: Public Schools of the City of Chicago, 1900), 115.

[59] AIA Guide to Chicago, ed., Alice Sinkovitch (New York: Harcourt Brace, 1993), 381.

[60] "Chicago School Architecture," The American School Board Journal 28 (February 1904): 8. For an announcement of Mundie's appointment, see The American School Board Journal 18 (January 1899): 11. The most complete discussion of Mundie's tenure, which mainly describes the workings of the architectural department, can be found in "The Architect and the Chicago Schools," The Western Architect 4 (July 1905): 4-12.

[61] Judy Jolley Mohraz, The Separate Problem: Case Studies of Black Education in the North, 1900-1930, Contributions in Afro-American and African Studies, No. 42 (Westport, CT: Greenwood Press, 1979), 103;

The Chicago Commission on Race Relations, The Negro in Chicago: A Study of Race Relations and a Race Riot (Chicago: The University of Chicago Press, 1922), 245.

62 According to Philippe Bourgois, visitors to St. Louis in the nineteenth and early twentieth centuries commented on the dominant Southern culture of the city. Ibid, "If You're Not Black You're White: A History of Ethnic Relations in St. Louis," City & Society: Journal of the Society for Urban Anthropology 3 (1989): 114.

63 U.S. Census figures cited in Mohraz, The Separate Problem, 18.

64 Karen Graves, Girls' Schooling During the Progressive Era: From Female Scholar to Domesticated Citizen (New York and London: Garland Publishing, Inc., 1998): 171.

65 Outside of Sumner, the most prominent examples are in Washington, D.C. The M Street School opened in 1891 as one of the first high schools in the country for black students constructed with public funds. In 1916, Washington built Paul Dunbar High School, a large Gothic castle designed by William B. Ittner. Dunbar became the elite black high school in the country before its demolition in 1977. Ittner's design was typical of his late 1910s high schools and comparable to his Soldan High School in St. Louis. See Mary Church Terrell, "History of the High School for Negroes in Washington," Journal of Negro History 2 (July 1917): 252-266; Antoinette J. Lee, "Magnificent Achievements: The M Street High School," CRM, no. 2 (1997): 34-36; Thomas Sowell, "Black Excellence: A History of Dunbar High," The Washington Post (April 28, 1974): C8.

66 See e.g., Frank Estabrook Chancellor, "Schoolhouse Accommodations," The American School Board Journal 38 (April 1909): 20; A.D.F. Hamlin, "Consideration in Schoolhouse Design," in Modern School Houses (New York: The Swetland Publishing Co., 1910), 4; John J. Donovan, et. al., School Architecture: Principles and Practices (New York: The Macmillan Company, 1921), 18; Thomas E. Tallmadge, The Story of Architecture in America (New York: W.W. Norton & Co., 1927), 273. The literature on Perkins is extensive and quite repetitious. The best sources are Peter B. Wight, "Public School Architecture at Chicago: The Work of Dwight H. Perkins," Architectural Record 27 (January-June 1910): 494-512; "Dwight H. Perkins – father of today's "new school ideas," 119-125; Eric Emmett Davis, "Dwight Heald Perkins 1894-1904: From the Chicago School to the Prairie School to Chicago's Schools," Threshold 5-6 (Fall 1991): 24-33. Eleanor Ellis Perkins, "Perkins of Chicago" (1966) TMs. Burnham Library, Art Institute of Chicago, a sentimental biography by Perkins' daughter, provides the basic facts of his life. The best compilation of Perkins' later school designs is in Perkins, Fellows and Hamilton, Educational Buildings (Chicago: Perkins, Fellows and Hamilton, 1925).

67 For details on Perkins' trial and dismissal, see Chapter 3.

68 Fifty-Second Annual Report of the Board of Education of the City of Chicago (1905-06) (Chicago: Public Schools of the City of Chicago, 1907), 13-28.

69 Dwight H. Perkins, "The Relation of Schoolhouse Architecture to the Social Center Movement," Journal of the Proceedings and Addresses of the Fiftieth Annual Meeting of the National Education Association of the United States (1912) (Ann Arbor, MI: National Education Association, 1912): 239.

70 Fiftieth Annual Report of the Board of Education of the City of Chicago (1903-04) (Chicago: Public Schools of the City of Chicago, 1905), 18.

71 Bell, The Development of the Public High School in Chicago, 148. An 1898 ordinance had required all school buildings be inspected by the city's Commissioner of Buildings, but provided no specific regulations.

[72] "Chicago's New Manual Training School," The American School Board Journal 34 (February 1907): 12.

[73] Wight, "Public School Architecture at Chicago," 502.

[74] The Inland Architect and News Record 48 (November 1906): plates after page 48. See also The American School Board Journal 34 (February 1907): 11.

[75] Fifty-Sixth Annual Report of the Board of Education of the City of Chicago (1909-1910) (Chicago: Public Schools of the City of Chicago, n.d.), 13.

[76] Quoted in "Dwight H. Perkins – father of today's "new school ideas," 119.

Chapter Three

## SCHOOL ARCHITECTS

The most important preliminary step in the erection of a schoolhouse is the selection of a school architect.

The American School Board Journal, 1910[1]

A group of architects across the country like William Ittner tried to transform the schoolhouse into an efficient physical space. In most urban areas, specialized school board architects undertook this mission. School board architects were not entirely new, but their numbers increased in American urban school systems between 1890 and 1920. The development of school architecture as a specialization also led to the identification of leaders in the field whose work was widely imitated, setting the stage for an increasing standardization of school architecture by 1920. This chapter will briefly investigate the history of school architects and specifically discuss their roles in St. Louis and Chicago.

In 1904, Harvard President Charles W. Eliot, former leader of the "Committee of Ten," offered his views on the ideal superintendent of buildings:

> [The superintendent of buildings] should give his whole time to the service of the board, and should have been an engineer or architect by profession. Although all the American cities and large towns have been building schoolhouses with great activity during the past thirty years, the common stock of knowledge on the subject seems still to be small. There is much yet to be learned about fireproof and slow-burning construction, and the best means of heating and ventilating a building divided into numerous rooms of moderate size . . . The officer who should have general direction of the repairs and improvements of schoolhouses and of the construction of new schoolhouses would have his hands full. Great improvements have, of course been made within fifty years. The superintendent of buildings of a large urban school system would have a very serious charge, requiring experience, habits of observation, and the disposition to attack vigorously new problems. A building contractor would not answer the purpose; neither would a man trained in any other business than engineering or architecture. This is emphatically the place for a broad-minded expert.[2]

Though Eliot spoke of the "Superintendent of Buildings," his remarks are applicable to school board architects as well, for in most of America's larger cities the positions were the same (William Ittner, for example, was titled, "Commissioner of School Buildings"). When Eliot made these remarks, the position of School Board Architect was still relatively new. In the mid-nineteenth century, school boards contracted with individual architects each time a new schoolhouse was needed. The process was influenced by political favoritism and often resulted in buildings of uneven quality. As school enrollments increased and the need for more facilities grew, some school systems entered into more substantial arrangements with architects. Prior to 1878, the Chicago Board of Education's Committee on Buildings and Grounds was responsible for procuring plans and specifications for each new school building. In that year, however, the Committee authorized architect Augustus Bauer to prepare all plans and specifications and superintend the construction of all new buildings to be erected during the school year at a fee of $400 per job.[3] Bauer submitted "the lowest offer made by any responsible architect" to win a bidding war.[4] He kept his unofficial position for the next two years while maintaining an outside practice.

The first official school architect to achieve national renown was Edmund M. Wheelwright, who was appointed Boston Municipal Architect in 1891.[5] The position had been created in 1874. Municipal Architects were responsible, among other things, for designing the city's schools. In 1895 the position was abolished and Wheelwright's term ended. Though Wheelwright's tenure was short, his influence was widespread. Fellow architects recognized him for increasing the standards of school architecture in his city, and by extension, throughout the country.[6] Wheelwright's forte was primary school architecture. His typical design consisted of a three-story building with a basement (figs. 3.1-3.2). Most had a cross-axial hallway with stairways at both ends, classrooms approximately 24-27' x 32', and a hall in the center of the top floor flanked by classrooms and stairs. The exteriors were almost all inspired by Italian Renaissance examples. Wheelwright favored heavy bases, brick walls and prominent cornices. Important rooms, like libraries and assembly halls, were designated on the exterior by a change in the elevation. Each floor tended to have a different window treatment.

Wheelwright's Brighton High School (1894) and Boston Mechanic Arts High School (1893; 1900) also demonstrated his fondness for historical styles (figs. 3.3-3.7). Brighton High was a small, finely proportioned Renaissance Revival building; the Mechanic Arts High School was more reminiscent of German *Rundbogenstil* architecture combined with an Italian Renaissance tower. Inside, however, the buildings seem less attractive and not as well-planned as some contemporary schoolhouses. Brighton High School was a small building based on Wheelwright's grammar school work. He laid out the plan around a central corridor with stairwells at either end. All of the rooms had windows on two sides; some even admitted light from a third side. The hall was on the top floor in the mid-nineteenth century manner. The plans of the Mechanic Arts High School, which Wheelwright claimed were "developed by experience," were less formally ordered and featured an awkward Z-shaped corridor through the middle of the basement and first floors. The corridor was shortened to a single stretch on the second floor, requiring students to walk through a wood working room to get to one of the stairwells, and the upper floor had no corridor at all. Except for a skylit basement-level forge shop, the rooms and stairs appeared to be placed arbitrarily.[7] The fact that a small addition was added to the north side in 1900 (the top right corner on the plans) does not change these basic problems. Wheelwright's reputation as a school architect is hard to fathom from these two examples; it was more likely gained from his many grammar and primary school designs and the popularity of his book, School Architecture.

St. Louis

Other large cities began to include architects as part of the educational administration even earlier than Boston. Most began with a regularly used though unofficial architect, like Chicago and Augustus Bauer, and later created a permanent position. Cleveland, for example, appears to have relied on only two architects during the 1860s and 1870s, but did not authorize a School Board Architect until 1894.[8] Chicago and St. Louis both instituted School Board Architects in the early 1880s, though neither were full time jobs. The first St. Louis Board Architect, H. William Kirchner, was elected in 1881 to a one-year term. His role was laid out in the Annual Report for that year: "The Architect is charged with the supervision of the janitors in over a hundred schools and the repairs and permanent improvements upon all the Board's property, as well as with the work of an architect connected with the new buildings."[9] Kirchner served until 1883 and was succeeded by Otto J. Wilhelmi, the first three-year term Architect, who beat out five other candidates. Wilhelmi was also the first Board Architect required to devote all of his time to the office. In 1886, Kirchner returned to the post, and again held the job for one term. The Board Architect position was abolished in January 1889 and architectural work was contracted individually. Architects were paid 3% for a design and 2% for specifications.[10] Following a scandal in the construction of the new Central High School in 1892, the Board Architect job was resurrected, and Kirchner's younger brother and partner August H. Kirchner was appointed to the office. August Kirchner was reelected in 1893 and 1896. Then in 1897 the administration of the St. Louis school system was reorganized and the Commissioner of School Buildings job was created.[11] The first architect to occupy that position was William B. Ittner, who would become the preeminent school architect in America.[12]

Ittner's first move as Commissioner was to reorganize the office to run as a private practice "on a strictly business basis."[13] According to the Annual Report for that year:

> He found it necessary to provide an efficient office force of draughtsmen, etc., and maintain a rigid inspection of all work. That this plan has been successful is shown not only by a considerable reduction in the cost of maintaining the old buildings, but also by a corresponding reduction in the cost of our new buildings. *This business spirit has prevailed throughout the department during the past year* (italics mine).[14]

The Building Department had been the source of considerable scandal under the previous administration, especially in the handling of janitorships. Ittner changed the departmental requirements so that applicants for janitor positions had to pass competitive examinations, and he cut their $100-125 per month salaries in half.[15] This emphasis on economy reflects the school boards' concern with utilizing limited resources in the most effective manner.

Ittner's five high school buildings for St. Louis were nationally renowned (see Chapter 2). By 1910, he was receiving so much outside work from school boards across the United States that he resigned as Commissioner of School Buildings and became a special "Consulting Architect" while Hans C. Toensfeldt took over his former position.[16] Acting architect J.A. Whitlow replaced Toensfeldt in May 1914. Four months later, Rockwell M. Milligan was elected Commissioner of School Buildings after defeating nine challengers on the fifth ballot.[17] One of Milligan's first actions was to request a special committee to investigate the Building Department left to him by his predecessors. A main concern was the use of outside architects (i.e., Ittner) to design buildings for the department. Milligan felt the 3% fee that the Board had been paying to Ittner as Consulting Architect was unnecessary; he reorganized the department and eliminated Ittner's position in 1915. Milligan claimed that his reorganization saved the building department over $170,000 in the first year, a figure that was sure to make the Board happy.[18] Rockwell Milligan remained Commissioner of School Buildings in St. Louis until his death in 1929.

Chicago

The school board architect's job proved to be somewhat less stable in Chicago during the same time period.[19] Political tensions in St. Louis was rather mild compared to those in Chicago. In the larger city, Board Architects were required to deal with a firmly entrenched power structure and patronage system that impacted school building construction. The Chicago mayor's ability to appoint Board of Education members created an atmosphere rife with corruption and graft. This appointment method, wrote George Counts in 1928, "bound the school system to the city hall and has subordinated the interests of education to the vagaries and vicissitudes of partisan politics."[20]

In early 1881, the Board of Education first began to establish the parameters of its newly created position. The Board insisted that its Architect "give diligent superintendence" to all buildings under construction and be held responsible for all work certified.[21] A foreshadowing of future problems occurred, however, in February when architect Augustus Bauer's "disrespectful" letter to the Board concerning the Cottage Grove School was returned to the architect and censured for "containing a gross and unwarranted attack upon a member of the Board."[22] The "Architect and Superintendent of Construction" for the Board of Education was officially recognized in 1881, and during that school year the Board held its first elections for the position. Frederic Baumann was elected from a field of nine candidates on February 23, 1882, after the Board had voted unsuccessfully eight times in the previous five months. Baumann resigned in June and was replaced by Julius Ender. Four months later James R. Willett began serving a one-year term. Willett designed the North and South Division High School buildings, for which he received $800 each.

In January 1884, John J. Flanders was elected and the Board began to enjoy their first period of stability in the office of Board Architect. Flanders served until December 1888.[23] His fees increased over the years, and when he designed West Division High School in 1886 he received $3,500. During his two terms (1884-88 and 1891-92), Flanders designed three high schools. His schools were standard for their time but raised the ire of critics who considered them too elaborate. An editorial in the Chicago Daily Tribune in 1888 entitled "Wanted – An Architect" called for Flanders' resignation on the grounds that his schools were poorly designed, ornate and costly.[24] During Flanders' second term as Board Architect, The Inland Architect and News Record defended him against an attack in the Chicago Post.[25] The main issue this time was not competence but greed. The Post was outraged that Flanders received $42,000 for his work; The Inland Architect and News Record pointed out that this was for $2 million of construction and that the Board Architect's contract was for a percentage rather than a salary. However, the 21% commission reported by the Post does not agree with the official terms of Flanders' employment as they were reported in the Proceedings of the Board of Education of the City of Chicago – 1 ¼% for preparing drawings for new buildings, 1 ¼% for superintending and preparing working plans, 5% for repairs greater than $15,000 and 4% for lesser repairs.[26] Flanders' inflated commissions may have led to his downfall.

John Flanders was replaced in February 1893 by August Fiedler, who was the first Board Architect to be paid a straight salary ($6,000). The Board also solidified the Board Architect's job duties. Under the previous system, architects were paid percentages for designing and superintending. The Board had no control over the architect's staff, no records were kept, and the architect was not required to attend all Board meetings. In an effort to achieve "entire control" over the building process, the Board of Education amended its rules. The architect was now paid a salary, provided with an office in City Hall and a staff, and required to provide a full accounting of his actions to the Board.[27] These changes not only gave the Board tighter control over the Architect's Department; they also saved money. According to the Committee of Buildings and Grounds report, "From a standpoint of economy, a saving has been accomplished in the architect's department [because of the changes] of from ten to fifteen thousand dollars per year."[28]

August Fiedler held the position of Board Architect until December 1893. His next two successors, Normand Patton and William Mundie, apparently ran into trouble with the Board of Education. Patton, a well-respected local architect, lasted almost two years before problems arose. On September 30, 1898, he read a statement to the Committee of Buildings and Grounds which, as described in the Proceedings of the Board of Education of the City of Chicago, "contained language which was disrespectful, insulting and impertinent to this committee, and impugned the standing, reputation, integrity and honesty of a member of said committee and of this board . . ."[29] As a result of this unnamed offense, the Board charged Patton with insubordination, violation of discipline, "impugning the honesty and integrity" of a Board member, and willful disobedience. He was found guilty of the second and third charges and removed from office in November.[30] Patton's successor was William Mundie, who also appears to have had problems with the Board.[31] Mundie, the designer of six high school buildings, resigned after almost five-and-a-half years of service in 1904. Board President Graham H. Harris reported to the Board that Mundie was leaving "on account of his health."[32] The historical record suggests that Mundie was forced out of office because of problems with the Board's corrupt construction practices. A 1910 editorial in The Western Architect commented on the situation:

> Mundie served Chicago through its school board for five years and it well nigh ruined his physical health, but his sturdy Scotch-Canadian mentality would not allow the nagging of a politically domineering board to get on his nerves. He finally decided that the game was not worth the candle and resigned. Patton tried it, and his ethical training as well as his honesty received such a shock and was so unyielding in its mental attitude, that both mentality and health were affected when his uncompromising resistance toward trickery and chicane [sic] caused him to be discharged.[33]

None of this had been mentioned in an earlier article on Mundie, but the author made a veiled reference to possible problems:

> For years political affiliations were of paramount importance and a little merit here and there was somewhat essential. Today merit rules and politics is outside the [architectural] department, but not so of the board of education. Political parties pay off their political debts by appointments; and questions of nationality, sectional denominations, capital and labor, in fact any pact or organization of vote getting power is given consideration for seats upon the board and here friction and faction bother the heads of the executive department.[34]

The political friction between the Chicago Board of Education and its Architect reached its peak during the tenure of Dwight Heald Perkins.[35] Perkins replaced Mundie in 1905. He was the first Board Architect required to take a competitive qualifying examination administered by the Civil Service Commission.[36] Perkins beat six competitors for the position after the Board of Education cancelled the first scheduled examinations the previous autumn when only four local architects applied for the job.[37] The Board Architect position was probably unattractive to most architects because of its political nature and low pay, and the generally low status of school buildings in the hierarchy of architectural design.[38] Despite these obstacles, Perkins was apparently urged to apply for the job by members of the City Club of Chicago, a group of politically active citizens devoted to fighting corrupt politicians and promoting the public welfare.[39]

Dwight Perkins designed over forty school buildings for Chicago, including Schurz (1909) and Bowen (1909) High Schools.[40] He would be acknowledged as a leading authority on school design during his tenure as Board Architect. But not everyone supported his work. In 1910, Board President Alfred R. Urion ordered Perkins to either give up his outside architectural practice or resign his position. When Perkins refused, Urion suspended him on charges of "incompetence, extravagance, and insubordination."[41] Urion, who was corporate counsel for the powerful Armour Industries, believed in running the schools like a business; in 1910, he said "As long as I remain the president of the board of education it will be conducted on economical corporation lines."[42] Urion felt Perkins was refusing to "fit in" with his system by creating buildings that were costly and poorly designed. The charges were the culmination of a deteriorating relationship between Perkins and the Board. There is no way of knowing exactly what the true nature of the dispute was, but certain political incidents between 1905 and 1910 can be reasonably assumed to have instigated problems. According to various sources, Perkins had angered the Board numerous times by such actions as refusing to use cut stone ornamentation (thus upsetting the cut stone lobby), firing a politically connected building superintendent, hiring five English draftsmen, and rejecting flooring materials manufactured by a company in which Urion had a major interest.[43] Perkins was tried in a public hearing that lasted over two months and featured Superintendent Ella Flagg Young and school architects William B. Ittner and R. Clipston Sturgis testifying to his competence and ability. Despite public and press opinion (and common sense), the Board found Perkins guilty of extravagance and removed him from office on May 1, 1910. He was replaced by Alfred F. Hussander, who served for eleven years and designed numerous high schools around the city.

The Rise of a Profession

School board architects were relatively common in America's larger cities by the early 1900s. In addition to the cities already named, places like New York City, Denver, Los Angeles, Minneapolis and Seattle established permanent architect positions under the board of education's control. Other cities attempted to direct schoolhouse design and construction efforts through alternative relationships. Six years after Boston abolished the Municipal Architect position and terminated Edmund M. Wheelwright, the Board of Education created a three-member Schoolhouse Commission. The Commission was given authority over planning and constructing new school buildings, choosing new school sites, and repairing and altering old buildings. The Commission in turn set up a "School-house Department" for selecting architects to design new buildings. According to a contemporary account, the procedure for creating a new school in Boston combined both loose and tight restrictions:

> The School-house Department, being instructed by the School Committee that a new building is needed, studies the requirements, searches for and advises as to the site, recommends the amount it is desirable to spend, and procures the appropriation. Then, having carefully prepared a statement of the requirements, it selects from the general body of private practitioners one who seems likely to handle the work satisfactorily and then leaves the selected architect free to prepare his design and specification, subject always to the correction and final approval of the Commission itself.[44]

Selected architects were paid 5% of the gross construction cost and 2 ½% for "domestic engineering, material and labor ... the Commission reserving an equal amount to cover the cost of preparing in its own office the drawings and specifications that these important elements call for."[45] School systems in Detroit and Oakland used similar methods.

The various arrangements with school architects around the country emphasize two important aspects of school architecture at the turn-of-the-century: the importance of economy to public school systems and the degree to which school architecture was becoming a specialization. Having an architect associated with the board was a way to decrease costs while increasing control over the design and construction process.[46] Many of these positions were initially created to counter corruption and cronyism as well as to economize. Unfortunately, the result was not always a more honest system, since the school boards themselves were not free from illegal activity. And the history of school board architects in places like Chicago suggests a fundamental flaw in the system: architects were severely limited in their designs because school boards made the decisions on which sites to purchase and how large the schools would be. This combined with a seemingly ever-present pressure on architects from board members to patronize certain contractors or suppliers to constrict the typical board architect's practice.

Despite continued political problems, the school architect's prominence as a specialist continued to grow. And not all school specialists associated themselves with school boards. In his 1884 publication, Book of Designs for School Houses, and Suggestions as to Obtaining Plans, and How to Heat and Ventilate School Buildings, Gurdon P. Randall listed thirty-two Midwestern educational buildings of his own design, as well as "several hundred Ward School buildings scattered over the country, South to the Gulf States, East as far as Pennsylvania and Vermont, West to Colorado, North to Minnesota, and within a radius of five hundred miles of this city [Chicago] a great many."[47] Randall's boasting remains unsubstantiated, but a fellow Midwestern architect, F.S. Allen of Joliet, Illinois, appears to be one of the earliest architects to develop an almost exclusively educational practice.[48] The American School Board Journal published examples of Allen's work throughout the 1890s (fig. 3.8).[49] He constructed Romanesque designs in Michigan, Wisconsin, Illinois, Iowa, Indiana and Minnesota. At the 1893 World's Columbian Exposition in Chicago, Allen was granted a separate exhibit – according to The American School Board Journal, he was the only architect awarded such an honor.[50] In 1898, Allen won a competition to design a new high school for Trenton, New Jersey, thus significantly expanding the range of his practice.[51] Later in life he moved to California and continued to design schools in the San Diego and Los Angeles areas.

F.S. Allen was a very successful member of a class of school architects that arose in the 1890s. He was able to proffer his services to many small towns in the Midwest that were not large enough to need or afford an official school board architect. Allen's abilities were no doubt spread by word of mouth, enabling him to tap into the broad network of school system administrators that met periodically at state and national conventions. Architecture became an increasingly important topic of discussion at such conventions, as demonstrated by the records of the National Education Association. The NEA began meeting annually in 1857; the first paper on any aspect of architecture, "School Architecture," by William F. Phelps, was read in 1869. Before 1892, only three more papers involving school architecture were presented.[52] In the next seven years, speakers gave eight architectural papers (including an 1897 presentation on "Schoolhouse Construction" by St. Louis's August F. Kirchner), which reflecting a growing interest in architectural topics. Beginning in 1900, an architectural paper was read almost every year.[53]

While networking among educators undoubtedly helped architects like F.S. Allen, he also increased his exposure, like many other school architects beginning in the mid-

1890s, through advertisements in the nation's leading periodical for school architecture – The American School Board Journal (fig. 3.9). Prior to the 1930s, educational journals paid far more attention to school architecture than architectural journals. The American Journal of Education began presenting drawings and articles in the 1860s, and published over 800 woodcuts of school buildings during its twenty-six-year run.[54] Other educational journals, like the New-England Journal of Education, soon followed suit. The country's leading architectural periodicals, on the other hand, were rather disinterested in school architecture. The American Architect and Building News, founded in 1876, featured only nineteen illustrations of public school buildings – many only speculative designs – in its first decade of existence, along with a handful of one-two paragraph commentaries on ventilation and heating.[55] Even up into the early 1920s, lengthy articles on school buildings or substantive discussions of school architecture were absent from the pages of The American Architect and Building News. The journal's coverage of school buildings typically consisted of line drawings (later photos and a few plans), brief discussions of specific topics in the editorial notes, or a paragraph or two on schools within a longer story on the architecture of cities like Chicago or Philadelphia.[56] Architects and educators seeking help in school architecture matters would have found The American Architect and Building News disappointing.[57]

A number of other architectural journals also began publishing in the 1890s, such as the Architectural Record, Architectural Review, The Brickbuilder, and Architecture and Building, but none matched The American School Board Journal in its dedication to school architecture news and issues.[58] Founded in 1891, the journal was "Devoted to the

Interests of School Boards, School Officials, Teachers and Parents," though its features and editorials leaned heavily toward administrators.[59] By 1909, however, a changed motto reflected important educational developments: "Teachers and Parents" were dropped in favor of "Superintendents and School Architects." The American School Board Journal's second issue (April 1891) began the practice of including an illustration and written description of at least one school building every month; by the sixth issue, some floor plans were reproduced.[60] Late in the first year of its run, the journal started a regularly occurring section on "Heating and Ventilation." In 1892 substantive articles on architectural issues appeared, such as "Our School Buildings: Their Construction, Heating, Ventilation, School Hygiene, Etc.," and "Facts for Building Committees."[61] The journal started grouping a number of building illustrations on one page (often the title page) under the headings such as "Recent Designs in School Buildings" or "Modern School House Designs" in 1894. Beginning in 1901, each year included a "Schoolhouse Issue" devoted primarily to architecture. A semi-regular section on "School Buildings" debuted in 1902. And by the 1910s, every issue featured at least one article on school architecture, illustrated with plans and photographs, in addition to a section on "Building News" that chronicled school construction across the United States.

The American School Board Journal's interest in school architecture helped to disseminate contemporary design examples and theories to educators and architects throughout the nation. Its coverage of such issues was unequalled. In comparison, the School Review, founded in 1893 and shortly thereafter the leading American journal for secondary education, did not include an article on a school building until 1901. After a brief period in 1903 when it published four articles on individual school buildings and one on "The Evolution of the Little Red Schoolhouse," the School Review printed only two more building articles and an essay on interior decoration by the end of 1906; after that only one more architecturally oriented article (or photograph) appeared before 1920.[62]

## Conclusion

The secondary schoolhouse's transformation between 1880 and 1920 was carried out by a relatively new figure in the architectural world – the school specialist. Men like Gurdon Randall and F.S. Allen offered their services to school boards despite the lowly status of school design in the architectural hierarchy. They were "free-lance" architects who specialized in school design but did not work for a Board of Education. By the 1890s, however, school boards in larger American cities began to appoint or elect permanent Board Architects to oversee the design and construction of their schoolhouses. In addition to Edmund Wheelwright, William B. Ittner and Dwight Perkins, other school architects rose to prominence within their field, including Charles B.J. Snyder in New York, E.F. Guilbert and James O. Betelle in New Jersey, Frank S. Barnum and Walter R. McCornack in Cleveland, Frank Irving Cooper and Walter H. Kilham in Boston, and James J. Donovan in Oakland. The histories of the Board Architect position in Chicago and St. Louis demonstrate how the same job could offer different experiences and lead to different results.

[1] "Methods of Selecting Architects," The American School Board Journal 40 (April 1910): 8.

[2] Charles W. Eliot, Address to the Public Education Association of Philadelphia (January 1904), quoted in Fiftieth Annual Report of the Board of Education of the City of St. Louis, Mo. (1903-04) (St. Louis: Shallcross Printing and Stationary Co., 1905), 29-30. For a comparable description of the St. Louis Commissioner of School Buildings position, see note 11, infra. A 1925 NEA report on schoolhouse standardization was more specific in listing the "Essential Qualities" of a school architect: (1) Familiarity with educational practices; (2) Open-mindedness; (3) Originality and extended experience in school architecture; (4) Professional spirit; and (5) Executive ability. National Education Association Committee on School House Planning and Construction, Report of Committee on School House Planning, Frank Irving Cooper, Chairman (Washington: National Education Association, 1925), 12.

[3] Proceedings of the Board of Education of the City of Chicago (1878-79) (Chicago: n.p., n.d.), 14. Bauer's pay was raised to $600 per building three months later. Ibid., 86.

[4] Ibid., 91.

[5] Edmund March Wheelwright (1854-1912) came from a prominent Boston family. He studied architecture for a year at MIT after receiving a degree from Harvard in 1876, then went to work for Peabody and Stearns, McKim, Mead and Bigelow, and E.P. Treadwell. In 1881 Wheelwright left for an extended European trip. He opened his own practice in Boston in 1883. Five years later Parkman B. Haven became a partner. Wheelwright was elected a Fellow of the American Institute of Architects in 1891. In 1910, Wheelwright suffered a mental breakdown and was sent to a sanitarium; two years later he committed suicide. "Edmund M. Wheelwright," A Biographical Dictionary of Architects in Maine (Augusta, ME: Maine Historic Preservation Commission, 1984); "John Wheelwright (American Poet, 1897-1940)," http://www.english.uiuc.edu/maps/poets/s_z/wheelwright/bio.htm.

[6] For a brief history of the Municipal Architect position, see Francis W. Chandler, Municipal Architecture in Boston: From Designs by Edmund M. Wheelwright, City Architect, 1891 to 1895 (Boston: Bates & Guild Company, 1898), 1-4.

[7] For descriptions and plans of Brighton High School and Boston Mechanic Arts High School, see Edmund M. Wheelwright, School Architecture (Boston: Rogers and Manson, 1901), 207, 223-240; Idem, "The American Schoolhouse. II," The Brickbuilder 6 (December 1897): 267-269 (Brighton); Idem, "The American Schoolhouse. X," The Brickbuilder 7 (August 1898): 155-156 (Mechanic Arts).

[8] Eric Johannesen, Cleveland Architecture, 1876-1976 (Cleveland: Western Reserve Historical Society, 1979), 27; Ann M. Giblin, "Factors Affecting Nineteenth-Century Architecture in Cleveland School Buildings," Journal of the Cuyahoga County Archives 1 (1981): 36.

[9] Twenty-Eighth Annual Report of the Board of President and Directors of the St. Louis Public Schools (1881-82) (St. Louis: Slawson & Co., Printers, 1883), 37-38. The Architect's job description was further delineated in the Rules of the Board of Education. According to Rule 45: "1. It shall be the duty of the architect to draft all necessary plans, specifications, contracts, etc., that may be required for the execution of all new buildings, repairs, and improvements that may be decided upon by the Board or the Building Committee.
2. He shall take charge of the execution of all such work connected with the schools and school property, and superintend it, from its inception to its final completion." Rule 46 required the architect to give a bond in the sum of $10,000. Fourteen other rules covered such topics as organization, employees and office hours (each weekday from 4:30 – 6:30 p.m.). Ibid.

[10] Thirty-Fifth Annual Report of the Board of President and Directors of the St. Louis Public Schools (1888-89) (St. Louis: Nixon-Jones Printing Co., 1890), 22; Landmarks Association of St. Louis, Inc., "Education and Design: The St. Louis Public School Buildings," Landmarks Letter 22 (March/April 1987): 2.

[11] The duties of the new Commissioner of School Buildings according to the Board of Education Charter were outlined as follows:
SEC. 8. The Commissioner of School Buildings shall be appointed by the Board of Education for a term of four years, during which term his compensation shall not be reduced. He shall devote all his time to the duties of his office, and shall be charged with the care of the public school buildings of such city, and with the responsibility of the ventilation, warming, sanitary condition and proper repair thereof. He shall prepare, or cause to be prepared, all specifications and drawings required, and shall superintend all the construction and repair of all of such buildings; shall make report each month to the Board of Education showing in detail the costs of repairs and other work of the previous month on each building, embodying therein the amount of bills outstanding for work ordered by him, and stating specifically the cases where work was done, or ordered, without public letting; shall superintend all the advertisements for bids and the letting of contracts; and shall, within the limits of appropriations theretofore made by the Board of Education for repairs, make all contracts for the repairs of school property except where the cost of such repairs shall exceed the sum of fifty dollars. He shall give bond in such sum as may be fixed by the Board of Education, which shall not be less than ten thousand dollars, conditioned upon the faithful performance of the duties of his office.

SEC. 9. Subject to the approval of the Board of Education as to the number and salaries, the Commissioner of School Buildings shall have power to appoint as many engineers, janitors and other employees and agents as may be necessary for the proper performance of the duties of his department, for whom he shall be responsible, and whom he shall have power to remove . . .The Commissioner of School Buildings may be removed by the Board of Education for cause, by a two-thirds vote of the entire Board. Fiftieth Annual Report of the Board of Education of the City of St. Louis, Mo. (1903-04), 371-373.

[12] William Butts Ittner (1884-1936) was born and raised in St. Louis, where his father was a prominent brick manufacturer who later became a United States Congressman. After graduating from Calvin Woodward's Manual Training School, Ittner studied architecture at Cornell University, receiving a degree in 1887. He then made a European tour before returning to his native city to practice with Eames and Young. After a year, Ittner opened his own office and continued a private practice until his appointment as Commissioner of School Buildings. Ittner designed or consulted on over 500 school buildings in at least 25 states. He was elected a Fellow of the American Institute of Architects in 1891. J.L.M., "William B. Ittner," The Brickbuilder 24 (April 1915): 101; Margaret Mosinger Freedman, "William B. Ittner, The Man and His Work" (M.A. Thesis, Washington University, 1972).

[13] Forty-Fourth Annual Report of the Board of Education of the St. Louis Public Schools (1897-98) (St. Louis: Woodward & Tiernan Printing Co., 1898), 20.

[14] Ibid., 20-21.

[15] Elinor Mondale Gersman, "Education in St. Louis, 1880-1900: A Case Study of Schools in Society" (Ph.D. diss., Washington University, 1969), 104.

[16] See page 65, infra, for a further description.

[17] Printed Record of the Board of Education of the City of St. Louis XXI (1914-15)(St. Louis, 1915): 239-240.

[18] Sixty-Second Annual Report of the Board of Education of the City of St. Louis, Mo. (1915-16) (St. Louis: Board of Education of St. Louis, Missouri, 1916), 17.

[19] The complete list of Board Architects during the relevant time period list is as follows: Frederic Baumann (February 1882 – June 1882), Julius S. Ender (June 1882 – October 1882), James R. Willett (October 1882 – January 1884), J.J. Flanders (January 1884 – December 1888), Charles Rudolph (December 1888 – December 1890), J.J. Flanders (December 1890 – February 1893), August Fiedler (February 1893 – December 1896), Normand S. Patton (December 1896 – November 1898), Fred A. Fiedler (acting architect November 1898 – December 1898), William B. Mundie (December 1898 – March 1904), Robert B. Williamson (acting architect April 1904 – June 1905), Dwight H. Perkins (June 1905 – April 1910), Arthur F. Hussander (acting architect February 1910 – December 1912; architect January 1913 – 1921). List compiled from Proceedings of the Board of Education of the City of Chicago (1875-1921).

[20] George S. Counts, School and Society in Chicago (New York: Harcourt, Brace and Co., 1928), 36.

[21] Proceedings of the Board of Education of the City of Chicago (1880-81) (Chicago: n.p., n.d.), 83.

[22] Ibid., 90. The contents of Bauer's letter are unknown.

[23] There is no significant biographical information on Flanders. For an obituary, see The Western Architect 20 (June 1914): 58.

[24] "Wanted – An Architect," Chicago Daily Tribune (January 22, 1888): 4.

[25] "The Chicago School Board and Its Architect," The Inland Architect and News Record 20 (December 1892): 48.

[26] Proceedings of the Board of Education of the City of Chicago (1891-92) (Chicago: n.p., n.d.), 174.

[27] Thirty-Ninth Annual Report of the Board of Education of the City of Chicago (1892-93) (Chicago: Public Schools of the City of Chicago, 1894): 22.

[28] Ibid., 193. The creation of the new position was not without its detractors. An anonymous writer in The American Architect and Building News criticized the plan: "The Board of Education in this city has this month decided on a plan which, if carried out with the success usual in such bodies, will be fruitful of most grave results. The idea is no less than to establish a Building Bureau. Lately, work on school-buildings has been done unusually well, and at a very reasonable rate. The Board, however, did not seem to feel it was getting the most for its money, and has, consequently, created this Building Bureau." "Chicago," The American Architect and Building News 39 (February 4, 1893): 72. A month later the doubts continued: "All may – will – undoubtedly go right at first, but even should the head of the bureau continue to be an honest man, superior to temptation, there will doubtless be beneath him men more powerful than himself, as being the tools of prominent politicians. Such a state of things could hardly fail to bring about undesirable results, and an architectural bureau, with its contact with contractors and men of different trades, must ever be a dangerous place into which to introduce the conscience of the average politician, ever prone as it is to constitutional weakness." "Chicago," The American Architect and Building News 39 (March 4, 1893): 135.

[29] Proceedings of the Board of Education of the City of Chicago (1898-99) (Chicago: n.p., n.d.), 291.

[30] Ibid., 343. The offended Board member seems to have been James Downey, a member of the Committee on Buildings and Grounds who abstained from the removal vote. According to a 1952 article, Downey was a contractor who "had precipitated the discharge of the preceding school architect, who

charged that Downey tried to make him throw jobs to high bidders." "Dwight H. Perkins – father of today's "new school ideas," Architectural Forum 97 (October 1952): 123

[31] William B. Mundie (1863-1939) was born and raised in Canada, where he graduated from Hamilton Collegiate Institute. Mundie moved to Chicago in 1884 and immediately obtained a job as a draftsman for William LeBaron Jenney. In 1891, Mundie became Jenney's full partner. Elmer C. Jensen joined the partnership in 1895. In addition to his schoolhouses, Mundie was involved in the design of many Chicago commercial buildings. After leaving the Board of Education position, Mundie continued to practice until his death in 1939. Henry F. Withey and Elsie Rathburn Withey, Biographical Dictionary of American Architects (Deceased) (Los Angeles: Hennessey & Ingalls, Inc., 1970), 434.

[32] Proceedings of the Board of Education of the City of Chicago (1903-04) (Chicago: n.p., n.d.), 611.

[33] "Charges Against Architect Perkins by the Chicago School Board," The Western Architect 15 (March 1910): 25.

[34] "The Architect and the Chicago Schools," The Western Architect 4 (July 1905): 6. Later writers offered similar observations without citing their sources; see, e.g., "Dwight H. Perkins – father of today's "new school ideas," 123; Perry R. Duis and Glen E. Holt, "The Politics of Architecture," Chicago Magazine 10 (October 1981): 134 ("[Perkins'] two predecessors, William B. Mundie and Norman [sic] S. Patton, had been competent if not highly creative architects, and both had been hounded out of office by a school board more interested in rewarding cronies than in good architecture.").

[35] Dwight Heald Perkins (1867-1941) was born in Memphis and moved to Chicago as a youth. He studied architecture at M.I.T. for two years and briefly worked in H.H. Richardson's office before returning to Chicago in 1888. Perkins obtained a job with Burnham and Root and soon became one of the chief administrators. In 1894, he opened his own office. In the early 1900s, Perkins was a leading figure in the development of Chicago's extensive park system. While serving as Chicago Board of Education Architect from 1905-1910, Perkins carried out a private practice in partnership with J.L. Hamilton; after his dismissal, the firm added W.K. Fellows. Perkins, Fellows and Hamilton designed schools across the country, although Perkins cut back on his work significantly after going deaf in 1925. His son, Lawrence B. Perkins, became a significant educational architect in his own right with the firm Perkins, Wheeler and Will. Eric Emmett Davis, Dwight Heald Perkins: Social Consciousness and Prairie School Architecture (Chicago: Gallery 400 at the University of Illinois at Chicago, 1989); Donna R. Nelson, "School Architecture in Chicago during the Progressive Era: The Career of Dwight H. Perkins" (Ph.D. diss., Loyola University, 1988). For his later work, see Dwight H. Perkins, W.K. Fellows and J.L. Hamilton, Educational Buildings (Chicago: Blakely Printing Co., 1925).

[36] Kevin D. Murphy, "Dwight Heald Perkins (1867-1941): Architect of Reform," 1986, TMs, p. 11, author.

[37] "Want to be School Architect," Chicago Daily Tribune (February 25, 1905), 2. The other architects were George O. von Nerta (who would unsuccessfully attempt to become District of Columbia Municipal Architect in 1909), Robert B. Williamson (the acting architect), John Hulla, Harry W.J. Edbrooke, and Minard L. Beers. The cancelled examination was reported in The American Architect and Building News 86 (October 1, 1904): 10. ("Finding, however, that only four architects practising [sic] in Chicago presented themselves to attempt the examination, while no aspirants from other places appeared on the day named, the Board of Education decided not to hold the examination, but to postpone it and re-advertise for the sake of securing, if possible, a greater number of competitors from whom to make their selection.").

[38] Perkins' salary was either $7,000 or $8,000 for full-time work; his predecessors had all made $6,000, a figure that was unchanged from 1893-1905.

[39] Eleanor Ellis Perkins, "Perkins of Chicago," 1966, TMs. p. 104, Burnham Library, Art Institute of Chicago. Perkins was a member and co-founder of the City Club. Descriptions of the City Club's educational activities can be found in David John Hogan, Class and Reform: School and Society in Chicago, 1880-1930 (Philadelphia: University of Pennsylvania Press, 1985), 160-165; and Julia Wrigley, Class Politics and Public Schools: Chicago 1900-1950 (New Brunswick, NJ: Rutgers University Press, 1982),229-230.

[40] For a list of Perkins' schools (though incomplete), see Nelson, "School Architecture in Chicago during the Progressive Era," 142-143.

[41] "'Ajax' Perkins Struck By Bolt," The Chicago Daily Tribune (February 4, 1910): 1.

[42] "Architects Seek to Aid Perkins," The Chicago Daily Tribune (February 5, 1910), 3.

[43] Davis, Dwight Heald Perkins, 12; "Dwight H. Perkins – father of today's "new school ideas," 123-124; Duis and Holt, "The Politics of Architecture," 136.

[44] "Boston Public School Buildings," The American Architect and Building News 93 (January 4, 1908): 1. See also, R. Clipston Sturgis, "The Schoolhouse Department of Boston, Mass.," The American School Board Journal 46 (April 1913): 12-13, 57-58.

[45] Ibid., 2.

[46] A discussion of the Board Architect's working conditions at the end of this time period can be found in Rockwell M. Milligan, "The School Board, the Architect and the Builder," The American School Board Journal 51 (September 1920): 37-40, 95, 97.

[47] Gurdon P. Randall, Book of Designs for School Houses, and Suggestions as to Obtaining Plans, and How to Heat and Ventilate School Buildings (Chicago: Knight & Leonard, Printers, 1884), n.p. Randall unsuccessfully campaigned for the Chicago Board Architect position in 1881. See Proceedings of the Board of Education of the City of Chicago (1880-81) (Chicago: Board of Education, 1881), 21.

[48] There is hardly any biographical information on Allen (1860 – 1930). The best source is Withey and Withey, Biographical Dictionary of American Architects (Deceased), 17: "Retired some years ago, Mr. Allen formerly had an architectural office in Los Angeles, while in later years he made his home at Pasadena. In that city he was known to have designed a number of buildings, also schools in many different locations, among which were the High School and State College at San Jose, San Diego High School, and High Schools at San Pedro and Covina." An early article in The American School Board Journal fills in some of the details of his early career: "F.S. Allen was born in Galesburg, Ill., Jan 7th, 1860, and is a comparatively young man ... His work was brought into prominence two years ago when he began to devote his entire time to school house work. He had spent several years in Europe studying architecture and upon his return opened an office in Streator, Ill., where he remained until May of 1887 when he came to Joliet to reside ... During the past several years Mr. Allen has made annual visits to Europe to study the progress of school architecture in that country. He was among the first members of the Western Association of architects [sic], organized in Chicago in 1884, and later became a member of the American Institute of Architects." "A School House Architect," The American School Board Journal 4 (November 1892): 4.

[49] See e.g., "Allegan High School," The American School Board Journal 2 (September 1891): 12; "A New High School Building," The American School Board Journal 2 (October 1891): 10; "Hackley School, Muskegon, Mich.," The American School Board Journal 2 (November 1891): 10; "High School Building, Galva, Ill.," The American School Board Journal 11 (July 1895): 12.

[50] "An Architect's Exhibit," The American School Board Journal 5 (October 1893): 3.

[51] "Architect Allen's Advance," The American School Board Journal 16 (March 1898): 11.

[52] A.J. Rickoff, "Schoolhouse Plans" (1873), Charles Smart, "The Chemical Examination of Air as Applied to Questions of Ventilation" (1882), and John S. Billings, "Determining the Merits of the Heating and Ventilation System of a School Building" (1882). Listed in National Educational Association, Fiftieth Anniversary Volume 1857-1906 (Winona, MN: National Educational Association, 1907), 663.

[53] As the years progressed, some of the better-known school architects appeared. For example, William B. Ittner read papers at NEA conventions in 1904, 1908 and 1912, New York's C.B.J. Snyder in 1905, and Dwight Heald Perkins in 1912 and 1921. Architects also appeared at other meetings; for example, William Ittner presented "The Cost of School Buildings" at a meeting of the National Association of School Accounting Officers in 1915, and Rockwell Milligan presented "The School Board, the Architect and the Builder," to the National Association of School Accounting and Business Officials in 1920.

[54] Richard Emmons Thursfield, Henry Barnard's American Journal of Education (Baltimore: Johns Hopkins Press, 1949), 249.

[55] See e.g., "Lighting Schoolhouses," The American Architect and Building News 1 (August 26, 1876): 275; "Schoolhouses," The American Architect and Building News 1 (November 18, 1876): 369; "New York Schoolhouses," The American Architect and Building News 3 (February 9, 1878).

[56] See e.g., "Chicago," (February 4, 1893): 71-73; "Chicago," (March 4, 1893): 134-135.

[57] The journal's first lengthy discussion of school architecture as a whole (and the only one between 1890 and 1920) was contained in a reprint of a British report on school buildings: "The Essentials of School Buildings," The American Architect and Building News 82 (October 24, 1903): 28-30.

[58] On the nature of these early architectural journals, see Mary Woods, "The First American Architectural Journals: The Profession's Voice," Journal of the Society of Architectural Historians 48 (June 1989): 117-138.

[59] For a brief history of The American School Board Journal's first twenty-five years (and an outline of its philosophy), see William George Bruce, "The Story of a Publication," The American School Board Journal 52 (March 1916): 15, 82.

[60] "The Lawrence High School," The American School Board Journal 1 (April 1891): 5; "The Young School Building, St. Joseph, Mo.," The American School Board Journal 2 (August 1891): 11.

[61] Valentine Browne, M.D., "Our School Buildings: Their Construction, Heating, Ventilation, School Hygiene, Etc.," The American School Board Journal 4 (February 1892): 11; Albert P. Marble, "Facts for Building Committees," The American School Board Journal 4 (May 1892): 6.

[62] Between 1893 and 1920, the School Review published the following architecture-related articles: J. Stanley Brown, "The Joliet Township High School," School Review 9 (September 1901): 417-432; Franklin Spencer Edmonds, "The Central High School of Philadelphia: II. The New Buildings," School Review 11 (April 1903): 237-245; Walter Sargent, "The Evolution of the Little Red Schoolhouse," School Review 11 (June 1903): 435-455; G.W. Wharton, "High School Architecture in the City of New York," ibid., 456-485; W.K. Wickes, "The New Building of the Syracuse High School," ibid., 495-508; William E. Hatch, "A Modern High School Building," ibid., 509-520; George H. Locke, "The High School of Commerce, New York City," School Review 11 (September 1903): 555-562; Frank H. Beede, "The Public

High School Building at New Haven, Conn.," School Review 13 (February 1905): 89-104; Charles D. Larkins, "The Manual Training High School, Brooklyn, New York," School Review 13 (May 1905): 741-757; Walter J. Kenyon, "The Interior Decoration of Schools," School Review 14 (November 1906): 625-634; Leonard V. Koos, "Space-Provisions in the Floor-Plans of Modern High-School Buildings," School Review 27 (October 1919): 573-599.

# Chapter Four

## <u>"HEALTH" & "SAFETY"</u>

> The school-house is a permanent affair. Other matters may be changed with less ceremony; a building stands for two or more generations. If it is faulty in its method of lighting, it will send out every seven years its quota of children all affected more or less with a tendency to weakness of eyes, near-sightedness, and to nervous dyspepsia and irritability of temper. If the ventilation has been defective, and a remedy has been sought by opening the windows, so as to admit cold air from the bottom, the seeds of future rheumatism and heart-disease have been sowed. If the warming has been imperfect, a long series of colds have weakened the lungs of pupils, and many cases of consumption resulted.
>
> William Torrey Harris, 1887[1]

> The ground plan of the more recent school buildings make lighting, ventilation and heating the central thought. Everything else adapts itself in an ingenious fashion around these leading essentials.
>
> <u>American School Board Journal</u>, 1904[2]

A growing interest in students' health and safety was a driving force behind the type of architectural transformation seen in St. Louis and Chicago between 1880 and 1920. Americans became more aware of their bodies and physical health in the late nineteenth century, partially as a factor of increased advertising of consumer products aimed at cleanliness and personal hygiene and partially as a result of popular scientific theories. In the educational world, the new body and health awareness centered on four main areas pertaining to the schoolhouse: lighting, heating and ventilation, hygiene and physical education. This awareness had a two-fold effect on school architecture: it led to an attempt to create a healthier and safer school building, and it prompted schools to include physical education programs that required new and unique architectural spaces. By 1920, educators and architects had incorporated each of these concerns into the new high school building as the standard form of the modern schoolhouse was established.

Bodies and Health

A number of health-related issues rose to the forefront of American consciousness in the late nineteenth century. Reactions to the cultural upheaval created by publicity surrounding Charles Darwin's theory of evolution, which focused attention on an animal species' fitness (in terms of adaptation to the environment) as a means of survival, inspired many of these issues. Most Americans knew evolution theory, however, through Darwin's popularizers and interpreters, like Herbert Spencer and William Graham Sumner. Spencer applied Charles Darwin's ideas, which had been strictly limited to biological science, to human society. He injected religion and morality into the process of natural selection and introduced the idea of a progression from the simple to the complex in all things; both of these alterations made evolutionary theory more palatable for the masses. A number of American writers, including those who popularized the concept that has since been labeled "Social Darwinism," translated Spencer's ideas into practical terms. Social Darwinism was a debased version of evolutionary theory that is best summarized in the phrase, "survival of the fittest," which applies to all levels of human activity – from nations to business organizations to individual human bodies. Such thinking dovetailed perfectly with an early twentieth century interest in efficiency; the fittest body/business/etc. was obviously the most likely to survive and thrive. Not surprisingly, the business world's upper echelons, symbolized by the caricature "robber barons" of the late nineteenth century, vigorously promoted this idea.[3]

Two late-nineteenth and early-twentieth century intellectual movements that helped to bring bodies and health into the public eye were closely related to evolutionary theory.

Degeneration theory, first proposed by Hungarian Max Nordau, held that mental and physical defects were inherited and their effects intensified in each succeeding generation, leading to inevitable genetic and cultural decay.[4] Nordau's book Degeneration was published in English in 1895 and became a top-ten bestseller in America. Gaining prominence at the same time as Degeneration theory (and eventually surpassing it in influence) was the new "science" of Eugenics. The theory became so popular, as Marouf Harif Hasian, Jr., points out, that "In the first several decades of the twentieth century, 'eugenics' was a term that Anglo-Americans heard about from the time of their infancy. As the word entered the public vocabulary, it colored the way people perceived themselves and those around them."[5] Eugenics involved the belief that rational selection (i.e., science) could overcome natural selection and produce a better human race through selective breeding. The theory's racist underpinnings were hidden behind the same rhetoric of social improvement that characterized the language of early twentieth century educational reform.

Evolutionary theories and their progeny infiltrated everyday life at a time when urbanization and modernization were blamed for a vast array of human maladies. Tuberculosis was America's leading cause of mortality before 1915; it was also the subject of the country's first mass education campaign directed toward a single disease in the early twentieth century. The tuberculosis epidemic brought into sharp focus the inherent danger of large groups of people living and interacting in close proximity with inadequate sanitation and hygiene. Prior to 1880, however, it was erroneously believed that congenitally weak lungs caused "the white plague" and unhealthy personal habits exacerbated the disease.[6] The importance of personal and group hygiene became prominent only after discoveries in germ theory led to a better understanding of diseases' transmission. Less deadly disorders were also on the public mind. Dyspepsia, a generic term for various stomach and intestinal disorders induced by the overconsumption of unhealthy food, was highlighted and targeted by mass market "cure" producers through a multitude of "enemas, laxatives, diets, suppositories, and tonics."[7] Neurasthenia or nervous exhaustion, however, was the physical affliction most identified with modernity. Dr. George Beard's 1881 book, American Nervousness: Its Causes and Consequences, described a gamut of illnesses, including nervousness, insomnia, depression, agitation, headache, cold feet, and ticklishness suffered by many middle- and upper-class urban dwellers (and "brain workers") as a result of overwork and the excessive pace of modern life. To counter this modern ailment, Beard prescribed a regimen of rest, massage, diet, exercise, medicine and mild electric shock. An alternative treatment aimed almost exclusively at women was Dr. Silas Weir Mitchell's "rest cure," which author Charlotte Perkins Gilman condemned in the famous short story, "The Yellow Wallpaper."[8]

While the new urban-industrial world was blamed for causing neurasthenia and other modern ailments, the unquestioned symbol of that same world – the machine – was also used as a model for American bodies. As Thomas Schlereth points out, many advertisers in the Victorian Era equated the human body with the machine: "The human 'machine,' with its familiar assortment of gears, pipes, tubes, and levers (nervous system wires came with electricity), offered the public a convenient image of internal efficiency and precision – 'runs like a machine' became synonymous with good health."[9] Educators and scientists also made these analogies. When Biologist C.-E.A. Winslow presented a long paper on "The Scientific Basis for Ventilation Standards" at the 1911 National Education Association convention, he spoke of the body as "the living machine," and stated that "Our ideal [in ventilation] must be the conditioning of the air so that the human machine may operate at the highest level of health and efficiency."[10]

Medical discoveries and the mass production of consumer health products focused public attention on the American body between 1880 and 1920 like never before.[11] The result was a society that became body-conscious, manifesting physical fears and desires by increasing the consumption of hygiene and health products and expanding their recreational activities. Body consciousness and public health concerns combined in America's larger cities to stimulate a movement to obliterate sickness and ill-health through changes in personal behavior and environmental conditions. Urban reformers fought for parks, playgrounds, settlement houses, improved sanitation systems, and other public health and welfare improvements.[12] They targeted the dark, dusty, poorly ventilated schoolhouse as a leading threat to the health and well-being of young American bodies. Educators and architects enlisted science as an ally to combat this threat. Psychologist G. Stanley Hall spoke for the majority when he declared that "The schoolhouse, which has been called more important for the development of the average child than the home itself, ought to be *a palace of health* (italics mine)."[13]

Schoolhouse Lighting

In 1899, architect Warren Richard Briggs wrote, "Probably more has been written concerning the amount of light required, and the way it should be introduced into the schoolroom, than about any other feature of school construction."[14] This claim was hardly an exaggeration; beginning in the 1870s, the adequate lighting of the schoolroom became one of the most important topics in school architecture design. Before artificial lighting became widely-used in urban schoolhouses by the 1920s, architects literally reshaped and reoriented school buildings in an effort to control the amount and direction of natural light entering the classroom. Light was considered essential for maintaining students' eyesight; it was also prized for its alleged germicidal qualities. Efforts to control light's proper distribution were warranted because of decade's worth of "evidence" that poor lighting had damaged students' eyesight. A 1904 book on schoolhouse lighting, for example, began with three "indisputable" statements: "1. A large percentage of the children in our schools have defective eyesight. 2. This percentage increases as the children advance from one school year to the next. 3. The cause has been traced in part to the school."[15] In the 1910s, writers quoted scientific studies that revealed American students' poor vision. A test of 1,000 Rhode Island school children found 33 1/3% had "defective vision" in one or both eyes; a similar study of 4,765 Chicago students uncovered 35% with problems.[16] Studies like these influenced the rapid evolution of lighting standards during this period. These standards would affect school architecture by changing the typical classroom's size and shape and the school building's overall layout.

The earliest writers on school architecture addressed the issue of adequate lighting in general terms. Henry Barnard's School Architecture suggested that "arrangements for light should be such as to admit an abundance to every part of the room, and prevent the inconvenience and danger of any excess, glare, or reflection, or of cross-light."[17] Allowing light from only two sides of the classroom, through windows located three- to four feet from the floor and not behind the teacher or facing the students, would accomplish this goal. Barnard did not defer to scientific evidence to support his point, but science would soon become the authority in proper lighting matters. The trend can be detected in the work of writers like James Johonnot a few decades later. In School-Houses, Johonnot recognized that "Too little attention is given to admitting light into school-rooms . . . the thought that the admission of light exerts an important influence upon the health and comfort of pupils seems rarely to occur to the builders of school-houses."[18] Pupils were neither to face windows nor be attacked by "cross-lights" (light from windows on two sides of a room at right angles to each other). According to Johonnot, these guidelines were not just common sense observations – they were supported by science. He claimed that "In Germany, late scientific investigation has proved that a large proportion of the pupils of the intermediate and advanced schools have defective sight. In this country the same fact has been noticed."[19] This passage demonstrates two important points: the case for proper lighting as a remedy for students' poor eyesight, and the use of Germany as a model for American school architecture. Both of these practices began in earnest before the 1880s. For example, an anonymous writer in one of the first issues of The American Architect and Builder's News stressed that "Repeated experiment has proved that in schoolrooms lighted by windows on both sides, the children suffer more or less from injured vision; and so important has the subject been considered in Germany, that a law has been passed forbidding such disposition of windows in schools."[20]

Architects, however, were not alone in recognizing the dangers of inadequate lighting. As early as 1875, the Superintendent of the Chicago public schools alerted his colleagues to proper lighting's importance by suggesting that all school buildings be constructed to allow light into the classroom only over the students' left shoulders. "The tendency to assume such awkward and unhealthy positions [of the head], arises from the lack of sufficient light, in still many more from the admission of the light in the wrong direction," wrote Superintendent Josiah L. Pickard.[21] Chicago Board of Education President Norman Bridge included a section on "Increase of Light" in the 1882-83 Annual Report, where he commented on scientific standards for window area and lighting amounts "essential for the preservation of the eyesight of our pupils."[22] Later, in the 1910s, "hygiene experts" with an imprecise understanding of ophthalmology warned of inadequate lighting's disastrous effects on students' eyesight in passages like this:

> There can be no doubt of the fact that there is danger of our children injuring their eyes under the pressure of modern school demands. In fact, the results of careful examinations made in all progressive countries prove conclusively that school conditions are responsible for a large part of the nearsightedness prevalent among the children of the higher grades. It has been determined by many different investigations that myopia (nearsightedness) is not often, if ever, inherited, and is rarely congenital.[23]

Educators and architects clearly understood that the way school buildings allowed light to enter classrooms and corridors played an important role in protecting students' eyesight.

By the 1890s, the idea that pupils should receive light from a unilateral source behind their left shoulder was "a well established rule."[24] Writers in the most important source for school architecture information during this period, The American School Board Journal, cited this rule in numerous articles and editorials emphasizing classroom lighting.[25] The desire for unilateral lighting altered schoolhouse design, as classrooms were rotated in various directions in an effort to comply with the standard. A unique example of this practice can be found in Warren Richard Briggs' Modern American School Buildings (1899). In that book Briggs reprinted a report on his Bridgeport (CT) High School of 1879.[26] Along with the original plans and elevations, Briggs included updated versions that "show the same problem treated in the way I should recommend to-day, after the intervening years of experience in school construction" (figs. 4.1-4.4).[27] The interesting point is that the only major difference in Briggs' revised plans is in the classrooms' orientation; in the updated plan, he rotated them from being perpendicular to the main corridor to parallel with it. This brought the four corner rooms on each floor tighter into the main body of the building. Plans of all types during this period depict classrooms turned in divergent directions like this to allow unilateral lighting. The Bridgeport High School rooms were also altered to have windows only on the exterior walls, thus eliminating "cross-lights." Briggs' revised perspective reflected these changes, with longer banks of windows across the front of the building and a blank wall at one end of the corner rooms. Blank walls such as these became widespread in schools after 1900 though they would have appalled architects of the previous generation. Often the blank wall appears as an awkward space on the building's exterior that interrupts the window rhythm. Photographs of buildings from this time period show many with blank walls, obviously a consequence of following the unilateral lighting rule (figs. 4.5-4.6).

Apparently there were some architects who could not bring themselves to disrupt the exterior in this fashion; a 1916 survey of Cleveland school buildings praised those who put children's health over aesthetic concerns: "All of these rooms have unilateral lighting and this necessitates leaving some blank exterior walls, but since this was unavoidable, the architects wisely decided to defy tradition and considered children's eyesight rather an critical public opinion."[28] There were, however, ways to reconcile function and aesthetics. Many architects, like William Ittner, placed laboratories or other non-classroom rooms – where students participated in more active learning than sitting and reading – in the corners of a building, and lined the classrooms along the sides; this allowed all classrooms to have only single exposures while maintaining the rhythm of the windows and avoiding blank walls.[29]

The dictum that students should only receive light over their left shoulder remained virtually unchallenged until the widespread introduction of artificial illumination in the 1920s rendered it obsolete. There were some, however, who objected to the unilateral source rule's blind application. The authors of the Report of the Schoolhouse Commission Upon a General Plan for the Consolidation of Public Schools in the District of Columbia (1908) rejected unilateral lighting after studying schoolhouses throughout the nation.[30] The commission agreed that unilateral lighting was generally the best practice, but felt that it was inappropriate for District schools because of the climate. "Many days in the year are so hot as to make it necessary to have the windows open and the conditions are much better with openings for this ventilation on two sides of the room than could possibly be obtained with windows on one side only," they wrote.[31] The commissioners also complained that because unilateral lighting required almost the entire wall be given over to windows, when those windows faced east, west or south the sun would be too bright for some part of the day, and the window must be shaded, "thereby reducing the amount of light below the standard."[32]

The increased attention to light's effects on student eyesight modified school architecture at the level of the individual classroom as well as the overall plan. Architects calculated the schoolroom's proper dimensions based on the amount and source of light. Early writers like Barnard refrained from specifying classroom sizes but by the turn-of-the-century architects outlined room dimensions with scientific accuracy. The work of Edmund Wheelwright provides a prominent example of this trend. Wheelwright was the first notable school architect in America. He made his reputation largely as the Boston City Architect from 1891 to 1895, and solidified it with a series of articles in <u>The Brickbuilder</u> (1897-99) and a book, <u>School Architecture</u> (1901).[33] In later years, Wheelwright was universally recognized as a pioneer in the field.[34] Wheelwright's <u>Brickbuilder</u> articles are landmarks in the history of American school architecture. The writings constituted the first comprehensive and extended examinations of the various problems befalling schoolhouse architecture, and their appearance in a relatively well-known architectural publication helped introduce these topics to architects across the United States. Wheelwright began his seventeen-part <u>Brickbuilder</u> series with a comparison of German and American school buildings that focused on lighting and its effects on school design; he concluded it with a rumination on "the most important consideration in schoolhouse construction, namely, the lighting and air capacity of class rooms."[35] Like many school architects of the period, Wheelwright was well versed in German school architecture and saw it as superior in many ways. He did, however, see the main task of the school designer as the same in both countries:

> We find, therefore, the German schoolhouse closely resembling in plan the American schoolhouse as it is at present developed: the main consideration of the plan in each being to give conveniently disposed and well-lighted schoolrooms, giving off well-lighted corridors, and a large hall placed in the upper story of the building.[36]

Wheelwright felt the Germans had made a more careful study of schoolhouse lighting, "possibly on account of their proverbially bad eyesight."[37] The German solution was to make classrooms (and class sizes) smaller. The average German classroom was 21-22' wide, compared to the American average of 28'. Because American classes held more students, however, it would be "inadvisable" to shrink the classroom to the German standard. This hampered the state of American school design:

> Unless the number of pupils per class room in Grammar and High Schools is materially reduced, our schoolrooms cannot be planned according to the most scientific method of lighting, nor can the only weakness of the American schoolhouse plan, as compared with that of Germany, be removed, and consequently no radical improvement can be made in the general plan of our best designed schools.[38]

Wheelwright's solution was two-pronged. First, school boards must reduce class sizes to 40-48 students. Then classroom sizes could be reduced, to 24' x 32' for primary schools and 28' x 32' for grammar schools. This would allow light to properly penetrate all parts of the room from a bank of windows along the left hand/exterior wall. Ideally, such windows would begin at a height three feet above the floor and extend to within six feet of the ceiling.

Wheelwright's advice represented the culmination of nineteenth century expertise in the area of schoolhouse lighting. That body of knowledge also included formulas for the classroom's proper ratio of window-to-floor area. The commonly accepted rule by the turn-of-the-century called for a window area equal to one-fourth the amount of floor space, although this was often adjusted for school buildings in different regions of the country.[39] This standard changed only slightly in the ensuing years; a typical article from 1921 suggests a glazed area of twenty percent as acceptable.[40]

Proper lighting eliminated the possibility of excessive glare and strong contrasts, both of which were considered damaging to students' eyesight. Reformers believed the dark, cramped mid-nineteenth century schoolhouse had evolved into an equally dangerous place where "the eye is dazzled, irritated, and often permanently injured by working on objects that are directly illuminated by the sun."[41] Architects, educators and hygiene experts expounded on the proper color for blackboards (gray or green), classroom walls (buff, cream or light green), ceilings (light but not white), dados (dull but harmonizing with the rest of the room) and window shades (light or cream), as well as acceptable materials for walls and floors (fig. 4.7).[42] Above all else, white was to be avoided in the classroom, for, as Walter J. Kenyon explained in 1906, "It is the common testimony of physicians that the glaring whitewash intensifies nervous afflictions and injures the eyes."[43] Later writers were even more scientific on the subject of color and illumination, often citing appropriate figures for "candlepower per square inch" or "Lumens per square foot."[44] The combination of rational planning and improved technology did not, however, eliminate students' vision problems, which led some experts to blame teachers.

In 1904, Stuart H. Rowe found teachers "indirectly responsible for the majority of defective eyes found among pupils enjoying the advantages of well-lighted modern buildings;" their greatest sins were the "careless and ignorant manipulation of the shades," failure to correct bad reading posture, and inattentiveness to students with poor vision.[45]

Authorities argued over the schoolhouse's proper orientation, with seemingly equal proponents recommending exposures in all four directions.[46] No matter what direction the building faced, natural lighting concerns determined the overall building plan and individual classroom configurations to a great extent, as architects manipulated plans to introduce the maximum amount of light into classrooms and corridors. Even after electrical illumination was prevalent, the typical classroom's size and shape and its location in the plan remained unchanged. The windows' importance also influenced the schoolhouse's exterior, as the banks of regularly spaced windows required to light the individual classrooms created a distinguishable rhythm across the façade. Consequently; fenestration patterns became the most prominent aspect of schoolhouse façades in the early twentieth century.[47] Overall, then, lighting requirements affected the school building's interior arrangement, exterior appearance, siting and orientation before the widespread use of artificial illumination.

<u>Heating and Ventilation</u>

Architects' interest in adequate ventilation went hand-in-hand with proper lighting issues, and the two combined to significantly influence the schoolhouse's transformation. Schoolrooms in the late nineteenth century were not only designed with natural lighting in mind, but also with an eye toward proper ventilation and heating. The room's form, height, and window size had important consequences for the manner in which air could be circulated.

Heating and ventilation issues probably predated lighting as school architecture problems. Even the earliest urban high school buildings were simply too large to allow proper ventilation from open windows. Ventilation and heating thus became important considerations when designing schoolhouses. Typical journal articles on school buildings in the 1880s spent more time discussing the buildings' heating and ventilating systems than any other aspect. But awareness of ventilation problems began much earlier in the century. In the 1830s, educational reformer Horace Mann complained about improper ventilation in urban schools.[48] By 1846, the quality of classroom air in Boston schools was so bad that the city's School Committee appointed a special Committee on Ventilation to investigate. The results were appalling. Dr. Henry Clark, a Boston physician, found that grammar school classrooms received only five percent of the amount of fresh air necessary for a school day. The air the students did breathe was a "foetid poison" that hindered their health and ability to learn.[49] Unfortunately, the study had little immediate impact on the design of the city's schoolhouses. Forty-three years later, the Massachusetts Board of Health found almost 90% of Boston schools to be "without any modern or efficient means of ventilation."[50] Another survey in 1895 again found serious defects in most ventilation systems.[51] Boston was not unique in this regard, however. Health investigators found extremely high levels of carbonic acid in the air in New York city classrooms during an 1873 examination; an 1888 article in the Journal of the American Medical Association described the American classroom as "a propaganda of contagion;" an 1891 United States Bureau of Education pamphlet condemned the ventilation systems of the nation's schoolhouses; and in 1893 engineer John S. Billings complained that "Of all classes of municipal buildings in the United States, public or private, there are probably none which have until recently, been in such an unsatisfactory condition, as regards their ventilation, as the public schools."[52]

The mid-century Boston schoolrooms investigated by the Committee on Ventilation were typical of urban rooms around the country – square or rectangular rooms, generally with no ventilation system other than open windows, and overcrowded with students. Before the 1870s there was little in the way of technical guidance for architects designing school buildings. Henry Barnard's treatise, for example, provided no advice about heating and ventilating the urban school; his discussion was limited to fireplaces and stoves, suitable for the problems of a single room but not an entire building (he left it to the Boston Committee report to address that subject).

A growing interest in student health led late-century architects' to think about improving heating and ventilation systems. Three major considerations shaped their activities: the amount of cubic feet of air space needed for each student; the amount of cubic feet of fresh air per minute per student; and the air temperature. A desire to avoid the debilitating effects of vitiated air in the classroom prompted the first two considerations. Architect Charles Dwyer had previously recognized this problem in an 1856 pattern book, in which he exclaimed

> Want of pure air is the certain agent of destruction to our youth; and of all places its terrible effects are more potent and more certain in the school-room than in any

> other, because of the mass of exhalation from so many lungs, some already diseased and pouring forth their noxious vapors to be inhaled by the victims around.[53]

Temperature regulation was also linked to bad experiences in poorly heated and ventilated buildings. In the old one-room schoolhouse, children seated near the stove were subject to extreme heat, while those in the far parts of the room were unlikely to receive any heat at all. A similar problem occurred in rooms relying on direct radiation heating and ventilation systems, which placed radiators near the windows that were supposed to heat the cooler air to make it rise through and out of the room. Students sitting by windows could either be overly warmed by the radiators or chilled by the incoming air.

A concern for healthy student bodies influenced architects and educators to implement improved heating and ventilating systems. Ventilation standards seemed to be set fairly early although they were subject to variations among authorities. James Johonnot addressed the first major issue – the amount of air space to allow for each pupil – as early as 1871. Johonnot was slightly more specific than Henry Barnard regarding the topic. Proceeding from the premise that "Every child has a right to his own personality and his own share of uncontaminated air, and whatever deprives him of these becomes an outrage," Johonnot recommended 250 cubic feet of air space for each pupil.[54] He did not, however, relate how this would be worked out in designing the room or the ventilation system. Johonnot's advice was either amazingly prescient or represented an already-established standard – during the next fifty years architects hardly deviated from his recommendations. Almost all authorities prescribed between 200 and 300 cubic feet of air space per pupil as a minimum.[55] An 1896 St. Louis newspaper article on "Poisoned Air in the Schools," which tells the story of the St. Louis Health Commissioner's campaign to raise awareness and improve ventilation in the city's schools, demonstrates the extent of common acceptance of this standard.[56] Dr. Starkloff's" first report on school ventilation was "ridiculed" by the School Board, which dismissed him as "seeking cheap notoriety."[57] The determined Commissioner then re-inspected the schools and made a second report directly to the School Board "with a communication that the Board of Health means business right from the start."[58] Before listing defects in the individual schools, Starkloff made a general appeal, claiming:

> In this age of advanced sanitary science it is not necessary to cite any arguments to prove the importance of the most hygienic conditions for our schools. The school room is the common center towards which many of the streams of diseases of the community tend and from which they spread.[59]

The Commissioner bolstered his position with a reference to scientific authority: "Sanitary authorities agree that each pupil should be supplied with 2,000 cubic feet of fresh air per hour, and the minimum amount of cubic feet of air space that should be allowed each pupil is 300 feet, and this providing the air is changed constantly."[60]

The air space per student requirement of a typical classroom was linked to the second major issue in heating and ventilation: the amount of air provided to each student per minute. The District of Columbia Schoolhouse Commission Report of 1883 provided precise guidelines typical of the period. The Report suggested ventilation systems be installed in the District schools that could afford each student in a classroom thirty cubic feet of fresh air per minute, "which amount must be introduced and thoroughly distributed without creating unpleasant draughts ... The velocity of the incoming air should not exceed 2 feet per second at any point where it is liable to strike on the person."[61] The St. Louis Board of Education made a similar pronouncement in their 1908-09 Annual Report, where they reported that the proper ventilation of a classroom required that "Each pupil in the room must receive per minute the required quantity of pure air, about 30 cu. ft."[62] This air was to be distributed throughout the room "in a manner not to create currents to strike pupils;" at the same time, the ventilation system must allow "vitiated air expelled from the lungs" to easily leave the room.[63] Like the standards for cubic feet of air space, the cubic feet per minute regulations varied; between the 1880s and 1920s, experts and amateurs recommended anywhere between twenty and forty cubic feet of air per minute per pupil, with thirty being the most popular figure.[64]

The third main issue in heating and ventilation was air temperature. A seventy-degree schoolroom was universally accepted by 1900, but the previous generation proved itself of heartier stock.[65] In an 1877 article on schoolhouse ventilation and warming (the first technical article on school architecture in The American Architect and Building News), "Dr. F. Winsor" declared that seventy degrees was "uncomfortable;" the ideal temperature range was between sixty-four and sixty-eight degrees.[66] Even this rather chilly ideal was often hard to accomplish with inefficient heating systems. Classrooms in New York City schoolhouses were measured between 47 and 70 degrees in an 1873 study.[67]

School architects searched for ways to address the three considerations of air space per pupil, fresh air per minute, and temperature. In general, two types of heating systems existed between 1880 and 1920: direct and indirect. Direct radiation was the oldest form of heating the schoolroom. It consisted of a stove or a set of radiators in the room. The stove held a fire that radiated heat out into the room; radiators accomplished the same result using hot water. Direct heating systems were notoriously inadequate, and their failures led to the widespread installation of indirect systems in urban schools by the 1870s. Indirect systems introduced air to the classroom that had been heated somewhere else, usually in the basement. Ventilation played a different role in these two heating systems. In direct radiation buildings there tended to be little or no ventilation, prompting teachers to open windows for fresh air. Indirect heating systems included air circulation mechanisms to provide fresh air as well as heating it.

Most large urban high school buildings prior to the 1890s contained heating and ventilating systems that used heated flues to induce air flow and control temperature. The most common method was a basement furnace. Hot air, hot water or steam from the furnace heated the ducts that traveled to individual rooms. Air circulated through the building because the air outside the building was colder and heavier than the air inside; the temperature differential caused outside air to be drawn into the building and up through the system. Hot air systems, which forced heated air directly from the furnace to the classroom, were difficult to regulate and produced additional problems. In 1885, Chicago Board of Education President James R. Doolittle, Jr., listed four major reasons why his school system had abandoned hot air furnaces: the classroom atmosphere was "vitiated and de-vitalized" by being subjected to great heat; deleterious gases escaped through the overheated iron and poison the air; it was too difficult to secure the equal distribution of warm air in different parts of the building; and furnaces were fire hazards because of accumulated combustible dust in the flues.[68]

A typical example of furnace ventilation was installed in the Hartford (CT) Public High School (1883), designed by local architect George Keller (figs. 4.8-4.10).[69] The building contained a gravity heat and ventilation system. An underground boiler room produced steam that was carried through a series of pipes throughout the building. The steam heated coils in a chamber in the building's basement. Outside air was drawn into the basement and through the heated coil by temperature differential; the air then rose through flues to the individual rooms, where it was discharged through four openings in the inner walls. The openings were set seven feet above the ground to prevent the air from blowing in students' faces and to facilitate circulation. The heated air was projected toward the windows in the room's outer wall. Upon striking the windows, which were cooled from outside, the circulated air would in turn cool down and begin to fall toward the floor. Six outlets in the floor and along the baseboard of the room's cross-wall allowed the cooled and vitiated air to escape. After leaving the room, the air entered a chimney, where it rose to the roof and was expelled into the outdoors. Steam radiators were also located in different places throughout the building to expedite circulation; for example, each room had a set of radiators below the windows to keep the window-cooled air from laying on the floor; each wardrobe had a steam radiator to aid in drying out the clothes; and each chimney contained a radiator to reheat the air expelled from each room, thus promoting its rise up and out of the building. Exhaust chimneys were visible on buildings such as this in the form of towers or cupolas.[70] The Hartford High School system was designed to provide each of the fifty-sixty students in its classrooms with thirty cubic feet of fresh air per minute. A damper system allowed teachers to adjust the amount of air entering their rooms and thereby control the temperature.

The intricate nature of ventilation systems like the one described above inevitably led to problems. Gravity systems never worked as well as planned. They were at their best in cold weather, but rooms were often stiflingly hot – which prompted teachers to open windows, thereby defeating the entire system – or frigidly cold. The accumulation of discharged air from fifty-odd bodies in a classroom was difficult to expel through temperature regulation. Windy days adversely affected the system by pushing cold outside air through the schoolhouse's many cracks and openings. And gasses and dust from the fuel (usually coal) used to heat the air managed to find its way through the flues and into the classrooms. As a result of these problems, some school architects and engineers began to experiment with circulating air through the school building by mechanical means. By the end of the nineteenth century, mechanical ventilation (using fans to circulate the air rather than temperature differentials) had become the method of choice. Englishman J.D. Sutcliffe reported that on an 1891 tour of American school buildings on the East Coast, approximately 90% of the ventilation systems he inspected used the "Smead System" hot-air furnace.[71] When Sutcliffe returned to the States in 1905, the Smead System was nonexistent, and all the schools he visited combined steam or hot-water heating with a fan system. These "plenum systems" were an improvement over the complicated gravity systems of the earlier generation. Plenum systems used mechanical power (steam, then electricity) to drive large basement fans that circulated heated air through the building (fig. 4.11). A less-popular relative was the exhaust system, which placed the fans in the attic and pulled rather than pushed air through the ventilation circuit.[72]

Plenum systems became widely used in the early twentieth century. Electricity eventually allowed for such systems to become centrally controlled. The advantage (or disadvantage, depending on one's position) was that the central air system did not require the teacher to control room temperature. Unfortunately, the advanced systems often worked as poorly as their nineteenth-century precursors. Despite improved ventilation technology, the classroom situation was not always ideal even in the 1920s. A teacher at the 1921 National Education Association convention complained about inadequate ventilation, uncomfortable temperature ranges and unclean floors.[73] A 1924 study of New York City schools found that only two percent of the city's classrooms had functioning ventilation systems.[74] These conditions often led to conflicts between teachers and administration when the teachers attempted to make their classrooms more comfortable. As in the case with classroom lighting, teachers were often blamed for ventilation problems. "Both school principals and supervising engineers admonished teachers sharply" for opening windows, notes Kate Rousmaniere, "deriding them for claiming some expertise over scientific issues of health and air quality."[75]

Schoolhouse ventilation improved by the 1910s, mainly due to the application of the new mechanical systems. While the changes in heating and ventilation did not affect the school building as visibly as the changes in lighting, there were nonetheless repercussions for the entire modern school building. New high schools were intricate machines with huge mechanical instruments and many miles of hidden ducts, flues, and pipes. The complexities of the improved air delivery systems forced school architects to gain important knowledge about the mechanics of heating and ventilation, or to associate themselves with experts in the field. Some cities employed full-time engineers to design and implement ventilation systems. Chicago had an engineering specialist by the early 1900s; when Englishman J.D. Sutcliffe visited in 1905, he found that the school board's heating, ventilation and sanitation expert, Thomas J. Waters, co-designed school buildings with William Mundie, the Board Architect.[76] The fact that all of this attention was paid to the heating and ventilation of school buildings demonstrates a change in society's priorities. Children were becoming more valued as future societal resources whose health was worth protecting. While much was written at the turn of the century about the heating and ventilation of all types of American buildings, in no other area was adequate ventilation considered such a *necessity* and advocated with such enthusiasm – one does not find as many passionate expressions of concern for maintaining the average office worker's health, for example, while the vast literature on heating and ventilating schoolhouses was always written from a perspective that viewed children's' health as the foremost consideration.

The Open Plan

Architects' increased attention to lighting, heating and ventilation profoundly impacted the development of the open plan school building. The open plan and the differentiation of room size and use are *the* factors that distinguish the early twentieth-century schoolhouse from its nineteenth century forefathers. When William B. Ittner, one of the nation's most prolific school architects, reflected on his field near the end of a long career, he attempted to summarize the turn-of-the-century schoolhouse transformation:

> The fundamental change in schoolhouse planning was initiated about 1899 when the so-called "closed" plan gave way to the open and semi open plans. The significance of this change will be appreciated when consideration is given to the fact that practically all important subsequent improvements in planning and construction, in lighting and ventilation, to say nothing of the improvements in design, may be traced directly or indirectly to this change. The enrichment of the educational program which came about gradually from this time on gave emphasis to the flexibility and possibilities of the open type of plan.[77]

While Ittner implies that lighting and ventilation improvements may have resulted *from* the rise of the open plan, the historical evidence suggests that the opposite was true – that mounting concerns about student health in the late nineteenth century *drove* the search for alternatives that culminated in the open and semi-open plans.

Open plans came in many forms, but all were designed to expose the building's interior spaces to light and air. Nineteenth century schools had resembled a "stuffed box" (or an "egg crate"); in other words, a cubical or rectangular shell was completely filled with rooms and hallways and interior corridors were small or nonexistent (fig. 1.3). There were no open spaces within the confines of the exterior walls. These closed designs prevented light and air from penetrating very far into the building. Some architects recognized the limitations of the "egg crate" plan and lined rooms along a double-loaded central corridor, which maximized light in the classrooms but left corridors lit only by end windows. William B. Ittner described a typical plan in 1912:

> In this country it is almost universal to flank the two sides of the corridor with classrooms and depend upon the classroom doors and transoms and windows at

> the ends for light. In Germany, the prevailing custom places the classrooms on one side only, giving direct outside lighting in the corridor. While the American custom gives a more compact and economical building, it is accomplished at the sacrifice of proper lighting and attractiveness, and is one of the weakest points about our school plan.[78]

During the 1880s, there had been a movement to open school building interiors without inserting courtyards into the box. This was often accomplished by expanding the central corridor into a multi-story atrium. Open spaces in the center of larger building were sometimes lit by skylights, as in Robert Roeschlaub's East Denver High School (1881-90) (figs. 4.12-4.13).[79] These atriums were used at times as assembly halls in schools that did not have a large room specifically for that purpose. Students sat on the ground floor and the upper floors acted as balconies. This type of design would eventually prove deadly in the event of fire, as explained below.

Another 1880s trend was the experiment with open plans to improve lighting and ventilation. The Boston Latin and English High School was one of the first American school buildings to contain an interior light court (figs. 1.24-1.27). As mentioned above, the Boston Latin and English High School was inspired by German schools that John Philbrick visited during a European tour. Architects of the time had access to more European open and semi-open school plans in E.R. Robson's School Architecture.[80] Robson illustrated many of these types of designs from Germany and other countries. Most of the plans in the American architectural and educational journals were closed plans, however, until the 1910s.

In a 1925 report on schoolhouse planning, architect Frank Irving Cooper listed eight types of school plans based on extensive nationwide research of school buildings.[81] The plans fell into two general categories: closed and open (fig. 4.14). Closed plans were identified as the "solid rectangle," the "hollow rectangle," and the "rectangle with interior auditorium and courts." Open plans included the "small I," the "large I," "T," "U," and "E." The text also listed the "H" plan but did not include it on an accompanying chart. Cooper outlined the main considerations in choosing one of these plans as follows: "1. Orientation 2. Natural Light & Natural Ventilation 3. Expansiveness 4. Flexibility 5. Light Corridors 6. Efficient Supervision 7. Reduction of Vertical Travel 8. Aesthetic Fitness 9. Economy."[82] While the report made no specific recommendations, it did favor the open plans for their superior natural light and ventilation and their ability to be expanded. Reviewing the floor plans of school buildings in published journals, however, uncovers a definite trend away from closed plans and toward open plans between 1890 and 1920. The most popular high school floor plans by far in the 1910s were the "rectangle with interior auditorium and courts," the "E," and the "H" (figs. 4.15-4.16). By the early 1920s, closed plans were almost nonexistent in the larger urban areas. The open plan had triumphed because of its superior ability to provide light and air to the schoolhouse.

Hygiene

The rise of the open plan in a growing educational discourse about proper lighting and ventilation related to another important factor in turn-of-the-century schoolhouse design. Proper lighting was considered necessary not only for safeguarding students' eyesight, but also for maintaining their general health. Student health became a leading concern in the late nineteenth century as a growing interest in healthy living swept through American society. This movement was particularly important for the school, where the collection of students in confined areas gave rise to a myriad of illnesses. Scientific schoolhouse design was a weapon to combat these maladies. For example, in the early twentieth century, "hygiene experts" promoted sunlight's health-giving aspects to educators and architects. One of the best-known hygiene experts was Fletcher B. Dresslar, a professor at Peabody College in Memphis, who stated a prevailing view in 1913:

> Direct sunlight is the most economical and practical of all germicides. Schoolrooms that are kept thoroughly clean and receive a thorough sunning each day are not likely to need much further attention in the matter of disinfection. Cleanliness and sunshine are worth more than any artificial germicides that can be applied to schoolrooms.[83]

The germ theory of illness, which held that microscopic bacteria spread through casual contact caused illnesses, had gained acceptance by this time in terms of the origin of disease, but knowledge of anti-bacterial techniques remained rudimentary.[84] Many reformers, like Dresslar, still believed that bright light could kill germs. The Superintendent of the District of Columbia schools, William Estabrook Chancellor, wrote in 1909, "Sunlight is the great germ-killer and health-maker."[85] Architect Walter Kilham, who wrote an Edmund Wheelwright-like series of articles on school design for The Brickbuilder in 1915, agreed with the disinfecting light theory, and emphasized the need to design school buildings so that direct sunlight could penetrate corridors, closets and toilets "where the effect of its disinfecting powers is even more necessary."[86] Light was also considered a mood-enhancer; as early as 1871, James Johonnot commented on this quality: "Sunshine is as necessary to health as air, and besides, it has a direct effect upon the nervous system, allaying irritability, and diffusing a happy spirit through the school, when its summer intensity is properly subdued by blinds or curtains."[87] Johonnot was ahead of his time, since sunlight was not seriously promoted as a health aid in American society until the 1910s.[88]

There were also some "experts" who believed fresh air could serve the same disinfectant purpose as bright sunlight. In a 1905 article on American school ventilation, the English author related his conversation with "Professor Woodbridge, who is recognized as an authority on the warming and ventilating of American school buildings." The author questioned Woodbridge on the difficulty of keeping ventilation ducts free of dust; Woodbridge's reply was that such accumulations were "perfectly harmless," because "with the large volumes of air passed through these ducts the oxygen so thoroughly purified the dust and dirt that no harm could possibly come from it."[89]

All of this attention to the schoolhouse's hygienic fitness was relatively new. In the mid-nineteenth century there were no hygiene experts, few reports on schoolhouse conditions and no real understanding of how illnesses were transmitted. Most Americans believed "miasmas" or noxious fumes arising from decomposing filth and dirt caused diseases.[90] Widespread acceptance of the germ theory in the late nineteenth century led to a full-scale assault on dust, dirt and germs in the schoolhouse. Reformers saw the late nineteenth-century schoolhouse as a cesspool teeming with threats to students' health, such as dust, dirt, soot, and the many unseen germs that lurked in nooks and crannies.[91] Fletcher Dresslar advocated a war on dust brought into schoolrooms by students' shoes, which contained

> lint from clothing, bits of excreta from horses, dogs, or other animals, decaying vegetation, in fact, all the rubbish of the outer world, and to such particles pathogenic germs are very frequently attached. When air laden with dust of this type is breathed, it not only irritates and clogs the air passages, but offers opportunity for infection, especially from the germs of tuberculosis and other diseases of the respiratory tract.[92]

Beliefs such as these arose out of the so-called "dust theory of disease," which inappropriately coupled germ theory to an increasing American obsession with cleanliness.[93] The dust theory held that everyday dust was an insidious carrier of deadly bacteria. This belief arose in part from an earlier disease theory based on "fomites," which was a term applied to any object capable of carrying infectious material. The Massachusetts State Board of Health advanced the "fomite" theory in a late nineteenth century circular on scarlet fever that warned about infectious transmission by "air, food, clothing, sheets, blankets, whiskers, hair, furniture, toys, library-books, wallpaper, curtains, cats, [and] dogs."[94] The solution to all of these fears was a clean schoolhouse, which could be achieved by eternal vigilance from the janitorial staff. Even in the 1910s, when the germ theory was widely accepted, there were those like Dresslar who blamed dust and dirt for causing illnesses. In an article entitled "Dustless Schools," for example, Thomas D. Perry claimed that "It has been amply proven that the infectious germs of both [tuberculosis and pneumonia] are 'air borne,' that is, may be transmitted or 'caught' by means of the infinitesimal dry particles of dust or dirt that are breathed or otherwise brought in contact with sensitive human tissues."[95] Perry advocated the dustless school, which could be achieved only by using a modern building-wide vacuum system driven by a powerful pump. Many educators agreed, and the demand for such systems increased.

By the late 1910s, The American School Board Journal was filled with advertisements from vacuum system companies touting their wares (fig. 4.17).

Larger urban school systems often created special departments to combat the health menace. St. Louis introduced a Department of Hygiene in February 1909, "following the example of other cities."[96] The anti-germ campaign could become obsessive, however, as demonstrated by a set of rules promulgated by the Indiana State Board of Health prior to 1896. The rules, described in The American School Board Journal, required all pencils, pens, desks, floors, windows, and woodwork be scrubbed and disinfected every day; refused entry to any student "with a dirty face or unclean clothing;" forbid open water buckets; and outlawed slate and slate pencils because they were "believed to be microbe hot-beds."[97] It is doubtful that these rules were followed with any strict regularity, but their mere existence (along with similar laws in other states) demonstrates the seriousness with which school hygiene was taken. In addition to central vacuuming, the new hygienic mindset inspired other changes like bubbling-water drinking fountains, which replaced the bucket and community cup; individual lockers in hallways rather than wardrobes attached to classrooms; the increased use of marble and tile for toilet rooms; and in some larger cities, baths.[98] These modifications and many others were designed to reduce or eliminate the spread of tuberculosis, typhoid, diphtheria, and other prevalent illnesses. While these sanitary developments did not require major changes in schoolhouse design, they did necessitate a new way of thinking about the school building, and their inclusion in schools from this time period records a shift in American attitudes toward health in general and children's health in particular.

Physical Education

An often overlooked but nonetheless important influence on the American high school's architectural transformation was the development of physical education. In order to accommodate a growing interest in physical development and interscholastic athletics, the twentieth-century school building needed specialized facilities that the nineteenth-century schoolhouse did not have. Before the 1880s, physical education consisted of simple exercises conducted in "halls, corridors, basements, abandoned buildings, and even barns."[99] By 1920, the modern high school included gymnasiums, swimming pools, running tracks and athletic fields to accommodate elaborate physical education and interscholastic athletics. These amenities demonstrated a societal commitment to adolescents' physical and social development as well as an unprecedented national interest in athletics.

Physical education began in America in the mid-nineteenth century.[100] Before the Civil War, a handful of writers and lecturers began to preach the benefits of "gymnastics," as exercises were known, to counter Americans' perceived ill health and lack of physical stamina. The fitness problem was brought to public attention when nearly fifty percent of all American males drafted during the Civil War out of the professional, mercantile, semiskilled and skilled laboring classes were rejected on the grounds of physical disability.[101] The solution to such a national embarrassment was vigorous exercise in the form of both organized athletics and individual calisthenics. In addition to sports such as rowing and baseball, many fitness proponents advocated exercises with apparatus like Indian clubs and dumbbells. Dr. Dioclesian Lewis, a well-known promoter of the "new gymnastics," was one of many praised physical training's ability to build strength and "give flexibility, agility and grace of movement."[102] In response to the growing movement, private and public gyms opened in cities throughout the country and YMCA (1851) and YWCA (1866) programs offered calisthenics and light gymnastics, but the physical education movement was slow to gain entry into American schools. Not until the 1880s, influenced largely by German-American Turnvereins, did many school systems began to integrate physical education. The "Turners," as they were called in this country, wanted to introduce physical training into all American schools. Turnvereins were social and physical societies, originating in Germany, which emphasized physical education and intellectual and social development; their buildings included gymnasiums where the "German" system of exercise was taught. The first turnverein was formed in Cincinnati in 1848. They were especially prominent in Midwestern cities with large German communities, like Cleveland, Cincinnati, Milwaukee and St. Louis. By 1909, there were 40,000 "turners" across the United States.[103]

Physical education programs and interscholastic sports in American high schools grew in the 1880s. Physical education was introduced into a number of urban school systems during the next fifteen years.[104] These programs varied widely in their method and philosophy. The most popular, particularly for boys, was the "German" system, which involved a series of exercises with weights and apparatus designed to increase strength and speed. Close behind the "German" method in popularity was the "Swedish" system, which also used apparatus, marching and games, but emphasized heart and lung development.[105] Because it was supposedly less strenuous, many educators considered the Swedish method more appropriate for girls. There were also other, less enduring forms of physical education. For example, the St. Louis school system introduced the Delsarte system into its high schools during the 1885-86 school year.[106] While not truly a form of physical education, the Delsarte system did involve an attempt to develop the body. Frenchman François Delsarte developed it as a method of training the artistic gestures of actors and singers. Practitioners stood in one place and engaged in a series of relaxation and deep-breathing exercises while striking different gestures and poses.[107] The Delsartean system as practiced in the United States was a debased version of the original theory, but it became extremely popular for a time in a culture that was becoming obsessed with health; as Richard Swanson and Betty Spears point out, at the end of the century "Americans now were told that exercise, sport, play, and recreation were worthwhile aspects of democratic life."[108] The Delsarte system's effects on school architecture were negligible since it did not require movement, unlike the German and Swedish systems; thus the Delsarte exercises were probably conducted inside classrooms or outdoors. The St. Louis schools discontinued the Delsarte system in the city's high school in 1894, replacing it with the more apparatus-oriented German system that had been adopted for the lower grades in 1888.[109]

Chicago high school students began conducting informal physical activities in the mid-nineteenth century. In 1859, Principal Charles A. Dupee of Central High School reported that

> During the year, the boys of the school erected, at their own expense, a gymnasium at the cost of upwards of $100. Very beneficial results were soon

> apparent, in the increased health and vigor of the boys, and in their appreciation of the utility of regular and appropriate exercise. The gymnasium was, of necessity, erected in the open air, and cannot be used except for the warm months. No facilities for physical exercise for girls yet exist.[110]

The Chicago Board of Education formally introduced physical education into its high schools in 1889.[111] Students were required to perform fifteen- to twenty minutes of exercises every day with dumbbells and Indian clubs.[112] The schoolhouses had no gymnasiums, so the exercises were done in hallways, the assembly hall or outdoors.[113] Later that year the new Northwest Division High School opened with a fully equipped gymnasium, approximately 90' long, 40' wide and 26' high – unusually large for the time (fig. 2.43). The gym was located in the building's basement, which would become typical in the 1880s and 1890s. This was the first gymnasium in a Chicago high school, and the city's educational administrators were understandably proud:

> Calisthenics in our public schools so far have been a success, as principals as well as teachers assist our special teachers to make their work successful, but I think it was a wise step on the part of the board of education to provide a gymnasium in the new high-school building ... *The gymnasium of the Northwest Division High School is as I believe the first gymnasium in connection with a public school in our country* (italics mine).[114]

The Supervisor's claim was untrue, for the Boston Latin and English High School had a large third-floor room "set apart for gymnastic exercises," and other schoolhouses of the 1880s undoubtedly followed suit.[115] Special rooms for physical education were rare, however, and the rather large space allotted in the Northwest Division High for such purposes marked the beginning of a shift toward including physical education as a staple of the high school curriculum. But the Northwest gymnasium limited the activities that could take place within it – though large for the time, by comparison it was merely one-third the size of the school's assembly hall, or roughly equivalent to three classrooms laid end-to-end.

Chicago high school students were receiving "systematic training in physical culture" once a week by the early 1890s.[116] In 1892, Superintendent Albert G. Lane reported that the German system of exercise using wands and dumbbells was having a beneficial effect on the city's 5,000-plus high school pupils:

> Careful observation and investigation show that the children need this kind of training to overcome the tendency to the stooping posture in studying, and physical weakness that is the outgrowth of the habits of a city and school life. It has been demonstrated that under proper systematic physical training, good health and a well developed physical form can be cultivated . . . The good results observed included better breathing on the part of the pupils, more erect forms, and the better command of the body in recitation and movement.[117]

A decade later, Chicago proudly presented another prominent gymnasium. The North Division High School was cited in The American School Board Journal: "The most novel feature of the new building will be the gymnasium, which will be more elaborate than any yet placed in any school building in Chicago."[118] The basement-level gym was 75' x 40' and featured an upper level running track.

As the new century approached the Chicago Board of Education mandated gymnasiums be placed in each new high school building and added recreational spaces to existing schools. In 1904, when the city's high school enrollment exceeded 12,000 students, thirteen of the city's eighteen high schools had gymnasiums.[119] Shortly thereafter Superintendent Ella Flagg Young doubled high school students' physical education requirements from one to two periods per week.[120] In the 1910s, two developments further expanded the size of Chicago high school buildings: first, a policy of constructing separate gymnasiums for boys and girls, and second, the addition of swimming pools to supplement the physical education curriculum (figs. 4.18-4.19). These developments mirrored larger nationwide trends.

The nationwide physical education movement was stronger than ever in the early twentieth century. The traditional German and Swedish systems were often supplemented with or replaced by the "new physical education," which included exercise, play, games, and dance.[121] A North American Gymnastic Union (the Turners) survey of major metropolitan school systems in 1915 found high school students receiving an average of two periods of physical education per week.[122] But impending war highlighted Americans' lack of fitness for the second time in a half-century. A 1917 medical examiners report disclosed that over one-third of the three million male draftees for World War I were unfit for military service.[123] A year later the Committee on Health Problems of the National Council of Education released the sobering news that approximately three-fourths of the nation's twenty-five million elementary and secondary school students suffered from debilitating physical defects.[124] These revelations and their coverage in the popular media provoked a flurry of state legislation on physical education. Prior to 1917, six states (including Illinois) enacted physical education legislation; between 1917 and 1921, twenty-two more (including Missouri) followed suit.[125]

Including a full physical education curriculum in the high school required specialized space within the school building. Gymnasiums were the largest spaces in the transformed schoolhouse next to the assembly hall/auditorium, and their placement therefore required some manner of consideration in the plan. Early gyms were located in basements, like Chicago's North West Division High School, or on the top floor; limited physical education curriculums imposed few restrictions upon architectural space other than a large room that allowed students enough room to practice their exercises and engage in athletic activities. In 1897, Edmund Wheelwright recommended that gymnasiums be placed in the basement with manual training and cooking classrooms.[126] William G. Bruce disagreed and suggested gyms be located on the top floor to maximize air and light. Basement gymnasiums, according to Bruce, became "a reservoir for dead air" below the window line; in contrast, a top floor gym could have fresh air vents near the ceiling, which was not possible in the basement.[127] Reviewing schoolhouse plans from the 1890s through the 1910s reveals that Wheelwright's advice was followed more often – gymnasiums were usually in the basement.[128]

As the physical education curriculum began to expand after World War I, it required larger and more varied facilities. Gymnasium sizes increased, swimming pools became more common, and in support of these spaces locker rooms and showering facilities were needed. The average gymnasium in the mid-1910s was approximately 48' x 80'.[129] By 1920, the American urban high school contained specialized physical education spaces that were unknown just forty years before – gymnasiums, swimming pools, indoor and outdoor running tracks, locker rooms, and athletic fields. All of these amenities were a result of a growing cultural emphasis on physical health, and all of them placed new demands on schoolhouse designers.

Fire Safety

One final important aspect of the schoolhouse's transformation was the movement toward fire prevention. The ever-present risk of fire haunted architects and educators in the late nineteenth and early twentieth centuries. Disasters like the Collinwood, Ohio fire in 1908, which killed 172 students and two teachers, spurred legislative reform throughout the United States, while advances in technology and innovations in planning led to the creation of a safer school building.

School building fires were a fact of life in turn-of-the-century America. There were 55,779 reported fires in the United States in 1897, causing over $2 billion of losses.[130] The American School Board Journal regularly included a section entitled either "Last Month's School House Fires" or "Fire and Insurance" during the 1890s; in April, 1893 for example, the list showed nine fires across the country in the previous month.[131] In a 1908 speech at the National Education Association annual convention, architect William B. Ittner confirmed for the audience what they already knew – school fires were reaching epidemic proportions:

> "In 1899" (only eight years ago), said the late Edward Atkinson, "485 college buildings and schoolhouses were burned, or 10.46 per week; and the rate of destruction is increasing." A recent insurance report gives a record of fifty-eight fires in educational institutions for a period of three months from January 1 to March 30 of this year.[132]

Communities took various steps to thwart the fire danger, but there was no concerted effort to standardize fire safety measures. Chicago seemed a prime candidate for fire safety consciousness after the disastrous 1871 fire that devastated the city's downtown area. But the great conflagration had little effect on the subsequent construction of school buildings. Not until the late 1890s was there a change in policy regarding fireproofing. Even then the Board limited its support for full-scale fireproofing, as demonstrated by President's words in 1896: "The general movement toward fireproof buildings has been recognized in the construction of school buildings in a manner to insure the safety of the pupils *without incurring the expense of an absolutely fireproof construction* .... (italics mine).[133] In 1898 Chicago city regulations changed and the school buildings came under the purview of the Commissioner of Buildings. The move forced schoolhouses to comply with the municipal building code and exposed them to enforcement inspections. At the same time, Board Architect Normand Patton developed a less expensive fireproof construction for the city's schools.[134] As a result, fireproof construction materials like asphalt, mastic, terrazzo, metal and steel became more common in stairways, corridors and doorways, despite their expense.[135] The Waller High School (1898) was typical of this time period, partially fire-proofed by fire-resistant materials in the corridors, iron stairs, and fireproof walls between rooms. As the Annual Report stated, these measures, rather than full fireproofing, resulted "in the saving of thousands of dollars."[136]

Tragedy conquered financial considerations when the Iroquois Theater fire in Chicago on December 30, 1903 killed 602 people.[137] The Board of Education immediately adopted a new policy of full fireproofing for the city's schools. In the 1904 Annual Report, President Clayton Mark explained that

> Provisions for the greater safety and comfort of the children have been recently made by the Board of Education. All school buildings in the future over two stories in height are to be constructed entirely of fire-proof material, and equipped with conduits for electric lighting. All assembly

> halls are to be on the ground floor, and all buildings are to be provided with fire escapes and fire alarm boxes, and the pupils thoroughly trained in fire drills ... [T]he board of education was compelled to overhaul a large number of its old buildings, making them conform to the new regulations of the building department. Almost the entire force of the architect's office was put at work trying to properly safeguard the lives of the children of the city.[138]

Educators in St. Louis began to move toward improved fire protection at about the same time as their Chicago contemporaries. The public had been aware of a problem for some time and often tried to force the school board into action. St. Louis citizens first complained about a lack of fire safety in the schools in 1877, and continued throughout the 1880s, but nothing was done.[139] An 1879 fire in Webster grammar school alerted officials to the possibility of a problem with the old-fashioned furnace heating systems in most school buildings; as a result, inspectors toured the city's schools to evaluate furnace conditions.[140] Webster School teachers had made previous complaints about the heating system after several small fires, but, as a commentator sarcastically noted, "as they were not supposed to understand the difficulties and mysteries of practical calories, their remonstrances had slight effect."[141] The St. Louis City Commission on Building Laws finally addressed fire safety in 1896, requiring that all school buildings be constructed "in an absolutely fire-proof manner," which included as little wood as possible, iron or steel beams in floors with masonry or concrete infilling, and terra cotta insulation for all exposed iron framing members.[142]

The specific concern for fire safety was a relatively recent development among school architects in the early 1900s. The earliest writers on American school architecture made few comments about fireproofing or fire prevention. Samuel F. Eveleth's <u>School-House</u>

Architecture (1870) represents many school building guides of the period.[143] A pattern book full of drawings and a few specifications, Eveleth's book contained one design specifically for a high school building (No. 15: "A brick School-House, adapted for two high schools, three stories in height, two stories containing one large room and two class-rooms each, the third story containing one large lecture hall. Irregular steep roof."), and three designs for larger, two-story buildings (Nos. 12-14) (fig. 4.20). None of the specifications mentioned materials or techniques for enhancing fire safety. The various floor plans demonstrated a similar lack of fire awareness. Eveleth's proposed high school building had two sets of entrances and stairwells, an important later component of fire safety. In theory, circulation devices at opposite ends of the building increased students' and teachers' ability to evacuate in case of fire. But as Sara Wermiel points out in her recent study of fireproofing, nineteenth century architects, builders and fire safety experts focused on preventing and containing fires while ignoring the issue of how to evacuate a building once it starts to burn.[144] The dual entrances in Eveleth's high school plan are more likely derived from organizational or aesthetic concerns (or sex-segregation) than fire safety awareness.[145] There are no other exits from the building.

Eveleth's Design No. 15 is made safer (though less comfortable) by its brick construction and the lack of any heating or warming system. Designs 12-14 are wooden frame buildings, considerably more fire-prone. The single-stairways of Nos. 12 and 13 add to the danger. But perhaps the single most perilous aspect of Eveleth's building designs occurs in No. 13, where a furnace appears in the basement beneath the entry hall and stairs. This type of arrangement was apparently very common in late nineteenth century schoolhouses. Unfortunately, if the fire in the furnace were to escape control, the flames would spread first and foremost to the only means of exit in the entire building, with disastrous consequences. This is exactly what happened in the infamous Collinwood fire.

In 1904, an editorial in the American School Board Journal decried the lack of fire safety in American schoolhouses, and woefully predicted that "Not until a schoolhouse horror of some proportion caused by fire is enacted will there be a complete awakening to the real condition of the average school building."[146] This statement proved to be unfortunately prophetic in light of the catastrophic fire at the Lakeview Elementary School in Collinwood, Ohio on March 4, 1908. On that morning, a fire broke out somewhere in the school's basement, probably from an overheated steam pipe in contact with wooden framing members, although no specific cause was ever found. The school building contained a basement, two stories of four rooms each around an octagonal central corridor, and an assembly hall in the attic (fig. 4.21). It was constructed of brick walls, a slate roof, and steel girders supporting wooden floor joists. Two steam boilers were located in the basement in the center of the building. There were two internal stairways, both constructed of wood; the front stair extended from the basement to the top floor, while the rear stair did not go down to the basement.

The school janitor discovered the fire and sounded the alarm. Within minutes, the wooden front stairway was completely consumed by fire, and since it rose the full height of the building, flames and smoke were carried to the upper stories. Panicking children swarmed the rear stairway. Post-fire testimony conflicted as to whether the inner vestibule doors were locked; even if they were open, children began to pile up on the stairs and were crushed or overcome by smoke and heat (fig. 4.22). Within twenty minutes the entire building was in flames. Some children were able to exit through an exterior fire escape or jumping out of windows. One-hundred seventy-two of the 347 students and 2 of the 9 teachers in the building that day lost their lives.[147]

Three months before the Collinwood fire, The American School Board Journal cover illustration showed a schoolhouse in the grasp of "The Fire Fiend," with the caption, "It has been estimated that about fifteen million dollars worth of school property was destroyed by fire during the winter of 1906-07" (fig. 4.23).[148] The cover of the first issue after the Collinwood fire featured a female figure, identified as "Education" by her headband, holding a book on "School Architecture" and pointing to a black board on which was written, "School Buildings MUST Be Safeguarded Against FIRE;" beneath was the caption, "Protect the Children" (fig. 4.24).[149] These repeated warnings demonstrate both the omnipresence of school fires and The American School Board Journal's ongoing campaign to promote awareness and safety.[150]

The 1904 American School Board Journal editorial that predicted an American school fire tragedy also offered advice for educators and architects for making schoolhouses safer. Arguing that it was incumbent upon school authorities to "secure the greatest possible safety, and thus comply with the sacred duty devolving upon them," the author urged three important safeguards: a fire drill system, fire escapes, and fireproof or slow-burning construction.[151] In the wake of the Collinwood fire calls for protective measures intensified and numerous suggestions about methods for avoiding future catastrophes were offered. An architect hired to work on the Lakeview School before the tragedy was more specific in a post-fire report; he advocated a series of reforms, including (1) fireproofed boiler rooms, (2) "plain" fireproof structures without towers, attics and high slate roofs, (3) basements closed off from the rest of the building by fireproof stairs and partitions, (4) outside exits to each room, (5) fire drills that lead children "away from danger" and not into it, (6) the removal of wood wainscoting and ceiling work, (7) removal of rubbish from the building, (8) non-oiled floors, (9) outward-swinging doors, and (10) large first floor exits.[152] Many of these suggestions were heeded as urban school administrators were shocked into confronting the dangerous conditions of their own buildings. Reinforced concrete and hollow tile were more frequently used as construction materials.[153] A month after the Collinwood fire the American School Board Journal documented fire safety inspections and measures adopted by school boards in twenty-eight communities from New York to San Francisco.[154] Fire drills, fire escapes and outward-swinging doors were the most popular of these changes. By 1908, fire-consciousness was so widespread that William Ittner could report in a speech on fire safety that "The planning and construction of school buildings is so well understood that mistakes leading to serious loss are almost unpardonable."[155]

Conclusion

Americans' mounting interest in health matters in the late nineteenth century had repercussions for school building design. As public school enrollments increased and more and more children were massed together in schoolhouses for most of the day, students' health and safety became major concerns. Educators and architects began to take steps to make the schoolhouse a healthier place to learn based on their understanding – though often rudimentary – of illnesses and their transmission. These steps included more light and air, better heating, and the eradication of dust and dirt. The schoolhouses of St. Louis and Chicago all demonstrated these developments through the increasing use of the open plan, the orientation of classrooms to maximize light, and the use of improved heating and ventilation technology. At the same time that these preventive measures were being instituted, prescriptive health measures were increasing in the form of physical education programs. Developing the students' bodies and facilitating their health began to receive as much attention as training their minds. As a result, new architectural spaces were required in the high school building to accommodate recreational activities and interscholastic sporting events. These spaces significantly expanded the size and scope of schoolhouses in Chicago and St. Louis, as well as other urban areas around the United States.

[1] William T. Harris, "Editor's Preface," to Gilbert B. Morrison, The Ventilation and Warming of School Buildings, International Education Series, Vol. IV (New York: D. Appleton and Company, 1887), v-vi.

[2] "St. Louis School Architecture," The American School Board Journal 28 (April 1904): 8.

[3] On the influence of Darwin's theory on American culture as a whole, see Edward J. Pfeifer, "United States," in The Comparative Reception of Darwinism, ed. Thomas F. Glick (Austin: University of Texas Press, 1974), 168-206; Cynthia Eagle Russett, Darwin in America: The Intellectual Response, 1865-1912 (San Francisco: W.H. Freeman and Co., 1976). Spencer's work is outlined in J.D. Peel, Herbert Spencer: The Evolution of a Sociologist (New York: Basic Books, 1971). For "Social Darwinism," see Robert C. Bannister, Social Darwinism: Science and Myth in Anglo-American Social Thought (Philadelphia: Temple University Press, 1979); Richard Hofstadter, Social Darwinism in American Thought, 1860-1915 (Philadelphia: University of Pennsylvania Press, 1945).

[4] See George Frederick Drinka, The Birth of Neurosis: Myth, Malady, and the Victorians. (New York: Simon & Schuster, 1984). For a discussion of degeneration theory and artistic character, see Sarah Burns, Inventing the Modern Artist: Art & Culture in Gilded Age America (New Haven and London: Yale University Press, 1996), 80-85; Deborah L. Silverman, Art Nouveau in Fin-de-Siècle France: Politics, Psychology, and Style (Berkeley, Los Angeles, Oxford: University of California Press, 1989), 81-83.

[5] Marouf Arif Hasian, Jr., The Rhetoric of Eugenics in Anglo-American Thought (Athens, GA and London: The University of Georgia Press, 1996), 30.

[6] Nancy Tomes, The Gospel of Germs: Men, Women, and the Microbe in American Life (Cambridge and London: Harvard University Press, 1998), 4.

[7] Thomas J. Schlereth, Victorian America: Transformations in Everyday Life, 1876-1915, Everyday Life in America Series, ed. Richard Balkin (New York: HarperPerennial, 1991).

[8] Drinka, Birth of Neurosis, 184-209; Tom Lutz, American Nervousness, 1903: An Anecdotal History (Ithaca: Cornell University Press, 1991); Charlotte Perkins Gilman, "The Yellow Wallpaper," (1892), "The Yellow Wallpaper" and Other Stories (Mineola, NY: Dover Publications, Inc., 1997).

[9] Schlereth, Victorian America, 165. For slightly different studies of the human-machine metaphor and its implications, see Mark Seltzer, Bodies and Machines (New York and London: Routledge, 1992) and Anson Rabinbach, The Human Motor: Energy, Fatigue, and the Origins of Modernity (New York: Basic Books, 1990).

[10] C.-E.A. Winslow, "The Scientific Basis for Ventilation Standards," Journal of the Proceedings and Addresses of the Forty-Ninth Annual Meeting of the National Educational Association of the United States (Winona, MN: National Education Association, 1911): 979.

[11] For an overview of American advertising during this period, see T.J. Jackson Lears, Fables of Abundance: A Cultural History of Advertising in America (New York: Basic Books, 1994); James D. Norris, Advertising and the Transformation of American Society, 1865-1920 (New York: Greenwood Press, 1990).

[12] Basic discussions of various urban reform movements can be found in Stanley K. Schultz, Constructing Urban Culture: American Cities and City Planning, 1800-1920 (Philadelphia: Temple University Press, 1989); Paul Boyer, Urban Masses and Moral Order in America, 1820-1920 (Cambridge and London: Harvard University Press, 1978); and Dominick Cavallo, Muscles and Morals: Organized Playgrounds and Urban Reform, 1880-1920 (Philadelphia: University of Pennsylvania Press, 1981).

[13] G. Stanley Hall, "The Health of School Children as Affected by School Buildings," Journal of the Proceedings and Addresses of the National Educational Association (1892) (New York: National Educational Association, 1893): 683.

[14] Warren Richard Briggs, Modern American School Buildings (New York: John Wiley & Sons, 1899), 119.

[15] Stuart H. Rowe, The Lighting of School-Rooms (New York: Longmans, Green, and Co., 1904), 8.

[16] N.R. Baker, "School Room Fenestration," The American School Board Journal 40 (May 1910): 5; Fletcher B. Dresslar, School Hygiene (New York: Macmillan, 1913), 228.

[17] Henry Barnard, School Architecture, 2d ed. (New York: A.S. Barnes & Co., 1848; reprint, ed. Jean and Robert McClintock, New York: Teachers College Press, 1970), 56.

[18] James Johonnot, School-Houses (New York: J.W. Schermerhorn & Co., 1871), 34.

[19] Ibid.

[20] "Lighting Schoolrooms," The American Architect and Building News 1 (August 26, 1876): 275. For architects comparing American and German schoolhouses, see Edmund M. Wheelwright, "The American Schoolhouse I," The Brickbuilder 6 (November 1897): 244-247; William B. Ittner, "School Architecture," Journal of Proceedings and Address of the 50th Annual Meeting of the National Educational Association (1912): 1207-1222. St. Louis Superintendent Frank Louis Soldan also described German schoolhouses in "A Visit to German Schools," in idem, The Century and the School and Other Educational Essays (New York: The Macmillan Company, 1912).

[21] Proceedings of the Board of Education of the City of Chicago (1874-75) (n.p., n.d.), 104; Twenty-First Annual Report of the Board of Education of the City of Chicago (1874-75) (Chicago: publisher unknown), 75-76. See also Superintendent Louis Soldan's comments on classrooms and lighting in. the Forty-Second Annual Report of the Board of President and Directors of the St. Louis Public Schools (1895-96) (St Louis: Nixon-Jones Printing Co., 1897): 25-26.

[22] Twenty-Ninth Annual Report of the Board of Education of the City of Chicago (1882-83) (Chicago: Jameson & Morse, Printers, 1884), 16. Bridge wrote that using at least five windows in each classroom increases lighting surface from 10.5% to 13.13% of the floor space, which increases light 25%; but this was not ideal, since a 28x34 room for 60 pupils needs not less than 16%. Ibid.

[23] Dresslar, School Hygiene, 221.

[24] Albert P. Marble, "How to Light School Buildings," The American School Board Journal 4 (July 1892): 3. Although accepted by most architects, the unilateral source rule was not without challenges. For example, in 1904, Stuart H. Rowe advocated lighting from two sides of the classroom (while also agreeing that unilateral lighting was generally the most practical). Rowe, The Lighting of School-Rooms, 34-38. Reviewing photographs and floor plans of schools from the early twentieth century also shows that most buildings contained corner rooms that received light from two directions.

[25] See e.g., Albert P. Marble, "Facts for Building Committees," The American School Board Journal 4 (May 1892): 6; William George Bruce, "Selecting School House Plans," The American School Board Journal 5 (October 1893): 6.

[26] Briggs, Modern American School Buildings, 195-218.

[27] Ibid., 195.

[28] Leonard P. Ayres and May Ayres, Cleveland Education Survey: School Buildings and Equipment (Cleveland: The Survey Committee of the Cleveland Foundation, 1916), 33.

[29] Ittner's architectural manipulations were apparently unsuccessful in the eyes of hygiene expert Fletcher Dresslar, who criticized the St. Louis (i.e., Ittner) school buildings in a 1918 survey of the school system: "A classroom 32 feet long and 24 feet wide should have approximately 160 square feet of glazing in the windows. Five windows 8 feet long and 4 feet wide will meet this requirement; but these five windows should be so placed in the wall as to allow about 7 feet of "dead" space in the front of this side. Consequently windows set in accordance with this demand will not balance when observed from outside. The school buildings in St. Louis, both old and new, exhibit an unwillingness of the architects to sacrifice "balance" to meet this need . . . Some day it may be possible to insist that the comfort and health of the children should take precedence over "balance," or that architects should devise means of satisfying both demands." Fletcher B. Dresslar, "Hygienic Conditions in the Buildings, in Charles H. Judd, Survey of the St. Louis Public Schools, Vol. 1: Organization and Administration (Yonkers-on-Hudson, NY: The World Book Company, 1918), 171.

[30] The Commission was created by a 1906 "Organic Law" aimed at clarifying administrative responsibilities between the District of Columbia Board of Education and the United State Congress. The commission members – District Superintendent A.T. Stuart, Supervising Architect of the Treasury James Knox Taylor, and D.C. Engineering Commissioner Jay J. Morrow – visited schools in fourteen cities across the country, including St. Louis and Chicago. Antoinette J. Lee, "The Public School Buildings of the District of Columbia," (Washington, D.C: Sumner School Museum and Archives, District of Columbia Public Schools), 29-30; A.T. Stuart, James Knox Taylor, and Jay J. Morrow, Report of the Schoolhouse Commission Upon a General Plan for the Consolidation of Public Schools in the District of Columbia (Washington, DC, U.S. Government Printing Office, 1908).

[31] Stuart, et. al., Report of the Schoolhouse Commission, 24.

[32] Ibid.

[33] Edmund M. Wheelwright, "The American Schoolhouse" I-XVII, The Brickbuilder 6-8 (November, 1897 – April, 1899); idem, School Architecture (Boston: Rogers and Manson, 1901).

[34] See e.g., A.D.F. Hamlin, "Consideration in Schoolhouse Design," in Modern School Houses (New York: The Swetland Publishing Co., 1910), 4; Ittner, "School Architecture," (1912): 1207; John J. Donovan, et. al., School Architecture: Principles and Practices (New York: The Macmillan Company, 1921), 18; Thomas E. Tallmadge, The Story of Architecture in America (New York: W.W. Norton & Co., 1927), 273.

[35] Wheelwright, "The American Schoolhouse XVII," 69.

[36] Idem, "The American Schoolhouse I," 244.

[37] Ibid.

[38] Ibid., 245.

[39] See e.g., Marble, "How to Light School Buildings," 3; Forty-Second Annual Report of the Board of President and Directors of the St. Louis Public Schools (1895-96), 26; William G. Bruce, School Architecture: A Handy Manual for the Use of Architects and School Authorities, 3rd ed. (Milwaukee:

Johnson Service Company, 1906), 39; Ittner, "School Architecture," (1912): 1213; Dresslar, School Hygiene, 53; C.B. J. Snyder, "The Lighting of School Rooms," The American Architect and Building News 108 (September 8, 1915): 70.

[40] John J. Donovan, "The Classroom," in idem, School Architecture: Principles and Practices, 264. The dissemination of architectural standards during this period will be addressed in Chapter 6.

[41] Severance Burrage and Henry Turner Bailey, School Sanitation and Decoration (Boston, New York, Chicago: D.C. Heath and Company, 1899), 54.

[42] Edmund M. Wheelwright, "The American Schoolhouse II," The Brickbuilder 6 (December 1897): 267; Burrage and Bailey, School Sanitation and Decoration, 83-93; Rowe, The Lighting of School-Rooms, 49-51; Bruce, School Architecture, 25; Walter J. Kenyon, "The Interior Decoration of Schools," School Review 14 (November 1906): 625-634.; Donovan, "The Classroom," 275.

[43] Kenyon, "The Interior Decoration of Schools," 625-626.

[44] See e.g., F. Laurent Godinez, "School Room Lighting," Architecture and Building 47 (October and November, 1916): 365-367; 400-402; Romaine W. Myers, "Electrical Installation and Illumination," in Donovan, et. al., School Architecture, 557-568; George D. Strayer and Nicholas L. Engelhardt, Standards for High School Buildings (New York: Teachers College, Columbia University, 1924), 27.

[45] Rowe, The Lighting of Schoolrooms, vii, 68.

[46] East and West exposures seem to have been slightly more regarded, followed by north and then south, but there were advocates for all. See, e.g., Marble, "How to Light School Buildings," 3 (North & South); Walter H. Kilham, "The Modern Schoolhouse IV. Exposure and Plan," The Brickbuilder 24 (1915): 94 (East & West); Bruce, School Architecture, 31 (East); William B. Ittner, "School Architecture," Journal of the Proceedings and Addresses of the National Education Association, Winona, MN: National Education Association, 1908): 1067 (East & South); Ittner, "School Architecture" (1912): 1210 (East & West); Wheelwright "The American Schoolhouse XVII," Brickbuilder 8 (April 1899): 69 (Southeast).

[47] For a discussion of the aesthetic impact of the concern for lighting, see Chapter 7.

[48] Stanley K. Schultz, The Culture Factory: Boston Public Schools, 1789-1860 (New York: Oxford University Press, 1973), 92-94.

[49] Ibid., 96-98.

[50] Massachusetts State Board of Health, Twentieth Annual Report, 1889 (Boston, 1890), cited in John Duffy, "School Buildings and the Health of American School Children in the Nineteenth Century," Healing and History: Essays for George Rosen, ed., Charles E. Rosenberg, (New York: Science History Publications, 1979), 170.

[51] Alice Upton Pearmain, "The Boston Schools: A Sanitary Investigation," Municipal Affairs 2 (September 1898): 497-501.

[52] H. Endemann, "Chemical Examination of the Air of Various Public Buildings," in New York Board of Health, Third Annual Report, 1872-1873 (New York: New York Board of Health, 1873); J.A. Larrabee, "The Schoolroom a Factor in the Production of Disease," Journal of the American Medical Association 11 (1888): 614; Albert P. Marble, Sanitary Conditions for Schoolhouses, U. S. Bureau of Education, Circular

of Information, No. 3 (Washington, D.C.: U.S. Government Printing Office, 1891); John S. Billings, Ventilation and Heating (New York: The Engineering Record, 1893), 410.

[53] Charles P. Dwyer, The Economy of Church, Parsonage and School Architecture, Adapted to Small Societies and Rural Districts (Buffalo: Phinney & Co., Publishers, 1856), 57.

[54] Johonnot, School-Houses, 27.

[55] See e.g., Wheelwright, "The American Schoolhouse XVII," 67-69 (250 cubic ft.); Pennsylvania Statue on Schoolhouse Construction (1905), cited in Bruce, School Architecture, (200 cubic ft.); Indiana Statue on Schoolhouse Construction (pre-1912), cited in L.N. Hines, Response to William B. Ittner, "School Architecture," Journal of Proceedings and Address of the 50th Annual Meeting of the National Educational Association (1912): 1223-24 (225 cubic ft.); School Laws of Virginia (1915), Sec. 61(200 cubic ft.).

[56] "Poisoned Air in the Schools," St. Louis Post-Dispatch (October 25, 1896): 6.

[57] Ibid.

[58] Ibid.

[59] Ibid.

[60] Ibid.

[61] District of Columbia Schoolhouse Commission Report (Washington, DC, 1883?), in Stuart, et. al., Report of the Schoolhouse Commission, 18-19.

[62] Fifty-Fifth Annual Report of the Board of Education of the City of St. Louis (1908-09) (St. Louis: Buxton & Skinner Stationary Co., 1909): 21.

[63] Ibid.

[64] See e.g., Albert P. Marble, "Facts for Building Committees," 6 (20 ft./min.); " Poisoned Air in the Schools," (33 ft./min.); R.C. Carpenter, "Heating and Ventilating of Schoolhouses," Brickbuilder 9 (January 1900): 52-59 (33 ft./min.); Pennsylvania Statue on Schoolhouse Construction (30 ft./min/); Indiana Statue on Schoolhouse Construction (30 ft./min.); George E. Reed, "Heating and Ventilating," in Donovan, et. al., School Architecture, 526 (25-30 ft./min.).

[65] "As a rule, school rooms are overheated, the temperature in winter in our schools ranging usually from 72 degrees to 76 degrees. The rule should be that the temperature should never exceed 70 degrees, and Dr. Lincoln is no doubt correct in his statement that children can be made comfortable at 66 degrees in a well-aired room." Billings, Ventilation and Heating, 416.

[66] Dr. F. Winsor, "The Ventilating and Warming of Schoolhouses in the Northern United States," The American Architect and Building News 2 (October 13, 1877): 327.

[67] Endemann, "Chemical Examination of the Air of Various Public Buildings," 301. In 1879, J. Wilkinson reported on his experiments with a building's temperature during a period where the outside temperature ranged from 98 degrees to –26; inside, the air was 40 during the coldest weather and 55 in the hottest. J. Wilkinson, "School-House Ventilation," The American Architect and Building News 6 (July 26, 1879): 31.

[68] Thirty-First Annual Report of the Board of Education of the City of Chicago (1884-85) (Chicago: George K. Hazlitt & Co., 1885), 12-13.

[69] "New Building for Hartford Public High School – 1882-83," American Journal of Education 32 (1882): 193-204.

[70] Roof projections on nineteenth century buildings were not always aesthetic, as May Ayres recognized in one of the first histories of American school architecture: " [O]ne is inclined to take the stand that the towers, spires, belfries, and similar architectural adjuncts which became so prominent towards the end of the 19th century were introduced principally in response to a popular demand for better heating and ventilation, and did not become an educational tradition until very nearly the present time." May Ayres, "A Century of Progress in Schoolhouse Construction," The American School Board Journal 55 (July 1917): 45.

[71] J.D. Sutcliffe, "The Progress of American Schools in Regard to Health Laws," American Architect 88 (November 4, 1905): 148. The Smead System was heavily promoted in advertisements in The American School Board Journal late in the nineteenth century.

[72] For an excellent summary of early twentieth century heating and ventilation systems, see Wilbur T. Mills, American School Building Standards (Columbus: Franklin Educational Publishing Company, 1915), 125-151.

[73] Ethel M. Gardner, "The School Building In Its Reaction On The Teacher's Work," Addresses and Proceedings of the Fifty-Ninth Annual Meeting of the National Education Association of the United States 59 (1921): 404-406.

[74] School Survey Committee, Survey of Public School System, City of New York (New York: Board of Education of the City of New York, 1924), 347.

[75] Kate Rousmaniere, City Teachers: Teaching and School Reform in Historical Perspective (New York: Teachers College Press, 1997), 85.

[76] Sutcliffe, "The Progress of American Schools in Regard to Health Laws," 148. Waters was first listed as the Board of Education's Chief Engineer in the Thirty-First Annual Report of the Board of Education of the City of Chicago (1884-85). His work in one of Mundie's schools is described in "Typical Chicago School Heating and Ventilating Plant," The Western Architect 4 (July 1905): 10-12.

[77] William B. Ittner, "Forty Years in American School Architecture," The American School Board Journal 82 (March 1931): 49.

[78] Ittner, "School Architecture," (1912): 1212.

[79] Robert Roeschlaub was one of the earliest official school architects, serving as the Board Architect of the East Denver School District from 1876 – 1889. See Francine Haber, Kenneth R. Fuller and David N. Wetzel, Robert St. Roeschlaub: Architect of the Emerging West, 1843-1923 (Denver: Colorado Historical Society, 1988).

[80] E.R. Robson, School Architecture (London: John Murray, 1874; reprint, New York: Humanities Press, 1972).

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[81] National Education Association Committee on School House Planning and Construction, Report of Committee on School House Planning, Frank Irving Cooper, Chairman (Washington: National Education Association, 1925).

[82] Ibid., 39. A similar taxonomy was enumerated by William Estabrook Chancellor in 1909; Chancellor's plan types were the square, rectangle, interior court, "T," "E," "H," "L," "U," "V," "Y," and "Wide-Angle," which was a "V" extended to a larger angle. William Estabrook Chancellor, "Schoolhouse Accommodations," The American School Board Journal 38 (April 1909): 4.

[83] Dresslar, School Hygiene, 359. Dresslar, who was not an architect, prepared an earlier book, American Schoolhouses (United States Bureau of Education Bulletin No. 5, 1910, later published, Washington: U.S. Government Printing Office, 1911; updated 1925) for the U.S. Bureau of Education. He later became a faculty member at George Peabody College, where he created a program in school hygiene and construction. The program influenced Tennessee's Interstate School Building Service. See Mary S. Hoffschwelle, Rebuilding the Rural Southern Community: Reformers, Schools, and Homes in Tennessee, 1900-1930 (Knoxville: University of Tennessee Press, 1998).

[84] On germ theory and turn-of-the-century America, see Tomes, Gospel of Germs.

[85] Chancellor, "Schoolhouse Accommodations," 4.

[86] Kilham, "The Modern Schoolhouse IV. Exposure and Plan," 95. Also: "Colds seem to be passed from one child to another through minute drops of mucous which are sprayed into the air in coughing or sneezing. The best way to avoid contagion is to flood every corner of the room with sunshine and so render these drops sterile." Ayres and Ayres, Cleveland School Building Survey: School Buildings and Equipment, 43.

[87] Johonnot, School-Houses, 35.

[88] Michael J. Lillyquist, Sunshine and Health (New York: Dodd, Mead, 1985).

[89] Sutcliffe undoubtedly referred to S.H. Woodbridge, who later wrote Pure Air as an Investment in 1909. Sutcliffe, "The Progress of American Schools in Regard to Health Laws," 149.

[90] On American attitudes toward dirt and health, see Suellen Hoy, Chasing Dirt: The American Pursuit of Cleanliness (New York and Oxford: Oxford University Press, 1995).

[91] For a general overview of nineteenth century health concerns, see Duffy, "School Buildings and the Health of American School Children in the Nineteenth Century."

[92] Dresslar, School Hygiene, 345.

[93] Tomes, Gospel of Germs, 60.

[94] Massachusetts State Board of Health, Suggestions for Preventing the Spread of Scarlet Fever (n.d.; received at the Surgeon General's office in 1888), in ibid., 61.

[95] Thomas D. Perry, "Dustless Schools," The American School Board Journal 41 (November 1910): 5.

[96] Fifty-Fifth Annual Report (1908-09): 12.

[97] "Public School Hygiene," The American School Board Journal 13 (October 1896): 8.

[98] See e.g., Charles James Fox, "Tiling as a Help to Hygiene in School Architecture," The American School Board Journal 35 (October 1907): 15-19.

[99] C.W. Hackensmith, History of Physical Education (New York: Harper & Row, Publishers, 1966), 352.

[100] For a good overall view of fitness and health in American history, see Harvey Green, Fit for America: Health, Fitness, Sport and American Society (New York: Pantheon Books, 1986). An essay that attempts to examine American fitness within a larger cultural context is John Higham, "The Reorientation of American Culture in the 1890s," in Writing American History: Essays on Modern Scholarship (Bloomington, IN and London: Indiana University Press, 1970).

[101] Ibid.

[102] Dio Lewis, The New Gymnastics for Men, Women and Children (Boston: Ticknor and Fields, 1864), 9.

[103] Mabel Lee, A History of Physical Education and Sports in the U.S.A. (New York: John Wiley & Sons, 1983), 138.

[104] Ibid., 84-85. By 1894, the following cities had system-wide physical education programs: in Boston, Chicago, Davenport, St. Louis, Milwaukee, Cleveland, Omaha, Kansas City, La Crosse, Davenport, Los Angeles, Oakland, Moline, Detroit, Erie, Indianapolis, San Francisco, Spokane, Dayton and St. Paul.

[105] For more detailed descriptions of the two systems, see Lee, History of Physical Education, 53-57.

[106] Thirty-Second Annual Report of the Board of President and Directors of the St. Louis Public Schools (1885-86) (St Louis, 1886): 21.

[107] Lee, History of Physical Education, 57.

[108] Richard A. Swanson and Betty Spears, History of Sport and Physical Education in the United States, 4th Ed. (Madison, WI & Dubuque, IA: Brown & Benchmark Publishers, 1995), 179.

[109] Fortieth Annual Report of the Board of President and Directors of the St. Louis Public Schools (1893-94) (St Louis, 1895); Lee, History of Physical Education, 84.

[110] Sixth Annual Report of the Superintendent of Public Schools (1859), 52, quoted in John Wesley Bell, The Development of the Public High School in Chicago (Chicago: University of Chicago Libraries, 1939), 159.

[111] Educators advocated physical training prior to that year. For example, in 1884 Board President Adolf Kraus suggested 15-20 minutes per day for each student with light dumbbells and Indian clubs. Thirtieth Annual Report of the Board of Education of the City of Chicago (1883-84) (Chicago: George K. Hazlitt & Co., 1885), 31.

[112] Thirty-Fifth Annual Report of the Board of Education of the City of Chicago (1888-89) (Chicago: Jameson & Morse, Printers, 1890), 52.

[113] Bell, The Development of the Public High School in Chicago, 159.

[114] Thirty-Eighth Annual Report of the Board of Education of the City of Chicago (1891-92) (Chicago: Public Schools of the City of Chicago, 1893), 237-238.

[115] Philbrick, "Boston Latin and English High Schools," 428.

[116] Thirty-Eighth Annual Report of the Board of Education of the City of Chicago, 45.

[117] Ibid.

[118] North Division was designed by Normand Patton, but constructed (as Edward Waller High School) under the supervision of Board Architect William Mundie, who made some changes to the Patton plans illustrated in "New High School, Chicago," The American School Board Journal 17 (July 1898): 12.

[119] Fiftieth Annual Report of the Board of Education of the City of Chicago (1903-04) (Chicago: Public Schools of the City of Chicago, 1905), 120.

[120] Proceedings of the Board of Education of the City of Chicago (1910) ( n.p., n.d.), 409.

[121] Swanson and Spear, History of Sport and Physical Education, 198.

[122] Hackensmith, History of Physical Education, 393.

[123] Ibid., 411-412. Susan Hoy cites the draftee figures as 731,000 unfit out of 2,511,000. Hoy, Chasing Dirt, 134.

[124] Ibid., 412.

[125] Ibid., 413. The national movement to implement physical education was tempered by those like Fletcher Dresslar, who cautioned against overexertion: "In the work of physical education it is unhygienic to cause children to develop out of proportion to the demands of normal and usual living. Athletes who have through long-continued training developed a lot of muscles not usually needed, or a heart capacity beyond the demands of customary living, are thereby endangered through the onset of natural degeneration when they settle into a normal or a probable form of life which makes less strenuous demands on the circulation. Physical education will fail of its purpose if it does not adjust its efforts to preparing the body to do its work without danger of degeneration." Dresslar, School Hygiene, 299.

[126] Wheelwright, "The American Schoolhouse II," 267.

[127] Bruce, School Architecture, 35.

[128] Of 78 high school plans published in Wheelwright's School Architecture, Dresslar's American Schoolhouses, and William C. Bruce, High School Buildings (Milwaukee: The American School Board Journal, 1913), 87% had gymnasiums in the basement.

[129] These figures are derived from the examples shown in Bruce, High School Buildings. In their 1924 book of standards, Strayer and Engelhardt specified 50' x 80'. Strayer and Engelhardt, Standards for High School Buildings, 70. Other specific recommendations include 50' x 80' (Ittner, "School Architecture," (1912): 1213) and 50' x 75' (M.B. Reach, "Gymnasiums – Their Plan and Equipment – II," The Brickbuilder 18 (March 1909): 48.

[130] The Brickbuilder, 7 (August 1898): 154. The figure was actually down over $2 million from the previous year.

[131] "Last Month's School House Fires," The American School Board Journal 5 (April 1893): 11.

[132] Ittner, "School Architecture," (1908): 1066. The speech was reprinted as "Modern School Architecture," The American School Board Journal 37 (September 1908): 3-4, 18.

[133] Forty-Second Annual Report of the Board of Education of the City of Chicago (1895-96), 16, cited in Bell, Development of the Public High School in Chicago, 168-169.

[134] "Architect Patton has been in consultation with the leading fireproof companies for some time, and a scheme of construction has been evolved which will render the structures safe at a cost of but thirteen and one-half per cent over the combustible methods of the past. This should destroy the main argument against fireproofing, that of cost, and no school structure should be erected in the future without this safeguard." "The Future Fireproofing of Schoolhouses in Chicago," The Inland Architect and News Record 31 (June 1898): 41.

[135] Bell, Development of the Public High School in Chicago, 166.

[136] Forty-Fifth Annual Report of the Board of Education of the City of Chicago (1898-99) (Chicago: Public Schools of the City of Chicago, 1900), 115-116.

[137] For further reading on the Iroquois Theater fire, see Marshall Everett, Lest We Forget: Chicago's Awful Theater Horror (Chicago: Memorial Publishing Co., 1904).

[138] Fiftieth Annual Report of the Board of Education of the City of Chicago (1903-04) (Chicago: Public Schools of the City of Chicago, 1905), 13, 18.

[139] See Elinor Mondale Gersman, "Education in St. Louis, 1880-1900: A Case Study of Schools in Society" (Ph.D. diss., Washington University, 1969), 60.

[140] C.E. Illsley, "The Panic at the Webster School," The American Architect and Building News 7 (January 31, 1880): 38.

[141] Ibid.

[142] "New Building Laws Ready," St. Louis Post-Dispatch (December 20, 1896): 19; "The Sky Scraper Problem Solved," St. Louis Post-Dispatch (January 22, 1896): 7. The pertinent sections of the building laws classified all public school buildings as "first class buildings," which required them to "consist of non-inflammable materials throughout, with floors constructed of iron and steel beams filled in between with terra cotta, concrete, or other masonry construction . . ." Forty-Second Annual Report of the Board of President and Directors of the St. Louis Public Schools (1895-96): 21.

[143] Samuel F. Eveleth, School-house Architecture (New York: The American News Company, 1870).

[144] "Yet the experts focused exclusively on perfecting the fire resistance of structures and thereby overlooked the fact that fireproof buildings could still contain hazards for occupants. If nothing else, the building's contents could burn. Therefore, a sufficient amount of safe exits or places of refuge were necessary even in fireproof buildings. But the fire protection fraternity did not see the necessity. They considered emergency egress a problem for buildings that were *not* fireproof and therefore out of the realm of their concerns. Thus, in the nineteenth century, the men with the most knowledge about fires, and how to design, construct, and manage buildings to protect them from fire damage, simply did not apply themselves to the issue of how to evacuate burning buildings." Sara E. Wermiel, The Fireproof Building: Technology and Public Safety in the Nineteenth-Century American City (Baltimore & London: The Johns Hopkins University Press, 2000): 187.

[145] The two sets of entrances and stairways were probably intended to separate boys and girls – a common practice in the nineteenth century. The description of Design No. 15 lends credence to the theory that the two entrances served an organizational purpose; although a single building, the plan is "adapted for two high schools."

[146] "School House Fires," The American School Board Journal 28 (March 1904): 8.

[147] Willard Hirsh, "The Lesson of the Collinwood Fire," The American School Board Journal 36 (April 1908): 10d, 31; Marshall Everett, Complete Story of the Collinwood School Disaster and How Such Horrors Can Be Prevented (Cleveland: The N.G. Hamilton Publishing Co., 1908).

[148] The American School Board Journal 35 (December 1907).

[149] The American School Board Journal 36 (April 1908).

[150] Even as late as 1920, The American School Board Journal ran a cover with a hooded death figure ("Responsibility") pointing at a distant schoolhouse fire and remarking to a distraught man ("The School Board"), "Have you done everything you could do to prevent that?" The American School Board Journal 60 (April 1920).

[151] "School House Fires," 8.

[152] Hirsh, "The Lesson of the Collinwood Fire," 31.

[153] See e.g., H.C. Brubaker, "Fireproof School Buildings," The American School Board Journal 40 (April 1910): 14-15.

[154] "Fire Protective Measures Adopted by School Boards," The American School Board Journal 36 (April 1908): 11, 18.

[155] Ittner, "School Architecture," (1912): 1066. In that speech Ittner listed eleven essential points in fire safety: (1) A "generous, well-drained, and dry" site; (2) Buildings limited to two stories where possible with an above-ground basement; (3) At least two direct exists from the first floor as far from each other as possible; (4) The boiler and fuel room equipment should be separated by masonry walls and a fireproof ceiling, and their should be no doorways between basement rooms; (5) All exit doorways should swing out; (6) There should never be fewer than two internal stairways; (7) Stairways in a non-fireproof building should be in a fireproof enclosure; (8) Classrooms should have only one door to the corridor, located by the teacher's desk; (9) No wardrobes in the corridors – they should be attached to the classrooms without doorways into the corridors; (10) All basement bearing walls should be masonry; (11) Fire escapes should be avoided if additional enclosed stairways can be substituted. Ibid., 1066-1068.

# Chapter Five

## "EDUCATION"

> Buildings that take care of the health of the pupils and that are adequate for the accommodation of modern courses of study, trying to turn the graduate out into the world ready to do useful work in it, will be multiplied so fast in the next ten years as to surprise all, even those who make a study of school architecture, for American democracy has adopted the school as its assured salvation.
>
> Frank Estabrook Chancellor, 1909[1]

Changes in the educational system at both the administrative and curricular levels stimulated the American high school's architectural transformation. Between 1880 and 1920 the organizational framework of the nation's educational system was largely restructured and a fundamental shift occurred in the conception and purpose of education. A myriad of reform movements arose at this time, symbolized by the ubiquitous John Dewey, the nation's most visible spokesperson for educational change. While Dewey provided a powerful voice for reform, there was no consensus on fixing what was wrong with American education. Progressive reformers did, however, agree on one thing – that education was one of our most important institutions. In The Promise of American Life, Herbert Croly preached the importance of education as the salvation of American democracy and the true path to individual self-improvement. "The real vehicle of improvement is education," wrote Croly, "It is by education that the American is trained for such democracy as he possesses; and it is by better education that he proposes to better his democracy."[2]

Despite the lack of direction, competing reform notions *were* successful in altering education's purpose and subject matter. The most visible curricular change was an expanded course of study and the addition of manual and vocational training programs.

These changes significantly impacted the way architects designed school buildings. An evolving educational agenda forced school designers to find ways to accommodate new spaces in the high school, like wood, metal and print shops, model kitchens, sewing rooms, swimming pools, gymnasiums and auditoriums. Architects were also confronted with a basic need to enlarge the schoolhouse simply because there were more students. The mixture of compulsory education laws, stricter child labor laws, increased immigration and greater societal interest in education produced an incredible upsurge in high school enrollments. In 1890, 3.7% of Americans between the ages of fourteen and seventeen attended high school; that figure swelled to 28.4% by 1920.[3] In concrete terms, this represented an increase from 203,000 to 2,200,000 students.[4] Since many of these children had neither the inclination nor the resources to attend college, educators were forced to reevaluate the traditional high school curriculum. This chapter will examine the changes in the purpose and subject matter of American education that affected the transformation of the schoolhouse.[5]

## The New American Adolescent

The transformation of American secondary school education at the end of the nineteenth century was largely a product of an important cultural shift in the conception of young adults and their place in society. The stage of life that we now know as "adolescence" was first recognized during this period as a result of psychological studies of the differences between younger and older children. The "invention" of adolescence had a permanent effect on American society.[6] Joseph Kett points out that in the decades after 1900 "A biological process of maturation became the basis of the social definition of an entire age group," which resulted in "the massive reclassification of young people as adolescents and the creation of institutions to segregate them from casual contacts with adults . . ."[7]

Educators, psychologists, journalists, reformers, and members of the criminal justice system were responsible for recognizing this new age group. For example, the amount of magazine literature aimed at the middle class and addressing adolescent issues jumped significantly after 1900.[8] A major catalyst for such interest was the seminal book, Adolescence: Its Psychology and Its Relations to Physiology, Anthropology, Sociology, Sex, Crime, Religion and Education, by psychologist G. Stanley Hall, leader of the child study movement in the late nineteenth century.[9] Hall based his idea of adolescence on the theory of recapitulation (summarized in the phrase, "ontogeny recapitulates phylogeny"), which involved the conception that every individual's life is a reenactment of the history of all mankind. According to Hall, the period of adolescence corresponded with a particularly savage and traumatic time in human history.[10] Thus adolescents' energy, social instincts, moodiness and eccentric behavior had biological roots which could not be denied. Hall recommended athletics, group activities and special organizations to shelter young adults from the pressures of the adult world while they negotiated their way through this often-confusing stage of life. His references to instinctual and evolutionary behavior meshed with the cultural fascination with Darwinian theory and its derivatives discussed in the previous chapter. Overall, Hall's influence extended to four major areas according to Joseph Kett:

> The movement to organize the spare-time activities of middle-class boys and girls in adult-sponsored youth organizations; parents' manuals which sought to guide

> the management of teenagers in middle-class and upper-middle-class homes; *educators who had to manage the teenagers who were flooding public high schools; and the vocational guidance movement, which sought to bridge the gap between classroom and workplace* (italics mine).[11]

The latter two references are particularly important for this study, for they address issues directly connected to adolescents' education.

One of the consequences of this new conception of American youth was that it set the adolescent apart from (and considered them not quite ready for) the adult world. In the nineteenth century children were more likely to be viewed as small adults. Significant portions of them were engaged as part-time or full-time workers, whether on farms, in shops or in the growing number of manufacturing plants. The United States Census Bureau reported 765,000 children ages ten to fifteen were "gainfully employed" in 1870 (13% of the population for that age group), 1,750,000 in 1900 (18%), 1,990,000 in 1910 and 1,061,000 in 1920, though these numbers are estimates and probably underrepresented the actual numbers.[12] Such statistics appalled Progressive reformers, who set in motion a campaign to get more children out of the workplace and into school. Educators realized the dangers of child labor as well; the Chicago Board of Education's Annual Report for 1864-65, for example, contained the following lament: "Many a child has been sacrificed mentally and morally as well as physically to the pecuniary interest of the parent."[13]

Beginning in the late nineteenth century, lawmakers passed child labor laws that first reduced and then restricted the hours children were allowed to work.[14] This legislation often went hand-in-hand with compulsory education laws requiring children to spend certain amounts of each year in school. The Missouri legislature enacted legislation in

1905 that required children between six and fourteen to attend school at least half of the school year. The law was strengthened two years later when legislators eliminated all exemptions and mandated full-year attendance. In Illinois, the situation was different. The General Assembly passed its first compulsory education legislation in 1883, requiring all children eight- to fourteen-years-old to attend school at least twelve weeks a year. The law was sporadically enforced and faced strong opposition. The Chicago Inter Ocean expressed the sentiments of many when it announced, "Compulsory education is preposterous. Education is not necessary for everyone."[15] Noncompliance was so widespread that the Chicago Board of Education formed a committee in 1888 to devise ways to improve the compulsory education law's enforcement. The General Assembly amended the law the next year to increase the required school time from twelve to sixteen weeks per year, eight of which were to be consecutive; the new law also required school systems to appoint truant officers. In 1891, Illinois adopted its first child labor legislation. The law prohibited employment of any child under thirteen without a certificate, with exceptions. Nonetheless, there were still thousands of children working in businesses across the state, especially in the Chicago area.

Despite slow progress in Chicago and other cities, eventually the combination of compulsory attendance and child labor restrictions began to increase public school enrollments. National census figures showed that school attendance by fifteen-year-olds grew from 36.9% in 1880 to 49.0% in 1900 to 60.3% in 1920; for seventeen-year-olds, the numbers were 13.1% in 1880, 19.2% in 1910, and 21.9% in 1920.[16] St. Louis' high school population, for example, rose from 1,096 in 1880 to 2,243 in 1900 to 5,147 in

1910, and 12,078 in 1922.[17] The result of this enrollment surge – partially enforced by law – was that many students who had no academic inclinations and would not have attended school in previous generations were forced to be there at the turn-of-the-century. Public schools administrators, particularly at the high school level, faced the new problem of how to educate these children. Educators soon recognized the inadequacy of the traditional high school curriculum.

<u>Curriculum Reform</u>

The American high school in the late nineteenth century continued to be an ill-defined institution, just as it had been almost half-a-century before. Theodore R. Sizer summarized the state of secondary education:

> American secondary schools were, at best, doing an imperfect job. They enrolled few; they provided their students with instructors the majority of whom were barely competent. The schools' strength was sapped by politics and by the need for buildings and equipment. They provided no clear philosophy for education, as they were split by two relatively antithetical philosophies. They could only agree on a desire for mental power, whether it be gained from the grammar of the classics or from the study of political economy. Their pedagogy in the hands of teachers was one of rote memorization and recitation, hardly popular with students.[18]

High school curriculums were not prepared for the type of students that the schools would soon be forced to educate due to rising immigration and increasing child labor and compulsory attendance legislation. Traditional nineteenth-century education had been oriented toward the humanities. High school students, who constituted a very small proportion of all students, were a privileged group of middle- to upper class youth whose parents could afford to keep them out of the workplace. High school courses were academically oriented and leaned heavily toward the "classical" fields of study – Latin and Greek. Science and moral philosophy (which included religious instruction) were also popular. The goal of this curriculum was two-pronged: to train the mind to think and to firm up the moral character. According to advocates, mental discipline provided the properly trained mind with the ability to easily adapt itself to any future endeavor. Two prevalent theories of knowledge and its attainment formed the basis for this outlook. First, the faculty theory of psychology held that a number of distinct parts or "faculties" (reason, memory, etc.) made up the human mind, and that each of these faculties could be strengthened through exercise. Second, scientists and academics, as David K. Cohen explained, "Regarded knowledge as objective systems of facts and laws," and "portrayed knowing as a relatively passive process, in which the mind learned from the habitual association of data impressed upon it by the external world."[19] These two beliefs combined to affect the educational process. More important than preparation for any specific vocation was the broad knowledge and reasoning ability that any cultured person was expected to possess. Herbert M. Kliebard has described the theory underlying nineteenth century education as follows:

> Mental disciplinarians built on that psychological theory by alleging that certain subjects had the power to strengthen faculties such as memory, reasoning, will and imagination. Moreover, mental disciplinarians argued, certain ways of teaching these subjects could further invigorate the mind and develop these powers. Just as the muscles of the body could be strengthened through vigorous exercise, to the mental muscles, the faculties, could be trained through properly conceived mental gymnastics.[20]

The mental discipline conception of education was authoritatively set forth in the famous "Yale Report," which has been described by two educational historians as "determining the theory of liberal education in the nineteenth century."[21] A committee of

Yale College faculty members responding to attacks on the "mental discipline" approach to education wrote the report in 1828. The committee, in its most famous statement, claimed: "The two great points to be gained in intellectual culture, are the *discipline* and the *furniture* of the mind; expanding its powers, and storing it with knowledge."[22] The former was clearly more important, as the committee precluded from their ideal curriculum any professional or vocational courses, apparently believing that the intricacies of any given occupation could be learned on the job. The "storing" aspect of education was also extremely significant. In 1882, Chicago Superintendent George Howland included a nine-and-a-half-page section on "Memory in Instruction" in the Annual Report; the first sentence read, "The memory of course must play an important part during the years of school life, for by its aid alone all reason and intelligence are made possible."[23]

The type of passive education encouraged by the mental discipline approach placed few requirements on school architects apart from the lighting and ventilation concerns discussed in the previous chapter. Classrooms needed only to be large enough to hold the students and their neatly lined desks, with a platform for the teacher's desk, some blackboards, a storage cabinet and a wardrobe for students' coats and belongings. Since almost all subjects were taught in the same manner, there was no reason for schoolhouse rooms to vary. Architects merely calculated the number of rooms necessary for the projected enrollment, added some stairways and small corridors for circulation and a small assembly hall (usually the size of two or more classrooms) and the school was complete.

Toward the end of the nineteenth century, a strong contingent of humanists continued to champion the classical curriculum even as reformers tried to expand the course of study to include more practical subjects for those students who were not college-bound. The most important statement of support for traditional education in terms of the American high school was the "Committee of Ten" report of 1893. In the previous year, the National Education Association had appointed a Committee on Secondary School Studies to investigate college entrance requirements. Diverse entrance standards concerned high school administrators trying to prepare their students for college. In its final report, the Committee of Ten, as it was popularly known, circumvented its original purpose and focused on the high school curriculum rather than collegiate standards. The Committee's final recommendations reflected a mixture of concerns. On one hand, the Committee acceded to reformers' wishes in proposing curricular uniformity at the high school level. They designated four appropriate courses of study: Classical, Latin-Scientific, Modern Languages, and English. The courses were largely differentiated by the amount of foreign language study involved. The Committee felt all four courses were equally adequate for college preparation, and favored no particular curriculum. It also made no distinctions between college-bound and non-college-bound students: everyone had to choose one of the four tracks. But beyond these recommendations the Committee of Ten report also reinforced the tenets of mental discipline. The proposed curriculum contained no room for manual or vocational training of any kind and made no concession to those students without collegiate aspirations. According to the Committee, training for higher education and training for "life" should be identical.[24] While the Committee of

Ten had no binding authority over any school system, its suggestions would influence the course of education in America for decades.

The Committee of Ten's proposals reflected changes that had already occurred in many American school systems. At the end of the nineteenth century, administrators began to loosen the restrictive classical curriculum to include more options, though the alternative courses of study tended to remain close to the classical course in subject matter and application. In 1870, for example, St. Louis students could choose either the Classical Course or the General Course at Central High School. The Classical Course required four years of Latin or Greek; the General Course offered a choice between four years of Latin or a "modern language" (German or French), and included more courses in science and mathematics.[25] These options continued until 1890, when the Board of Education revised the high school curriculum into five alternatives: Classical, Scientific, English, Normal, and Business. The new structure arose from "a growing desire on the part of the patrons of the schools, for a wider range of studies from which to select, with the view of a more definite preparation in a chosen direction."[26]

The revised St. Louis curriculum anticipated the Committee of Ten's recommendations when it adopted a flexible program accommodating non-college-bound students while offering little in the way of practical training. But pressure from critics and parents to make education more applicable to real life changed school systems across the United States. The St. Louis Board of Education recognized such demands in 1902, when, as plans were on the boards for two new high schools, the curriculum expanded to nine different courses of study: Art, General, Scientific, College Scientific, Classical, College Classical, Commercial, Manual Training, and Teachers' Preparatory.[27] The following year, the Superintendent explained that the new curriculum complemented the theory that "[t]he general purpose of the High School education is to develop manhood and womanhood with strength of character and trained intelligence ... While the High School does not train for any vocation in particular ... this is the best and most valuable general preparation for any specific calling."[28] While this statement might seem compatible with the Committee of Ten's ideals, in reality the new curriculum offered proof that the St. Louis Board of Education was moving away from the classical, college preparatory model of secondary education.

This shift toward practical education was manifested by 1911. In the Fifty-Seventh Annual Report, the St. Louis Board of Education succinctly summarized its curricular changes and offered a revised philosophy of the purpose of education:

> The last quarter of a century has seen a radical change in the determinants of the high school course of study. College entrance requirements, based on the foundations of thought necessary for the professions, have gradually become less of a factor in shaping the work and regard for a difference in interest and plans for the future created a variety of courses through a regrouping of the old elements or through the addition of new subjects. In this way commercial and manual training courses for both boys and girls have grown up, offering opportunity for High School study arranged with direct regard for the kind of work the pupil intends to pursue after leaving the High School; still there remains much to be done to arouse in the students the motives for their school work which will associate it vitally with the vocation to be followed.[29]

Following this announcement, the Board revised the high school curriculum again in 1917. They reduced the nine courses of study to five: General, Fine Arts, Classical, Home Economics, and Commercial. The new curriculum required all students to take four years of Chorus and Physical Education; only those following the Classical course had to take a foreign language (Latin). The high schools also created two-year courses in such practical areas as manual training, home economics and commercial studies, and one-year courses in bookkeeping and stenography.[30] In the Annual Report, St. Louis's Superintendent Ben Blewett elucidated the goals of junior high school education, which were just as applicable to the new high school curriculum. These aims included giving every pupil a type of work that appealed to him as being worthwhile; helping children choose as widely as possible about future occupation and future education; and adjusting the course of study and the whole work of the school more closely to life conditions and life needs.[31] The Yale Report's conceptual model of education as a means of developing the "discipline and furniture of the mind" had disappeared.

Curriculum development in Chicago followed a different path. In contrast to St. Louis, the Chicago Board of Education could not seem to make up its collective mind about the proper high school curriculum. They continuously vacillated between a uniform, classically inspired course and a set of multiple courses that recognized the needs of non-college-bound students. At Chicago Central High School in 1876 students pursued either a three-year classical course or a two-year course if they had attended one of the city's division high schools. Central High closed in 1880 and students had to attend one of the three new division high schools (North, South and West) where they continued the three-year classical curriculum. Then in 1884 the Board of Education took a drastic step when it abolished Greek from the high school curriculum, which effectively terminated the schools' ability to prepare students for college. Education essentially became a general training for life rather than for college. The college preparatory course was reestablished in 1891, along with the addition of a three-year teacher-training curriculum. In the Annual Report that year, Superintendent George Howland described the Board's equivocal attitude toward the high school: "The prime purpose of the High School is to prepare those who can go no farther, for the business of life, and to open up to those who would go farther the several avenues of scientific and literary culture which they may hereafter desire to follow."[32]

After just five years, the Board reinstated a uniform four-year curriculum for all of the city's high schools in 1896. This single course was considerably augmented by the addition of electives in 1900. The Board's confusion over the proper mission of its high schools led to silence; as one early historian noted, the Board records from 1898 to the late 1930s "contain few direct statements by superintendents concerning the purposes and functions of the high school."[33] Seeming to follow an accordion-like pattern, the Chicago Board constricted the high school course again in 1905, eliminating most electives, and loosened it in 1910 with the introduction of nine different, vocationally oriented high school curriculums: English, general, science, foreign language, business, builders, manual-training, household arts and architectural.[34] These courses continued to be offered with only slight modifications through the 1930s.[35]

The curricular changes in St. Louis and Chicago demonstrate in different degrees the national trend in American education toward the development of curriculums that emphasized vocational training over humanistic learning by the 1910s. The trend was encapsulated in an important report that, like the Committee of Ten Report twenty-five years earlier, both reflected and influenced secondary education in America. The 1918 report of the National Education Association's Commission on the Reorganization of Secondary Education (popularly known as the "Cardinal Principles" report) announced the triumph of "social efficiency" as the guiding force in secondary education.[36] Where the Committee of Ten report had accorded practical training a minor role in comparison to classical education, the Cardinal Principles took training for adult life as the high school's essential purpose. Herbert Kliebard observes that

> It was perhaps inevitable, given the intense and largely successful efforts at curriculum reform since 1893, that some form of repudiation of [the Committee of Ten] report should be forthcoming and that it should reflect the growing belligerence toward academic subjects through the ascendance of social efficiency in the educational world.[37]

The Cardinal Principles succinctly stated the principal objectives of secondary education: "1. Health. 2. Command of fundamental processes. 3. Worthy home-membership. 4. Vocation. 5. Citizenship. 6. Worthy use of leisure. 7. Ethical character."[38] The end of all of these goals was to create a well-rounded adult citizen; with the possible exception of "Command of fundamental processes," none could be learned through a traditional classical course of study, and none of the goals sought to enhance students' intellectual development.

Curriculum changes in St. Louis and Chicago reflected the Cardinal Principle's recommendations. These changes also demonstrated the high school's evolving role in American society. Once considered an elite training ground for the privileged few, high schools were now charged with a new mission – to integrate the masses into adult society. Elwood P. Cubberley of Stanford University explained the basis for this position when he wrote that urban schools should "give up the exceedingly democratic idea that all are equal, and that our society is devoid of classes . . . Increasing specialization . . . has divided the people into dozens of more or less clearly defined classes."[39] According to the new philosophy, some students were to be trained for the subordinate roles they were sure to occupy.[40] The school's job then was to prepare adolescents for life rather than exercise their minds. As Wayne Urban and Jennings Wagoner point out, education at the turn-of-the-century shifted from a largely moral purpose – the equitable development of good citizens with proper American values – to a significant economic purpose – instructing students according to their individual needs and capabilities for a future in the modern industrial society.[41] The employable worker was now more important than the cultured gentleman or woman.

The American high school curriculum underwent a shift from equality to differentiation between 1880 and 1920. The traditional academic curriculum, which offered a limited course of study and emphasized training students to think, tended to teat all students more or less equally. The "new" curriculum, with its multiple courses of study, intended to better prepare students for their future life tasks based on their abilities and interests; it was the epitome of differentiation. This same shift from equality to differentiation was materialized in physical space inside the schoolhouse. The old floor plan with identically sized rooms gave way to new floor plans with specialized spaces designed to accommodate a broad range of subjects. Leonard Koos' 1919 study, cited in Chapter 1, that found 109 different room types in high school building plans of the 1910s demonstrates this complexity and adaptation.[42] School architects could no longer stack duplicate four- or six-room plans on top of each other to create a high school; they now needed to design spaces for laboratories, domestic sciences, art and mechanical drawing, and shops. The "stuffed box" or "egg-crate" plan room was no longer sufficient.

Manual and Vocational Training

The differentiated curriculum was most visible in the growth of manual and vocational training programs. The development of vocationalism dominates the history of American secondary education between 1880 and 1920. Vocationalism's growing acceptance marked a paradigm shift in the high school's purpose. It also had a significant impact on the design of high school buildings. Architect Walter Kilham proclaimed in 1916 that "The development of this branch [Manual Arts] of high school instruction has afforded perhaps the most striking feature of modern high school planning."[43]

Vocational education was an outgrowth of the manual training movement that began in the late 1870s. Manual training was originally intended to supplement the regular liberal arts curriculum. Proponents championed the idea of students utilizing their hands as well as their minds. The manual training movement also embodied what Herbert Kliebard calls "moral regeneration" – the honest use of tools as an antidote to the corruption of work by an increasingly industrialized society.[44] What the early reformers clearly did *not* want was a program to teach specific skills to future factory workers. Calvin M. Woodward, a professor at Washington University in St. Louis, emphatically emphasized this idea. Woodward founded the nation's first manual training school in 1880 with the motto: "The Cultured Mind – The Skillful Hand." The St. Louis Manual Training School offered instruction in shopwork, mathematics, and science as well as traditional subjects. Woodward described the school's philosophy in an 1885 speech:

> We put the whole boy to school, not a part of him ... We believe that mental activity and growth are closely allied to physical activity and growth, and that each is secured more readily and more fully in connection with the other than by itself ... The object of the introduction of manual training is not to make mechanics.[45]

Manual training was increasingly accepted through the 1880s. Public manual training high schools opened in Baltimore (1884), Philadelphia (1885), Toledo (1885), and Cleveland (1886), while other cities added manual training classes to their high school curriculum. The facilities needed for such programs made fresh demands on school architecture. New shop rooms required equipment and power sources that were unknown in the traditional schoolhouse. Consider the following description of the Cleveland Manual Training School (1886), which occupied its own "three-story brick building, 54 feet by 90 feet" (fig. 5.1):

> The first floor was occupied by the machine shop, forge ship, boiler room, wash room, and office. One [sic] the second floor was a drawing room, wood turning shop, class room, store room, and wash room. A carpenter shop, foundry, class room, laboratory, store room and wash room, were on the third floor. A fifty horse power steam engine, of modern design, was in the machine shop, together with a steam pump and heater, two 14 inch swing, screw cutting, engine lathes, three 12 inch swing speed lathes with side rests, one 18 inch swing upright drill and two 15 inch shapers. Besides machine tools, there were 12 bench vises, three sets of drills, taps, dies, reamers, files, squares, etc. All chisels, punches, scrapers, and lathe tools were made by the pupils.[46]

Such elaborate equipment required specialized spaces. Articles began to appear in educational journals offering guidance in designing manual training rooms. Calvin Woodward published such an article in The American School Board Journal in 1892. Woodward advised that shop rooms should ideally be in a separate building, should accommodate no more than twenty-five students, and should contain 1,600 square feet of floor space.[47] Many early shop rooms were in basements or separate buildings, but as the manual training movement grew stronger in the late 1890s some cities, like those mentioned above, inaugurated the manual training or mechanical arts high school, which offered practical training in addition to the regular high school curriculum.

Vocational training received a great stimulus in 1906 when the Massachusetts Commission on Industrial and Technical Education (known as the "Douglas Commission") issued its report. The Commission criticized Massachusetts' "old-fashioned" curriculum as out of touch with the practical demands of modern society. The decline of the apprenticeship system in the late nineteenth century was found to have serious repercussions for American industry; in a series of hearings held across the commonwealth, the Douglas Commission heard numerous complaints about the lack of skilled workers. Manufacturers looked to the public school system to remedy this problem. The Commission chided existing manual training programs, however, for being too narrowly focused on supplementing the academic course of study rather than providing an alternative. A new system should be created, wrote the Commission, which would be more in tune with "callings in life . . . professional, commercial, productive and domestic."[48] Appended to the Douglas Commission Report was a study of 25,000 fourteen- to sixteen-year-old dropouts – none of whom had ever attended high school – which found that the main reason these children quit school was lack of interest, not economic hardship. Reformers used this evidence to support their call for broader curriculums that could adequately train students for the future.[49]

The Douglas Commission Report was highly influential. Herbert Kliebard claims that after its publication, "the main terms of the industrial education debate began to shift somewhat from its alleged value to the national economy to the beneficial effects that would accrue to American education generally and to a distressed segment of the youth population in particular."[50] In the same year as its publication (1906), the National Society for the Promotion of Industrial Education was founded. The NSPIE was instrumental in forming alliances with organizations like the National Education Association and backing state and federal legislation promoting industrial education, including the important Smith-Hughes Act of 1917. The Smith-Hughes Act provided federal matching funds for teacher salaries in agriculture, trade and industrial education and home economics, as well as $1 million for teacher training in vocational education. The money was specifically targeted to secondary schools. This federal mandate changed the face of American secondary education; by 1919, all forty-eight states had instituted vocational education programs pursuant to the Smith-Hughes Act.

Chicago and St. Louis represented the different approaches that school systems took to implementing manual and vocational training. Chicago formed a dual system of public education, with manual and vocational training programs in separate schools.[51] The first Chicago Manual Training School opened in 1886. It was followed by Crane Manual High School in 1903, Lake and Hoyne Manual High Schools in 1905, Lane Manual High School in 1908, and Tilden Technical High School in 1919. The city's leading businessmen, like many throughout the United States, supported the programs because they perceived a lack of skilled workers.[52] Educators attempted to frame this support more in educational than economic terms to avoid criticism that the schools would become publicly subsidized training programs for American industry. For example, Superintendent Albert G. Lane stated in 1894 that Chicago's Manual Training School was:

> in no sense a trade school, but it is laying the foundation for a business education in the elementary knowledge of mathematics, physics, chemistry, mechanical and architectural drawing, and the use of tools upon wood and iron; at the same time it is giving a general education in the use of English, and in history and literature.[53]

The high school buildings that housed these programs were similar to their non-vocational counterparts in the use of open plans and differentiated rooms, but unlike them in the amount of interior space given over to shop rooms. Dwight Perkins' Lane Technical High School (1908), for example, held fewer classrooms and lecture rooms than his Schurz High School, an academic school designed at almost the same time (figs. 2.54-2.56, 2.60-2.62).

In contrast, St. Louis eschewed the dual system and integrated their manual training programs into the regular high school to form the "comprehensive" or "cosmopolitan" high school. Between 1900 and 1920, the city included manual training facilities in all of its new high school buildings. McKinley and Yeatman High Schools were the city's first comprehensive high schools. Their floor plans represented a melding of vocational and academic spaces (figs. 2.12-2.21).

By 1898, manual training high schools had become prevalent enough for Edmund M. Wheelwright to devote two articles to them in his series on "The American Schoolhouse" (one was on his own 1893 Boston Mechanic Arts High School).[54] Wheelwright identified manual training schools as "the most distinctly American development of schoolhouse architecture . . ."[55] He used the first article to describe schools in St. Louis, Toledo, and Cambridge, Massachusetts. Calvin Woodward's St. Louis Manual Training

School had been constructed in two parts in 1879 and 1882, "at a time when there was little precedent to guide its projectors," according to Wheelwright (figs. 5.2-5.3). The building was three stories high and laid out in a stunted "U" shape. It was essentially a "stuffed box" plan with identically shaped rooms stacked on top of each other and no internal corridors. The first floor contained a machine shop, forge room and third-year classroom; the second floor was comprised of a wood working room, molding and soldering room, a small drawing room, and the second year classroom. On the third floor was a wood working room, a drawing room, a physical laboratory, two small recitation rooms, and the first year classroom. These minimal appointments were designed for approximately 800 students. Calvin Woodward recognized that the accommodations were far from ideal, and criticized the building's layout.[56] By the turn-of-the-century, however, manual and vocational training schools became better adapted to students' and educators' needs. An essay on "The Industrial Arts Department" from 1921 demonstrates how extensive and complicated the design of vocational/manual training spaces could be by that time. The author describes materials and layouts needed for grinding rooms, foundries, and machine, pattern, forge, automobile, printing, electrical, sheet metal, cabinet and carpentry shops, in what was only a partial listing of the types of trade training available to high school students of the time.[57] The elaborate requirements of such rooms included power sources, specialized (and expensive) machines and tools, storerooms, washrooms, and demonstration areas.

The "Girl Question"

Alongside the development of manual training for boys was a concurrent rise in vocational programs for girls centered on "Domestic Science" and commercial studies.[58] Girls made up the bulk of America's high school population until the 1920s. In St. Louis, 77% of the city's public high school students in 1893 were female; the numbers declined steadily after that, but even in 1920 girls constituted 54% of the enrollment.[59] Despite their majority, however, girls' status in the male-centered educational community was low. As late as 1925, a psychologist's description of the "average girl" demonstrates the mindset that influenced girls' education:

> What then can be expected of the average girl? There are certain things we know she cannot do; she cannot fill positions requiring the exercise of much initiative or executive ability; she has little capacity for leadership; she can think very little for herself; she follows her leaders blindly . . . she is more easily taught and trained, more apt to make an adjustment to her immediate social environment . . .; by virtue of her very lack of intellectual ability she accepts things as she finds them and goes with the crowd.[60]

Such beliefs formed the basis for the new vocational curriculums. Domestic science and commercial courses taught girls to be efficient homemakers or competent secretaries, maids, cooks or seamstresses. This was partly a reaction to the increasing number of women in the workplace. The number of women employed in manufacturing, mechanical and clerical jobs between 1890 and 1910 increased by almost 200%.[61] Perhaps more significant was the growing importance put on the woman's role in managing domestic life. As Jane Powers notes, "advocates of vocational training for young women placed women at the center of significant social and economic change and linked societal change to home economics and preparation for women's trades."[62] In preparation for these roles, high schools taught girls sewing, laundering, cooking, typing, stenography and bookkeeping. Some of these courses required new types of architectural space. For example, many early 1900s high schools began to include fully operational kitchens, model dining rooms and bedrooms, and mock offices. Whereas the Chicago Division High Schools had no specialized rooms for "girls training," the 1912 Senn High School contained two "Household Arts" rooms, a laundry, model dining, living and bedrooms, and rooms for bookkeeping, typewriting, stenography, and textile arts and sewing (all but the latter were immediately adjacent to a girls toilet room). Some cities even opened separate girls' vocational schools to rival industrial arts training for boys, like Chicago's Lucy Flower Technical High School for Girls (established in 1911).

Pedagogy

Pedagogy was one area of American education that had a minimal effect on school architecture between 1880 and 1920. The methods used to teach the nation's youth remained virtually unchanged during that time despite the efforts of educational reformers. While a lack of scholarship hinders our knowledge of historical teaching techniques, we can discern from existing evidence that the classroom was a strict and ordered world.[63] In schools around the country students sat in orderly rows of desks that were bolted to the floor and facing the teacher (fig. 4.7). They raised their hands to answer questions and stood when speaking. Educational historians have described the dominant mode of instruction in the turn-of-the-century schoolhouse as "teacher-centered," meaning the teacher exercised tight control over the learning process (or tried to).[64] David Macleod has summarized such instructional methods in primary schools as follows:

> By the late nineteenth century, teachers had settled into a routine of marching students through textbooks. Some teachers, described by historian Barbara Finkelstein as "overseers," merely prescribed assignments and checked their completion, commonly by catechizing students. Others, the "drillmasters," organized exercises, unison recitations, and competitions. A third group, "interpreters of culture," actually "clarified and elaborated" materials for students. Yet all three teaching styles settled for rote reproduction of skills or knowledge.[65]

These same techniques would have been used in high schools. Students in each grade studied the same texts at the same speed; they either learned or were left behind. In this strict environment the main vehicle of instruction, as it had been in the mid-nineteenth century, was the recitation method. Recitation was designed to develop the "mind muscle" through memorization. Students memorized long poems, multiplication tables, historic events and geographical locations from textbooks, then recited them before the class. Teachers controlled the recitation process with a steady stream of questions. A study of New York City teachers conducted from 1907 to 1911 found, for example, that teachers asked an average of two-to-three questions each minute. In a forty-five minute period, teachers could ask between twenty-five and 200 questions. The author concluded that teachers were "drillmasters instead of educators."[66] Joseph M. Rice made a similar judgement. Rice visited elementary schools in thirty-six cities during a five-month period in 1892 to observe American education first-hand. Rice published the results in The Forum and later collected them in a book. His investigation provided the first comprehensive evaluation of American teaching. Overall, Rice found good and bad teaching in the nation's schools, but his judgments tended to be caustic and critical and his final evaluation was that there was much "ludicrous teaching" in these schools due to "unscientific management."[67] In too many "mechanical" schools (including those in St. Louis and Chicago), Rice discerned, "the aim of instruction is limited mainly to drilling facts into the minds of the children, and to hearing them recite lessons that they have learned by heart from text-books."[68] While Rice only examined elementary schools, we can assume his findings were applicable to secondary education as well.

Not all classrooms were run with military precision. Science and vocational classes that emphasized student participation did not lend themselves to the recitation method. Laboratory work, metal and wood shop construction, cooking and sewing all required different teaching techniques, and the rooms where these activities took place were less rigid in their layout. But overall, high school teaching methods did not change very much by 1920. Progressive practices like those advocated by John Dewey that emphasized less formal approaches to learning simply did not penetrate secondary school education.[69] As a result, the classroom's basic layout did not change.[70] The formal recitation classroom's omnipresence was a reflection of larger social and cultural issues. Larry Cuban perceived this when he noted that "Embedded within teacher-centered instruction were assumptions about the social and economic role of schools, knowledge, children, and learning consistent with the profound changes occurring at the turn-of-the-century in the larger society."[71]

Discipline

As the high school building was transformed from a simple collection of boxlike rooms to a large, differentiated complex designed for health and safety, it became an instrument of control as well as an efficient machine. The same innovations that helped bring light and air into the classroom also provided educators with more a efficient physical environment for discipline. During the latter nineteenth century rising enrollments created organizational and disciplinary problems in the urban schools. The modern school building was a partial solution to these problems, channeling students into architectural spaces where their behavior could be more easily observed and directed.[72] Planning the school's physical environment with an eye toward regulatory measures was not new in school architecture, however, as Dell Upton has shown with his analysis of early nineteenth-century Lancasterian schools.[73] Upton demonstrated how the "Monitorial" school's spatial orderliness complemented the personal regulation sought by society as a whole. By the late nineteenth century, this type of personal discipline became less important as enrollments increased and the schools took on a custodial function. Educators tried to impose order on unwieldy institutions through a variety of administrative and architectural means, just as American society was trying to "strengthen the framework of order" to come to grips with the "obvious social dislocations of an urban, industrial age."[74]

In the mid-nineteenth century educators were already aware of a connection between architecture and behavior. James Johonnot recognized this connection when he wrote in 1859, "Certain fixed principles, both of instruction and discipline, are adapted to the different ages and developments of pupils . . . A true . . . system of education [must apply these] principles in the arrangement of schools, and in the construction of schoolhouses."[75] As schools grew beyond the one-room stage, there was an increasing need physical environments to facilitate student control. St. Louis superintendent William Torrey Harris expressed the mindset of many educators in 1871: "The first requisite of the school is *Order:* each pupil must be taught first and foremost to conform his behavior to the general standard."[76] The imposition of order was more prevalent in classroom behavior in these years than in architectural design. An example can be found in Joseph M. Rice's account of a St. Louis classroom:

> During several daily recitation periods, each of which is from twenty to twenty-five minutes in duration, the children are obliged to stand on the line, perfectly motionless, their bodies erect, their knees touching and feet together, the tips of their shoes touching the edge of a board in the floor. The slightest movement on the part of a child attracts the attention of the teacher ... I heard one teacher ask a little boy: "How can you learn anything with your knees and toes out of order?" The toes appear to play a more important part than the reasoning faculties.[77]

Overall, Rice found the characteristic feature of the St. Louis schools to be an "absolute lack of sympathy for the child."[78] But by the late nineteenth century educators were interested in extending this type of control to the school building. An illuminating article from The American Architect and Building News is unique in the way it addresses the issue of architecture and discipline in some detail.[79] The author discusses a paper on school planning from the January, 1890 edition of The Builder, written by a "Head Master." The earlier article listed the "four chief foes" to school discipline as, "Disorder and Noise," "Bullying," "Petty Larceny," and "Indecent Writing." According to the "Head Master," the school architect can either "greatly aid" in the maintenance of discipline through his design or "can render good discipline almost impossible."[80] The architect can foster a lack of discipline by creating a school that has (a) a line of classrooms connected by a dark, narrow corridor, with a few sharp turns; and (b) stone paving in the corridors, which enhances noise. Such a design will influence students to run down the long corridors, clash at the angles, and bully each other in the dark corners. The "Head Master's" solution to the discipline problem is worth quoting at length:

> Inside the school-building, the two former ["foes" – Disorder and Noise, and Bullying] are chiefly promoted by long, dark corridors. With short, wide, straight and well-lighted passageways, which can be supervised at a glance, they can easily be repressed indoors, but the scene of them may be transferred to the playground entrances, or outbuildings, and these must be arranged for easy inspection. Every corner of the playground should be visible from the head-master's room, and from some of the class-rooms: the entrances should be commanded, both from the head-master's room and the janitor's office, and the latter should be placed so that the janitor can oversee, also, the lavatories, and observe every one who enters or leaves them. The existence of the third defect in school discipline [Petty Larceny] may be said to depend entirely on the architect; if he plans the wardrobes so that they can be easily observed from the class-rooms, there will be no stealing from them: if he does not do so, there will inevitably be pilfering and consequent unhappiness. To meet the fourth evil [Indecent Writing], corridors should, as before, be few in number, light, and easily supervised; and their walls, as well as those of all lavatories and closets, should be lined with glazed bricks or tiles.[81]

The author thus places a heavy burden on the school architect – the entire issue of student discipline either succeeds or fails because of the school building. While this view might have been extreme, there was a kernel of truth in it. The outstanding interior feature of the modern high school building was its wide, brightly lit corridors, which contrasted sharply with the dark, dusty spaces of the old schoolhouse. When noted social and cultural critic Randolph Bourne visited William Ittner's Ralph Waldo Emerson School in Gary, Indiana, in 1915, the corridors fascinated him; he saw them as

> broad halls [that] serve not only as the school streets for the constant passage of the children between their work, but also as centers for the "application" work, or for informal study. They are so wide that all confusion is avoided, and they suggest to the visitor that they serve the school community in the same way that the agora or the forum did the ancient city.[82]

Yet these same spaces served another important purpose – they allowed educators to observe student behavior between classes to a greater degree. When lockers began to be added to these corridors, replacing the small, cramped wardrobes attached to classrooms, it increased the scope of student behavior that took place under the authoritarian gaze. Many early twentieth century schoolhouses also featured windows in classroom doors, allowing administrators to surreptitiously observe classes without being in the room. The classroom's physical arrangement, little changed since the mid-nineteenth century, also encouraged and imparted order. As Larry Cuban notes, the organizational structure of the school system ("how school space is arranged; how content and students are organized into grade levels; how time is allotted to tasks; and how organizational rules govern the behavior and performance of both adults and students") as well as the school building influenced pedagogical practices.[83] Thus, the entire system, from age-graded classrooms, to the recitation method, to the classroom layout, with students seated in orderly rows facing a teachers desk (often raised on a platform) was designed to maximize educators' control over student behavior. A 1912 editorial in The American School Board Journal illustrated this attitude:

> The [modern school's] interior is arranged not only with a view of conserving the comfort and health of the occupants, but also to gain the highest possible amount of efficiency in teaching, management, and discipline and extra service for the community . . . Everything is made inviting and attractive, and intensely practical. In fact, it may safely be said that the modern schoolhouse is in itself a positive aid to teaching and strong factor in the civil and social advancement of the community.[84]

Disciplinary techniques extended beyond the classroom and the building's overall plan as high schools grew larger and more impersonal. Increasing enrollments, a new conception of adolescence and the influence of the corporate model of education changed faculty-student relations. As Thomas Gutkowski notes of Chicago:

> [A]s professionals in charge of people now defined as old children rather than young adults, teachers enjoyed a growing sense of superiority. In the 1890s the school board began installing faculty-only lavatories in the high schools. Teachers stopped calling pupils "Mr." and "Miss" around 1907 or 1908. And a kind of we-they mentality began to appear.[85]

Further evidence of the new relationship and the power struggle that it created are the installation of locks on schoolroom doors (1888 in Chicago), and new rules requiring students to carry hall passes during school hours or eat in the school lunchroom even if they brought a meal from home.[86] Students were aware of the changed atmosphere; some even connected it with architectural aspects of the modern school building. In Chicago, a Lake View High School student lamented the passing of the "friendly home atmosphere" in 1908. An Englewood High School student depicted the school's physical education curriculum as "wholesome training in subordination." And a Hyde Park High School student wrote in 1913 that the new building's "locker lined, cement floored and white ceilinged" halls were "reminiscent of a cell-house in a penitentiary."[87]

<u>Conclusion</u>

Late nineteenth- and early twentieth-century curricular changes, inspired by a new conception of children and their place in society, had significant effects on American high school architecture. The previous generations of schoolhouses were designed for a limited curriculum where students sat in ordered rows of desks and recited their lessons. Classrooms were essentially the same for every grade (sometimes multiple grades shared one room) and every floor in the multi-room schoolhouse. With the revised curriculum, however, came new demands. The standard classroom was ill-equipped for classes in drawing, cooking, machine work or chemistry, just as the cube-shaped "egg crate" schoolhouse, with three or four floors of identical rooms, was unable to accommodate the diverse physical requirements of the comprehensive high school. A different way of planning the high school building was necessary.

[1] Frank Estabrook Chancellor, "Schoolhouse Accommodations," The American School Board Journal 38 (April 1909): 20.

[2] Herbert Croly, The Promise of American Life (1909), ed. Arthur M. Schlesinger, Jr. (Cambridge, MA: The Belknap Press of Harvard University Press, 1965).

[3] In 1930, the number was 47%. U.S. Census figures, cited in Karen Graves, Girls' Schooling During the Progressive Era: From Female Scholar to Domesticated Citizen (New York and London: Garland Publishing, Inc., 1998): 164.

[4] Ibid.

[5] The next chapter addresses administrative reforms (i.e., centralization and bureaucracy) under the heading, "Economy."

[6] The phrase comes from Joseph F. Kett, Rites of Passage: Adolescence in America, 1790 to the Present (New York: Basic Books, Inc., 1977).

[7] Ibid., 215-16. Kett argues for the permanent effect of these changes: "[T]he institutions created in the early 20th century survived to become an enduring form of custody for youth long after the ideas and impulses which created them were laid to rest." Ibid., 217.

[8] David Nasaw, Schooled to Order: A Social History of Public Schooling in the United States (New York: Oxford University Press, 1979), 90.

[9] G. Stanley Hall, Adolescence: Its Psychology and Its Relations to Physiology, Anthropology, Sociology, Sex, Crime, Religion and Education, 2 vols. (New York: D. Appleton, 1905). The child study movement was the first scientific attempt to understand child development in terms of the relative effects of environment and instinct, and to use education to nurture children's' development. The research was characterized by large compilations of data, usually questionnaires of teachers and parents. Hall's Clark University in Boston was the center of the child study movement. See Herbert M. Kliebard, The Struggle for the American Curriculum, 1893-1958. 2nd ed. (New York, London: Routledge, 1995).

[10] Hall described the adolescent period as lasting from ages twelve or thirteen into the early twenties, but the phrase quickly became associated with high school age children, so that "a stage of life was defined in terms of a stage of schooling." Kett, Rites of Passage, 238.

[11] Ibid., 221.

[12] Cited in David I. Macleod, The Age of the Child: Children in America, 1890-1920, Twayne's History of American Childhood Series, eds. Joseph M. Hawes and N. Ray Hiner (New York: Twayne Publishers, 1998), 110. See Ibid., 110-111 for a discussion of possible problems with these figures.

[13] Eleventh Annual Report of the Board of Education of the City of Chicago (1864-65), 20, cited in Mary J. Herrick, The Chicago Schools: A Social and Political History (Beverly Hills and London: Sage Publications, Inc., 1971), 52.

[14] It is important to remember, as David Nasaw points out, that child labor legislation was successful *only* because labor allowed it to be. "[Universal schooling] was contingent on something the reformers could not produce: the acceptance of child labor regulation by the employers themselves. Without this acceptance – based on the recognition that unregulated child labor was destroying workers before they reached their productive prime – no child labor or compulsory schooling legislation could produce

widespread common school enrollment." Nasaw, School to Order, 80. For more on child labor regulation and compulsory education, see David B. Tyack, Thomas James and Aaron Benavot, Law and the Shaping of Public Education, 1785-1954 (Madison, WI: University of Wisconsin Press, 1987).

[15] Quoted in Herrick, The Chicago Schools, 63.

[16] Cited in Selwyn K Troen, The Public and the Schools: Shaping the St. Louis System, 1838-1920 (Columbia, MO: University of Missouri Press, 1975), 201.

[17] Graves, Girls' Schooling During the Progressive Era, 169. Comparable numbers in Chicago were 1,236 in 1881; 2,559 in 1907; 25,322 in 1915; 66,932 in 1926. John Wesley Bell, The Development of the Public High School in Chicago (Chicago: University of Chicago Libraries, 1939), 90-91.

[18] Theodore R. Sizer, Secondary Schools at the Turn of the Century (New Haven and London: Yale University Press, 1964), 69.

[19] David K. Cohen, "Practice and Policy: Notes on the History of Instruction," in American Teachers: Histories of a Profession at Work, ed. Donald Warren (New York: Macmillan Publishing Company, 1989), 399.

[20] Kliebard, The Struggle for the American Curriculum, 4.

[21] John S. Brubacher and Willis Rudy, Higher Education in Transition: A History of American Colleges and Universities, 1636-1976. 3rd ed. (New York: Harper & Row, Publishers, 1958): 288.

[22] Faculty of Yale College, "Original Papers in Relation to a Course of Liberal Education," (1829), quoted in George Willis, William H. Schubert, Robert V. Bullough, Jr., Craig Kridel, and John T. Holton, eds., The American Curriculum: A Documentary History (Westport, CT and London: Greenwood Press, 1993), 28.

[23] Twenty-Eighth Annual Report of the Board of Education of the City of Chicago, (1881-82) (George K. Hazlitt & Co., 1883), 40. The section concluded with the statement, "When memory shall take its proper place, and our pupils be taught to observe, to think, to do, instead of to memorize and repeat, then will the growth of our pupils compel the respect of the wise for our schools." Ibid., 49.

[24] National Education Association, Report of the Committee of Ten on Secondary Schools (Washington, DC: U.S. Government Printing Office, 1893), in The American Curriculum, eds. Willis et. al, 92.

[25] Sixteenth Annual Report of the Board of Directors of the St. Louis Public Schools (1869-70) (St. Louis, 1870): lxxxix.

[26] Thirty-Seventh Annual Report of the Board of President and Directors of the St. Louis Public Schools (1890-91) (St. Louis: Nixon-Jones Printing Co., 1892): 12-13.

[27] Forty-Ninth Annual Report of the Board of Education of the City of St. Louis, Mo. (1902-03) (St. Louis: Nixon-Jones Printing Co., 1904): 239, 241.

[28] Ibid., 239.

[29] Fifty-Seventh Annual Report of the Board of Education of the City of St. Louis, Mo. (1910-11) (St. Louis, n.p, n.d.): 171.

[30] Sixty-Third Annual Report of the Board of Education of the City of St. Louis, Mo. (1916-17) (St. Louis: n.p., n.d.): 119-121.

[31] Ibid., 127-131.

[32] Thirty-Seventh Annual Report of the Board of Education (1890-91) (Chicago: Public Schools of the City of Chicago, 1892): 39.

[33] Bell, The Development of the Public High School in Chicago, 23.

[34] Proceedings of the Board of Education of the City of Chicago (1910-11) (n.p., n.d.): 448-449.

[35] A summarization of the Chicago high school curriculum changes can be found in Bell, The Development of the Public High School in Chicago, 176-194.

[36] Department of the Interior, Bureau of Education, Cardinal Principles of Secondary Education: A Report of the Commission on the Reorganization of Secondary Education, Appointed by the National Education Association (Bulletin, 1918, No. 35) (Washington, DC: U.S. Government Printing Office, 1918). On social efficiency, see Barry M. Franklin, Building the American Community: The School Curriculum and the Search for Social Control (Philadelphia: Falmer, 1986); Edward A. Ross, Social Control: A Survey of the Foundations of Order (New York: Macmillan, 1901). For a critique of the role of social efficiency in the development of the comprehensive high school, see William G. Wraga, Democracy's High School: The Comprehensive High School and Educational Reform in the United States (Lanham, New York, London: University Press of America, 1994).

[37] Kliebard, Struggle for the American Curriculum, 98.

[38] Quoted in The American Curriculum: A Documentary History, 158.

[39] Ellwood P. Cubberley, Changing Conceptions in Education (Boston: Houghton Mifflin, 1909), 56.

[40] David Nasaw has commented on the effects of this ideological shift: "Differentiated, separated secondary schooling might increase industrial efficiency, but only at the cost of social harmony . . . The high schools were becoming so firmly harnessed to the social order that they reflected all the contradictions of that order. They were called upon to do the impossible: to uphold the myths of the "classless" community while at the same time preparing young people for their future lives in a society based on class divisions." Nasaw, Schooled to Order, 155, 157.

[41] Wayne J. Urban and Jennings L. Wagoner, Jr., American Education: A History (New York: The McGraw-Hill Companies, Inc., 1996): 197-198. This characterization supports Warren Susman's thesis that American culture in the nineteenth century was more concerned with "character," in the form of a community-oriented emphasis on self-sacrifice and obedience, while in the early twentieth century a culture of "personality" developed, emphasizing individualistic self-expression and self-gratification. See Warren I. Susman, Culture as History: The Transformation of American Society in the Twentieth Century (New York: Pantheon Books, 1984); Casey Nelson Blake, "The Young Intellectuals and the Culture of Personality," American Literary History 1 (Fall 1989): 510-534.

[42] Leonard V. Koos, "Space-Provisions in the Floor-Plans of Modern High-School Buildings," School Review 27 (October 1919): 573-599.

[43] Walter H. Kilham, "The High School. II. Domestic Science, Commercial, and manual Arts Departments, and Special Rooms," The Brickbuilder 25 (March 1916): 58.

[44] Herbert M. Kliebard, Schooled to Work: Vocationalism and the American Curriculum, 1876-1946 (New York and London: Teachers College, Columbia University, 1999), 8.

[45] Cited in Wraga, Democracy's High School, 6.

[46] William J. Akers, Cleveland Schools in the Nineteenth Century (Cleveland: The W.M. Bayne Printing House, 1901), 228.

[47] Calvin M. Woodward, "Manual Training Equipment," The American School Board Journal 4 (April 1892): 7.

[48] Kliebard, The Struggle for the American Curriculum, 87.

[49] For more on the Douglas Commission, see Kliebard, Schooled to Work, Chapter 2; Edward A. Krug, The Shaping of the American High School (New York: Harper & Row, 1964), 217-223.

[50] Ibid., 35.

[51] Actually, as David John Hogan points out, by 1913 Chicago had four different types of high school: "academic, composite, technical high schools for boys, and technical high schools for girls. Each type of high school employed different combinations of industrial or vocational education – prevocational, technical, manual training, and commercial – for varying lengths of time (two years, four years)." David John Hogan, Class and Reform: School and Society in Chicago, 1880-1930 (Philadelphia: University of Pennsylvania Press, 1985), 169.

[52] Ibid., 152-155.

[53] Fortieth Annual Report of the Board of Education (1893-94) (Chicago: Public Schools of the City of Chicago: The J.M.W. Jones Stationary and Printing Co., 1894): 43.

[54] Edmund M. Wheelwright, "The American Schoolhouse IX," The Brickbuilder 7 (July 1898): 135-138; Idem, "The American Schoolhouse X," The Brickbuilder 7 (August 1898): 155-156.

[55] Wheelwright, "The American Schoolhouse IX," 135.

[56] Ibid., 135-136. In the article, Wheelwright mistakenly attributes Woodward's criticisms to the "Toledo school," but a reading of these remarks makes clear that Woodward is referring to the St. Louis plan. In Wheelwright's book, School Architecture, Woodward's critique is reprinted verbatim and properly attributed to his own school. Edmund M. Wheelwright, School Architecture (Boston: Rogers & Manson, 1901), 218-219.

[57] Walter A. Tenney, "The Industrial Arts Department," in John J. Donovan, et. al., School Architecture: Principles and Practices (New York: The Macmillan Company, 1921).

[58] An excellent study of the nuances of girls' vocational education during this period is Jane Bernard Powers, The 'Girl Question' in Education: Vocational Education for Young Women in the Progressive Era (London and Washington, D.C.: The Falmer Press, 1992). See also Graves, Girls' Schooling During the Progressive Era.

[59] Graves, Girls' Schooling During the Progressive Era, 164.

[60] Quoted in ibid., 262.

[61] Powers, The 'Girl Question' in Education, 10.

[62] Ibid., 128.

[63] There has been very little analysis of the history of teaching. Notable exceptions include Larry Cuban, How Teachers Taught: Constancy and Change in American Classrooms 1890-1990 (New York and London: Teachers College Press, 1993); David K. Cohen, "Practice and Policy: Notes on the History of Instruction," American Teachers: Histories of a Profession at Work, ed. Donald Warren (New York: Macmillan Publishing Company, 1989); Kate Rousmaniere, City Teachers: Teaching and Social Reform in Historical Perspective (New York and London: Teachers College Press, 1997).

[64] Larry Cuban identifies five major characteristics of "teacher-centered" instruction: (a) Teacher talk exceeds student talk during instruction; (b) Instruction occurs more frequently with the whole class than with small groups or individuals; (c) Use of class time is largely determined by the teacher; (d) Teachers rely heavily on textbooks to guide curricular and instructional decision making; and (e) Classroom furniture is usually arranged into rows of desks or chairs facing a chalkboard with teacher's desk nearby. Cuban, How Teachers Taught, 7.

[65] Macleod, The Age of the Child, 79. The citation refers to Barbara Finkelstein, Governing the Young: Teacher Behavior in Popular Primary Schools in Nineteenth-Century United States (New York: Falmer Press, 1989).

[66] Cuban, How Teachers Taught, 35-36.

[67] Dr. Joseph M. Rice, The Public-School System of the United States (New York: The Century Company, 1893), 9.

[68] Ibid., 20.

[69] See Kliebard, The Struggle for the American Curriculum, Chapter 3.

[70] There were, however, significant changes regarding the lighting and ventilating of classrooms, as discussed in Chapter 4.

[71] Cuban, How Teachers Taught, 38.

[72] For an extreme explication of this theory, see Michael B. Katz, Class, Bureaucracy and Schools (New York: Praeger Publishers, 1975), xv-xvi: "For the schools are fortresses in function as well as form, protected outposts of the city's educational establishment and the prosperous citizens who sustain it. In their own way, they are imperial institutions designed to civilize the natives ... Their main purpose is to make these children orderly, industrious, law-abiding, and respectful of authority ... They were designed to reflect and confirm the social structure that erected them."

[73] Dell Upton, "Lancasterian Schools, Republican Citizenship, and the Spatial Imagination in Early Nineteenth-Century America," Journal of the Society of Architectural Historians 55 (September 1996): 238-253.

[74] John Higham, "The Reorientation of American Culture in the 1890s," in Writing American History: Essays on Modern Scholarship (Bloomington, IN and London: Indiana University Press, 1970), 89. The classic study of this period is Robert H. Wiebe, The Search for Order 1877-1920 (New York: Hill and Wang, 1967).

[75] James Johonnot, Country School-Houses (New York: Ivison and Phinney, 1859), 119.

[76] William Torrey Harris, cited in David B. Tyack, The One Best System: A History of American Urban Education (Cambridge: Harvard University Press, 1974), 43.

[77] Rice, The Public-School System of the United States, 98.

[78] Ibid., 98.

[79] "The Planning of School Buildings," The American Architect and Building News 27 (February 8, 1890): 81-82.

[80] Ibid., 81.

[81] Ibid., 81-82.

[82] Randolph S. Bourne, The Gary Schools (Boston, New York, Chicago: Houghton Mifflin Company, 1916), 23-24.

[83] Cuban, How Teachers Taught, 17.

[84] "Progress in School Architecture," The American School Board Journal 44 (April 1912): 32.

[85] Thomas W. Gutkowski, "Student Initiative and the Origins of the High School Extracurriculum: Chicago, 1880-1915," History of Education Quarterly 28 (Spring 1988): 54.

[86] See Ibid., 54-55.

[87] Ibid., 52-53, 55-56.

# Chapter Six

## "ECONOMY"

> [The problem of classroom management is a] problem of economy: it seeks to determine in what manner the working unit of the school plant may be made to return the largest dividend upon the material investment of time, energy, and money. From this point of view, classroom management may be looked upon as a 'business' problem.
>
> William C. Bagley, 1910[1]

> In the schoolhouses erected in all our large cities there is a marked reflection of the character and the purposes, not only of the citizens at large, but also of the efficiency of school boards under whose direction they were planned and constructed.
>
> The American School Board Journal, 1912[2]

"Economy" was a particularly cogent watchword among early twentieth century educators. In the educational world, economy took the form of a quest for efficiency in all things – curriculum, organization, testing, etc.[3] Efficiency in its many guises (and its practical application through "scientific management") drove educational reform for decades. This was part of an efficiency mania that swept through American society in the early twentieth century. Few areas of American life were untouched by the desire to create a more efficient person/building/society etc. Education was no exception, as educators and administrators became particularly enamored of "scientific" efficiency techniques and their application to education. A very visible outcome of this obsession was the wholesale restructuring of urban school systems. Educational systems were "centralized" by altering the size and composition of school boards and changing the administration's organizational structure. The roles of superintendent, principal, and teacher were sharply defined for the first time and each encouraged to become an expert in their field. At the same time, educators tailored courses of study to individual students' needs to eliminate waste in the curriculum. The search for educational economy also impacted school architecture in two distinct ways: a movement to design buildings as efficient "factories" or "machines," and the standardization of school plans and elevations by the 1920s.

Centralization and Bureaucracy

Reorganizing the nation's urban school systems along the lines of the "corporate-bureaucratic model" in the late nineteenth century was one of the most significant reforms in American education.[4] The model consisted of a small, centralized school board, a superintendent to oversee operations and a professional staff to execute policies. The middle- and upper class reformers who pioneered theses changes in urban systems' organizational structures sought two important goals: to remove school administration from the political arena, and to implement successful business or corporate principles in the educational realm. Reformers viewed centralized and consolidated school boards as more efficient school boards, just as professional superintendents and business managers – education "experts" – were deemed necessary for the system's smooth operation.[5] The project's widespread appeal was due in part to American society's willingness to embrace the doctrine of efficiency as a tool for social reform.[6]

The drive toward reorganization had its roots in the 1880s. In 1885, John D. Philbrick published City School Systems in the United States, which aimed at perfecting the American educational system.[7] Philbrick promoted the idea that there was "one best way" of educating children – a uniform system in terms of curriculum, pedagogy and administration.[8] Implementing this system was crucial to the nation's growth and survival. Philbrick was not alone in his beliefs. School boards in America's urban areas tended to be large, cumbersome bodies comprised of politicians and their cronies elected from local wards or districts. In response, educators and reformers across the United States fought to lessen political influence in educational decisions and argued for educational systems modeled on the American business, with a centralized decisionmaking authority (akin to the corporate Board of Directors), rigid hierarchies of control and "expert" managers.[9] By the 1890s, these battles began to produce victories. A major step in the reform movement occurred in Cleveland, where a coalition of reformers succeeded in changing the makeup of the city's school board in 1892. Problems with the city's educational system were seen as deriving from a corrupt and inefficient city government; streamlining the school board could be a first step toward reducing political influence and revitalizing the schools. For five years, reformers worked to reorganize Cleveland's municipal government under the so-called "Federal Plan." Their efforts were rewarded when the Ohio state legislature passed a law that abolished the old twenty-member school board (representing different wards of the city) and set up a new structure that combined a seven-member school council (five members elected at-large and two from special districts) with a school director, elected by the people, who served as the executive authority for the system and had the power to appoint the superintendent.[10]

The Cleveland reorganization proved popular and influential. The National Education Association supported a model plan for urban school systems based on the "Federal Plan." In 1897, the St. Louis school system was one of the first to copy Cleveland. A decade earlier, reformers had won a small victory when they persuaded the Missouri legislature to change the St. Louis school board composition from twenty-eight members elected from the city's wards to twenty-one members – fourteen from wards and seven elected at-large.[11] However, the intent behind this reorganization was undermined when the city's Republican machine regained control of the board under the new system. This prompted cries for further reforms to eliminate all ward-elected positions. A second restructuring occurred in 1897 when the board was reduced to twelve at-large members and given legislative authority to control school property and levy taxes. In addition to these powers, four new positions were created within the St. Louis school system: a superintendent of public instruction, a commissioner of school buildings, a secretary and treasurer, and an auditor.[12] As Elinor Mondale Gersman points out, these changes "centralized authority by decreasing the size of the board and making it responsible to the entire city while separating business functions from educational ones, and legislative functions from executive ones."[13]

The centralization movement resulted in significant changes in America's largest school systems. Between 1893 and 1913, the average number of school board members per city in the nation's twenty-eight largest cities dropped from 21.5 to 10.2; by 1923, the median had fallen to seven.[14] Along with this centralization of authority were an attendant decrease in ward-elected board members and an increase in superintendents' powers. All of these developments reflected progressive reformers' efforts to economize by reorganizing urban school systems along the corporate model. Not all cities, however, were open to this new approach. In Chicago, competing political, business and labor interests hindered efforts to transform the school system. Even as the city's population exploded, causing significant hardships on the schools, the centralization movement made little headway. One of the greatest hindrances was an 1891 Illinois law that gave the mayor the power to appoint members of the Board of Education. Reformers pressed for changes nonetheless, and in 1898 the mayor appointed a commission to study administrative reorganization in the Chicago school system. The commission, known as the "Harper Commission" for Chairman William Rainey Harper, president of the University of Chicago, sought the advice of educational experts throughout the United States. The Harper Commission's 1899 report concluded that "the school machinery of Chicago is largely defective," and recommended shifting to the centralized model of cities like St. Louis and Cleveland.[15] In particular, the Commission advocated reducing the school board to eleven appointed members (from twenty-one elected members), increasing the superintendent's powers, and hiring a business manager to run the system according to business principles.[16] A bill introduced into the Illinois legislature in 1899 tried to implement the Harper Commission's recommendations; it was soundly defeated thanks to the opposition of the powerful Chicago Teacher's Federation, which enlisted the Chicago Federation of Labor and the Chicago Woman's Club as allies. Similar bills were defeated every other year between 1901 and 1909. The Teacher's Federation's own proposal for an elected school board passed a citywide referendum in 1904 but died in the legislature. Finally, in 1917 a bill sponsored by the Public Education Association and supported by the Teacher's Federation (the "Otis Bill) passed the legislature. The Otis Bill reorganized the school board into eleven appointed members, and instituted a three-member executive arm made up of the superintendent, the school attorney and the business manager. Despite this reform victory, the Otis Law was not fully implemented until the 1930s, making Chicago the last major American city to centralize its educational system.[17]

Accompanying the reorganization of educational systems into centralized or consolidated bureaucracies was the increasing "specialization" of education. The American school system's new structure often included new administrative positions. Superintendents and their staffs were empowered with more administrative control. Supervisory positions were created were none had previously existed.[18] The growth of vocational education, for example, spurred the creation of guidance or vocational counselors. Widespread institution of child labor and compulsory education laws gave rise to new positions whose occupants were charged with insuring children's' attendance. And teachers began to specialize for the first time, receiving certifications as elementary or high school teachers. All of these developments were evidence of a changed attitude in American education – one that viewed professional specialization as more efficient. That mindset was also reflected in the Annual Reports published by school boards throughout the country. In the mid- to late nineteenth century, many superintendents and school board presidents used Annual Reports to outline their dreams, hopes and ideals. Educators also wrote lengthy, eloquent statements of their educational philosophies. To a certain extent, they directed these reports at the general public in an effort to explain the ideas underlying their children's education. As the corporate model overtook educational systems, however, the tenor and purpose of the Annual Report changed. They became more like business reports, summarizing facts and figures to justify performance.

According to Raymond E. Callahan, by the 1910s "The motive for preparing annual reports was to justify expenditures and educate the public in case additional funds were needed."[19] Whereas the Annual Reports of the 1880s and 1890s were almost entirely comprised of text, their successors in the late 1910s and 1920s contained innumerable charts, tables and graphs, with little explanation and no theoretical discussion.[20]

Efficiency

The reorganization of American school systems along the lines of business corporations beginning in the 1890s illustrates an important aspect of economy – the influence of efficiency and scientific management concepts on education. The centralized, non-political school board and the organization of professional experts were supposed to create a more efficient school system. To a great extent, the interest in efficiency was a reflection of a larger socio-cultural movement. Historians have traced the beginnings of the efficiency movement's effect on society at large to the publicity surrounding the Eastern Rate Supreme Court Case of 1910-11, which exposed the public to Frederick Winslow Taylor's scientific management techniques.[21] Educators actually predated this trend; their interest in making schools operate more efficiently arose almost from the beginning of the public school system. Throughout the nineteenth century, however, there had been a significant gap between the type of education that educators wanted to provide and the type of education they could afford to offer. Limited resources plagued American public education from the outset. By the turn-of-the-century, overcrowded and understaffed urban schools with a chronic lack of funds were barely able to keep up with inflation.[22] David Macleod notes that

> Despite the contemporary rhetoric of concern for children, progressive-era schools operated with limited resources . . . While not a time of extreme stringency, neither was the progressive era an unusually flush time for schools. Progressive invocations of efficiency, which grew in fervor during the inflationary 1910s, reflected real pressures on educators.[23]

Such conditions led educators to embrace reform movements that applied "business values" that had proven effective in the corporate world.

During the first two decades of the twentieth century, promoters advocated "efficiency" as the panacea for both individual and social problems. Books and articles appeared in the 1910s that taught techniques for achieving "personal efficiency" or "scientifically" managing the household.[24] "What began as a blueprint for rearranging authority in the workplace," according to Sean Wilentz, "turned into a design for modern living."[25] At the turn-of-the-century, the corporation had become the model for social institutions as well, and education was no exception. Eager educators turned their eyes to successful American businesses for guidance in organizing and operating their school systems.[26] A new breed of educators, whom David B. Tyack labeled "administrative progressives," implemented educational versions of organizational and management techniques adapted from corporate America.[27] George D. Strayer, in a 1912 speech to the National Educational Association entitled, "By What Measures or Tests Shall the Efficiency of a School or System of Schools Be Measured?" expressed the mood of the times when he noted that "One hears continually of scientific management and in the school field, no less than in other situations demanding organizing and administrative genius, the result of investments is being accurately measured."[28] The National Education Association formed a "Committee on Economy of Time in Education" in 1911 to formulate recommendations for removing waste from the school curriculum.[29] The following year, an important article entitled "The Elimination of Waste in Education" praised Gary, Indiana Superintendent William A. Wirt as an "educational engineer" who was able to "create a thoroughly modern school plant."[30]

In addition to reorganized school boards and administrative systems, a very visible characteristic of the efficiency movement's cultural infiltration was a growing tendency to analogize schools with businesses or machines, or to conceptualize schools in business terms.[31] William Wirt demonstrated this inclination in a 1911 article "Scientific Management of School Plants," in which he advocated his "work-study-play system" as the way to create "the improved school machine."[32] References to school buildings as "plants" rather than "houses" gained popularity.[33] A very blatant business analogy came from one of the corporate model's greatest promoters – Ellwood Cubberley, an education professor at Stanford University. In his popular treatise, Public School Administration, Cubberley described public schools as "factories in which the raw products (children) are to be shaped and fashioned into products to meet the various demands of life." This conception required, among other things, "specialized machinery" in order to eliminate waste and increase output.[34] Educators were not the only ones to adopt such descriptions, however, as this 1921 statement from architect Frank Irving Cooper demonstrates:

> The final test of structural worth in a schoolhouse is its working efficiency. A school building may well be called a factory, under corporate control . . . The pupils form the raw material. They are graduated as the finished product of the educational factory. The quality of their educational preparation for life is the dividend which is reaped by the stockholders, who are the parents and taxpayers. It is the duty of the committee-directors and faculty-operatives to secure a high dividend rate from their educational plant. It is the duty of the school architect to

> provide them with a plant which shall be 100 per cent efficient, so far as the structural element is concerned.[35]

Cooper recognized that the school building was a type of "specialized machinery" for producing satisfactory students. Educators had dreamed of schoolhouses perfectly adapted to their educational needs since at least the 1880s. John Philbrick demonstrated the important relationship between school architecture and reform when he convinced the Boston school system to construct the Quincy School with more classrooms than the typical schoolhouse so that the school's unique graded system could operate more efficiently. But at the turn-of-the-century a vexatious problem arose: how to apply such an ill-defined concept as "efficiency" to a building? Such terms as "economy," "efficiency," and "scientific management, as well as the concepts behind them, were elusive. For example, educators throughout the period often failed to agree on what "scientific management" actually meant in the educational realm.[36] Despite these problems, the nineteenth century schoolhouse's transformation into the twentieth century school plant can be viewed in part as an attempt to manifest efficiency ideas in architecture. The architectural counterpart of the scientific management movement was a quest to design buildings that best fit the curriculum and protected the health of the students for the least cost. The development of different sized rooms to house different subjects and plans intended to maximize light and improve ventilation can be seen as architectural corollaries to educators' efforts to train students according to their individual capacities. The dark, stuffy nineteenth century schoolhouse with its stacks of identical rooms and poor circulation was simply inefficient and unsafe. It did not promote student health, it was not properly adapted to the curriculum, and it was costly.

Cost was a limiting factor in schoolhouse design and architects were very aware of it constraints. When William B. Ittner listed his "Ideals in Schoolhouse Planning and Construction," one of the considerations was "To eliminate waste."[37] The standard method of comparing school buildings in different cities during this period was not aesthetic but economical – by the "cost per square foot" index[38] Architects included such cost data in their articles and building descriptions to justify the efficiency of their designs. Economic considerations were not only a response to the realities of the market; they may have been partially prompted by public opinion, which tended to disfavor extravagant schoolhouses. A Chicago Daily Tribune editor echoed popular sentiments in 1906 when he claimed, "Utility and economy, not art and extravagance, should be the motto of the board of education . . . in justice to the taxpayers and the school children, not a dollar of it should go for useless ornamentation and costly architectural fripperies."[39]

School architects strove for efficiency in three ways: first, the schoolhouse was designed to promote students' health and thus protect the "raw materials" of education from going bad; second, the building was designed to provide adequately diverse spaces for the curriculum, which follows the scientific management principle of using the right person or the right tool for the job; and finally, all of this was to be accomplished at for the cheapest price.[40] While the turn-of-the-century schoolhouses may seem seriously inefficient to us today, the important point to remember is that they were better adapted to the curriculum and better able to provide a healthy student environment than their predecessors were. They are more significant in that respect for their *attempt* than for their execution.

Gary, Indiana: A Case Study

The Gary, Indiana public school system created and run by Superintendent William A. Wirt from 1907 to 1938 is a celebrated example of American progressive education. The early twentieth century educational press lauded the system as the ideal solution to overcrowded schools and inefficient curriculums, and the popular press praised it as an educational solution that worked. Wirt's "work-study-play" system (also known as the "platoon system" or the "Gary Plan") epitomized early twentieth century reformers' beliefs in the ability of scientific management and efficiency to enhance education.

The Gary, Indiana story began in the empty sand dunes at the south end of Lake Michigan in 1906, when the United States Steel Company built the city from scratch for the employees of its new steel mill.[41] In the fall of that year, the city organized a school system under a three-man Board of Trustees and named William Wirt, from Bluffton, Indiana, as Superintendent. The first school building was a primitive one-room structure just south of the U.S. Steel mill. No documentation concerning this building remains, but we can assume that it was similar to one-room schoolhouses across the country, with desks or benches, a blackboard, and probably a stove. By 1907, the Gary school system had expanded to four locations. None of the school buildings had any permanence and some may have been originally constructed for other uses. At year's end the city's 530 students attended classes in three wooden structures and fifteen portable buildings.[42]

These makeshift buildings provided a temporary solution to a growing overcrowding problem while Superintendent William A. Wirt dreamed of grander things. The Board of Education gave Wirt almost total control over the operation of the Gary schools. With this mandate, Wirt began to set up his self-styled "work-study-play" system, whereby each different subject in the curriculum – English, art, geography, physical education, etc. – was taught in its own room. The school day was broken into periods, and the children moved to a different room every hour. Theoretically, this allowed all schoolrooms to be in constant use throughout the entire day. The system could also allow for twice as many students to be educated as the standard school. Wirt created the "work-study-play" system out of a belief that the traditional school, where each child was assigned his or her own desk to be used throughout the day, contained wasted space and wasted opportunity. He described his solution in a 1913 report:

> While one set of children are in the school seats in the study room learning to read, write and figure from formal drill and text books, another set of children are on the playgrounds, in the gymnasiums, swimming pools, auditoriums, gardens, science laboratories and work shops. All of the school facilities are occupied all of the time . . . Thus the combined study room, work shop and playground schools are provided at a much lower per capita cost for investment in plant, annual maintenance of the plant and cost for instruction than the usual established exclusive study school.[43]

The last sentence typifies Wirt's evaluation of his plan. While he extolled the virtues of getting children out of the streets and alleys and allowing them to develop to their full capacity, he also tirelessly preached the gospel of economic efficiency.[44] As Wirt once said, "The purpose of the school administration has been to secure not only an efficient school plant but the most economical and efficient plant."[45]

The "work-study-play" system was part of a larger program to enhance the schools' value to the surrounding community. Wirt intended each Gary school to serve as "a social center for its respective district."[46] This entailed giving the adult public access to schoolhouse amenities – the library, swimming pool, gymnasium, auditorium and, of course, its classrooms. This program was considered particularly important in a "boom town" full of immigrant steelworkers. Providing the masses with access to the school building enhanced their cultural development, instilled the importance of education in people who may have been unfamiliar with such an idea, and provided a forum for "Americanizing" adults as well as children.[47] The program was also cost-effective. According to the gospel of efficiency, a school building that was used only eight hours per day for five days per week was wasteful. But a school used at night and on weekends would not only benefit the community; it would also lower the per-unit operating costs.[48] The Gary schools began to offer an extensive night program in 1908, and Wirt boasted in 1913 that his schools were open every day "from 8:00 a.m. to 5:00 p.m. and from 7:00 p.m. to 9:30 p.m."[49] By 1915, more adults than children used the school each week.[50]

The early twentieth century obsession with efficiency obviously inspired the "work-study-play" system. Wirt's dual goals for his system reflect this influence: he wanted to maximize the child's learning experience while making the most efficient use of the school building. Wirt envisioned schools as both self-sufficient communities for children and social centers where neighborhood adults could take classes, attend plays and lectures and use recreational facilities. The ideal "work-study-play" school was a "Child World" and a "People's Clubhouse."[51]

The "work-study-play" system demanded a wide range of facilities and continual motion that only a uniquely adapted school building could provide. A few years would pass before Wirt would get a school to fit his program. The first permanent school building in Gary – the Jefferson School – could not adequately house the "work-study-play" system. Jefferson was a rectangular brick structure in the nineteenth century schoolhouse tradition designed by Chicago residential architect J. Lyman Silsbee and commissioned before Wirt was hired (fig. 6.1). The building had a basement, two identical stories of four classrooms each, and a small assembly hall in the attic. There were no specialized facilities of any kind. Jefferson was designed to instruct students in a limited curriculum in the conventional teacher-centered manner.[52] The Jefferson School was supposed to open in 1907, but construction delays postponed its debut until September 1908. Meanwhile, William Wirt formed a relationship with St. Louis architect William B. Ittner, who would become vital to Wirt's educational vision.

Ittner was hired to design the first Gary school building and continued to build in the city until the early 1930s. His Ralph Waldo Emerson School (1908-10) embodies his mature architectural vision as well as Wirt's quest for an efficient school plant (fig. 6.2). A comprehensive kindergarten-through-high school, Emerson was located near downtown in the new city's most developed section. Behind its neo-Gothic façade were two floors of classrooms above a ground floor in an "E" shaped plan (the ground floor was slightly below grade). To facilitate evacuation in case of fire, it was shorter than the typical nineteenth century schoolhouse. The "E" shaped plan featured a wide corridor that acted as a main street for students going to their various destinations (figs. 6.3-6.4). Rooms were generally arranged on the outside of the corridor in order to maximize the amount of light and air that could enter each room from the exterior windows and interior light courts. The variety of rooms in the Emerson School provided the spaces for Wirt's expansive curriculum. The ground floor contained six classrooms, two kindergarten rooms, two library rooms, special rooms for wood turning, wood working and domestic science, two gymnasiums, a swimming pool, two locker rooms and the heating and ventilating equipment. These rooms were spread about the building in a logical manner. Ittner placed the kindergarten on the ground floor so the school's smallest occupants would not have to climb stairs. The wood shops were there so that the noise and vibrations caused by their machinery would not disrupt the rest of the school. The public could have easy access to the library and gymnasiums without entering the school proper.

Emerson's first and second floors were nearly identical, with classrooms, science laboratories, and offices laid out along the outside of the "E." Ample stairways were located in the building's center and at the angles and ends of wide hallways. These corridors facilitated the constant movement of students required by the "work-study-play" system and served as study halls and meeting places. The many stairways also served as multiple evacuation routes in case of fire, though the building featured fireproof construction and finishing materials throughout. The center arm of the "E" was an 800-seat auditorium for student and community use. Outside the building one could find a handball court, sand box, wading pool, boys' and girls' playgrounds, a small park with animal cages, a tennis court, chicken houses, and an athletic field.

The local community was delighted with its new school. Gary newspapers described Emerson as "a masterpiece in the art of school building" and a "Thing of Beauty."[53] Architectural journals like The Brickbuilder and educational journals like The American School Board Journal published articles on the building; the latter described Emerson as "A Model American School."[54] Architects and administrators from across the country wrote for information about the building, the architect and the system, and came for a firsthand look. By the end of 1913, as many as 500 visitors arrived each week to see the Emerson building and observe the "work-study-play" system.[55] The Emerson School seemed a true reflection of William Wirt's conception of a self-sustained "Child World" and a community-oriented "People's Clubhouse."

In 1912, a second Ittner building was constructed in Gary on the south side of town in the center of the immigrant community. Like Emerson, the Friedrich Froebel School also contained kindergarten through twelfth grades, and the building itself was almost identical to its illustrious predecessor (figs. 6.5-6.7). The main changes in Froebel were the addition of more shops, a second swimming pool, a larger auditorium, an expanded auditorium stage which provided a third gymnasium, locker space for 600 adults, toilets adjacent to individual classrooms rather than grouped together, and a larger overall site.[56] Many of these changes reflected the Gary school's growing prominence as community centers used as much by adults in the evenings and on weekends as by children during the school day.[57]

The Emerson and Froebel Schools epitomized modern American school architecture in the early 1900s. They also exemplified the ideal "work-study-play" environment. However, the city's other school buildings presented a different side of Gary's educational program. In these schools, students often struggled with aging, inadequate buildings, racial prejudice, and the inability of Wirt's "work-study-play" system to work in less than optimal conditions.

There were nine schools in Gary housing over 5,000 students by 1916.[58] Their educational needs were met in ways that contrasted sharply with the vision of the efficient "school machine" promoted by Wirt and designed by Ittner.[59] The Glen Park and Beveridge Schools joined the Gary system after municipal annexations in 1909 and 1910. These school buildings were typical late nineteenth century designs: two story brick buildings with bell towers; inside were six identical classrooms and no amenities. The Glen Park School overflowed into three primitive portable buildings, one of which contained a "gymnasium."[60] The Beveridge School had grown so large by 1916 that it included a two-story wooden frame building, a two-story brick building, and five portables. These two schools represented the best of the Gary system after the Emerson, Froebel, and Jefferson buildings. The city's four other schools were dilapidated and inadequate. The Clarke School was a small wooden shelter that contained two rooms; in 1910, one of its two teachers complained to Wirt that the clock was broken and the floors and windows needed cleaning.[61] The Ambridge, 24th Avenue, and West Gary Schools did not even have permanent buildings – they consisted of two-to-five portables. Teachers in the portables had to put up with dreadful conditions, including "sand fleas, sand storms, hot rooms, cold lunches and many other objections ..."[62] None of these schools had indoor plumbing.[63]

Three important accounts of Gary's schools were published in the 1910s. America's premier educational spokesman and critic, John Dewey, praised the Gary schools in the 1915 book Schools of To-morrow. Dewey found them to be models of efficient organization and community interaction, producing children who would be "good citizens and happy and prosperous human beings.[64] In 1916, prominent American social and cultural critic Randolph Bourne published a collection of articles under the title The Gary Schools. The book gave a detailed and favorable account of Wirt's system.[65] Bourne described the Emerson and Froebel Schools as "architectural creations of unusual beauty and impressiveness."[66] Lyman Silsbee's Jefferson School was "the greatest triumph of the Wirt plan" because its 1910 remodeling demonstrated how any building could be made to fit the "work-study-play" system.[67] Overall, Bourne thought the school buildings served an important educational purpose by facilitating the ideal system within. Bourne virtually ignored the city's other schools to concentrate on the marquee schools, however – his only comment on six of the nine city schools was that "the use of portable houses by the smaller schools of Gary has enabled the small wayside 'district school,' hitherto confined entirely to study and recitation, to transform itself into a genuine Wirt school, with its four-fold work and study."[68]

Two years after Bourne's book appeared the General Education Board (GEB) published the initial results of its survey of the Gary schools.[69] Led by Abraham Flexner and Frank P. Bachman, the GEB survey team's goal was an objective and scientific analysis of the Gary school system. The results were mixed. Flexner and Bachman found the system efficient and impressive overall but saw defects in its execution. They applauded the Froebel and Emerson school buildings as "instruments formed to embody and realize a distinct educational idea," much better than the "square brick 'soap-box' buildings" found in other communities.[70] But they also pointed out defects in city's other schools, citing the Glen Park and Beveridge Schools as "inadequate buildings, in which only a few of the features of the Gary plan are attempted."[71] At the same time, they were encouraged by the effort to adapt as much of the "work-study-play" system as possible to these lesser schools, claiming "The least favored school is in position to carry on, more or less well, nature study, gardening, physical education, recreation and play, while the schools that may be regarded as permanent parts of the plant are, all the circumstances considered, really notable."[72]

The story of the Gary school buildings suggests that the impetus behind Wirt's progressive educational system and Ittner's modern architecture was the same: the early twentieth century interest in economy. A contemporary architectural discourse on health and safety, heating and ventilation influenced Ittner's designs. The desire for efficiency drove all these factors. A safe, healthy building adapted to the school's curriculum provided an environment for efficiently educating the students. As Wirt once said, "The purpose of the school administration has been to secure not only an efficient school plant but the most economical and efficient plant."[73] The buildings also demonstrate that the "work-study-play" system functioned best in architectural spaces that could meet its unique requirements. Emerson and Froebel – as well as Ittner's later Gary buildings – accommodated the Wirt plan with ease according to contemporary accounts. The efficient floor plans of these buildings spread specialized and regular classrooms around wide corridors that allowed for the continual movement the system demanded. The auditorium, gymnasium and swimming pools provided the students and the adult community with aesthetic and physical recreation. Ample outdoor playground space served as a public park. These buildings allowed the school to approach Wirt's dream of a "Child World" and a "People's Clubhouse." They also dealt with challenges unknown just twenty-five years before. In the 1880s, for example, a school might have had one or two manual training classes, taught in the classroom or in a basement, while physical education, if it existed at all, was often a set of exercises the children performed next to their desks. With curricular expansion in the twentieth century, however, architectural requirements changed. Schools needed full-scale gymnasiums to accommodate a variety of fitness activities and interscholastic athletic events, and vocational programs offered a variety of specialized classes. In 1916, the Emerson School contained a machine shop, a forge shop, a foundry, a printing shop, a cabinet making shop, a wood turning shop, a sewing room and a commercial room. The complexity and variety of schools like Froebel and Emerson was unimaginable thirty years before.

Gary's non-Ittner buildings, however, tell a different story. Jefferson was remodeled in 1910 to include basement rooms for cooking and sewing, mechanical drawing, and industrial arts, and the third floor was converted from an assembly hall into a small gymnasium.[74] It functioned nearly as well as the bigger schools according to most accounts, but the city's other small schools were able to incorporate the "work-study-play" system only to a limited extent.[75] Limiting factors like overcrowding, primitive conditions and fewer teachers hampered the smaller schools. Some buildings simply could not support the full system. The Clarke School, for instance, had only two teachers in two rooms; the Ambridge School, consisting of five portable buildings, covered only kindergarten through the second grade. The "work-study-play" system's struggle to adapt to these conditions underscores the importance that architecture played in its application. The educational system based on strict efficiency needed the rationally designed modern school building (and increased student populations) to thrive.

Standardization

William Ittner's Gary and St. Louis school buildings, as well as those of other urban school architects, were disseminated to the rest of the country through school administrators' conferences, architectural and educational journal articles, and architects' books. This network had the effect of largely standardizing American school architecture by the 1920s. A natural outgrowth of the efficiency/economy mindset, architectural standardization was attractive for its cost-saving features and for its ability to make solutions to architectural problems available to the smallest communities. By the 1920s it was manifested in three distinct areas: a movement to standardize construction; a narrowing of "appropriate" schoolhouse plans and elevations; and an increasing number of public and private interstate projects to provide standardized school buildings to rural communities.

Educational standardization found increasing acceptance in the early 1900s. Going back to the 1880s, when John Philbrick advocated his "one best system" based on the idea that "Modern civilization is rapidly tending to uniformity and unity . . . The best is the best everywhere," educators sought to standardize curriculum and instruction.[76] The primary goal was to unify the educational process for all American children; a secondary concern was the economic advantages (in terms of both time and money) of implementing and operating a predetermined system. To help further these goals, educators turned to the new field of testing and measurement. The revised secondary school curriculum's promise of tailoring students' studies to their interests and abilities that was eventually codified in the Cardinal Principles report required extensive knowledge of those traits. "Scientific" testing was viewed as a means of acquiring the necessary information. At the same time, educators desired a way of evaluating student progress to see if their programs worked. These needs influenced the development of standardized testing. David Macleod has described educators' mood at the time: "Drawing on business models of measured efficiency, the quest to regularize student advancement triggered an 'orgy of tabulation' as educational researchers sought to quantify current achievement levels and embody them in standardized tests."[77] It was only natural then that architectural standardization was seen as a perfect complement to these educational trends. The American Architect aptly summarized the argument for standardization in 1918:

> The education of children in public schools is quite generally standardized and a pupil in a certain grade of the elementary schools on the Atlantic Coast will find practically the same educative methods in the same grade in Pacific Coast schools . . . As the teaching of pupils in a certain grade is practically uniform throughout this country, it follows that certain physical surroundings and accessories should be uniform. The building has a very important influence on the occupant and to produce a satisfactory public school pupil, the teaching process must include the standard educative essentials and the process be carried on in a building containing physical characteristics and equipment which is complementary to the mental processes, hence the development of standard school buildings requirements.[78]

Writers like Henry Barnard and James Johonnot had promoted a type of standardization when they outlined architectural norms in their mid-nineteenth century books. The first literal calls for architectural standardization came in response to the dangerous conditions of the average schoolhouse. The American School Board Journal was a strident voice in seeking nationwide construction laws to combat the ever-present fire danger.[79] As mentioned above, the Collinwood disaster in 1908 shocked the educational community into action to a certain extent. Preceding this panic, however, was the long process of developing and disseminating architectural standards described above. The educational network had succeeded in spreading standards for lighting and building orientation to such a degree that even in the 1880s educators with no architectural background felt comfortable writing about how schoolhouses *should* be built.[80] By 1909, District of Columbia Superintendent Frank Estabrook Chancellor could proudly state: "we are having now a genuine renaissance in schoolhouse construction and that in certain features of such construction we are now approaching standardization."[81]

Partly as a response to the Collinwood disaster (and at the request of Dr. Luther H. Gulick of the Russell Sage Foundation), Boston architect Frank Irving Cooper undertook a review of the laws and regulations pertaining to the planning, construction, fire protection, sanitation and furnishings of American school buildings in 1910.[82] Contrary to Chancellor's assertion, the results were appalling and Cooper was indignant: legislated standardization lagged behind informal customs. Cooper found that only eight of the forty-eight states had "passed laws worthy of the name bearing on schoolhouse construction," and twenty-two states had "no laws or regulations whatever to prevent school buildings from being built as crematories."[83] Perhaps motivated by this experience, Cooper thereafter became the most visible architect in the standardization movement.

When the National Education Association created a "Committee on Standardization of Schoolhouse Planning and Construction" in 1916, Frank Irving Cooper was named Chairman. The Committee was interested in both regularizing construction and safety codes and devising standards of space and usage that architects and educators could use "so that the working efficiency of the completed structure may be determined before actual construction is begun."[84] As part of that project, the Committee examined 150 school buildings from 26 states, measuring floor space and evaluating construction. Six main categories of floor space were recorded: Administration, Instruction, Accessories, Stairs and Corridors, Flues, and Walls and Partitions.[85] The percentage of each category in an individual building was expressed relative to the building's total floor space. The results were used to create a chart entitled, "The Candle of Efficiency in Schoolhouse Planning" (fig. 6.8). According to the Committee's research, greater efficiency and less waste would be achieved if the school building had the following divisions of space: Walls and Partitions < 10%; Flues < 5%; Stairs and Corridors < 20%; Accessories < 3%; Instruction > 50%; and Administration > 12%. The Committee expanded on these recommendations in a 1925 book-length report.[86]

In that report the Committee proposed a scientific approach to school planning. Floor plans were to be subjected to "tests," for example, to determine their suitability in eight key categories: Adaptation to Educational Needs, Safety, Healthfulness, Convenience, Expansiveness, Flexibility, Aesthetic Fitness, and Economy.[87] The last category formed the heart of the evaluation. Architects could conform to the requirements depicted in the "Candle of Efficiency" if they accurately determined the size needed for each room (based on "the adoption of scientifically studied layouts"); created rooms with more than one use; and eliminated waste areas pursuant to the Committee's division of space recommendations. Plans that passed all of these "tests" would be acceptable – and, as one might imagine, very similar. But that was not a concern of standardization promoters like Cooper who harkened back to John Philbrick's "one best system" theory. School buildings were considered too important to be left to the whims of untrained or aesthetically minded architects. Frank Irving Cooper had summarized this position a few years before the Report when he said:

> The school building of to-morrow must set a standard for the entire community. It will be used by parents as well as by children. It will represent a spiritual ideal. It will represent democracy, free education, hospitality and good-will to every person entering its portals . . . The complexity of architectural detail will increase and, more than ever, it will be the imperative necessity of the school architect to have his plan founded upon *the rock of standardization* (italics mine).[88]

George D. Strayer and Nicholas L. Engelhardt, two Columbia University professors, devised a system in the late 1910s for designing school buildings that epitomized architectural standardization. Their technique was designed to guide both the planning of new schools and the assessment and refurbishing of existing school buildings. The key to the system was the "Strayer-Engelhardt Score Card," which assigned points to a proposed plan or existing building according to a detailed set of standards. These standards were based on experience gathered from Strayer and Engelhardt's surveys of schools for cities and states around the country.[89] The Strayer-Engelhardt Score Card contained seven main categories for Site, Building, Service Systems, Classrooms or Recitation Rooms, Special Classrooms, General Service Rooms, and Administration Rooms; within each category were subheadings for specific types of rooms and specific properties of rooms.

The maximum possible score was 1,000 points, and any school scoring below 500 was considered completely inadequate and practically beyond repair. In a series of books, Strayer and Engelhardt explained how their system related to the desired qualities of school buildings. For example, in Standards for High School Buildings the Score Card categories were explained in detail, from the appropriate soil for the building site to the building's "Aesthetic Balance" to the proper dimensions of a laboratory table.[90] Point totals were added for each school to produce an overall score; this allowed the school to be compared to others in the system or in other cities.[91]

The follow-the-numbers approach to school design advocated by educators like Strayer and Engelhardt reflected the ongoing influence of the efficiency movement in education, as well as the source for such efficiency ideas, the business model. Standardization was a way to use acknowledged architectural solutions to minimize costs and accelerate the design process. Architectural standardization also fit nicely with the educational standardization that was taking place in curriculum and instruction. The American Architect aptly summarized the argument for standardization in 1918:

> The education of children in public schools is quite generally standardized and a pupil in a certain grade of the elementary schools on the Atlantic Coast will find practically the same educative methods in the same grade in Pacific Coast schools . . . As the teaching of pupils in a certain grade is practically uniform throughout this country, it follows that certain physical surroundings and accessories should be uniform. The building has a very important influence on the occupant and to produce a satisfactory public school pupil, the teaching process must include the standard educative essentials and the process be carried on in a building containing physical characteristics and equipment which is complementary to the mental processes, hence the development of standard school buildings requirements.[92]

Not everyone, however, was sold on the virtues of architectural standardization. A 1901 book review of Edmund M. Wheelwright's School Architecture voiced a widespread concern based on pragmatism :

> [T]he tendency to lay down general principles in school-architecture is rather stronger than it should be, particularly among School Boards and superintendents, and the advance of the science is in some danger of being checked by the reduction to formulas of principles which greater experience or the changing conditions of school life should be left free to modify.[93]

Some educators condemned architectural standardization as the physical embodiment of overly mechanical educational procedures. "The standardization of the classroom and the obsolete lock-step promotion system go hand in hand," wrote educator E. Morris Cox.[94] Architect William Roger Greeley was more specific in his criticism, hinting at a darker side of the "panacea" of standardization:

> Probably the object is to produce a standardized American by the use of new, standardized desks, in a standardized room with standard air at a standard temperature, under standardized teachers whose old age will be pensioned by Standard Oil. The first weakness is that the effect of standardization is stagnation. Until a perfect form has been evolved, to standardize is to stifle further development. This is the case with schoolhouse design.[95]

Despite such warnings, American secondary school architecture was highly standardized by 1920. A review of any issue of The American School Board Journal from that time, or compilation books like William C. Bruce's High School Buildings demonstrates the similarities in plan and elevation of most of the buildings depicted.[96]

Further evidence of architectural standardization's importance can be found in the numerous interstate building programs that arose in the early century. The earliest example of a statewide standardization program may date back to 1899, when Minnesota offered limited funds to schools meeting certain standards.[97] By 1920, an official of the

U.S. Bureau of Education reported that twenty-seven states were in the process of standardizing rural schools.[98] In Tennessee, for example, the state legislature authorized the Superintendent of Public Instruction to issue model schoolhouse plans in 1907.[99] The Superintendent was given no authority to enforce compliance, but the plans proved popular throughout the state. The model plans for small schoolhouses were based on accepted standards for window-to-floor ratios and cubic feet of air per pupil. Strong Progressive agents in the state succeed in creating the Interstate School Building Service (ISBS) and the Tennessee Department of Schoolhouse Planning by 1928. The ISBS was a private organization supported by private funds, although most members were educators from state departments of education. The organization promoted a standardized architecture for rural Tennessee through regular meetings and the dissemination of model plans and specifications.[100] A similar situation occurred in Delaware, where Pierre S. du Pont incorporated the Delaware School Auxiliary Association (DSAA) in the summer of 1919 to supervise a statewide building campaign. The act of incorporation outlined the DSAA's role as providing for "ample, appropriate, and suitable grounds, buildings, and equipment ... remodeling of old school buildings and constructing new school buildings with appropriate fixtures and equipment."[101] According to Robert J. Taggart, the DSAA "provided funds and supervision to construct almost all of the public schools built in Delaware between 1919 and 1927."[102] Prior to setting up the DSAA's funding, Du Pont hired George D. Strayer and Nicholas L. Engelhardt to survey all of the state's schoolhouses according to their Score Card. Out of more than 400 schoolhouses surveyed, only eight buildings scored above 500 points (the cutoff for a non-recoverable building) and were therefore deemed worth saving.[103] Strayer and Engelhardt then teamed with James O. Betelle, a prominent school architect from Newark, New Jersey, to write a set of standards for school building design and construction that were officially adopted by the Delaware legislature (fig. 6.9).[104]

In contrast to Tennessee and Delaware, Virginia operated a school construction program in the 1920s that was not founded on private contributions. In 1920, the commonwealth formed the School Buildings Service (SBS) under control of the Department of Education. This made official a service that had previously been carried out by the commonwealth Superintendent of Public Instruction. As early as 1911, for example, the Superintendent reported that

> the Department of Public Instruction furnished plans and specifications for two, three, four, six and eight-room schoolhouses without cost. Sixteen different designs and plans for schoolhouses have been prepared by the department at very low cost – a cost, indeed, which does not exceed $40 per thousand copies of the plans.[105]

The SBS created a variety of standardized plans for rural, suburban and urban schools. The program's goal was to introduce architectural reform into the commonwealth's rural school systems. The Division of School Buildings was in charge of designing or reviewing school plans to make sure they complied with the most recent developments in lighting, heating and ventilation and fire safety. The Division's basic model was then tailored to the individual circumstances of each locality. As a result, there is a great uniformity in schools designed throughout Virginia (and similar states) during this period.

Conclusion

Considerations of economy influenced secondary school architecture in important ways. The formidable presence of "business values" in the educational world and its accompanying emphasis on efficiency led educators and architects to seek a more efficient alternative to the traditional schoolhouse; as a result, they created a building that was better adapted to the curriculum and healthier for the pupils. The corporate model also inspired reformers to reorganize American urban schools systems, creating in the process a new bureaucracy of experts that included the school board architect. And for the first time in the late nineteenth century, school architects were recognized for their special knowledge. The development of a class of school architects helped to spread that knowledge across the country, which in turn provided the basis for a nationwide standardization of school architecture.

[1] William C. Bagley, Classroom Management (New York: The Macmillan Co., 1910), 2.

[2] "School Boards and School Architecture," The American School Board Journal 44 (May 1912): 28.

[3] In this chapter I examine "economy" in two forms: as an economic measure, but more importantly as a concept tied to an early century interest in efficiency. I propose that the core ideas that drove the efficiency movement, like accomplishing a task in the simplest, easiest and least costly (in terms of time, money, etc.) manner, are subsumed under the general heading of economy; likewise, "scientific management" can be thought of as a set of principles or methods designed to achieve efficiency. Under this framework, I will examine the efficiency movement in education and its possible effects on architecture, the rise of the school architect as an important part of efficient/economical school reform, and standardization, which can be conceived of as beneficial to school systems in both economical and efficiency terms. Thus, while the terms "economy" and "efficiency" may be used interchangeably, for my purposes efficiency is best viewed as a means of achieving economy, or guided by notions of economy.

[4] The phrase comes from David B. Tyack, The One Best System: A History of American Urban Education (Cambridge: Harvard University Press, 1974), 6.

[5] These beliefs were not unique to education: as Tyack points out, the turn-of-the-century was "an age of consolidation." As an example, Tyack relates the fact that corporate capitalizations valued at one million dollars or more rose from \$170 million in 1897 to \$5 billion in 1900 to over \$20 billion in 1904. Ibid., 141. See also Robert H. Wiebe, The Search for Order 1877-1920 (New York: Hill and Wang, 1967).

[6] Whether the educational reorganization was beneficial is beyond the scope of this study; however, the fact that it occurred demonstrates pervasive ideas about educational economy that also influenced school architecture. Lawrence Cremin's seminal study, The Transformation of the School: Progressivism in American Education, 1876-1957 (New York: Knopf, 1961), implies that the restructuring was advantageous for American education; since then, many important works in American educational history have challenged this view. See e.g., Tyack, The One Best System; Raymond E. Callahan, Education and the Cult of Efficiency (Chicago: University of Chicago Press, 1962); Michael B. Katz, Class, Bureaucracy and Schools (New York: Praeger Publishers, 1975). Joel H. Spring, Education and the Rise of the Corporate State (Cuernavaca, Mexico: Center for Intercultural Documentation, 1971); David Nasaw, Schooled to Order: A Social History of Public Schooling in the United States (New York: Oxford University Press, 1979).

[7] John D. Philbrick, City School Systems in the United States, U.S. Bureau of Education, Circular of Information No. 1 (Washington, DC: U.S. Government Printing Office, 1885).

[8] Ibid., 8.

[9] A description of this attack on the ward system can be found in Nasaw, Schooled to Order, 106-113.

[10] For more detail on the Cleveland reorganization, see Ronald M. Johnson, "Politics and Pedagogy: The 1892 Cleveland School Reform," Ohio History 84 (Autumn 1975): 196-206; Edward M. Miggins, "The Search for the One Best System: Cleveland Public Schools and Educational Reform, 1836-1920," in Cleveland: A Tradition of Reform, eds. David D. Van Tassel and John J. Grabowski (Kent, OH: Kent State University Press, 1986).

[11] On St. Louis' reorganization, see Elinor Mondale Gersman, "Progressive Reform of the St. Louis School Board, 1897," History of Education Quarterly 10 (Spring 1970): 3-21; Tyack, The One Best System, 157-160; Forty-Fourth Annual Report of the Board of Education of the St. Louis Public Schools (1897098) (St. Louis: Woodward & Tiernan Printing Co., 1898).

[12] Gersman, "Progressive Reform of the St. Louis School Board, 1897," 12.

[13] Ibid., 13.

[14] Tyack, The One Best System, 127.

[15] Educational Commission of the City of Chicago, Report of the Educational Commission of the City of Chicago Appointed by the Mayor, Hon. Carter H. Harrison, William R. Harper, Chairman (Chicago: R.R. Donnelly, 1899), xiii.

[16] Julia Wrigley, Class Politics and Public Schools: Chicago 1900-1950 (New Brunswick, NJ: Rutgers University Press, 1982), 92-94; David John Hogan, Class and Reform: School and Society in Chicago, 1880-1930 (Philadelphia: University of Pennsylvania Press, 1985), 194-214.

[17] Wrigley, Class Politics and Public Schools, 137-141; Hogan, Class and Reform, 210-211.

[18] Between 1890 and 1920, the number of "supervisory officers" increased from 58 to 155 in St. Louis, 7 to 159 in Boston, and 10 to 159 in Cleveland, with similar gains in other major cities. Tyack, The One Best System, 185.

[19] Callahan, Education and the Cult of Efficiency, 156.

[20] This style of report was advocated in such articles as C.N. Kendall, "What Should Go into a City Superintendent's Report?" The American School Board Journal 101 (August 1915): 9-10, 71.

[21] The "Eastern Rate Case" was really a hearing before the Intestate Commerce Commission in the fall of 1910. Some Northeastern railroad companies had applied for an increase in freight rates, claiming that the increase was necessary to offset a wage hike granted to railroad workers that spring. Merchants opposed the action because it would increase shipping costs. An association of merchants (led by future Supreme Court Justice Louis Brandeis) argued at the hearings that the railroad companies were being run inefficiently and could more than make up for their supposed losses without raising rates. Brandeis presented testimony from a number of "efficiency experts" to support his case. Press coverage of the hearings introduced the American public to the phrase "scientific management." For an overview of the efficiency craze, see Samuel Haber, Efficiency and Uplift: Scientific Management in the Progressive Era 1890-1920 (Chicago and London: The University of Chicago Press, 1964). See also, Frederick Winslow Taylor, Scientific Management Comprising Shop Management, the Principles of Scientific Management, Testimony Before the Special House Committee (New York: Harper, 1911); Horace Bookwalter Drury, Scientific Management: A History and Criticism 3rd ed., revised and enlarged (New York: Columbia University, 1922).

[22] According to David Macleod, average spending per pupil in American schools was 12.8 cents in 1890, 15.1 cents in 1900, 20.2 cents in 1910 and 18 cents in 1920 (all in 1890 prices). David I. Macleod, The Age of the Child: Children in America, 1890-1920, Twayne's History of American Childhood Series, eds. Joseph M. Hawes and N. Ray Hiner (New York: Twayne Publishers, 1998), 77.

[23] Ibid., 76-77.

[24] See e.g., Herbert N. Casson, "Efficiency in Intellectual Life," Independent LXX (May 11, 1911), 999-1001; Edward Earle Purinton, Efficient Living (New York: R.M. McBride, 1915); Robert Grimshaw, Personal Efficiency (New York: Macmillan, 1918); Mary Pattison, The Business of Home Management: The Principles of Domestic Engineering (New York: Robert M. McBride, 1915); Francis E. Leupp,

"Scientific Management in the Family," Outlook XCVIII (August, 1911): 832; Martha B. Bruere and Robert W. Bruere, Increasing Home Efficiency (New York: Macmillan, 1912).

[25] Sean Wilentz, "Speedy Fred's Revolution," review of The One Best Way, by Robert Kanigel, In New York Review of Books 44 (October 20, 1997): 32.

[26] For a detailed analysis of this process, see Tyack, The One Best System, and Raymond E. Callahan, Education and the Cult of Efficiency. According to Callahan, by 1916 school systems in Boston, New York City, New Orleans, Kansas City, Detroit, Rochester, and Oakland had set up "efficiency bureaus." Ibid., 98.

[27] "Men and women who sought centralization of control and social efficiency in urban education at the turn of the century . . ." Tyack, The One Best System, 127.

[28] George D. Strayer, "By What Measures or Tests Shall the Efficiency of a School or System of Schools Be Measured?" Journal of the Proceedings and Addresses of the 50th Annual Meeting of the National Education Association (Ann Arbor, MI: National Education Association, 1912): 560. See also, William H. Maxwell, "How to Determine the Efficiency of a School or a School System?" The American School Board Journal 50 (May 1915): 11-12, 73-74; Harlan Updegraff, "Scientific Management in Educational Administration," The American School Board Journal 55 (November 1917): 19-21, 83.

[29] According to Lawrence Cremin, the Committee's goals were to eliminate nonessentials, improve teaching methods, and organize courses of study to conform most closely to the realities of child development. Cremin, The Transformation of the School, 193.

[30] John Franklin Bobbitt, "The Elimination of Waste in Education," Elementary School Teacher 12 (February 1912): 260.

[31] A random sample of pertinent writings includes David Snedden, "Increasing the Efficiency of Education," Journal of Education (July 17, 1913): 13; Frank E. Spaulding, "The Application of the Principles of Scientific Management" Journal of the Proceedings and Addresses of the 50th Annual Meeting of the National Education Association (Ann Arbor, MI: National Education Association, 1912), 265; J.M. Rice, Scientific Management in Education (New York: Hinds, Noble & Eldridge, 1913).

[32] William A. Wirt, "Scientific Management of School Plants," The American School Board Journal 42 (February 1911): 2. The "work-study-play" system was an effort to maximize use of the school building. See "Gary, Indiana" section below.

[33] See Chapter 7.

[34] Ellwood P. Cubberley, Public School Administration: A Statement of the Fundamental Principles Underlying the Organization and Administration of Public Education (Boston: Houghton Mifflin, 1916), 338. Leonard Ayres had used the same terminology a few years earlier in explaining his "Index of Efficiency" for evaluating school systems. Leonard P. Ayres, Laggards in Our Schools: A Study of Retardation and Elimination in City School Systems (New York: Charities Publication Committee, 1909).

[35] Frank Irving Cooper, "Standards of Schoolhouse Planning," in John J. Donovan, et. al., School Architecture: Principles and Practices (New York: The Macmillan Company, 1921), 569.

[36] A good example comes from two of the sources cited above. Frank Spaulding defined "scientific management" as consisting of three principles: (1) Measuring and comparing results; (2) Analyzing and comparing the conditions that led to those results; and (3) Adopting and using the best results. Spaulding, ,

"The Application of the Principles of Scientific Management." A year earlier, John Franklin Bobbitt had listed four maxims of scientific management: (1) Use all of the school plant all of the time; (2) Reduce the number of workers to a minimum; (3) Eliminate waste; and (4) Work up the raw material into a product for which it is best adapted. Bobbitt, "The Elimination of Waste in Education.," The first definition emphasizes testing and measurement while the second is more general (and practical) advice about how to operate a school. For a contemporary analysis, see Martha Banta, Taylored Lives: Narrative Productions in the Age of Taylor, Veblen, and Ford (Chicago & London: The University of Chicago Press, 1993), 114. Banta characterizes Frederick Winslow Taylor's four principles of scientific management as *selection, repetition, obedience*, and *reward*.

[37] William B. Ittner, The Planning and Construction of Modern School Plants (St. Louis: William B. Ittner, 1922), 4. Ittner's successor as St. Louis Commissioner of School Buildings, Hans C. Toensfeldt, wrote that although the (Ittner-designed) Cleveland High School building was to have been planned for 1,200 students, "It was found, however, that a school having a capacity of nearly 1500 pupils could be built at less than 6 per cent increase in cost, and it became evident that to build a Manual Training High School with laboratory facilities to accommodate only 1200 would be an uneconomical thing to do." Fifty-Ninth Annual Report of the Board of Education of the City of St. Louis, Missouri (1911-12) (St. Louis: Board of Education of St. Louis, Missouri, 1913), 260.

[38] See e.g., "Typical Schools in New York, Chicago and St. Louis," The American Architect and Building News 93 (January 4, 1908): 9-10; Leonard P. Ayres and May Ayres, Cleveland School Building Survey: School Buildings and Equipment (Cleveland: The Survey Committee of the Cleveland Foundation, 1916), 86-92. The obsession with costs per square foot was not always a good thing, as Cleveland Board of Education Architect Walter R. McCornack pointed out: "The architect is satisfied if his building shows a low cubic foot cost compared to the cubic foot cost in some other city, whereas in providing the same student accommodations he may have a lot of waste area with high studded rooms, all of which additional cubical cubage tends to lower the price per cubic foot, but raises the total cost of the building . . . One can generally be suspicious of a building showing an abnormally low price per cubic foot, for the chances are that the use of poor and cheap materials and lax supervision are the direct cause." Walter R. McCornack, "Construction of the St. Louis School Buildings," in Charles H. Judd, Survey of the St. Louis Public Schools, vol. 1, "Organization and Administration" (Yonkers-on-Hudson, NY: World Book Company, 1918), 153.

[39] "Public School Architecture," Chicago Daily Tribune (May 28, 1906): 8.

[40] My argument is that the efficient school building can be thought of as a form of *selection* ("tapping the right man for the level of physical and mental skill any particular task requires") according to Martha Banta's definition of scientific management. See Banta, Taylored Lives, 114.

[41] A general history of Gary can be found in James B. Lane, "City of the Century": A History of Gary, Indiana (Bloomington and London: Indiana University Press, 1978). For a more specific look at the city's people, see Raymond A. Mohl and Neil Betten, Steel City: Urban and Ethnic Patterns in Gary, Indiana, 1906-1950 (New York: Holmes & Meier, 1986).

[42] Ronald D. Cohen, Children of the Mill: Schooling and Society in Gary, Indiana, 1906-1960 (Bloomington and Indianapolis: Indiana University Press, 1990), 4-8.

[43] William A. Wirt, "Gary Schools," in Frank F. Heighway, Superintendent, Educational Report, Lake County Schools (Crown Point, IN: Lake County, Indiana, Public Schools, 1913): 17.

[44] See for example, William A. Wirt, "Gary's Modern School System and Its Future Development," Gary Post Tribune (June 11, 1909): 2; William A. Wirt, "Gary Public Schools," First Annual Report of the Board

of Trustees of the Town of Gary, Ind. (Gary, 1908): 1-16; William A. Wirt, The Great Lockout in America's Citizenship Plants: Past as Future (Gary: Horace Mann School, 1937). These fiscally oriented statements are not surprising given the fact that Wirt had dual careers as both educator and businessman/banker for most of his adult life.

[45] Wirt, "Gary's Modern School System and Its Future Development," 2.

[46] Ibid.

[47] "[Emerson] will be in a position to carry on a work of the greatest import to all who see in the Americanization of the foreign-born the cure for most of the ills that have come from the large immigration to American manufacturing centers in recent years." From an article in Gary Daily Tribune (June 21, 1911), cited in Cohen, Children of the Mill, 33.

[48] William A. Wirt, "Scientific Management of School Plants," 2.

[49] Wirt, "Gary Public Schools," 18. In a letter to a writer for The American School Board Journal, Wirt again resorted to economics, this time to promote the social center: "When the tax payers understand that adding social centers and recreation center facilities, playgrounds and physical culture, nature study and school gardens . . . to the school curriculum does not increase the first cost of the school plant or its annual maintenance, but actually reduces the per capita cost, the objection of the tax payers to these departments will cease." Wirt to William C. Bruce, December 9, 1910, William A. Wirt Manuscripts, Lilly Library, Indiana University, Bloomington, Indiana (hereafter cited as Wirt Mss.).

[50] John Dewey and Evelyn Dewey, Schools of To-morrow (New York: E.P. Dutton & Company, 1915), 180.

[51] Wirt, The Great Lockout in America's Citizenship Plants, 37.

[52] "New Jefferson School Opens," Gary Tribune (September 11, 1908): 2.

[53] "A Wonderful School," Gary Evening Post (June 3, 1910): 4; "Emerson School Thing of Beauty," Northern Indianian (April 17, 1908): 1.

[54] William B. Ittner, "The Manual Training High School – III," The Brickbuilder 20 (March 1911): 51-54; "A Model American School," The American School Board Journal 40 (June 1910): 12-13, 16.

[55] Cohen, Children of the Mill, 28. By 1913, Gary had become such a "mecca for progressive teachers" that the Board of Education was required to set up special visiting days. "Visiting Days," The American School Board Journal 47 (November 1913): 45.

[56] Ittner discussed the two schools in "The Manual Training High School – III," 54; Wirt also briefly compares them in Wirt to William C. Bruce, December 9, 1910, Wirt Mss.

[57] In addition to Emerson and Froebel, Ittner designed three other Gary schools in the late Twenties (Horace Mann, Lew Wallace and Theodore Roosevelt).

[58] Cohen, Children of the Mill, 8.

[59] Wirt, "Scientific Management of School Plants," 2.

[60] Portable buildings were small, easily constructed one-room buildings used by school systems as a temporary solution to overcrowding problems. They were typically of lightweight wooden construction and easily expandable (or portable). Quite often, however, these temporary buildings became permanent.

[61] Helen Langan to Wirt, September 8, 1910, Wirt Mss.

[62] Cohen, Children of the Mill, 33.

[63] Descriptions of these schools can be found in George D. Strayer and Frank P. Bachman, The Gary Public Schools: Organization and Administration (New York: General Education Board, 1918), 35-40.

[64] Dewey and Dewey, Schools of To-Morrow, 176.

[65] Randolph S. Bourne, The Gary Schools (Boston, New York, Chicago: Houghton Mifflin Company, 1916).

[66] Ibid., 23.

[67] Ibid., 33.

[68] Ibid., 34.

[69] Abraham Flexner and Frank P. Bachman, The Gary Schools: A General Account (New York: General Education Board, 1918). The General Education Board was an educational philanthropy begun by the Rockefellers in the early 1900s to study and support poor rural schools in the South. During the 1910s, the GEB became involved in surveying school systems across the country.

[70] Ibid., 196-197.

[71] Ibid., 22.

[72] Ibid.

[73] Wirt, "Gary's Modern School System and Its Future Development," 2.

[74] "Improve Jeff. School," Gary Post-Tribune, (June 23, 1910): 1.

[75] See Flexner and Bachman, The Gary Schools: A General Account, 22, 196-97.

[76] Philbrick quoted in Tyack, The One Best System, 40. For a much later representative of the same phenomenon, see H.A. Hollister, "Standardization of High Schools," School and Home Education 26 (June 1917): 284-85.

[77] Macleod, The Age of the Child, 82.

[78] "Standardized School House Design," The American Architect CXIV (November 6, 1918): 559-560.

[79] See e.g., "Fire Protective Measures Adopted by School Boards," The American School Board Journal 36 (April 1908): 11, 18; "The Collinwood Lesson," ibid., 36.

[80] See, e.g., Thirty-First Annual Report of the Board of President and Directors of the St. Louis Public Schools (1884-85) (St. Louis: Riverside Printing House, 1886), 13; Twenty-Ninth Annual Report of the Board of Education of the City of Chicago (1882-83) (Chicago: Jameson & Morse, Printers, 1884), 15-19.

[81] Frank Estabrook Chancellor, "Schoolhouse Accommodations," The American School Board Journal 38 (April 1909): 20.

[82] Frank Irving Cooper (1867-1933) was born in Boston and worked in the office of H.H. Richardson after graduating from high school. He was also employed by Henry Van Brunt and Shepley, Rutan and Coolidge. In 1880, Cooper opened his own architectural office in Pittsburgh; two years later he returned to Boston. He formed the Frank Irving Cooper Corporation in 1910 to specialize in school design. Henry F. Withey and Elsie Rathburn Withey, Biographical Dictionary of American Architects (Deceased) (Los Angeles: Hennessey & Ingalls, Inc., 1970), 138-139.

[83] Frank Irving Cooper, "Perils of School House Construction," The American School Board Journal 42 (April 1911): 2. Cooper created a chart to demonstrate his findings. Ibid. Updated versions of the chart are in National Education Association Committee on School House Planning and Construction, Report of Committee on School House Planning, Frank Irving Cooper, Chairman, 88-89. A revised version of the 1915 chart can also be found in Frank W. Hart, A Standard State Schoolhousing Code (Albany, NY: C.F. Williams & Son, Inc., 1924), 9.

[84] Frank Irving Cooper, "Standards of Schoolhouse Planning," in Donovan, et. al., School Architecture, 571.

[85] The categories were broken down as follows: Administration = "all floor area connected with government and maintenance of the school," including offices, storage, wardrobes, toilet rooms, and heating and ventilating equipment; Instruction = "Library, kindergarten, art or drawing rooms, class and study rooms, music rooms, laboratories, domestic science, manual training, commercial arts, household arts, auditorium, gymnasium, drill halls, and swimming-pools"; Accessories = whatever did not fit into the other five categories, such as playrooms, lunch rooms, closets and storerooms; Stairs and Corridors = "channels of all ordinary means of circulation and service"; Flues = "All vertical flues for conveying air or gases; Walls and Partitions = "the floor area occupied by the exterior walls and the interior partition." Ibid., 572.

[86] National Education Association Committee on School House Planning and Construction, Report of Committee on School House Planning.

[87] Ibid., 16-18.

[88] Cooper, "Standards of Schoolhouse Planning," 573.

[89] Surveys of school systems and buildings were common during the 1910s and 1920s. Raymond Callahan argues that their purpose was more economic than educational. Callahan, Education and the Cult of Efficiency, 112-120. An in-depth analysis can be found in Hollis L. Caswell, City School Surveys: An Interpretation and Appraisal, Contributions to Education, No. 358 (New York: Teachers College, Columbia University, 1929).

[90] George D. Strayer and Nicholas L. Engelhardt, Standards for High School Buildings (New York: Teachers College, Columbia University, 1924). The publication was the third in a series that also included Standards for Village and Rural School Buildings of Four Teachers or Less (1919) and Standards for Elementary School Buildings (1923).

[91] See e.g., The Pennsylvania State Department of Public Instruction, Report of the Survey of The Public Schools of Philadelphia, vol. 1 (Philadelphia: The Public Education and Child Labor Association of Pennsylvania, 1922), 55, where Philadelphia's school scores are compared to Atlanta, Baltimore, Omaha and St. Paul. Interestingly, the city fares rather well, with only 38.8% of its schools below the "non-recoverable" line, compared to 63% for Atlanta, 75% for Baltimore, 31% for Omaha, and 18% for St. Paul.

[92] "Standardized School House Design," 559-560.

[93] Review of School Architecture, by Edmund M. Wheelwright, In The American Architect 74 (December 7, 1901): 78.

[94] Donovan, et. al., School Architecture, 88.

[95] William Roger Greeley, "The Fourth Dimension in Schoolhouse Design," Architectural Forum 36 (April 1922): 128-129.

[96] William C. Bruce, High School Buildings (Milwaukee: The American School Board Journal, 1913).

[97] A brief history of the rural standardization movement can be found in Edith A. Lathrop, "Improving Rural Schools By Standardization," The American School Board Journal 51 (September 1920): 33-34.

[98] Ibid., 33.

[99] See Mary S. Hoffschwelle, Rebuilding the Rural Southern Community: Reformers, Schools, and Homes in Tennessee, 1900-1930 (Knoxville: The University of Knoxville Press, 1998), 24.

[100] Ibid., 58-59.

[101] The Educational System in Delaware (Wilmington: DSAA, 1920), quoted in Robert J. Taggart, Private Philanthropy and Public Education: Pierre S. du Pont and the Delaware Schools 1890-1940 (Newark, DE: University of Delaware Press, 1988), 123.

[102] Ibid., 122.

[103] Ibid., 126. Delaware clearly had some of the worst school buildings in the nation: the median score for black rural schools was 200; for white rural schools, 275.

[104] Ibid. Examples of the some of the smaller schoolhouse models were published in James O. Betelle, "Rural Schools for the State of Delaware," The American School Board Journal 60 (May 1920): 51-55.

[105] Annual Report of the Superintendent of Public Instruction of the Commonwealth of Virginia (1911-1912) (Richmond: Davis Bottom, Superintendent of Public Printing, 1914), 17.

# Chapter Seven

## "HAPPINESS"

> We believe that every schoolhouse should become a center for community life. Its assembly halls should be open for lectures and public gatherings; its classrooms should be used in the evening for night classes in which the ambitious may continue their studies, and the illiterate may receive the rudiments of language, writing and arithmetic. Cooking and manual training rooms, gymnasiums and libraries should be thrown open under competent supervision for whosoever desires to utilize them ... The public school will not fulfill its mission in the life of the people unless the school plant is thrown open to the adult population. From an economic standpoint the enormous investments in school buildings and equipment are wasteful, considering the use to which they are put.
>
> The American School Board Journal, 1908[1]

The changes in American high school buildings between 1880 and 1920 were not limited to planning or mechanical aspects; the buildings' appearance and use also underwent a significant transformation. Mid-nineteenth century schoolhouses were primarily teaching centers, with occasional use of their assembly halls for public events. In the early twentieth century schools faced new challenges from the increased enrollments caused by child labor and compulsory education laws and foreign immigration. The school's purpose changed from strictly education to socialization and "Americanization."[2] As a result, the modern school building was transformed into a community center, serving the adult public as much as their children. Schools became symbols of civic pride. Educators and architects agreed on the schoolhouse's need to aesthetically display its new importance, but debated which styles would serve that purpose.

### The High School's Role in Society

By 1920, American high schools enrolled almost 2 million students. The number of high schools had risen from 10,213 to 14,326 in the previous decade.[3] Secondary school was no longer for the privileged elite – it was becoming part of every child's life. Compulsory attendance and child labor laws combined to increase enrollments, but high schools were also gained popularity because they were more responsive to adolescents' practical needs. David Macleod described secondary education during this period as changing from "an extension of childhood" to a "ladder to adulthood."[4] The Cardinal Principles Report of 1918, which emphasized the non-academic aspects of secondary education, and the Smith-Hughes Act of 1917, which codified an already burgeoning vocational education movement, signaled a distinct change in education's purpose. As educators became more concerned with training students for life, the school became a central social agency in American society. School buildings hosted social gatherings, adult learning and Americanization programs, and public recreation events; very few of these activities had taken place in the pre-1880 schoolhouse. Americans began to expect something more from their schools. In the process, the schoolhouse began to represent more than just a place to learn, and its architecture reflected this institutional evolution. The high school occupied an especially important place in the educational hierarchy as the capstone of the public education system and the institution, which taught adolescents the most important skills they would need for later life. The high school's growing status was expressed by Chicago Superintendent George Howland in 1883, when he wrote, "The High School is the crown of our Public School System. It is the Citizen's College."[5]

Social Centers

An important development in early twentieth century education concerned the schoolhouse's evolving role as a social or community center.[6] In the 1900s, citizens began to realize two important things: that public school buildings belonged to the public, having been paid for with their tax dollars; and that these buildings could be used to engage the surrounding community in a number of educational and entertainment events. Various clubs, associations and organizations lobbied school boards to open the school buildings during off-hours. The resulting programs adopted in most large American cities helped to expand the school's role in society and increase the school building's importance.

Educational historians consider Rochester, New York to be the birthplace of the organized social center movement. In 1907, a group of eleven local organizations formed a "School Extension Committee" that was granted use of public school property and allocated a small portion of the city's educational budget.[7] Edward J. Ward was appointed to oversee the "experiment" and soon became the nation's leading social center proponent. He described the Rochester program's goal in nostalgic terms:

> The Social Center . . . was just to be the restoration to its true place in social life of that most American of all institutions, the Public School Center, in order that through the extended use of the school buildings might be developed, in the midst of our complex life, the community interest, the neighborly spirit, the democracy that we knew before we came to the city.[8]

To achieve that goal, the Rochester School Extension Committee organized a series of lectures, dances, shows, concerts, art exhibitions and dinners, and opened school gymnasiums, showers, libraries and music rooms to the public on a regular basis.

The social center movement spread rapidly following the Rochester experiment's overwhelming success. Wisconsin passed the first statewide law authorizing the establishment of social centers in 1911. The law provided all "nonpartisan, nonsectarian, and nonexclusive associations of citizens" the right to establish "evening schools, vacation schools, reading rooms, library stations, debating clubs, gymnasiums, public playgrounds, public baths and similar activities" and use of public school buildings free of charge.[9] According to contemporary accounts, seventy-one cities in twenty-one states had created schoolhouse social centers by 1913, and sixteen states had followed Wisconsin's legislative example by 1914.[10] Surveys showed athletics to be the most popular social center activity, but clubs, social gatherings, games, concerts, lectures, meetings and public discussions took place. In some cities, social center organizations used school buildings as art galleries, branch libraries, movie halls, polling places and "Americanization centers."[11] Social centers also received official sanction from such organizations as the National Educational Association. The NEA passed a resolution at its 1911 annual meeting that proclaimed a utopian ideal for the public school:

> The school buildings of our land and the grounds surrounding them should be open to the pupils and to their parents and families as recreation centers outside of school hours. They should become the radiating center of social and cultural activity in the neighborhood, in a spirit of civic unity and co-operation, omitting, however, all activities tending to promote division and discord. To safeguard the integrity, privacy, and hygienic security of school and children, this extended use should be controlled exclusively by the school board.[12]

The NEA also authorized its own "Department on the Wider Use of Schoolhouses" in 1915.[13]

All of these extracurricular activities were new. Some wider use of school buildings occurred in the late nineteenth century, but rarely was there a system of programs organized on a large scale. Clarence A. Perry, a leading social center spokesman, described the previous state of affairs in detail:

> The children who went to school back in the eighties skipped out of the school house door at half past three and scampered down the street shouting with glee. Instruction was finished for the day and the building turned over to the janitor for sweeping. After he finished his work he locked the doors, and the school house was not used by anybody during the rest of the twenty-four hours. On Friday afternoon the premises were closed until the following Monday morning. On Saturday and Sunday the grounds were shunned as forbidden territory and during the long summer months no one entered them, except possibly workmen to make repairs. During one hundred and eighty days out of the year the whole school property was used a scant seven hours a day -- less than one-half of the total usable period. The rest of the time it was absolutely idle. It was not only of no service; it was deteriorating.[14]

The community's limited involvement with the school building during the late nineteenth century was reflected in educational architecture. Auditoriums or assembly halls were not universal and were typically located on the building's top floor; the rooms were small (usually only two or three times the size of a normal classroom) and without a stage or fixed seats, reflecting their subsidiary status as a gathering place for formal recitations and graduation ceremonies. Some cities did, however, let the public use the schools on a limited basis. In Chicago, for example, Superintendent Albert G. Lane authorized a program of free public lectures at schoolhouses in the late 1890s. These lectures, on a variety of topics, were often supported by the Chicago Record Herald and included faculty members from the University of Chicago.[15] The Chicago Board of Education's 1896-97 Annual Report contained a section by Superintendent Lane entitled "The School House For the People" that listed the lectures given at six schoolhouses around the city, including the Northwest and West Division High Schools.[16] In the Annual Report for the following year, Lane outlined the rules for these lectures: (1) No theology or similar subjects; (2) Series' or courses were preferred to single lectures; (3) First choice went to districts which, owing to economy, were least able to provide their own lectures; (4) Lectures were only to be given in buildings where the principal or local committee would assume all responsibilities; (5) Only officially recommended lecturers could be used; (6) Venues should be centrally located rather than a series given in different places; and, most important, (8) The Board of Education would not pay expenses.[17]

In 1899, the Harper Commission Report (cited in Chapter 6) recommended offering community involvement in the schools beyond the free lecture series. Calling the city's school buildings "notoriously underutilized," the Commission envisioned a system where the schools were "the center of the educational life of the community from infant to adult, in a sense far different from what has been true up the present time."[18] The Chicago Daily Tribune reiterated that point in a 1901 editorial entitled "Schools as Social Centers," in which it implied that the schools had only been sporadically used for non-educational purposes:

> Last year several buildings were on certain evenings devoted to certain special educational purposes not under the direction of the School Board. In two or three cases buildings have been used this year, and a half a dozen applications for other buildings are now in the hands of Superintendent Cooley to be reported on with recommendations at the next meeting of the board.[19]

The Tribune recommended expanding beyond "lectures, musical or gymnastic classes, and general literary programs" to include boys' clubs and afternoon cooking classes for girls.[20] In early 1902, the Board of Education decided to allow some extracurricular activities to take place in school buildings, but unless the activity was a teachers' or alumni meeting, or related to student performances, the group making the request had to demonstrate that the program had a "distinctive educational value."[21] The Tribune attacked this position as elitist, arguing that tired workers were more interested in social activities like "Neighborhood improvement clubs, local dramatic clubs, chess and checker clubs, musical clubs, and . . . dancing clubs" than educational programs.[22] The newspaper did, however, applaud the Board's continuing effort to make the schools open to the larger public. After continuing pressure from the community, the Chicago Board of Education sent a committee to several Eastern cities to study their social center programs. The committee returned with a recommendation that the Board open some of the school buildings at least two nights a week to organizations devoted to "the physical, social, and moral uplift" of adults and children.[23] The Board of Education decided in December 1910 to change its previous policy based on the committee's report; during the 1910-11 school year it opened nine public schools for neighborhood social purposes. Activities included games and sports, singing, reading, motion pictures and instruction in gymnastics and dancing.[24] Not surprisingly, the Board President framed the decision in business-like terms: "In accordance with a general growing conviction that public school property as an investment is susceptible of yielding larger returns, the Board of Education authorized during the past year the opening of school buildings as social and recreational centers."[25] The Tribune applauded the move as "one of the most enlightened measures ever adopted in our school management," but a year later was again arguing to "Use the Schoolhouses More."[26]

St. Louis was slower to adopt the social center idea. The Board of Education recognized an increased public use of school buildings as early as 1908:

> Urban school conditions are demanding more and more the use of school buildings as civic centers, and the auditorium, or assembly hall, will be an essential in the city school of the near future, not only for the use of the children in the day schools, but for popular and helpful lectures in connection with the work of the Evening School, both for children and parents.[27]

But discussions of the "Wider Use of the School Buildings" did not enter the Annual Reports until 1914.[28] The first extensive statement was published in 1918. The Board admitted that "Acceptance of this [wider use] conception is being accelerated at present by general recognition of certain shortcomings in our community and national life which the war is revealing . . ."[29] After mentioning the exemplary social center systems in Cleveland, Detroit and Cincinnati, the Board provided a list of "Classifications" for extracurricular events:

> 1. School Uses: Entertainments, Graduations, Alumni Meetings, Drum and Bugle Corps, Patrons Associations, Mothers Clubs, Society of Pedagogy.
> 2. Athletics, Gymnastics, General Physical Culture: School groups (most of them formerly connected with evening schools), Alumni groups, Patrons Associations, Church groups, Other groups.
> 3. Park Department (General "Community Center" Activities)
> 4. Boy Scouts
> 5. Naval Scouts
> 6. Government and patriotic purposes
> 7. Lectures, musical groups, welfare organizations
> 8. Socialist party.[30]

The list provides a good example of wide variety of activities that were taking place in larger urban school systems. By 1921, the St. Louis Board of Education reported 318 meetings of various kinds took place in the city's six high schools during the previous school year, including 112 meetings at Central High and 119 at Cleveland.[31]

Efficiency advocates argued that the school plant should be used at night and on weekends as well as during the day. The social center movement's popularity was therefore a godsend to those who advocated a more efficient use of school property. A zealous advocate of this idea was Gary, Indiana Superintendent William A. Wirt, whose "work-study-play" system was specifically designed to increase public use of the school building. Wirt justified his program in a 1910 letter to William C. Bruce, stating that "When the tax payers understand that adding social centers and recreation center facilities . . . does not increase the first cost of the school plant or its annual maintenance, but actually reduces the per capita cost, the objection of the tax payers to these departments will cease."[32] Bruce's father, William George Bruce, the editor and publisher of The American School Board Journal, was a fellow believer in the social center's financial advantages, though he tempered his argument with a dose of social responsibility. A 1908 editorial in The American School Board Journal presented Bruce's position: "The public school is not realizing its widest usefulness, in that it often is an inefficient social factor in the community."[33] The school was inefficient because it was only open to children of legal school age and not to adults for purposes of recreation or social activity. It was also financially inefficient:

> The average school building is in use, at most, six or eight hours a day, five days in a week and nine or ten months in a year. It is nearly empty two-thirds of the time. Great sums of money are expended in erecting auditoriums which are used only twice or three times a week, during the regular school hours. Elaborate lighting fixtures are installed – to be used by the janitor in sweeping in the evening.[34]

The solution was to make the schoolhouse "a center for community life" by opening the assembly halls for lectures and meetings, using the classrooms for continuation programs, and letting the cooking and manual training rooms, gymnasiums, and libraries be "thrown open" to anyone who wanted to use them.[35]

The social center movement effected school architecture across the country. Architects began to think of ways to provide public access and accommodations beyond those needed for the students. The notion of the schoolhouse as a public gathering place influenced more than just the building's plan. In 1912 Dwight Heald Perkins announced in an NEA speech that

> A study of the growing use of schools for social and civil, as well as educational, activities will reveal the tendency of the times and the present and desirable relationship of schoolhouse architecture to the social center movement. While this influence has not as yet produced a complete and distinctive type of schoolhouse planning, its effect upon building in general is marked in other directions, and is more and more modifying the arrangement and style of buildings of educational purposes from the kindergarten to the college.[36]

The innovations mentioned most often in the social center literature during this period were the enlarged auditorium, which was relocated from the top floor to the first floor; public entrances that did not lead visitors past classrooms; branch libraries; shower baths; playgrounds; moveable furniture in classrooms; and larger gymnasiums. The social center movement did not directly initiate any of these architectural developments, but the changing attitude toward the wider use of school buildings probably facilitated their adoption by architects and educators. An example can be found in Gary, Indiana, where William Ittner's second school building – the Froebel School – was much more attuned to the community center concept than his Emerson School of a few years earlier. Froebel contained separate entrances for the public and lockeroom facilities for adults, as well as a third gymnasium on the auditorium stage (figs. 6.6-6.7)

Auditoriums

The most prominent demonstration of the social center movement's influence was in school auditorium design. In many ways, the auditorium became the high school's physical and spiritual heart, and in many cases it served the same role for the surrounding community. The auditorium was the place where students gathered for school assemblies and graduation, and where local adults heard lectures and watched various entertainment programs. Auditoriums grew into the largest single space in the early twentieth century high school.

As mentioned above, assembly halls in most nineteenth century schoolhouses existed on the top floor. St. Louis' first high school building featured a third-floor "Great Hall" capable of seating 600. The architect's of the city's Central High School, constructed in 1892, demonstrated an emerging trend by placing the auditorium on the first floor. In Chicago, however, all high school buildings prior to William B. Mundie's Waller School (1900) had assembly rooms or auditoriums on the uppermost floor.[37] While these types of rooms were often accentuated in some manner on the building's exterior, their actual purpose was minimal. American schools used the assembly room for large lectures and graduation ceremonies (fig. 7.1). They were rarely opened for public use. Many architects in the second half of the nineteenth century compensated for the lack of an assembly hall by designing a "central hall" plan, with the main corridor or hallway serving a dual purpose as the assembly area. Such buildings typically featured a central atrium that rose the full height of the building; activities were conducted on the ground floor and children sat or stood on balconies on the upper floors. Unfortunately, this design proved to be disastrous in the event of fire, since the open center area functioned as a flue to distribute heat and flames to the building's upper stories. This is exactly what happened in the Collinwood fire.[38]

As schools began to be more community-oriented, two important changes took place in the assembly hall. First, the room's location moved from a small, upper story to a prominent central position on the first or main floor. Many factors prompted this move, but the most significant were the need to locate the auditorium in a central spot to facilitate the open plan's lighting and ventilation advantages, the desire to move the auditorium to a place more convenient to public access, fire safety concerns and the auditorium's increasing size. Fletcher Dresslar listed the first-floor auditorium's overall benefits in detail in American Schoolhouses (1911):

> [The first floor location] saves much wear on the building, in that it enables large audiences to gather without threading hallways or climbing stairs . . . It is safer in case of fire, permits of easy entrance from the second floor to the gallery, allows ample height for the stage and from the ceiling above the gallery without interfering with a uniform scheme for roofing. It insures a safer and stronger building for large audiences, and gives a better opportunity to properly heat and ventilate it. By thus using the height of two stories, the floor of the main room as well as that of the gallery can be inclined without interfering with any other part of the structure, and extra exits can be arranged with little expense, and without marring the architectural effect of the building as a whole . . . If situated in the central axis of the building, and opposite the maintenance, it will give a unity and dignity to the interior, not possible when it is on the second floor.[39]

Dresslar's examples reinforced his opinion: seventeen of the twenty-three high school plans shown in his book had first-floor auditoriums or assembly halls (74%), with all but one placed longitudinally along the buildings central axis. Similarly, in William C.

Bruce's High School Buildings (1913), fifty-one of the sixty-four plans (80%) of buildings with auditoriums/assembly halls showed them on the first floor.[40] These figures were substantially higher than in previous compilation books. In Edmund M. Wheelwright's School Architecture (1901), only five out of seventeen plans for high schools and normal (teacher-training) schools contained first-floor auditoriums (29%), while the percentage was only slightly higher in Warren R. Briggs' Modern American School Buildings (1899) at 45%.[41]

Architect's using the omnipresent open plan in the 1910s and 1920s were almost unanimous in placing the auditorium along the building's main axis. Locating the auditorium in such a place moved the large, unwieldy and multistoried space away from the main circulation patterns and allowed the building to be symmetrical. Light courts on either side of the auditorium provided needed light and air to the corridors and rooms of either wing. Architects sometimes combined auditoriums with gymnasiums or locker rooms in a vertical stack (or, in some cases, horizontally, with the auditorium stage serving as the gymnasium). School architects merged these practical considerations with a recognition of the school's growing community status. As William B. Ittner stated in a 1908 speech at the National Education Association annual meeting, "The growing demand for the use of high-school auditoriums for evening lectures and purposes other than strictly school use demands that they be located on the ground or first floor, and near the main entrance of the building."[42] The American School Board Journal had reached the same conclusion five years earlier in an editorial on "High School Architecture."[43] That editorial also addressed the safety aspect of having first floor auditoriums, arguing that upper story rooms could not be evacuated as quickly as those on the first floor. Some authorities recognized this fact and attempted to mandate compliance. After the Collinwood fire disaster, Ohio took a step in this direction when it passed legislation stating that no auditorium seating more than 100 persons could be built above the first story in a non-fireproof building, and every school room, no matter what type of building, must have two fireproof exits to the ground.[44]

The second important change in the high school auditorium concerned its size and overall design. In earlier decades the assembly hall tended to be an open room with movable chairs and a platform at one end. As enrollments increased and the schoolhouse became more and more involved with community matters, the assembly hall evolved into the auditorium. The new spaces were much larger "formal theaters with side balconies, sky lighting, ornate arches, and high ceilings."[45] The top-floor assembly hall of Chicago's first high school building, constructed in 1856, was merely 48' x 48' with two rows of benches; Chicago's Lakeview High School (1885-86) also had a top floor auditorium that was slightly larger (50' x 70'). In St. Louis' Central High School (1892-93), the 85' x 80' auditorium was capable of seating 1,300. In contrast, the auditorium in Alfred Hussander's Senn High School (1912) in Chicago was 84' x 132,' with a faux barrel vault and a second-floor gallery. All of Hussander's Chicago high schools from the 1910s seated at least 2,000 (fig. 7.2). Some of the larger schools in America's bigger urban areas also featured elaborate mural paintings. The Yeatman High School auditorium in St. Louis contained a mural depicting scenes from James E. Yeatman's life, while a painting of the school's namesake graced the auditorium at the city's McKinley High School (figs. 7.3-7.4).[46]

Style and Symbolism

The transition from the nineteenth century "schoolhouse" to the twentieth century "school plant" was not merely a mechanical response to increasing concerns over student health and safety, nor was it simply an adaptation to curricular changes. These aspects of the transformation were accompanied by changes in the school's external appearance. While metaphors of the school as "temple" and "citadel" span the entire period, there is an undeniable shift in urban areas from a school architecture that largely imitated contemporary domestic models to an aesthetic that tried to evoke monumentality and importance on a limited budget. This evolution resulted from the physically larger school buildings needed to meet expanded enrollments and the high school's new role in American society.

From the high school's earliest days, the public recognized that it was a special building in the community. As William Reese notes of high schools in the mid-nineteenth century,

> School architecture became one of the clearest expressions of bourgeois social values throughout the nineteenth century. The size, shape, and cost of public facilities revealed dominant attitudes about cultural authority, centralized power, and the special role of high schools in the common system ... That citizens built so many imposing secondary schools was particularly notable when taxpayers were at the same time demanding better roads, lighting, sewers, and water systems.[47]

Henry Barnard was one of the first advocates for an impressive school architecture, writing in 1848 that schoolhouses should "be calculated to inspire children and the community generally with respect for the object to which it is devoted," and be comparable in "attractiveness, convenience and durability with other public edifices."[48] As noted above, Barnard also viewed the schoolhouse as "a temple, consecrated in prayer to the physical, intellectual, and moral culture of every child in the community, and be associated in every heart with the earliest and strongest impressions of truth, justice, patriotism, and religion."[49]

Despite the advice of early writers like Barnard, aesthetic conceptions of the high school building as a whole did not change very much until later in the century. An increased awareness of two aspects of the schoolhouse began to take shape in the 1890s: its didactic value and its place in the urban landscape. An editorial in The American School Board Journal addressed the first issue, exclaiming that that "A ramshackle building is a discouragement to educational interests. A plain structure, even, is not stimulating. The outward appearance of a building has its influences which cannot be overestimated."[50] "[F]ew are now found to maintain that the architectural effect of a schoolhouse is an unimportant consideration," wrote Edmund Wheelwright two years later, "and that a beautiful schoolhouse does not do its part in the education of the young."[51] Educators were particularly adamant about warning the public of bad architecture's ill-effects on the nation's youth.[52] William George Bruce, editor of The American School Board Journal, spoke for many when he wrote:

> The education of the community is affected by its architecture – hence, an edifice dedicated to the cause of education, above all other public buildings, ought to set the pace for taste, simplicity and dignity in the matter of form and design. If we inculcate the rising generation, by worthy example, with a correct taste in architectural expression, the future will bring forth higher achievements in that direction.[53]

These kinds of arguments were absent from architectural and educational journals before 1890. Their proliferation after that date suggests the high school's growing importance in American society. As a gauge of that increased status, many writers advocated a schoolhouse that not only had didactic value, but also expressed important cultural meanings. As usual, The American School Board Journal was one of the earliest advocates for a socially-significant school building:

> The high school in any community usually outshines, in architectural beauty and design, in interior equipment and finish, all other school buildings. Local pride in an educational system finds its gratification in a handsome structure. It is something that can be seen, and is regarded as an index to what the rest might be – in fact, serves as a sort of advertisement for many towns. That the thrift, wealth, and intellectual standard, may be measured largely by the appearance of the school buildings cannot be disputed.[54]

High School Principal Gilbert B. Morrison declared the schoolhouse "an infallible index of the educational status of the community in which it is located" in 1900.[55] Similarly, architectural critic A.D.F. Hamlin cited schoolhouses as "gauges of [a community's] enlightenment."[56] Beyond its local significance, however, many saw the schoolhouse as representing larger ideas. In the compilation book, School Architecture: Principles and Practices (1921), Frank Irving Cooper wrote of a model school building that "represents a spiritual ideal. It will represent democracy, free education, hospitality and good-will . . ."; in the same volume architect John J. Donovan asserted that "There is nothing more impressive or hopeful in American democracy than the devotion of the people to education . . . Unconsciously the spirit has been to represent this truly national devotion in the architecture of the public schools."[57] These writers and many others promoted a school architecture that reflected the unique mission of public education in a democratic society.

Not everyone was pleased with the high school's new image. Architect Walter Kilham, for example complained about the buildings' lack of sensitivity to their surroundings:

> Much of the current American school architecture seems to ignore the fact that a schoolhouse is an educational institution and not a political monument. I grant that a great city school of twenty to forty rooms or more must necessarily be imposing from the mere fact of its enormous bulk; but why do buildings of such hulking proportions have to be constructed in residential districts when they are out of scale with everything in the vicinity? The city school is surrounded by large and high buildings which bring it into some sort of proper relation to the neighborhood, but no such excuse exists in the suburb . . . The old high pitched roofs and towers which crowned the Romanesque school buildings of the '80's and '90's have gone by; but one may well wish that a quiet Collegiate or Georgian type of brick architecture with some vestige of a visible roof might replace the current flat roofed, boxlike designs which, while appropriate to urban surroundings, absolutely fail to correlate themselves with a suburban landscape.[58]

Kilham's criticism bears on the high school buildings of Chicago and St. Louis; the schoolhouses constructed in those cities between 1880 and 1920, as in other cities around the country, were overwhelmingly in residential neighborhoods, and the clash between rows of small houses and monumental school buildings is often jarring.

Lofty ideals such as those expressed by Cooper and Donovan were part of the high school building's metaphorical transformation between 1880 and 1920. In the mid- to late-nineteenth century, the school as house metaphor was pervasive, as reflected in the nearly universal use of the term "schoolhouse" and the distinct formal similarities between educational and domestic architecture. Architects designed school buildings as large houses whose Romanesque or Queen Anne formal attributes linked them with middle- and upper-class housing of the period (fig. 1.12). Not coincidentally, the majority of high school students were from these same classes. Even as late as 1905, one commentator suggested that "Our public schools ought to be, far more than they are, like the houses of wealthy but cultivated men."[59] On the exterior, the high school only differed from the large house in its size and towers or belfries. In fact, pattern book designs for schools were virtually indistinguishable from those for houses.[60] The iconography of the home was probably a by-product of the institution's small scale and limited role in American life. With the coming of mass public education in the 1900s, however, the conception of the high school changed. Educational historian William W. Cutler, Jr., has described how schools gained more and more control over students' education and lives at the turn-of-the-century; the architectural transformation from domestic to institutional models may be related to this development.[61] As concerns grew about how to efficiently organize and educate large numbers of students, and as the high school's mission began to change from imparting cultural knowledge to vocational training, the "school as house" metaphor declined in popularity, replaced by traditional symbols of authority and power (fig. 7.5). The changed was captured in photographs and drawings in The American School Board Journal, and even in the cartoons of schoolhouses that adorned the journal's cover. In 1896, the "Modern School House" featured pitched roofs, round-arched windows and towers, all architectural elements that could be found in upper-class housing of the time; by 1920, the artist's symbol for the school building was a plain flat-roofed structure with an oversized smokestack and pedimented portico (figs. 7.6-7.7).

References to the schoolhouse as a "building" or "plant" also increased, the latter particularly applicable given the business model's influence on education.[62] At the same time, architects made few attempts to extend those metaphors to the buildings' actual appearance – in fact, the opposite occurred, as architects argued against the blind application of efficiency notions to aesthetic design. Even in the late nineteenth century there were educators and administrators who favored a utilitarian approach to schoolhouse design. An 1890 article in the Real Estate Record and Guide described their attitude:

> There are those who hold that for school buildings no design is called for more pleasing to the eye than that of the factory . . . They look upon the school-life of a child as a grinding, manufacturing process to which the factory style of building is eminently suitable.[63]

This trend to counter this perspective began early, as demonstrated by pre-1900 statements by architects like Edmund M. Wheelwright, who "regretted that I have ever built brick school buildings of the factory type," and critics like John Beverly Robinson, who somewhat prematurely applauded New York City school buildings: "With all this the architecture of the buildings has not been neglected, for as education ceases to be conducted by factory methods it is well that the walls where education dwells should signalize the change by forsaking their factory appearance."[64] Over twenty years later architect Alfred Busselle attacked the same type of scientific school design engendered by an overreliance on "efficiency" principles:

> Architects, in designing schoolhouses, have too often, and I might almost say generally, worked along the easiest lines and have been taken up by the consideration of cubic feet of air, number of changes per minute, square feet of glass area, etc., and have lost sight of any spiritual factor in their problem. The architect, in attacking a school problem, often first transforms himself into an

> engineer, and afterward clothes the machine in such scanty architectural drapery as may allow him with reasonable grace to write "architect" on the drawings.[65]

As education became more important in American life, the school building became more visible on the American landscape. And as the public high school became more important in late nineteenth century American communities, the discourse on its proper appearance grew. Architects and educators had a lot to say about the schoolhouse's image, but very little to say about appropriate styles. The discussion was carried on at a level of generalization. There were few recommendations regarding what style *should* be used. Some architects, however, did venture stylistic advice. Edmund Wheelwright suggested that architects design the schoolhouse according to practical requirements (lighting, economy, etc.) and not by style. Since the building's internal arrangements influenced its external appearance, and the main consideration in arranging the interior was light, Wheelwright believed that the windows' size, distribution and form would have the greatest effect on the exterior. The regularity demanded by lighting concerns thus precluded picturesque effects, and suggested instead the regularity and orderliness found in Italian Renaissance and Colonial Georgian architecture.[66] Wheelwright also felt that these styles, which required little external decoration other than "properly designed brickwork with stone or terracotta trimmings," would help to keep school buildings economical.[67] Wheelwright's Renaissance-inspired designs continued to serve as models for Boston school architecture even after his tenure as City Architect ended.[68] In the same vein, The American School Board Journal declared in 1907 that in recent high school architecture "all turrets and towers, as well as the high slant roofs, have been abolished. It has been found that dignified and graceful exterior effects can be achieved without resorting to steeples and towers, and at less cost. Again, the modern schoolhouse exterior has lent itself to a maximum of lighting surface."[69] Other architects recognized the same programmatic limitations but reached different conclusions from Wheelwright regarding their effect on the building's appearance. William B. Ittner admitted that

> The necessities of a schoolhouse interior do not permit much expression of the artistic in exterior design ... The demand for the adequate lighting of each classroom calls for a liberal number of windows of certain sizes. These have a tendency to cut up the design, and for a certain treatment of the exterior, which does not cultivate the highest ideals in architectural expression.[70]

Unlike Wheelwright, however, Ittner believed that these limitations did not preclude the use of non-classical styles; Ittner personally found "the Old English, the Dutch and the Flemish feeling" to be the "most suitable for public school buildings" (figs. 7.8-7.9)[71] New Jersey school architect James O. Betelle agreed with Ittner (fig. 7.10). In recommending the "modified Collegiate Gothic" style as most appropriate to larger urban school buildings – and most prevalent – Betelle focused on the window problem as the main determinant:

> There are a number of reasons for this; one being the great amount of window surface to be provided to light the classrooms, and the relatively small proportion of wall surfaces remaining. In the Collegiate Gothic style, windows can be made as high and wide as needed, with only small divisions between to make the sash of convenient size for operation. The windows can be arranged regularly or irregularly, close together or far apart, without detracting from the general appearance or style; in fact, this often adds to the picturesque qualities of the design.[72]

The Colonial style also had its adherents, especially in New England (fig. 7.11). Ernest Sibley advocated the Colonial in a 1923 article entitled, "Why I Prefer the Colonial Style."[73] The main reason, the author admitted, was personal taste, but he also felt that "when we adapt this style to our school buildings, we link America's most noble institution with the spirit and traditions of the past."[74] Sibley believed that the Colonial style correlated the school building with the American home. This type of nationalism was common during the 1920s when patriots promoted the Colonial Revival as not only a true American style, but also an *Anglo-Saxon* style, which was an important bulwark to white New Englanders in an era of mass immigration from southern and eastern Europe.[75] Sibley's comments on the Colonial regarding this point echoed those of Alfred Busselle, who wrote the following in praise of the Colonial style two years earlier: "Special emphasis is laid upon the traditions of the early building along the Atlantic seaboard, because it is the principles of the Fathers of the Republic *which we are endeavoring to instill into our alien races* (emphasis mine)."[76]

Notwithstanding the lack of specific stylistic advice, a review of contemporary examples reveals that most American school architects designed high school buildings with classical, Gothic or Colonial motifs (figs. 7.12-7.14). Some cities even seemed to carry on stylistic traditions. In St. Louis, William Ittner's high schools were either castellated Gothic or English Renaissance; his successor, Rockwell Milligan, designed two high schools in the mid-1920s that seemed to combine the two styles. There were no classical designs. On the other hand, Chicago board architects favored classicism. William Mundie and Alfred Hussander designed only classically inspired high schools; in between their tenures, Dwight Perkins created the Schurz and Bowen schools discussed below and a Gothic design for Engelwood High School. Despite the widespread agreement on acceptable styles, a few architects experimented with alternatives. For example, Charles B.J. Snyder, School Board Architect of New York City from 1890 to

1918, favored a Flemish image for his major works like the Dewitt Clinton High School (1906) (fig. 7.15).

Two unique examples of the search for educational expression can be found in Dwight H. Perkins' Schurz and Bowen High Schools in Chicago (figs. 2.59-62). These schoolhouses rejected the contemporary trends in terms of both style and symbolism; they not only failed to use historical elements, but also implied domesticity at a time when the "school as house" metaphor was losing steam. Perkins began his career with the Chicago schools designing rather traditional grammar schools. His first high school – Lane Tech Manual Training School (1905) – was a boxy building with abstracted classical elements (fig. 2.54). This was followed by the preliminary drawings for Bowen High School from 1906; as mentioned in Chapter 2, the early version of Bowen is somewhat reminiscent of Frank Lloyd Wright's monumental works (e.g., Unity Temple, Larkin Building). But some time around 1907, Perkins began to change stylistic directions, moving toward geometric simplicity and ahistoricism. Some of his elementary schools were monolithic, undecorated structures whose visual effects are limited to their great bulk and polychrome brickwork. The Bowen High School was also reworked to become a companion to the Schurz High School. Both buildings feature huge sloping roofs that mark them as oversized domestic symbols. In addition, neither school contains historical ornamentation. Perkins was explicitly seeking a new expression in school architecture. He disclosed his philosophy in a 1912 speech at the NEA convention:

> I am optimistic enough to believe that when the public demands such schools as these it will become so intelligent that it will no longer permit architects to inflict

> designs executed in old, dead, and inappropriate styles; that eventually the imperialism of Rome and the debasing sham of American galvanized-iron imitations of Rome will be rejected to be replaced by a style at once direct, honest, modest, sensible, enduring, and beautiful. Then, and not till then, can we consistently preach these manly and womanly virtues to students, for until then the influence of sham and vulgarity in buildings will make itself felt above our words.[77]

Architectural historians in the 1960s and 1970s were fond of describing Schurz High School as an institutional example of the Prairie School (Bowen was conveniently forgotten).[78] It is probably more accurate to consider it in light of Perkins' other school designs, as a quest to find an appropriate expression for the schoolhouse that rejected historical references but boisterously announced its connection with the "school as house" metaphor.[79]

One factor that undoubtedly influenced Perkins' stripped and non-historical style was the tight budget allotted for school construction in most urban school systems (something that eventually led to his downfall in Chicago). The general public justly recognized high schools during this time period as social investments and sources of civic pride, but the investment was tempered – school systems never had the amount of money that they needed to build new schools. This situation often forced school architects to create muted versions of classical or Gothic buildings; a pedimented portico on an otherwise plain brick façade, or a curved or crenellated roofline and a few pointed arches. Even the most elaborately classical or Gothic-styled school buildings, such as those in New York City and Chicago, had very little in the way of decoration. Only a handful of high schools around the United States had any form of architectural sculpture during this period. St. Louis was rare in that three of its high schools – Yeatman, Soldan and

Cleveland – that featured exterior sculpture. Chicago had none. Restricted budgets limited most school decorations to abstract terra cotta patterns on the outside and perhaps a mural in the auditorium. The themes evoked in these decorations tended to be rather historical or related to the general idea of education. The Yeatman High School sculptures consisted of a generalized pair of bodies flanking a crest in the center of an abstracted frieze above the main entrance (fig. 7.16). The figures appear to represent a boy and girl but have no distinguishing attributes. At Cleveland High School, a band of terra cotta ornament depicting nine different school subjects appears over the main entry between the second and third floor windows. Soldan High School had the most elaborate treatment of the St. Louis High Schools. At the very top of the main projection in an aedicula is a group of five figures in semi-relief (fig. 7.17). A cross-legged female, probably representing Wisdom, sits on a chair flanked by two girls on her right and two boys on her left. The two children nearest to her are younger than their comrades. The youngest boy and girl appear to be holding books, while the older girls holds an easel and the older boy grasps what looks like a flute or other musical instrument. The unknown sculptor has created a generic image of "Education."

The Soldan High School sculpture exemplifies the types of scenes found on those few buildings around the country that possessed artistic embellishment. One of the grandest efforts in this direction can be found in a William Ittner building in another city – the Central High School (1914-16) in Washington, D.C.[80] For that project, Ittner enlisted the aid of prominent sculptor George Julian Zolnay to create scenes for a 50' x 8' frieze above the main entrance. Zolnay sculpted a series of three panels to symbolize the academic, business training, and manual and household arts programs offered by the school (fig. 7.18).[81] The twenty-one figures included likenesses of Ittner, D.C. Municipal Architect Snowden Ashford, Contractor William Dall, and Principal Emory S. Wilson. The frieze was designed to "impress [the students] with the force and dignity of the studies they are pursuing."[82]

Conclusion

Architects at the turn-of-the-century saw themselves as belonging to a new era of school design. They denigrated the previous generation of schoolhouses as uninspiring and inefficient. William Ittner described these ancestors as "mere buildings" which "fulfilled their function in providing a place in which to teach" but were "devoid, in most instances, of good taste, to say nothing of architecture."[83] Five years later he celebrated the new generation of school building that he had helped to initiate: "What a change, indeed, from the old 'school-housey' school, with its uninviting, monotonous, dead appearance, its inadequate site, and neglected surroundings!"[84] The new schoolhouses designed by Ittner and his colleagues were prominent landmarks on the American urban landscape that attempted to use historical architectural styles to imply civic importance, while at the same time their symmetry and controlled spaces bespoke a desire for order and control that many felt was lacking in a society in the early stages of industrialization. The nineteenth-century schoolhouse had been transformed into a civic icon, a community center, and a symbol of America's faith in public education.

[1] "Wider Use for School Buildings," The American School Board Journal 37 (October 1908): 8-9.

[2] Americanization programs were attempts to assimilate foreign immigrants into American life; most focused on illiteracy, hygiene, and learning the English language. See Lawrence A. Cremin, The Transformation of the School: Progressivism in American Education, 1876-1957 (New York: Alfred A. Knopf, 1961), 66-75; David B. Tyack, The One Best System: A History of American Urban Education (Cambridge: Harvard University Press, 1974); 229-255; Robert A. Carlson, The Quest for Conformity: Americanization Through Education (New York: Wiley, 1975).

[3] The actual enrollment was 1,851,965. Edward A. Krug, The Shaping of the American High School 1880-1920 (Madison, Milwaukee and London: The University of Wisconsin Press, 1969), 439.

[4] David I. Macleod, The Age of the Child: Children in America, 1890-1920, Twayne's History of American Childhood Series, eds. Joseph M. Hawes and N. Ray Hiner (New York: Twayne Publishers, 1998), 149.

[5] Twenty-Ninth Annual Report of the Board of Education of the City of Chicago (1882-83) (Chicago: Jameson & Morse, Printers, 1884), 61.

[6] Technically the "social center" was only one of the activities performed by schoolhouses in the early twentieth century, along with evening education, lectures, etc., but the phrase has come to define all of the activities that made up the wider use of school buildings and I will use it in that broader sense.

[7] Clarence A. Perry, Wider Use of the School Plant (New York: The Russell Sage Foundation, 1910), 270-271.

[8] Quoted in ibid., 272-273.

[9] Quoted in Clarence A. Perry, "Recent Progress in Wider Use of School Plant," Report of the U.S. Commissioner of Education (Washington, D.C.: U.S. Government Printing Office, 1915), 471.

[10] Ibid.; Charles Zueblin, American Municipal Progress: Chapters in Municipal Sociology (New York: The Macmillan Co., 1916), 422-423.

[11] Cited in Edward W. Stevens, Jr., "Social Centers, Politics, and Social Efficiency in the Progressive Era," History of Education Quarterly 12 (Spring 1972): 17.

[12] Quoted in George L. Voorhees, "Civic Service of the Social Center," Educational Bi-Monthly 7 (April 1913): 370-371.

[13] The Department was short-lived; by 1924 it had been abolished. Edgar Bruce Wesley, NEA: The First One Hundred Years (New York: Harper, 1957), 288.

[14] Perry, Wider Use of the School Plant, 3.

[15] Mary J. Herrick, The Chicago Schools: A Social and Political History (Beverly Hills and London: Sage Publications, Inc., 1971), 73.

[16] Forty-Third Annual Report of the Board of Education of the Public Schools of the City of Chicago (1896-97) (Chicago: John F. Higgins, Printers, 1897), 69-73.

[17] Forty-Fourth Annual Report of the Board of Education of the Public Schools of the City of Chicago (1897-98) (Chicago: Public Schools of the City of Chicago, 1898), 97-98.

[18] Educational Commission of the City of Chicago, Report of the Educational Commission of the City of Chicago Appointed by the Mayor, Hon. Carter H. Harrison, William R. Harper, Chairman (Chicago: R.R. Donnelly, 1899), 167.

[19] "Schools as Social Centers," Chicago Daily Tribune (November 10, 1901): 12. With this article the Tribune began a campaign of editorials aimed at promoting the use of public school buildings as social and community centers. The editorials continued for almost two decades. See e.g., "Schools as "Social Centers,"" Chicago Daily Tribune (June 9, 1902): 12; "Give the Board Authority," Chicago Daily Tribune (April 12, 1903): 20; "School Buildings as Community Centers," Chicago Daily Tribune (June 20, 1910): 6; "New Uses for Public Schools," Chicago Daily Tribune (December 10, 1911): 11; "Use the Schoolhouses More," Chicago Daily Tribune (September 8, 1912): 4; "Making Citizens," Chicago Daily Tribune (November 9, 1916): 6; "Open the Community Centers," Chicago Daily Tribune (November 29, 1917): 8.

[20] Ibid.

[21] "Schools as "Social Centers,"" 12.

[22] "Too often has it been the case that philanthropic ladies and gentlemen have proceeded on the theory that the first thing to do in raising the social tone of working life is to stuff the workingman with knowledge. This theory ought to be dropped. Knowledge has its value, but in the case of the tired worker there is more civilization in one decent good time than in many discourses on the history of civilization. Let the schools stand for the graces of life as well as for its intellectual structure." "Give the Board Authority," 20.

[23] Perry, Wider Use of the School Plant, 284; Voorhees, "Civic Service of the Social Center," 369.

[24] Fifty-Seventh Annual Report of the Board of Education of the Public Schools of the City of Chicago (1910-11) (Chicago: Public Schools of the City of Chicago, 1912), 110-111.

[25] Ibid., 22.

[26] "New Uses for Public Schools," 11; "Use the Schoolhouses More," 4.

[27] Fifty-Fourth Annual Report of the Board of Education of the City of St. Louis, Mo. (1907-08) (St. Louis: Buxton & Skinner Stationary Co., 1909), 15-16.

[28] Sixtieth Annual Report of the Board of Education of the City of St. Louis, Mo. (1913-14) (St. Louis: n.p., n.d.), 292-296.

[29] Sixty-Fourth Annual Report of the Board of Education of the City of St. Louis, Mo. (1917-18) (St. Louis: Board of Education of St. Louis, Missouri, 1919), 172.

[30] Ibid., 175.

[31] Sixty-Seventh Annual Report of the Board of Education of the City of St. Louis, Mo. (1920-21) (St. Louis: n.p., n.d.), page unknown.

[32] William A. Wirt to William C. Bruce, December 9, 1910, William A. Wirt Manuscripts, Lilly Library, Indiana University, Bloomington, Indiana.

[33] "Wider Use for School Buildings," 8.

[34] Ibid.

[35] Ibid.

[36] Dwight Heald Perkins, "The Relation of Schoolhouse Architecture to the Social Center Movement," Journal of the Proceedings and Addresses of the 50th Annual Meeting of the National Education Association (Ann Arbor, MI: National Education Association, 1912): 235.

[37] See "System of Public Schools in St. Louis," American Journal of Education 1 (March 1856): 348-356; "New Schools," St. Louis Post-Dispatch (August 27, 1893) 24; John Wesley Bell, The Development of the Public High School in Chicago (Chicago: The University of Chicago Libraries, 1939), 167.

[38] For examples of these "central hall" plans, see May Ayres, "A Century of Progress in Schoolhouse Construction," The American School Board Journal 55 (September 1917): 25.

[39] Fletcher B. Dresslar, American Schoolhouses (United States Bureau of Education Bulletin 1910, No. 5) (Washington, D.C.: U.S. Government Printing Office, 1911), 36-37.

[40] William C. Bruce, High School Buildings (Milwaukee: The American School Board Journal, 1913).

[41] Edmund M. Wheelwright, School Architecture (Boston: Rogers and Manson, 1901); Warren Richard Briggs, Modern American School Buildings (New York: John Wiley & Sons, 1899).

[42] William B. Ittner, "School Architecture," Journal of the Proceedings and Addresses of the 50th Annual Meeting of the National Education Association (Ann Arbor, MI: National Education Association, 1912): 1217.

[43] "The next change which has come about consists in placing the assembly hall or auditorium on the ground floor. It has been learned by experience that it is unwise to place an assembly hall on the third or even the second floor. Whenever a large body of people is assembled under one roof the means of affording safe exits must be supplied. In case of a calamity by fire no second or third floor hall can deliver its occupants as safely to the open air as can a ground floor hall. The constantly growing use of school halls for lecture and entertainment purposes, has also made it eminently practical to have these placed on the first floor. They afford easy entrance and safe exit. If so planned that the assembly hall will form the center wing of an E shaped building, the lighting is certain to be excellent." "High School Architecture," The American School Board Journal 34 (July 1907): 8.

[44] See Wilbur T. Mills, "Innovations in School Architecture," Journal of the Proceedings and Addresses of the National Education Association (Winona, MN: National Education Association, 1908): 1075.

[45] Kate Rousmaniere, City Teachers: Teaching and Social Reform in Historical Perspective (New York and London: Teachers College Press, 1997), 82.

[46] Yeatman was a St. Louis philanthropist and the first president of the city's Mercantile Library. Frederick L. Stoddard painted both murals.

[47] William J. Reese, The Origins of the American High School (New Haven and London: Yale University Press, 1995), 82.

[48] Henry Barnard, School Architecture 2nd ed. (New York: A.S. Barnes & Co., 1848; reprint, ed. Jean and Robert McClintock, New York: Teachers College Press, 1970), 55.

[49] Ibid.

[50] "Costly High Schools," The American School Board Journal 12 (April 1896): 10.

[51] Wheelwright, "The American Schoolhouse. VI," 76.

[52] See, e.g., A.C. Clas, "Modern School House Architecture," The American School Board Journal 26 (June 1903): 25; Ira Remson, "School Houses and Beauty," Architect's and Builder's Journal 5 (September 1903): 20; F. Treudley, "Public School Structures as Related to Educators," The American School Board Journal 30 (May 1905): 7.

[53] William George Bruce, School Architecture: A Handy Manual for the Use of Architects and School Authorities (Milwaukee: Johnson Service Company, 1906), 4. For later examples of this type of plea, see, e.g., "Our School Architecture," 325; Alfred Busselle, "Domestic Quality in School Design," Architecture 43 (April 1921): 121.

[54] "Costly High Schools," 10.

[55] Gilbert B. Morrison, School Architecture and Hygiene, Monographs on Education in the United States No. 9, ed. Nicholas M. Butler (Albany: J.B. Lyon Company, 1900), 3.

[56] A.D.F. Hamlin, "Consideration in Schoolhouse Design," in Modern School Houses (New York: The Swetland Publishing Co., 1910), 4.

[57] Frank Irving Cooper, "Standards of Schoolhouse Planning," in John J. Donovan, et. al., School Architecture: Principles and Practices (New York: The Macmillan Company, 1921), 573; John J. Donovan, "Architecture, Planning and Construction," ibid., 18.

[58] Walter H. Kilham, "The Modern Schoolhouse IV. Exposure and Plan," The Brickbuilder 24 (April 1915): 98.

[59] Treudley, "Public School Structures as Related to Educators," 7.

[60] I am not the first person to note these similarities. See e.g., John Crosby Freeman, "An Essay on Victorian School-house Architecture," introduction to School-House Architecture, by Samuel F. Eveleth (New York: The American News Company, 1870); reprint, Watkins Glen, NY: The American Life Foundation, 1978), n.p.; Lucian August Szlizewski, "Schoolhouse Architecture in America from 1830 to 1915" (Ph.D. diss., Miami University, 1989), 114 ("Many of Eveleth's designs, like Barnard and Johonnot, were, or appeared to be, recycled house types adapted to the purposes of public education. Take away the open spaces, rows of desks, and dual entrances for the segregation of the sexes and Eveleth's book becomes a Victorian house pattern book.").

[61] William W. Cutler, III, Parents and Schools: The 150-Year Struggle for Control in American Education (Chicago: U. of Chicago Press, 2000).

[62] As an example, writers in the Chicago Board of Education Annual Reports stopped using "schoolhouse" in 1915 (the preferred term after this date was "school building"). This is not to suggest that the term "schoolhouse" disappeared; in fact, it remained common into the 1930s, but my argument is that based on the developments discussed in this dissertation, the incompatibility between the school as "house" metaphor and the efficient social machine ideal argue against any lingering notions that might connect education with family life. Instead, it appears that continued use of the term "schoolhouse" can be attributed to mere custom.

[63] "New Public School Buildings," Real Estate Record and Guide 45 (February 22, 1890): 257-258.

[64] Wheelwright, "The American Schoolhouse. VI," 76; John Beverly Robinson, "The School Buildings of New York," Architectural Record 7 (January-March 1898): 383.

[65] Busselle, "Domestic Quality in School Design," 121.

[66] Edmund M. Wheelwright, "The American Schoolhouse VI," The Brickbuilder 7 (April 1898): 77.

[67] Ibid., 76.

[68] The Boston Schoolhouse Commissioners first Annual Report stated that "the new schoolhouses about to be erected should be plain, substantial structures, built in the most substantial manner, devoid of unnecessary or extravagant ornamentation, but attractive and tasteful from an architectural standpoint, the exterior walls to be in general of plain brick with a reasonable amount of trimmings ..." Cited in Walter H. Kilham, "The Work of the Boston Schoolhouse Commission, 1901-1905, I," The Brickbuilder 14 (October 1905): 222. For examples of the work that was subsequently built according to these guidelines, see the continuation of the series in The Brickbuilder, 14 (November 1905): 248-254; 14 (December 1905): 270-275; 15 (January 1906): 8-12; 15 (February 1906): 30-36.

[69] "High School Architecture," The American School Board Journal 34 (July 1907): 8.

[70] Quoted in "St. Louis School Architecture," The American School Board Journal 28 (April 1904): 8. Eight years later, Ittner elaborated on his design process in a speech at the NEA convention without commenting on specific styles: "As the design of a building should be the natural outgrowth and should express truthfully the function of the plan, we will now give it attention. We find that the projection and added height of the library furnish a natural motif for a dignified treatment of the main entrance; the fenestration of the large study-room units enables us to give them proper expression on the main façade; the side entrances and smaller class units furnish the natural spacing for a less ambitious treatment of the wing facades; and the high openings in the gymnasium enable us to give its location outward evidence. Thus, without any straining for effect or warping of its parts, we find our building capable of harmonious expression in every way consistent with its uses." Ittner, "School Architecture," 1219.

[71] "St. Louis School Architecture," 8.

[72] James O. Betelle, "Architectural Styles as Applied to School Buildings," The American School Board Journal 58 (April 1919): 28.

[73] Ernest Sibley, "Why I Prefer the Colonial Style," The American School Board Journal 66 (January 1923): 66.

[74] Ibid.

[75] On early aspects of nationalism and the Colonial Revival, see William B. Rhoads, "The Colonial Revival and American Nationalism," Journal of the Society of Architectural Historians 35 (December 1976): 239-254. Little has been done on the fascinating question of the link between Colonial Revival styles and white racial identity; the best example is Harvey Green, "Popular Science and Political Thought Converge: Colonial Survival Becomes Colonial Revival," Journal of American Culture 6 (Winter 1983): 3-24. For background on Americans' changing attitudes toward the racial identity of eastern and southern Europeans, see Matthew Frye Jacobson, Whiteness of a Different Color: European Immigrants and the Alchemy of Race (Cambridge: Harvard University Press, 1999).

[76] Busselle, "Domestic Quality in School Design," 121. Busselle's point raises an interesting question – if schools were considered the true melting pot where "the urban realities of class disparity and ethnic heterogeneity" were to be overcome, why was there no overwhelming drive to "Americanize" the *appearance* of the school, even in Boston? The quote is from Carrie Tirado Bramen, "The Urban Picturesque and the Spectacle of Americanization," American Quarterly 52 (September 2000): 444. There were a few voices hinting at such an approach: "We look to the teaching in public schools to help in the great problem of Americanizing our mixed people; why not make the buildings themselves a part of the teaching of the appreciation of architecture?" "Our School Architecture," Architecture 42 (November 1920): 325.

[77] Perkins, "The Relation of Schoolhouse Architecture to the Social Center Movement," 239.

[78] See e.g., Carl W. Condit, The Chicago School of Architecture (Chicago and London: University of Chicago Press, 1964); Mark L. Peisch, The Chicago School of Architecture (New York: Random House, Inc., 1964); H. Allen Brooks, The Prairie School: Frank Lloyd Wright and His Midwest Contemporaries (New York: W.W. Norton & Co., 1972). In sharp contrast to the late twentieth century acclaim for Schurz High School, contemporary critics and writers ignored it – there were no articles on Schurz in any of the architectural or educational journals, and it was not included in compilation books like Modern School Houses; Fletcher B. Dresslar, American Schoolhouses (United States Bureau of Education Bulletin No. 5 (Washington: U.S. Government Printing Office, 1911); Bruce, High School Buildings; Wilbur T. Mills, American School Building Standards (Columbus: Franklin Educational Publishing Company, 1915); or Donovan, et. al., School Architecture. Alfred Hussander's high school buildings received significantly more publicity in such sources, but his reputation never matched that of Perkins. Given these facts, it seems Perkins standing derived more from his grammar school buildings and his highly publicized termination than from his secondary school designs.

[79] Interestingly, Perkins school designs after being ousted from the Board Architect post are significantly more historical, especially those of the 1920s. See Perkins, Fellows and Hamilton, Educational Buildings.

[80] Central High is now known as Cardozo Sr. High School.

[81] "Business Training" included figures symbolizing shipping, accounting, geography, commerce, and barter. "Academic Education" featured chemistry, mathematics, physical culture, art, music, history, biology, and philosophy. "Manual and Household Arts" presented domestic science, dressmaking, mechanical drawing, art-crafts, and mechanics. "An Impressive Frieze," The American School Board Journal 52 (January 1916): 18.

[82] Ibid. See also Antoinette J. Lee, "School Building Survey, District of Columbia – Cardozo Sr. High School," (Washington, D.C.: School Building Survey, District of Columbia – Cardozo Sr. High School, 1986).

[83] William B. Ittner, "School Building Policies and the War, and Standardization of School Buildings," The American School Board Journal 55 (September 1917): 24.

[84] William B. Ittner, "The School Plant in Present-Day Education," Architectural Forum 37 (August 1922): 45.

# CONCLUSION

> The schoolhouse of today is not, like its predecessors, a succession of boxlike rooms strung along a corridor and lighted by windows placed haphazard according to the fancy of the builder. The old-fashioned schoolhouse had little to attract children. Its rooms were bare and uninviting, and when they were not too cold and draughty for comfort, they were sickening with hot, stagnant air. The modern public school has a simple exterior, depending for beauty upon correctness in proportion and outline, following one of the accepted styles of architecture. It is usually surrounded with the playgrounds and lawns, and in many cases, an attempt has been made at simple gardening and ornamentation. The interior is arranged not only with a view of conserving the comfort and health of the occupants, but also to gain the highest possible amount of efficiency in teaching, management, and discipline and extra service for the community. The appointments are elaborate when compared with the old schoolhouse. Everything is made inviting and attractive, and intensely practical. In fact, it may safely be said that the modern schoolhouse is in itself a positive aid to teaching and strong factor in the civil and social advancement of the community.
>
> The American School Board Journal, 1912[1]

American society underwent a significant metamorphosis between 1880 and 1920 as the country moved from an agrarian to an industrial nation. Social relationships changed from what Robert H. Wiebe called "the personal, informal ways of the community" to the "regulative, hierarchical needs of urban-industrial life," and the emerging market-based economy required skills beyond a rudimentary level.[2] The new society placed a greater emphasis on education than at any previous time in America's history as the public education system swelled from urban migration, foreign immigration, and compulsory attendance laws. The high school was the capstone of this system. From its beginnings as an elitist institution for children of well-off families, the high school grew to become the primary agency of social training for America's youth by 1920. The high school building was transformed to meet these challenges and changed circumstances.

The transformation of secondary school architecture was driven by three main influences. The first was a growing societal interest in children's "Health" and "Safety," which arose out of a larger trend toward health- and body-consciousness in turn-of-the-century America. Educators and reformers began to realize that the physical environment of the schoolhouse could have positive or negative effects on students. Keeping the school free of dust and germs became important in the battle against disease. Architects developed formulas for determining adequate light and ventilation, and these formulas shaped the size, layout and orientation of the classroom. Proper lighting could reduce the perceived plague of bad eyesight among school children; it was also believed to facilitate the building's hygienic fitness based on the "disinfectant" qualities of sunlight. Likewise, proper ventilation expelled vitiated air from the classroom and reduced the probability of airborne illnesses. The new school building was also designed with fire safety in mind. The nineteenth century schoolhouse was not only dark and sickly; it was also a fire hazard. The frequency of school fires and the shock of tragedies like the Collinwood fire led architects and educators to incorporate improved evacuation routes in their buildings along with fireproof materials. And educators aimed to go beyond merely protecting students' health by improving it through the development of physical education. All of these new concerns had lasting implications for the design of school buildings.

The second major influence on the schoolhouse's transformation combined interests in "Education" and "Economy" to affect changes in the organization and administration of public education. The high school grew during this time period from an elite institution for middle- and upper class children to a nearly universal requirement for every American child under eighteen. Compulsory education and child labor laws – along with increased foreign immigration – made enrollments soar in urban school systems. Partly as a means of addressing this new constituency, and partly as a reflection of the new societal interest in the stage of life we now know as "adolescence," educators changed high school curriculums to make them less humanities-oriented and more applicable to the needs of everyday life. Manual and vocational training programs in particular placed new demands on the schoolhouse. Architects responded to new and expanded curriculums by transforming the nineteenth-century "egg-crate" into a complex of differentiated architectural spaces that could accommodate various classes. These buildings were thus adapted to changed circumstances in a manner that efficiency-minded educators applauded. The American socio-cultural interest in efficiency and scientific management in the early twentieth century infiltrated educational systems, intensifying educators' desire to economize. School boards were reorganized to make them more efficient (and more like corporate Boards of Directors) and many urban school systems hired school architects to permanent positions. Architects were also interested in efficiency and economy and sought to create standardized plans for the modern school building that could be used throughout the country. High school buildings from the late 1910s in fact demonstrate a remarkable similarity in their plans and appearances; this is traceable to the rapid dissemination of successful design ideas among architects and educators.

The final major influence on the schoolhouse's transformation was discussed in general terms in the chapter on "Happiness." The high school's changing role in American society between 1880 and 1920 was reflected in both the appearance and use of the building. Schoolhouses became social centers in many communities, open to the surrounding neighborhood for entertainment and educational purposes. The high school building became the equivalent of a civic monument expressing a significant societal investment in children and their education. High schools were the leading agents for the social training of America's youth by 1920 and their larger size and enhanced symbolic statement reflected this new mission.

The schoolhouse's transformation is best illustrated in two ways. First is the visual evidence – compare any drawing and floor plan of an American high school from the 1880s with similar evidence from 1920. The change is remarkable – from closed plans and Romanesque Revival façades to open plans and muted classical, Gothic or Colonial Revival imagery. The second, related illustration is statistical. A large high school building in the 1880s typically contained classrooms, an assembly room, and perhaps one or two science laboratories and a recitation room/study hall. In 1919, Leonard Koos examined 156 high school floor plans and exclaimed, "Truly, space-provisions in modern high-school buildings are little short of protean!"[3] He found 109 different room types in use, including gymnasiums, swimming pools, specialized rooms for all types of manual training and domestic science, laboratories for physics, chemistry, biology, geology, and horticulture, commercial rooms, large and small auditoriums, drawing, drafting and art rooms, teachers' lounges, lunchrooms, locker rooms, libraries and music rooms. These spaces were required by the new secondary school curriculums that expanded courses of study in an effort to provide useful vocational or academic training for the nation's youth. The differentiation of spaces inside the modern high school thus mirrored the differentiation of courses. It also symbolized a growing compartmentalization of knowledge in the twentieth century.

The high school buildings of this generation are also important material reminders of the inequities that existed in even the most progressive educational systems. The lack of access to appropriate facilities greatly affected the African-American student experience. The rarity of black high school buildings like Sumner High in St. Louis demonstrates the difficulties faced by black students attempting to improve themselves in a racist society. At the same time, a more insidious discrimination took place against female students of both races. Despite educational reforms many systems still reinforced traditional gender prejudices in curriculum and administration, and the school buildings record these injustices. Girls in schools around the country were channeled into domestic science courses that taught them to be wives and mothers. The school buildings contained specialized rooms for sewing, housekeeping and cooking classes that attest to this program. Meanwhile, boys were trained for employment, and the buildings were full of various shops, drawing and art rooms. To a lesser degree, this differential treatment was also recorded in sex-segregated entrances, playgrounds, gymnasiums and swimming pools.

An important point to remember concerning the transformation of the schoolhouse is that it was successful in many ways and unsuccessful in others. The large factory-like buildings of the late 1910s were *imperfect* solutions to the problem of devising architectural spaces to complement the changing high school. These solutions are perhaps more important for what they tried to do than for what they actually did. The school buildings of this generation are frequently criticized today as "warehouses" or "factories" that perpetuated the ironclad, stifling pedagogical system of regimented learning in place back then.[4] The reality is that these schools *were* adaptable, as exemplified by their innovations concerning lighting, ventilation, physical education and manual training, but contemporary pedagogical practices did not demand much further. The architecture was restricted by the limitations of the educational system.

At present, because of age and negative connotations, there is growing concern over the survivability of this generation of schoolhouses.[5] I voice my support for protecting these schools as historic artifacts of society and education and as precursors to the "functionalism" synonymous with twentieth century modernism. They are important material products of a society that found itself in a period of great transition.

[1] "Progress in School Architecture," The American School Board Journal 44 (April 1912): 32.

[2] Robert H. Wiebe, The Search for Order 1877-1920 (New York: Hill and Wang, 1967), xiv.

[3] Leonard V. Koos, "Space-Provisions in the Floor-Plans of Modern High-School Buildings," School Review 27 (October 1919): 580.

[4] "Traveling across the United States one can find school buildings that exemplify diverse legacies from the turning points in our educational history . . . In the heart of the older cities is the quintessential legacy of the early twentieth-century professional managers: the urban high school, *often looking like a hard-edged factory with pilasters*, visually representing the union of an attenuated traditional culture with a dominant utilitarianism. Planned and staffed by specialists, sorting students into programs that would profoundly influence their life chances, the high school was an archetype of the ideal of social efficiency that dominated the thinking of the new professional managers . . .Today, run-down and often full of students who have no desire to be there but no jobs beckoning them either, *it resembles a fortress* overrun by the very people it was meant to arrange in serried ranks" (italics mine). David Tyack and Elisabeth Hansot, Managers of Virtue: Public School Leadership in America, 1820-1980 (New York: Basic Books, Inc., 1982), 4-5.

[5] "Historic Neighborhood Schools" made Preservation magazine's list of "11 Most Endangered Places 2000." Preservation 52 (July/August 2000): 15.

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# ILLUSTRATIONS

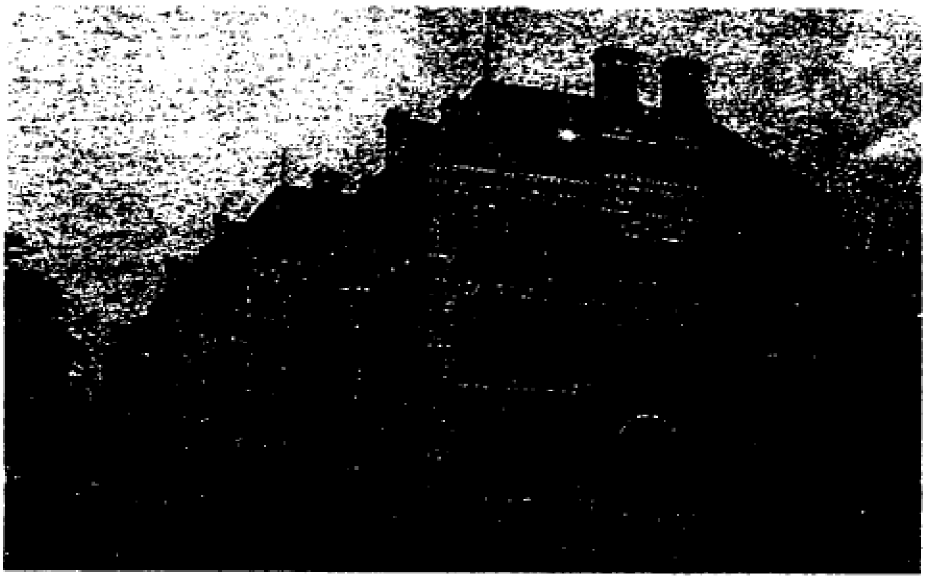

Fig. 1.1. George A. Clough, Latin High and English High Schools, Boston, Massachusetts, 1877-80. [Edmund March Wheelwright, School Architecture. (Boston: Rogers & Manson, 1901), 180].

Fig. 1.2. Architect unknown, Chicago High School, Chicago, Illinois, 1856. [A.T. Andreas, History of Chicago from the Earliest Period to the Present Time. (Chicago: A.T. Andreas, Publisher, 1884), 218].

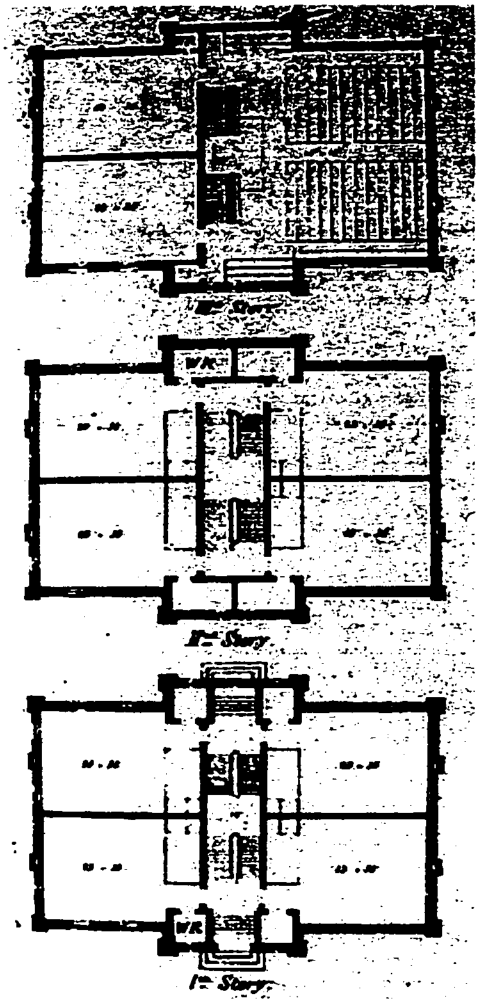


Fig. 1.3. Architect unknown, Chicago High School. First, second and third floor plans. [W.H. Wells, "Public High Schools in Chicago," American Journal of Education 3 (June 1857): 537].

Fig. 1.4. William Rumbold, St. Louis High School, St. Louis, Missouri, 1856. [St. Louis Public Schools Records Center/Archives, St. Louis, Missouri (hereafter "SLPSRC/A"].

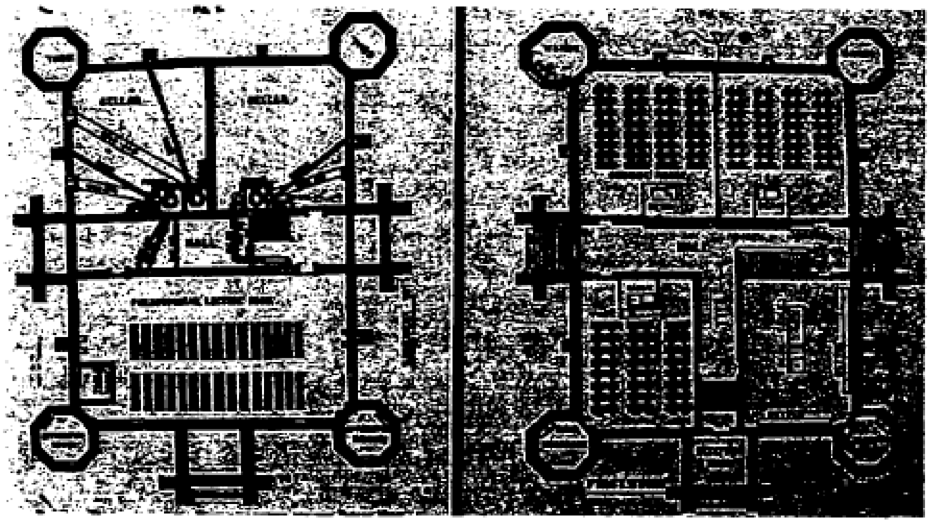

Fig. 1.5. Rumbold, St. Louis High School. Basement and first floor plans. ["System of Public Schools in St. Louis," American Journal of Education 1 (March 1856): 352-353].

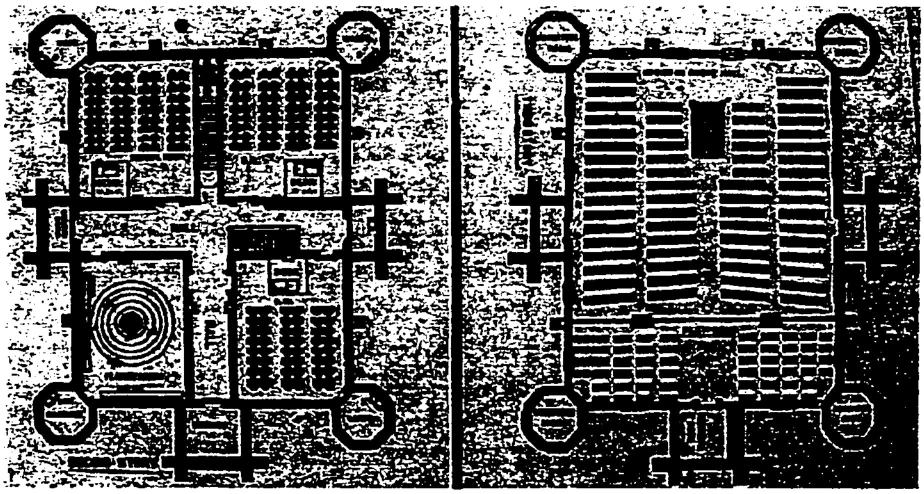

Fig. 1.6. Rumbold, St. Louis High School. Second and third floor plans. ["System of Public Schools in St. Louis," 354-355].

Fig. 1.7. John B. Earnshaw, Hughes High School, Cincinnati, Ohio, 1852-53. ["Plans of Hughes' City High School of Cincinnati," American Journal of Education 24, no. 76 (1873): 592].

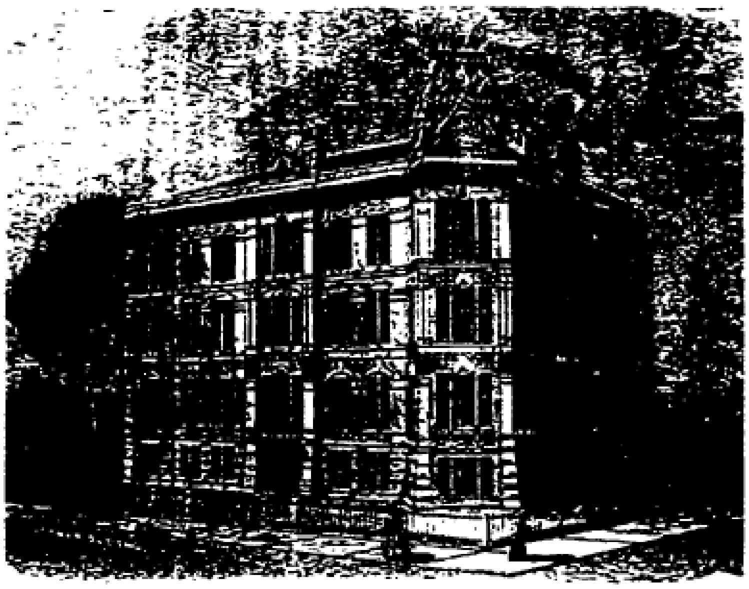

Fig. 1.8. Architect unknown, New Haven High School, New Haven, Connecticut, 1872. ["Plans of Public High School, New Haven, Connecticut, American Journal of Education 24 (1873): 194].

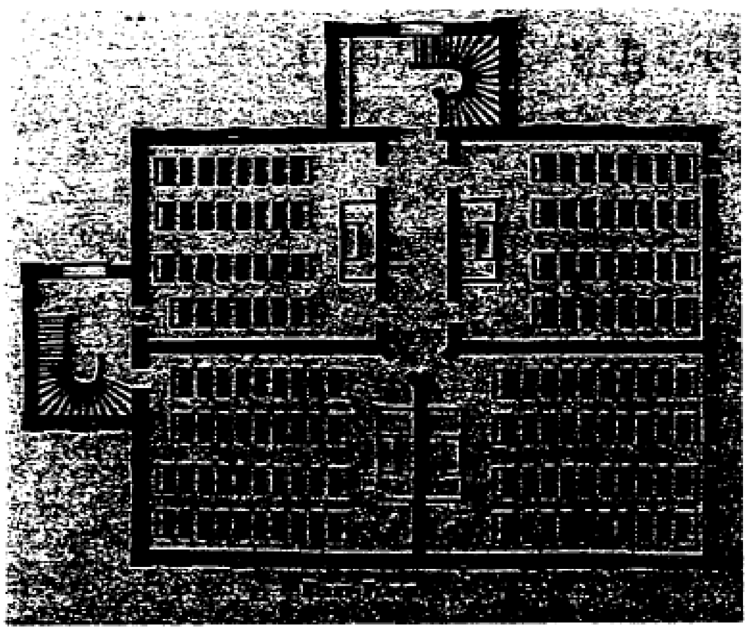

Fig. 1.9. Architect unknown, Springfield High School, Springfield, Illinois, date unknown. ["Public High School, Springfield, Illinois," American Journal of Education 23 (1872): 684].

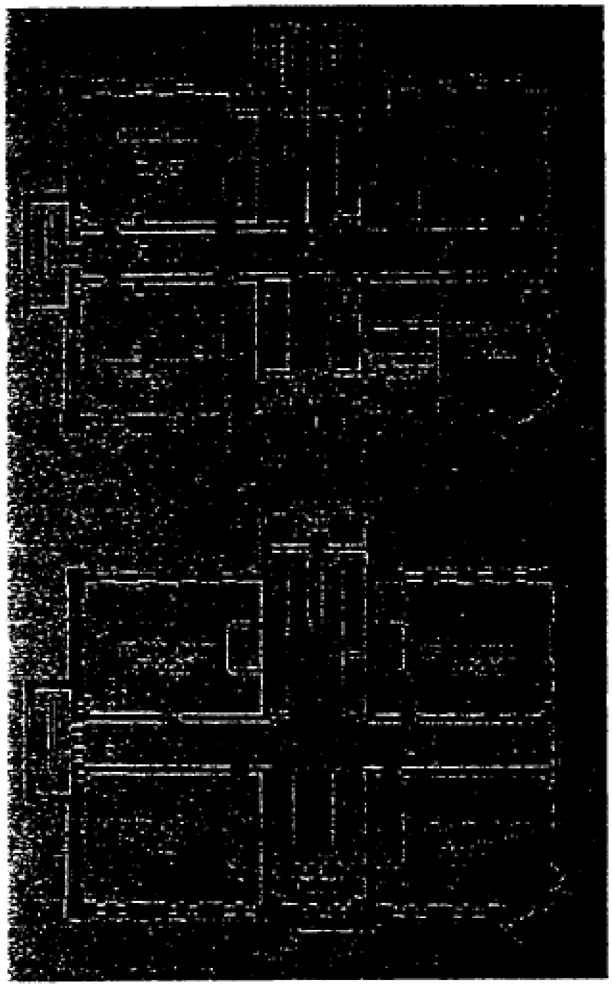

Fig. 1.10. New Haven High School. First and second floor plans. ["Plans of Public High School, New Haven, Connecticut," 195].

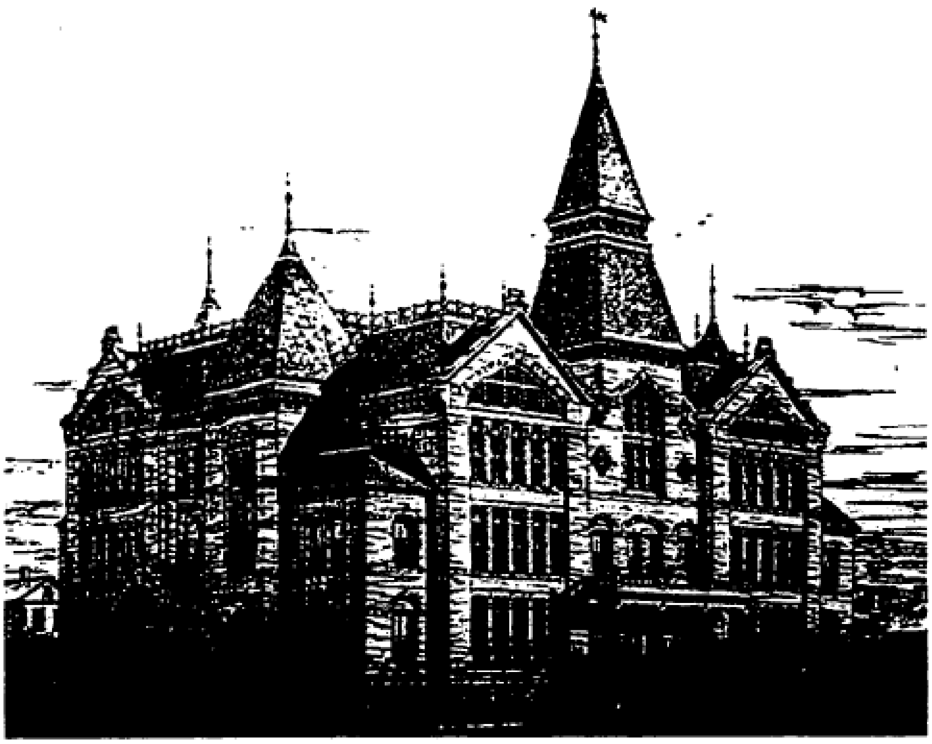

Fig. 1.11. William R. Walker and Thomas J. Gould, Providence High School, Providence, Rhode Island, 1877. [The American Architect and Building News 2 (January 20, 1877): n.p.].

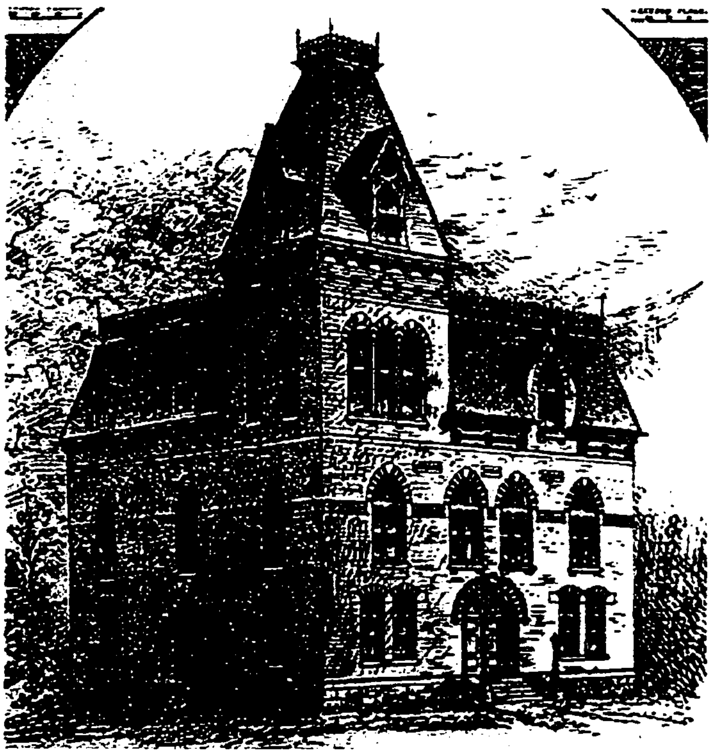

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Fig. 1.13. Architect unknown, Western Public High School for Girls, Baltimore, Maryland, date unknown. [American Journal of Education 24 (1873): 632].

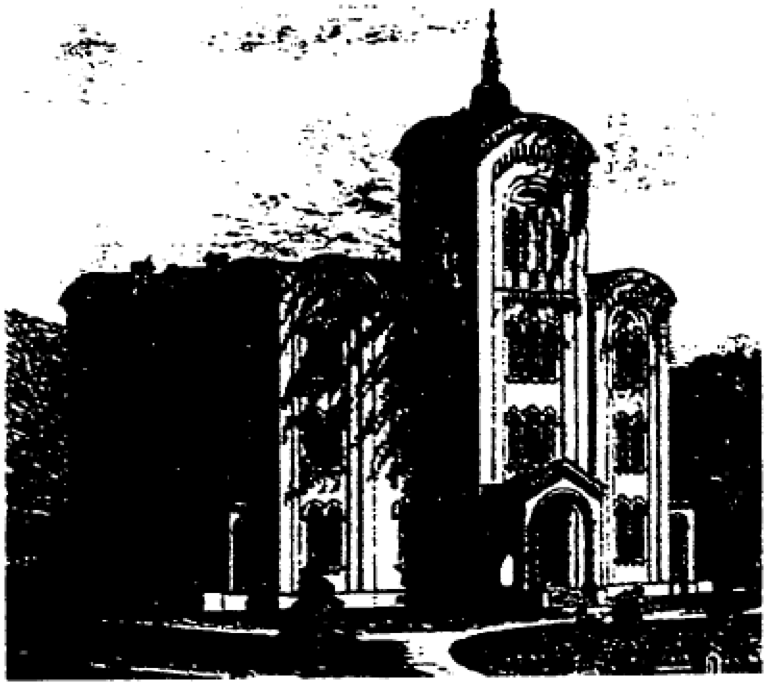


Fig. 1.14. Evan Burdick, Norwich Free Academy, Norwich, Connecticut, 1856. [American Journal of Education 7 (December 1856): 697].

Fig. 1.15. Samuel F. Eveleth, "Design No. 17." [Samuel F. Eveleth, School-house Architecture (New York: The American News Company, 1870; reprint, Watkins Glen, NY: The American Life Foundation, 1978), Plate No. 61.].

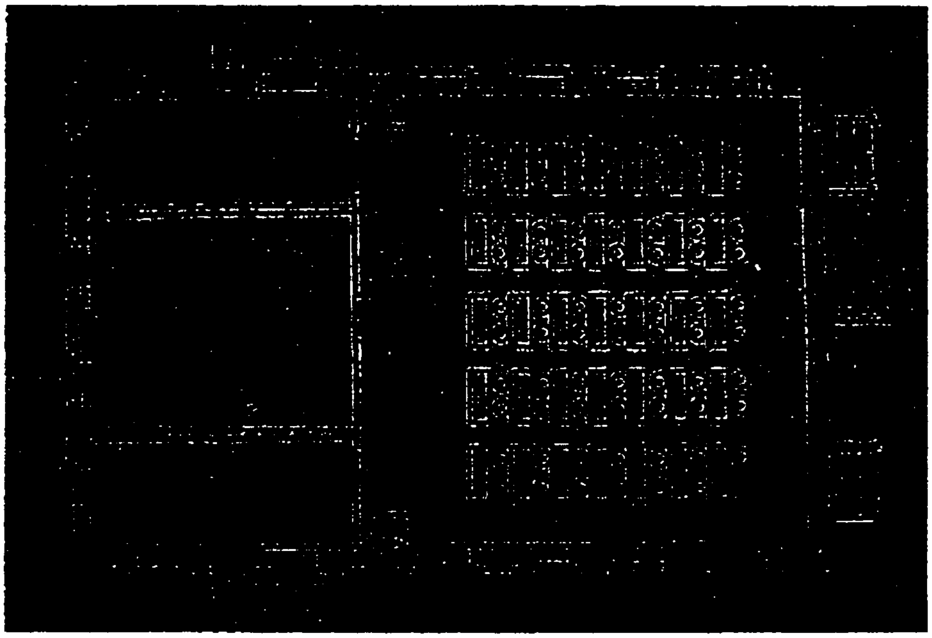


Fig. 1.16. S.E. Hewes, "Design V." [James Johonnot, School-Houses (New York: J.W. Schermerhorn & Co., 1871), 116].

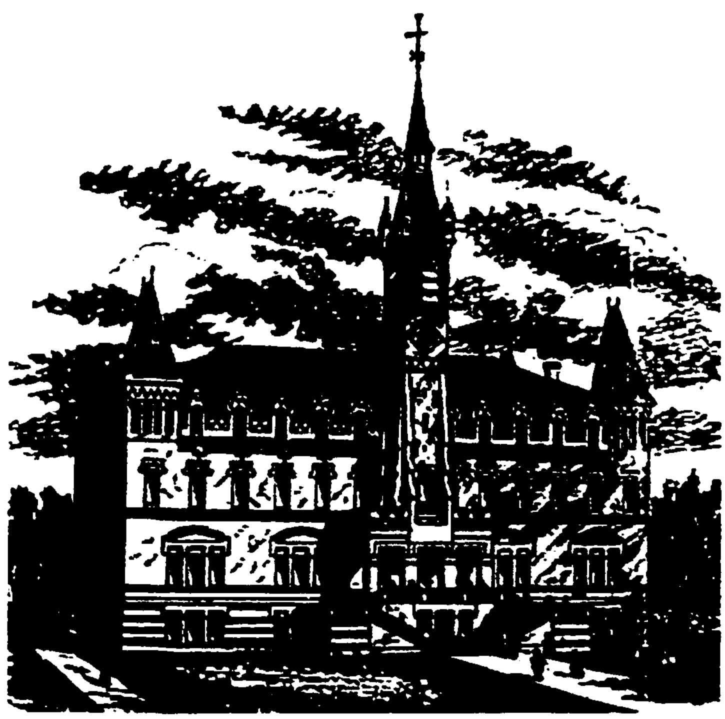


Fig. 1.17. Henry Hobson Richardson, Worcester High School, Worcester, Massachusetts, 1870-71. ["Worcester Classical and English High School." American Journal of Education 23 (1872): 658].

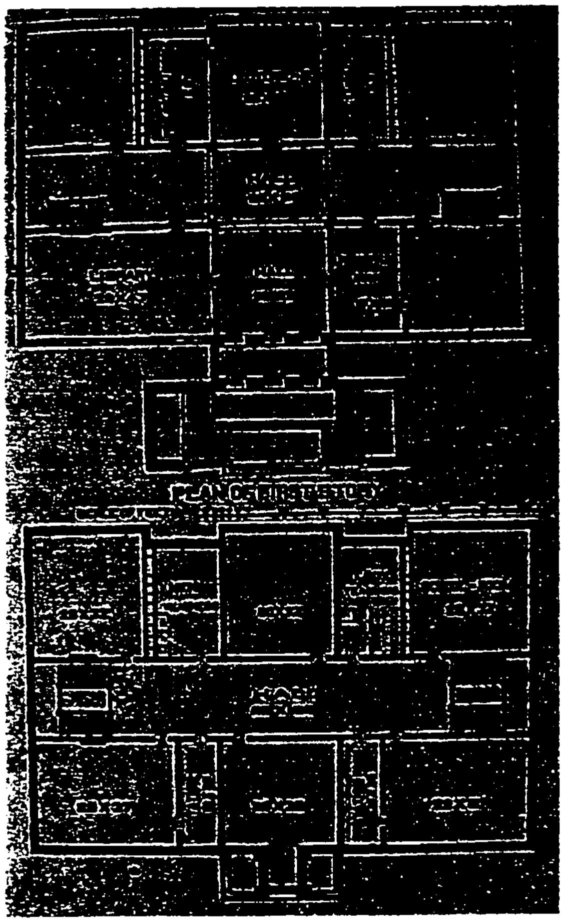



Fig. 1.18. Richardson, Worcester High School. First and second floor plans. ["Worcester Classical and English High School," 661].

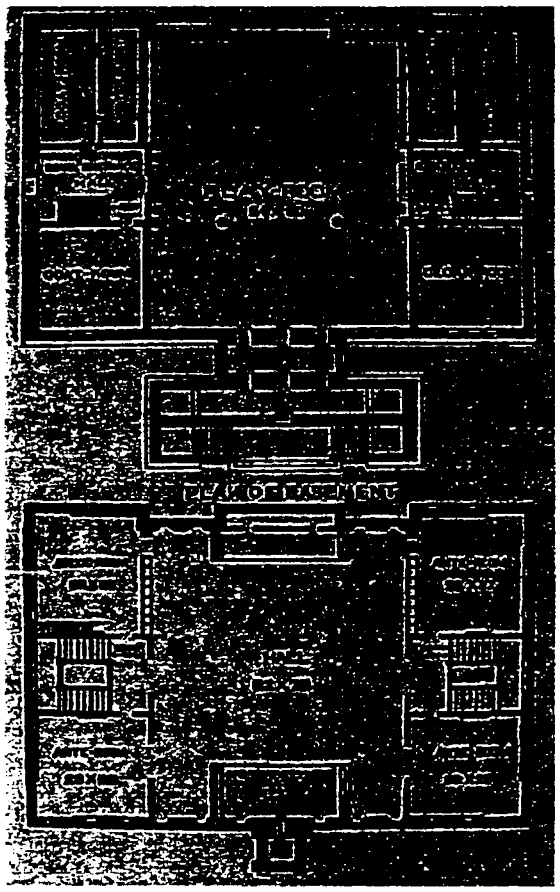


Fig. 1.19. Richardson, Worcester High School. Basement and third floor plans.
["Worcester Classical and English High School," 660].

Fig. 1.20. Levi T. Scofield, Cleveland Central High School, Cleveland, Ohio, 1878. ["New Central High School, Cleveland." New England Journal of Education 8 (September 26, 1878): 192].

Fig. 1.21. Sumner High School, St. Louis, Missouri, 1868. [SLPSRC/A].

Fig. 1.22. Architect unknown, Akademische Gymnasium, Vienna, Austria, date unknown. [Edward Robert Robson, School Architecture (London: John Murray, 1874; reprint, New York: Humanities Press, 1972), 154].

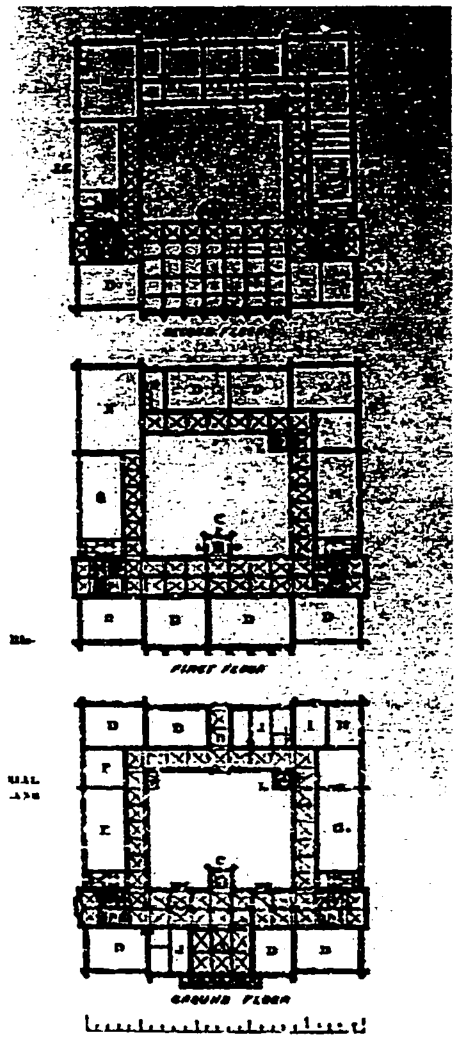


Fig. 1.23. Akademische Gymnasium. Ground, first and second floor plans. [Robson, School Architecture, 155].

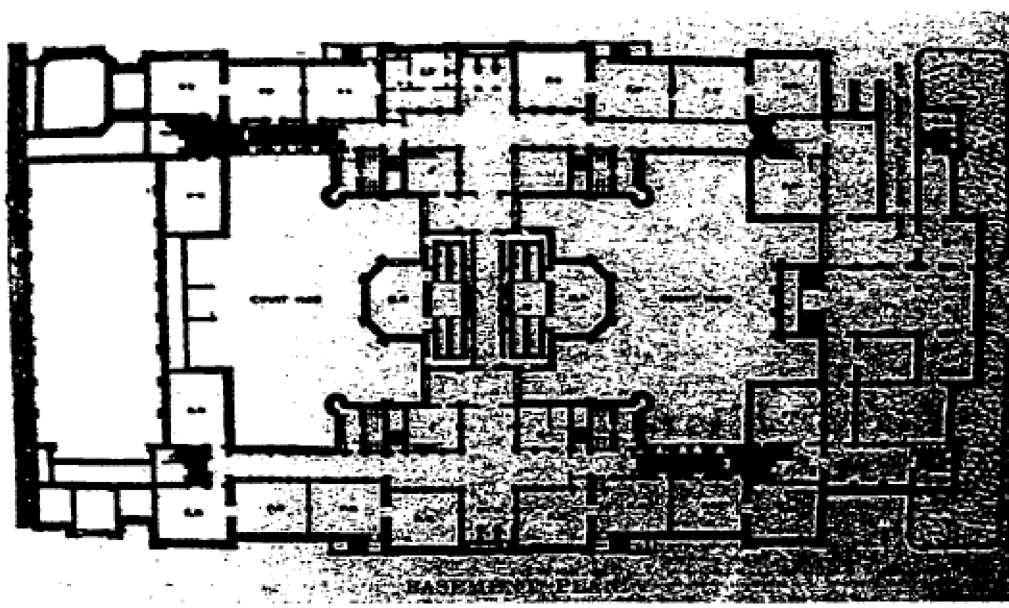



Fig. 1.24. George A. Clough, Latin High and English High Schools, Boston, Massachusetts, 1877-80. Basement plan. [Wheelwright, School Architecture, 179].

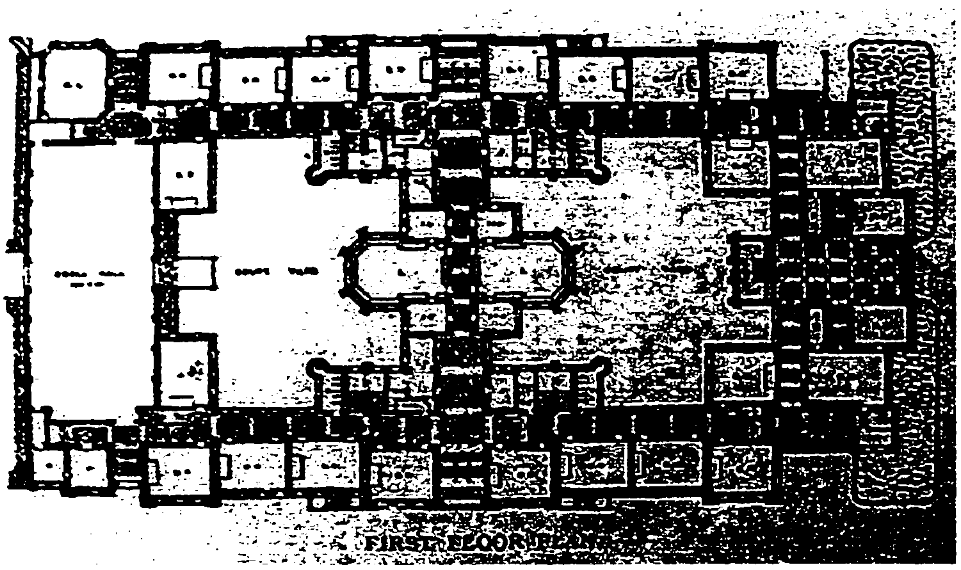



Fig. 1.25. Clough, Latin High and English High Schools. First floor plan. [Wheelwright, School Architecture, 179].

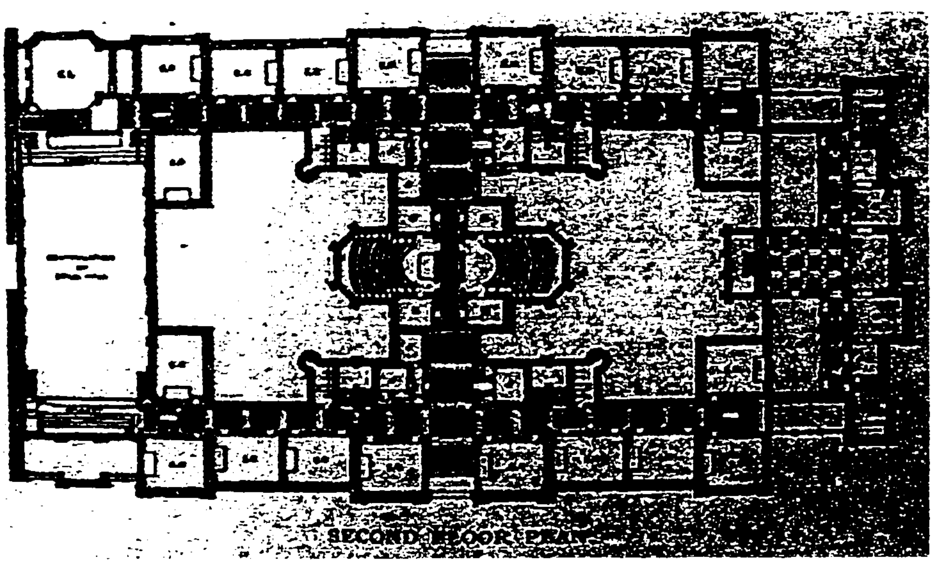


Fig. 1.26. Clough, Latin High and English High Schools. Second floor plan. [Wheelwright, School Architecture, 179].

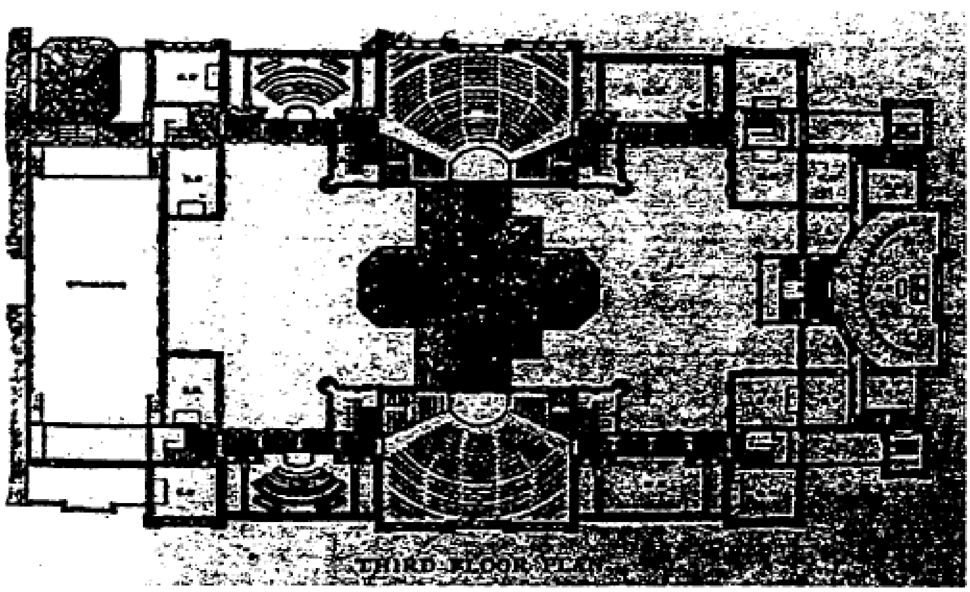



Fig. 1.27. Clough, Latin High and English High Schools. Third floor plan. [Wheelwright, School Architecture, 179].

Fig. 1.28. William B. Ittner, Frank Louis Soldan High School, St. Louis, Missouri, 1909. [Fletcher B. Dresslar, American Schoolhouses, United States Bureau of Education Bulletin, No. 5. (Washington, D.C.: U.S. Government Printing Office, 1911), Plate 50].

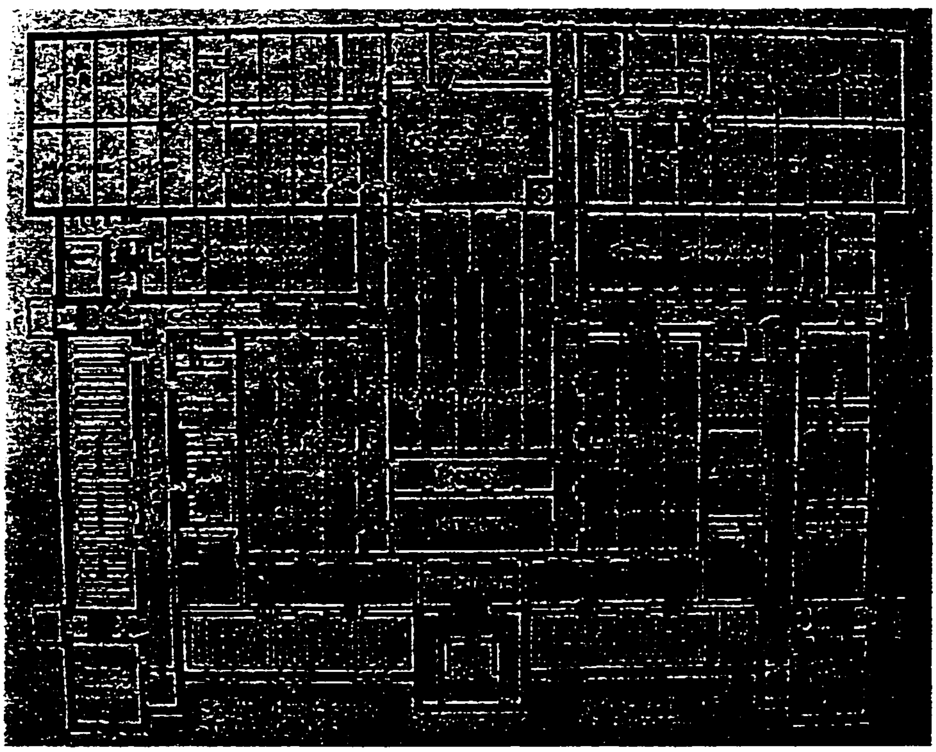


Fig. 1.29. Ittner, Soldan High School. Basement plan. [Wilbur T. Mills, American School Building Standards (Columbus, OH: Franklin Educational Publishing Company, 1915), 546].

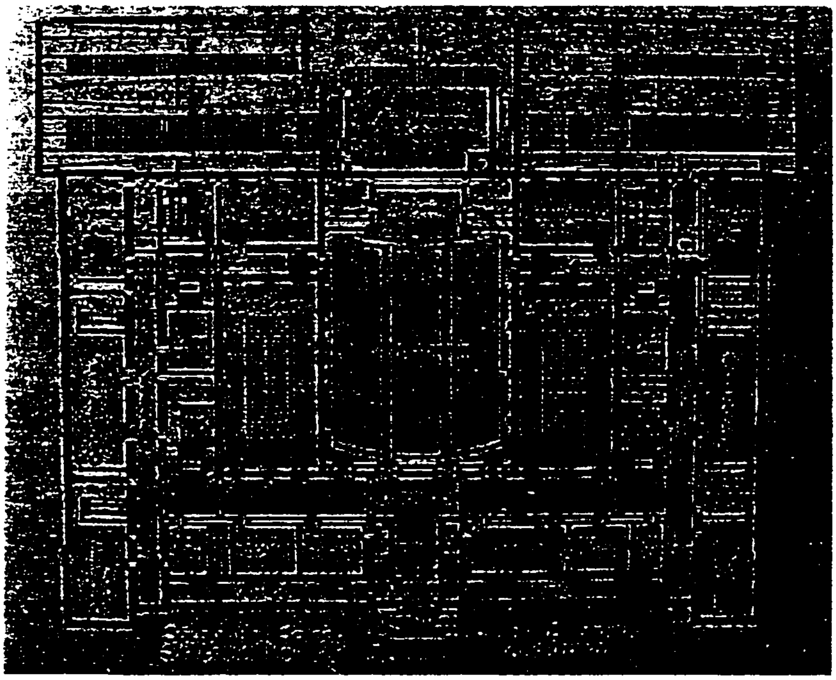
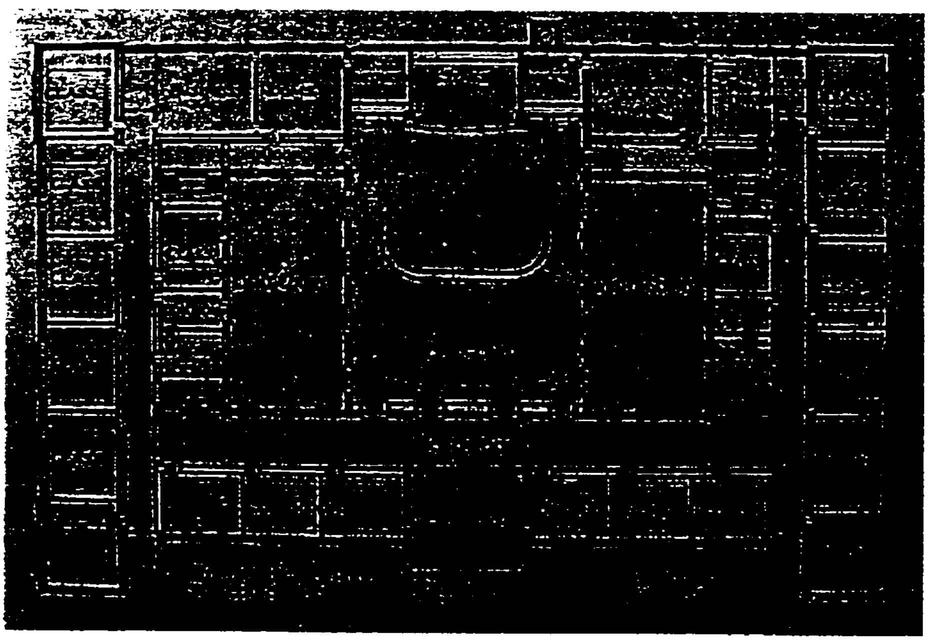


Fig. 1.30. Ittner, Soldan High School. First floor plan. [Mills, American School Building Standards, 546].



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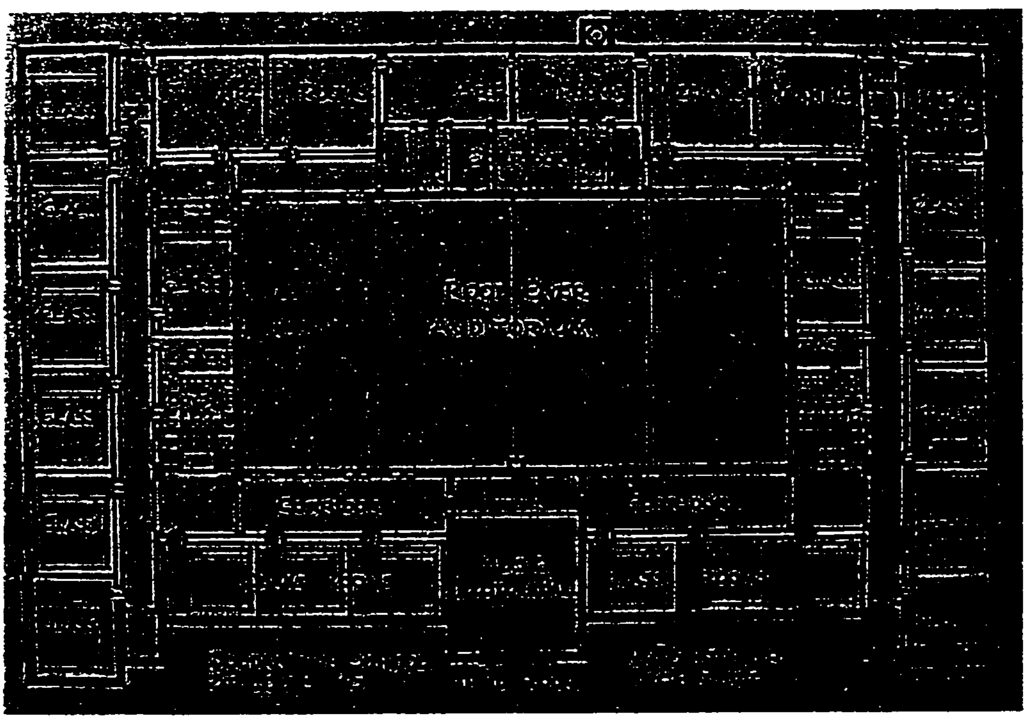


Fig. 1.32. Ittner, Soldan High School. Third floor plan. [Mills, American School Building Standards, 548].

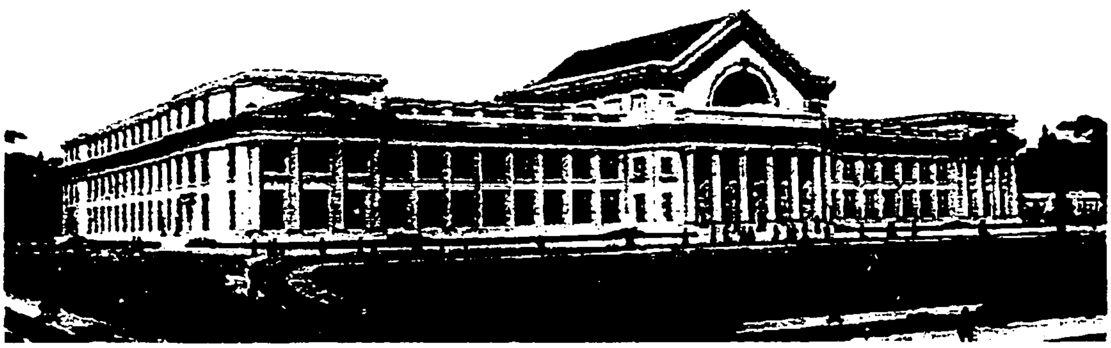
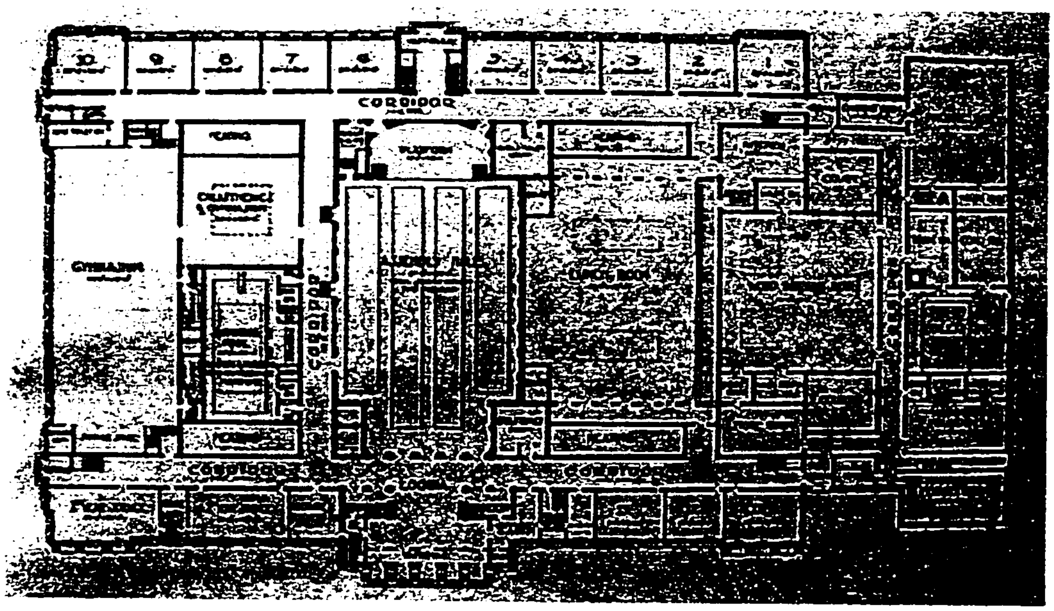


Fig. 1.33. Alfred H. Hussander, Nicholas Senn High School, Chicago, Illinois, 1912. [Fifty-Seventh Annual Report of the Board of Education of the City of Chicago (1910-1911) (Chicago: The Board of Education of the City of Chicago, 1912), n.p.].

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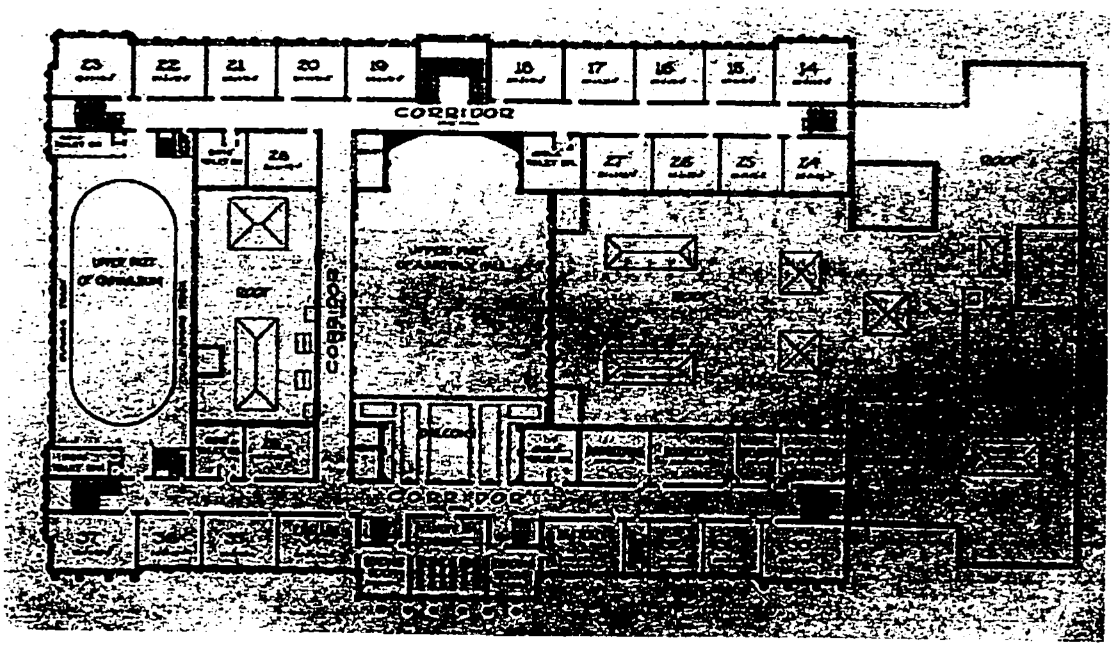


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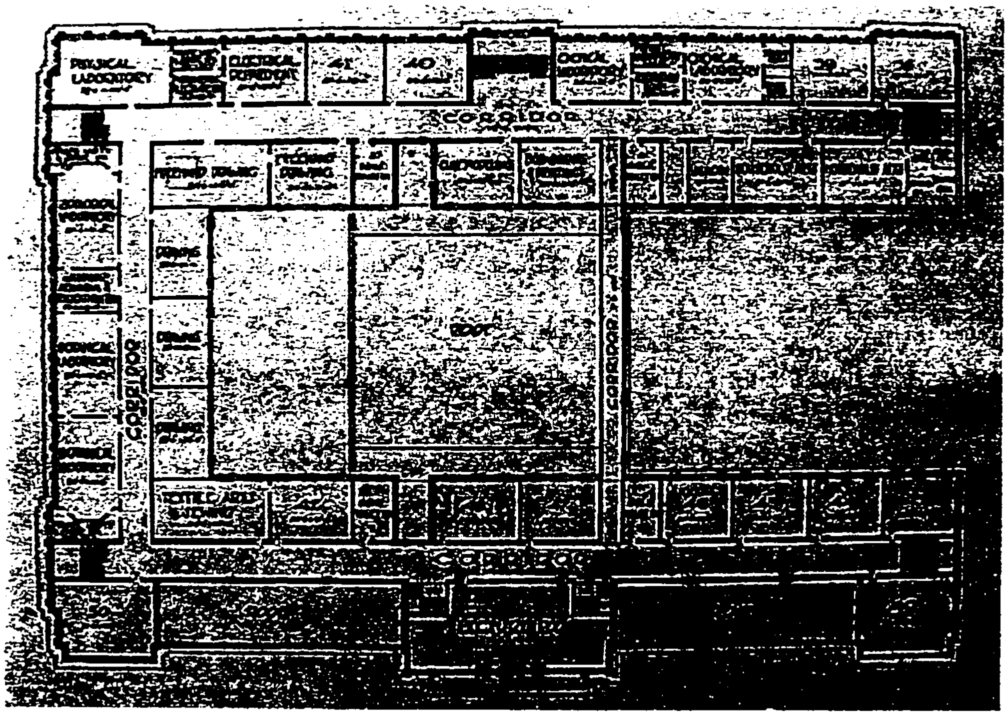


Fig. 1.36. Hussander, Senn High School. Third floor plan. [Fifty-Seventh Annual Report of the Board of Education of the City of Chicago, n.p.].

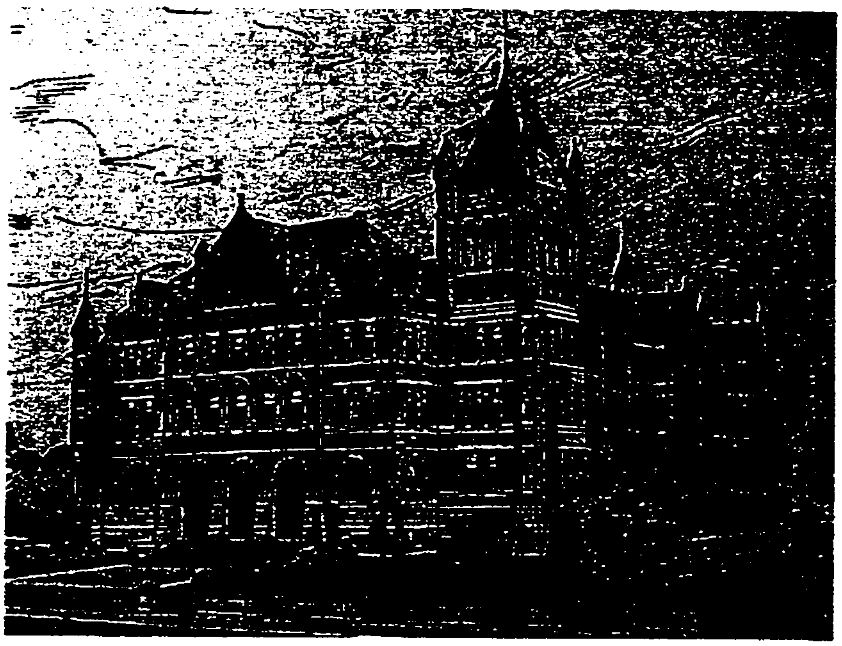


Fig. 2.1. H. William Kirchner and August Kirchner, St. Louis Central High School, 1891. Proposed perspective. [Building Budget 5 (June 1889): Plates following page 74].

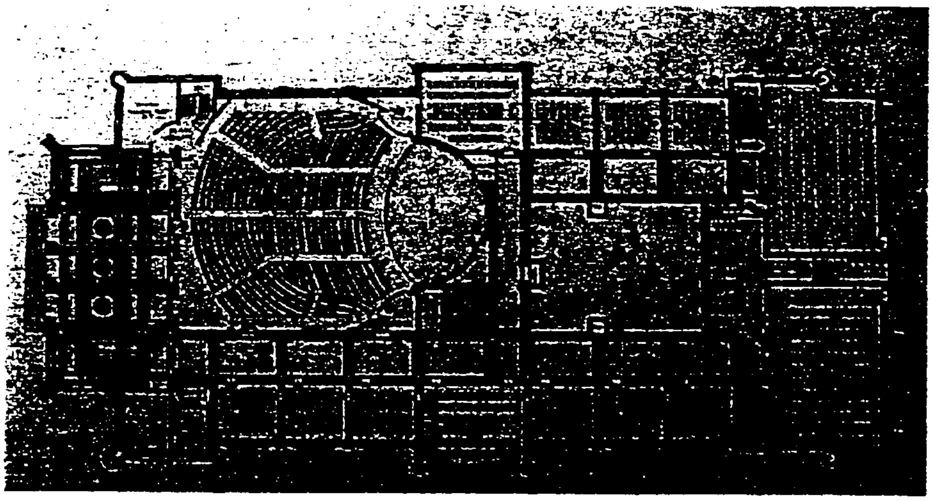


Fig. 2.2. Kirchner and Kirchner, St. Louis Central High School. Proposed plan. [Building Budget 5 (June 1889): Plates following page 74].

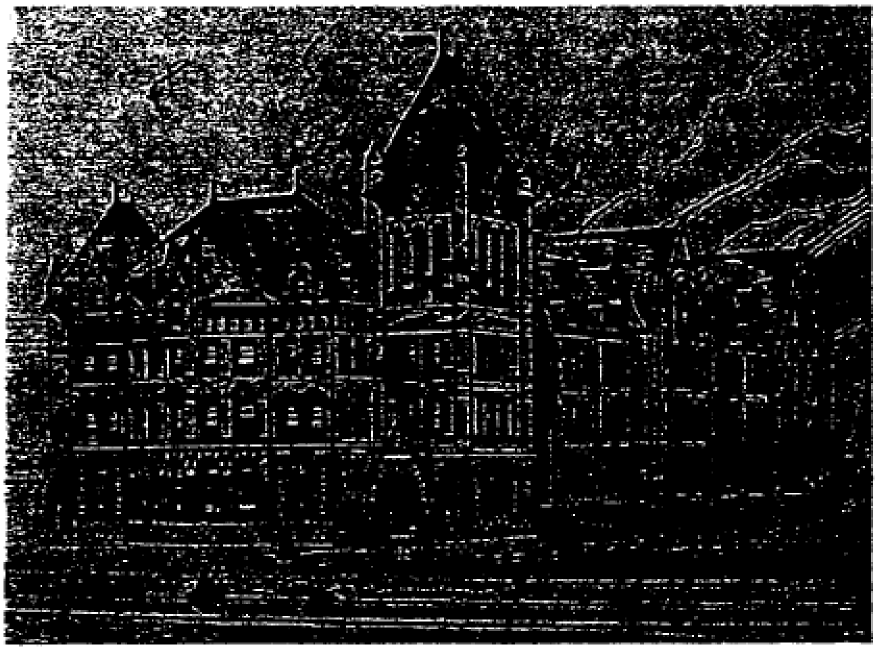


Fig. 2.3. Thomas J. Furlong and Charles W.H. Brown, St. Louis Central High School, St. Louis, Missouri, 1893. ["New Central High School." The American School Board Journal 5 (February 1893): 7.].

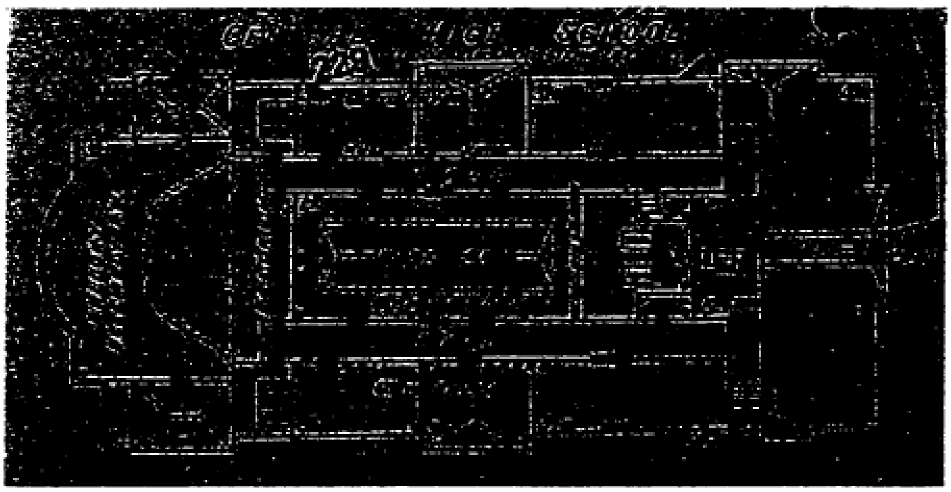


Fig. 2.4. Sanborn Map of St. Louis Central High School. [Sanborn Fire Insurance Company Map, St. Louis, Missouri, Vol. 2, Sheet 49 (1909)].

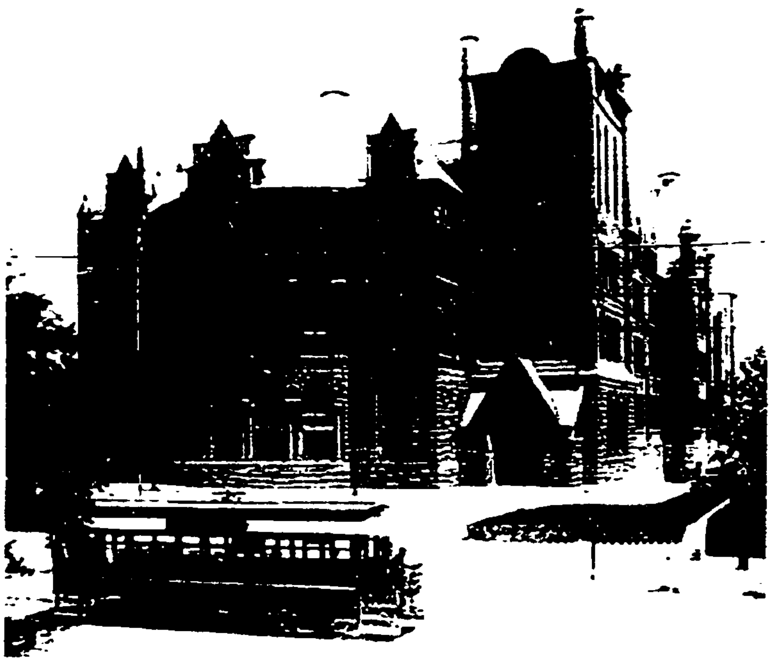


Fig. 2.5. Furlong and Brown, St. Louis Central High School. [SLPSRC/A].

Fig. 2.6. Furlong and Brown, St. Louis Central High School. Side elevation. [SLPSRC/A].

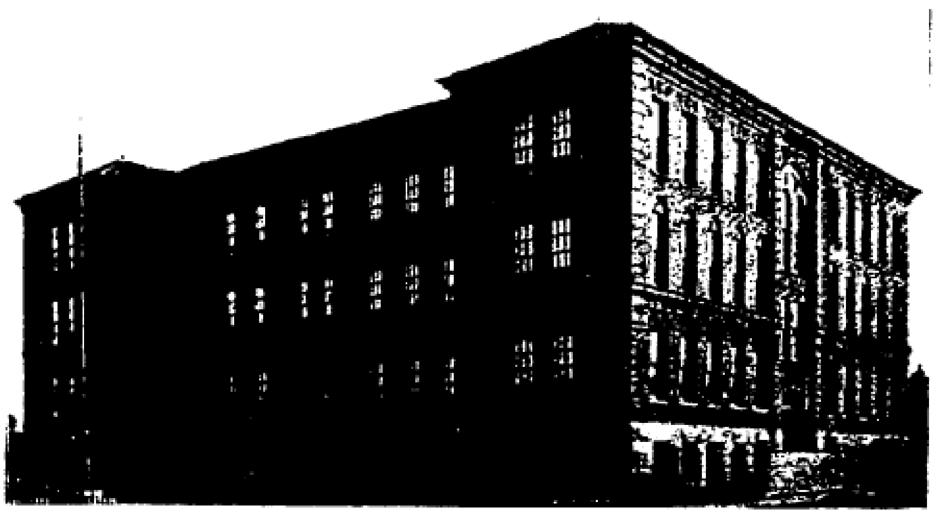


Fig. 2.7. William B. Ittner, William Greenleaf Eliot School, St. Louis, Missouri, 1899. [Wheelwright, School Architecture, 99].

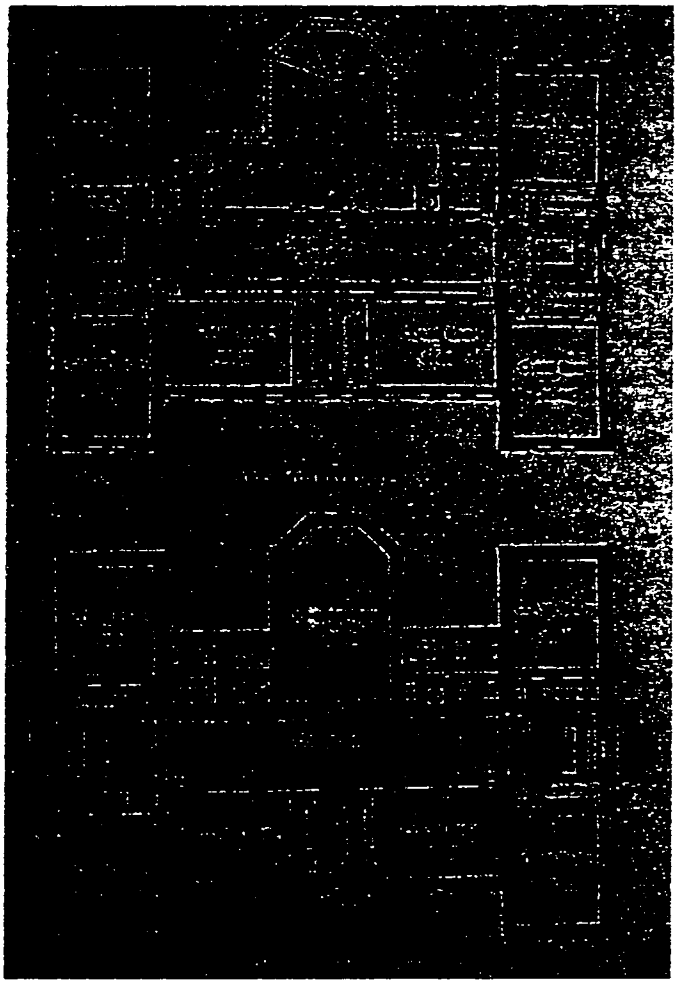


Fig. 2.8. Ittner, Eliot School. First and second floor plans. [Wheelwright, School Architecture, 98].

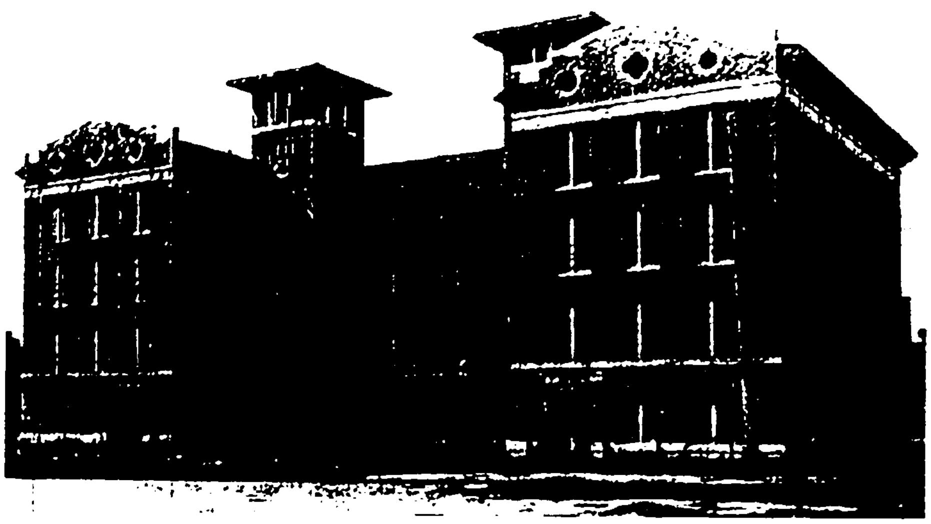
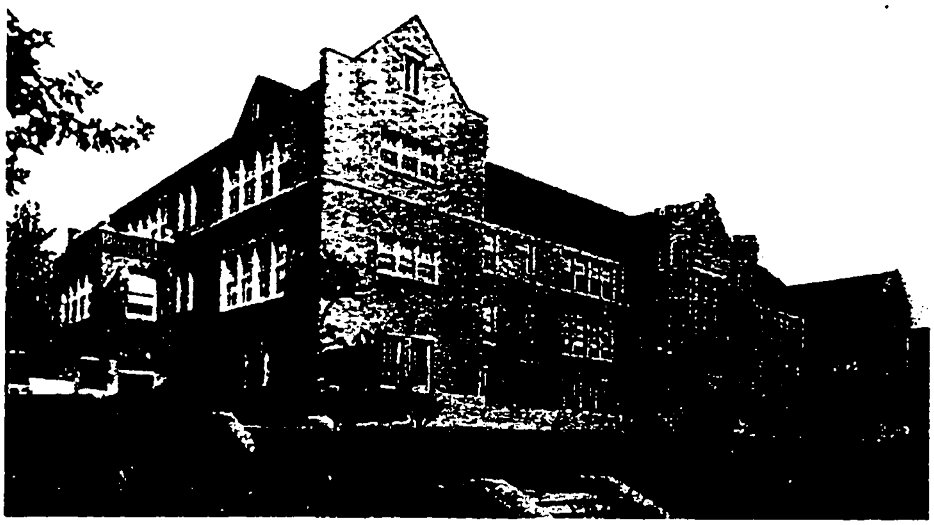


Fig. 2.9. William B. Ittner, Eugene Field School, St. Louis, Missouri, 1901. [S.L. Sherer, "Recent School Buildings in St. Louis. I. William B. Ittner, Architect," The Brickbuilder 13 (October 1903): 207].



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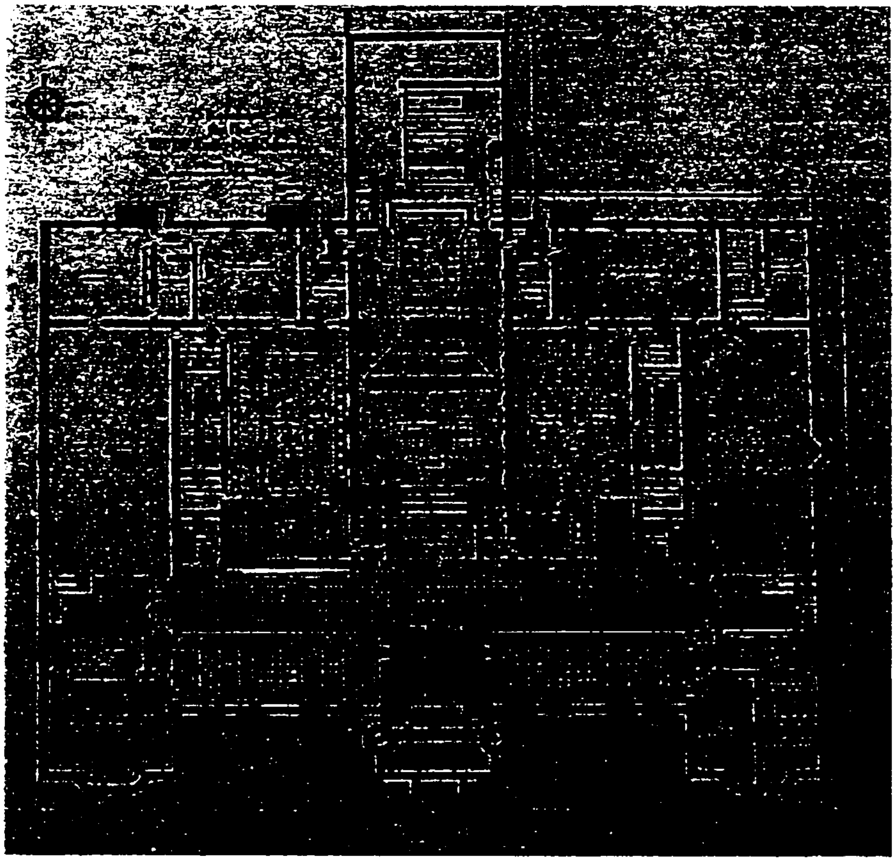

Fig. 2.13. Ittner, McKinley High School. Basement plan. [Forty-Eighth Annual Report of the Board of Education of the City of St. Louis, Missouri (St. Louis: Nixon-Jones Printing Co., 1903), n.p.].

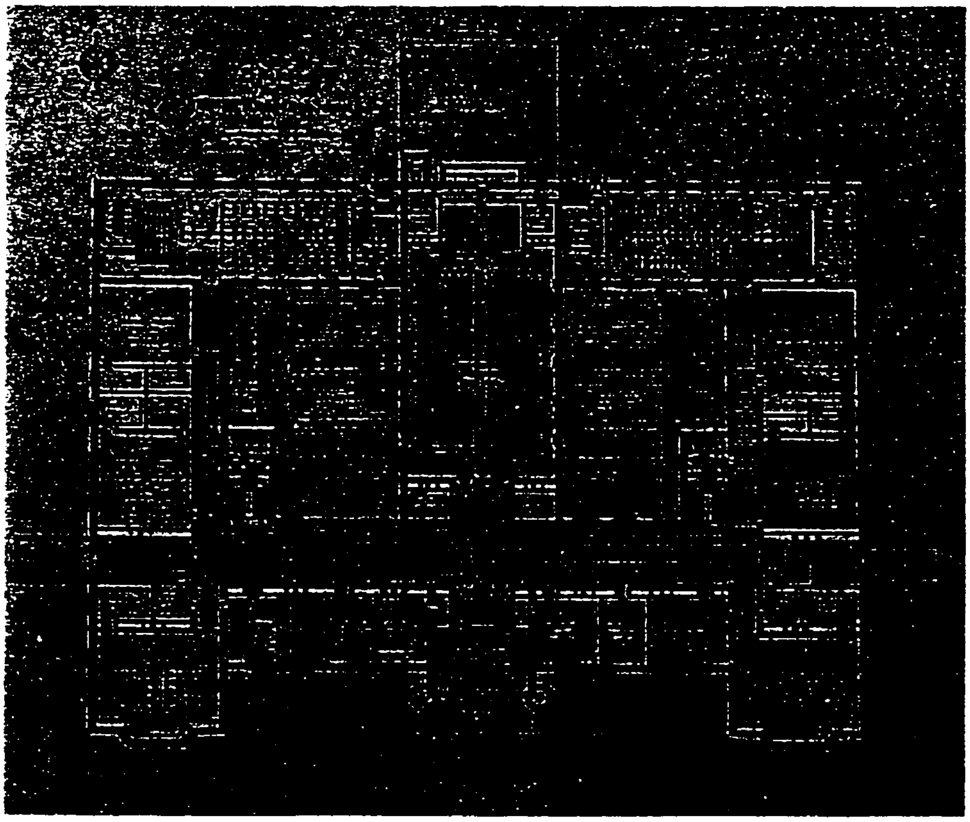

Fig. 2.14. Ittner, McKinley High School. First floor plan. [Forty-Eighth Annual Report of the Board of Education of the City of St. Louis, Missouri, n.p.].

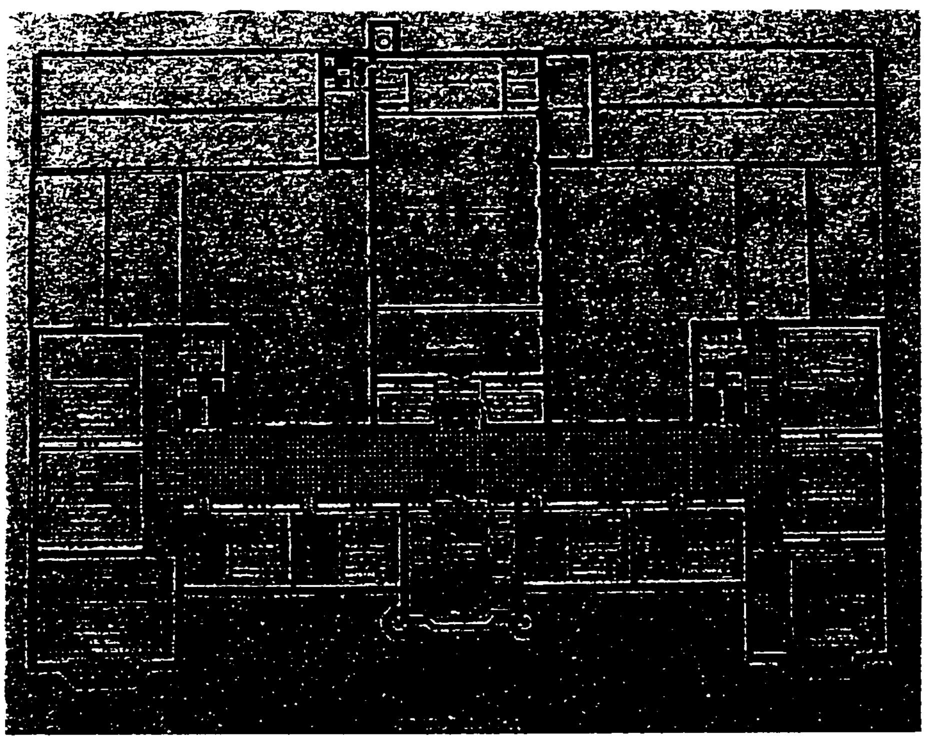

Fig. 2.15. Ittner, McKinley High School. Second floor plan. [Forty-Eighth Annual Report of the Board of Education of the City of St. Louis, Missouri, n.p.].

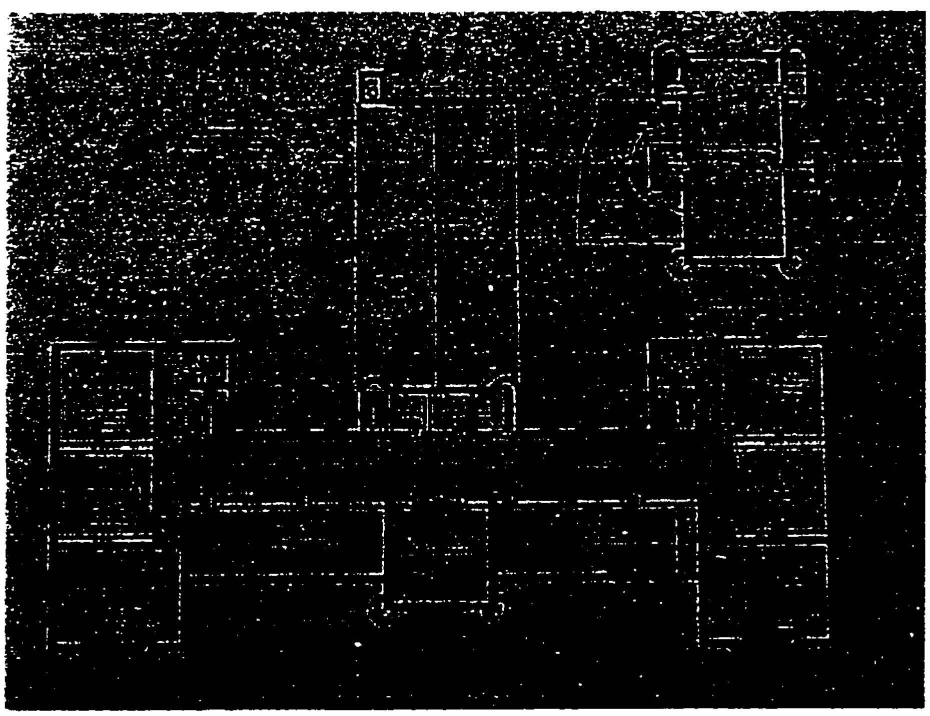

Fig. 2.16. Ittner, McKinley High School. Third floor plan. [Forty-Eighth Annual Report of the Board of Education of the City of St. Louis, Missouri, n.p.].

Fig. 2.17. William B. Ittner, James E. Yeatman High School, St. Louis, Missouri, 1904. [S.L. Sherer, "Recent School Buildings in St. Louis. II. William B. Ittner, Architect," The Brickbuilder 13 (November 1903): 229].

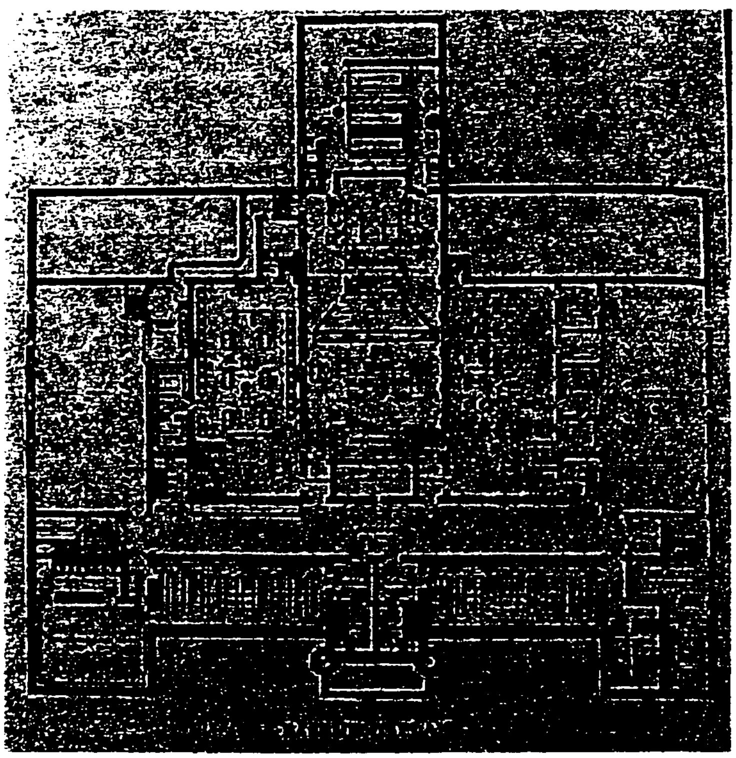

Fig. 2.18. Ittner, Yeatman High School. Basement plan. [The American School Board Journal 28 (May 1904): 12].

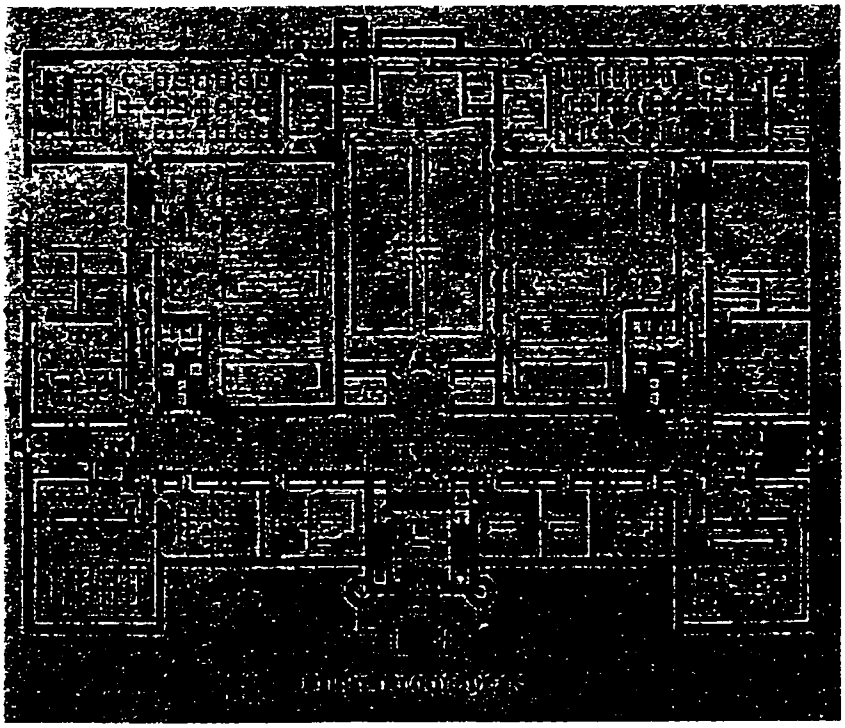

Fig. 2.19. Ittner, Yeatman High School. First floor plan. [The American School Board Journal 28 (May 1904): 12].

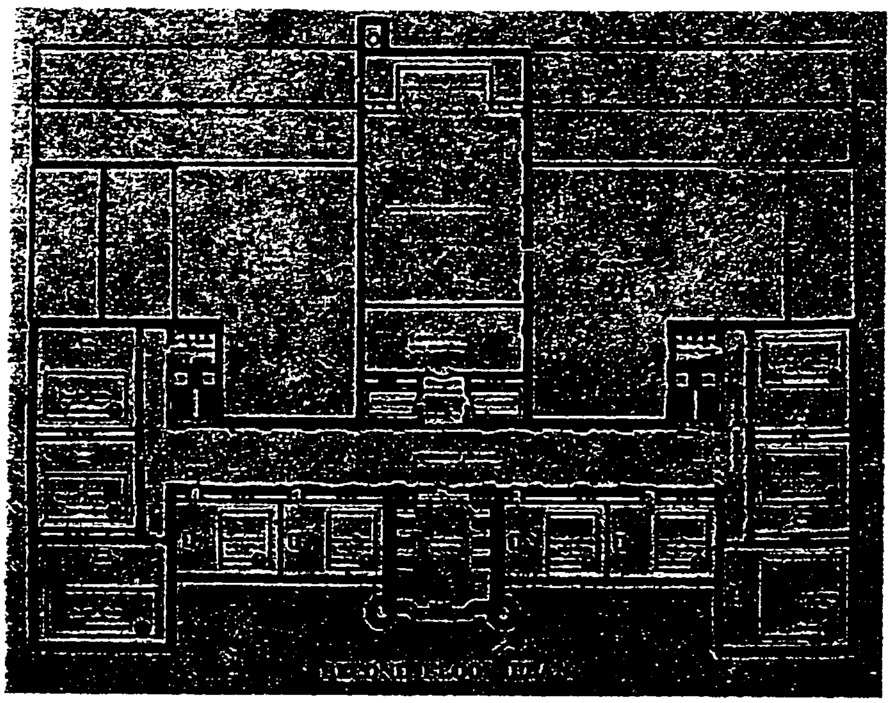

Fig. 2.20. Ittner, Yeatman High School. Second floor plan. [The American School Board Journal 28 (May 1904): 12].

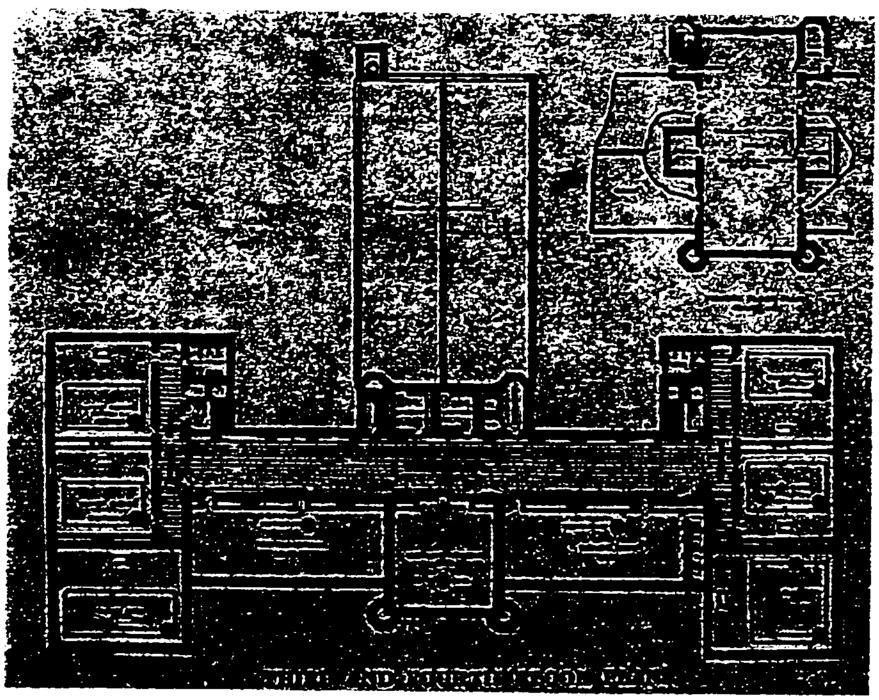

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Fig. 2.22. William B. Ittner, Charles Sumner High School, St. Louis, Missouri, 1910. [SLPSRC/A].

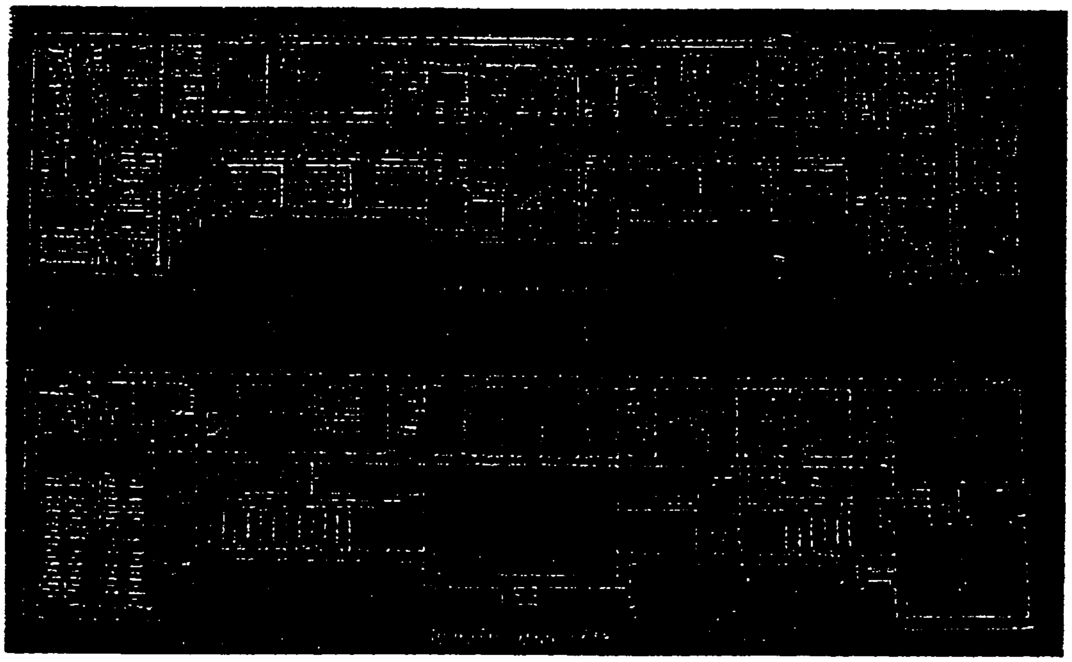


Fig. 2.23. Ittner, Sumner High School. Ground and first floor plans. [William B. Ittner, "School Buildings of St. Louis, Missouri," The American Architect and Building News 106 (September 30, 1914): 196].

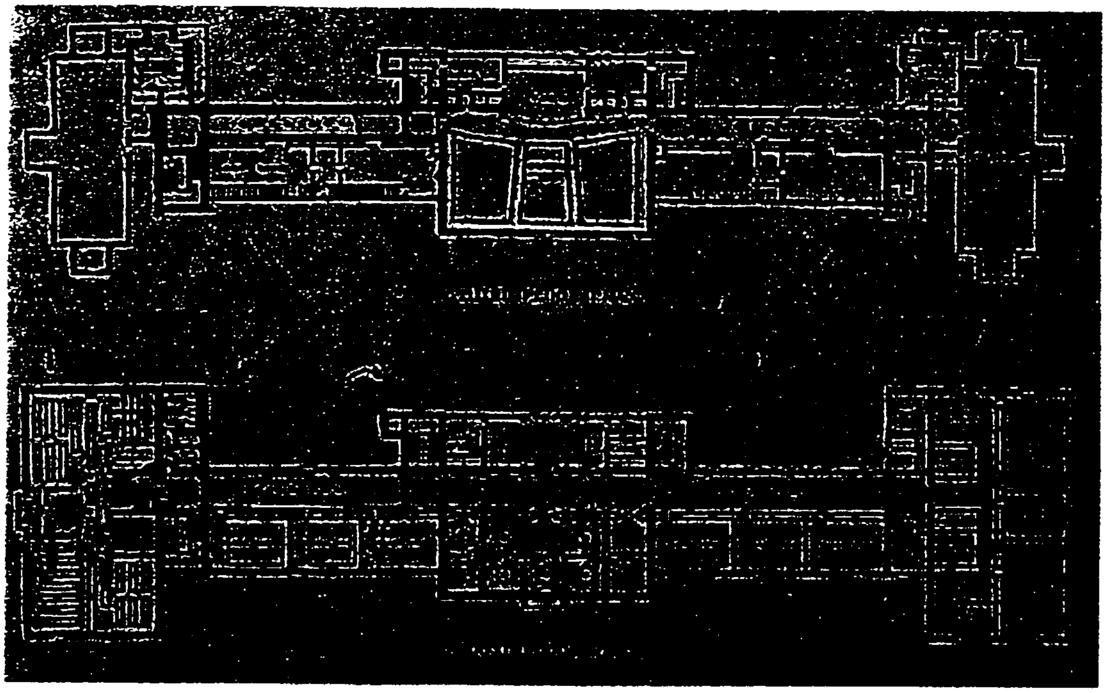


Fig. 2.24. Ittner, Sumner High School. Second and third floor plans. [Ittner, "School Buildings of St. Louis, Missouri," 196].

Fig. 2.25. William B. Ittner, Grover Cleveland High School, St. Louis, Missouri. [John J. Donovan, et. al., School Architecture: Principles and Practices (New York: The Macmillan Company, 1921), 141].

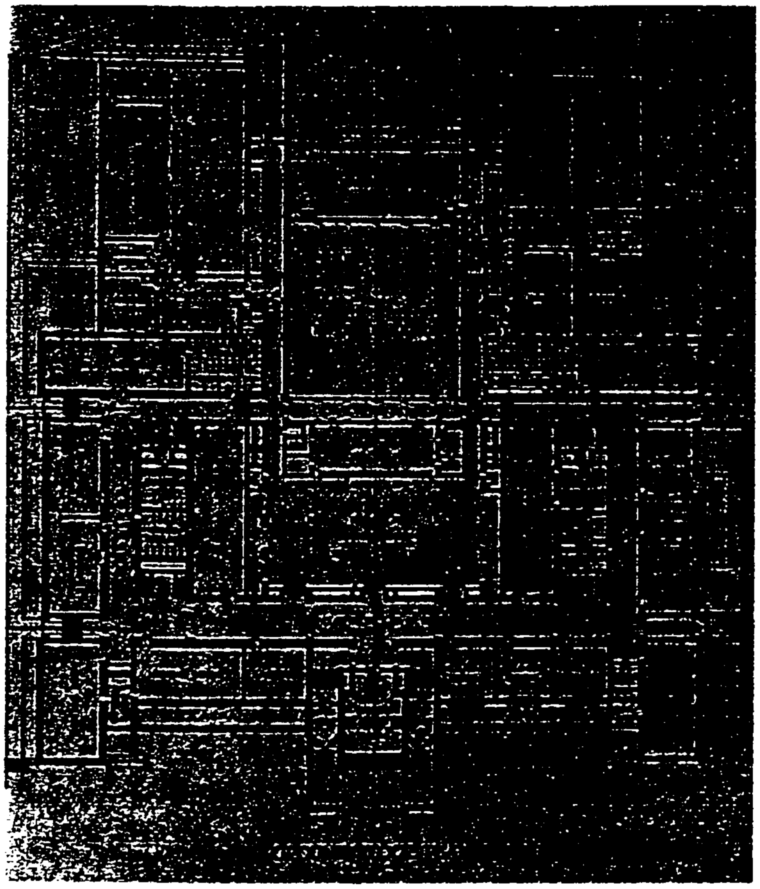


Fig. 2.26. Ittner, Cleveland High School. Ground floor plan. [Sixty-First Annual Report of the Board of Education of the City of St. Louis, Missouri (1914-15) (St. Louis: Board of Education of the City of St. Louis, 1916), n.p.].

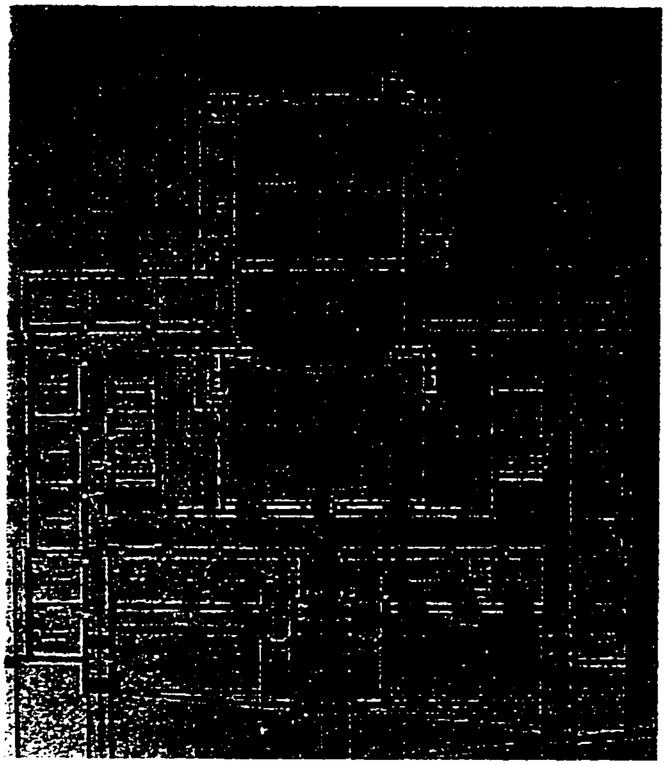


Fig. 2.27. Ittner, Cleveland High School. First floor plan. [Sixty-First Annual Report of the Board of Education of the City of St. Louis, Missouri, n.p.].

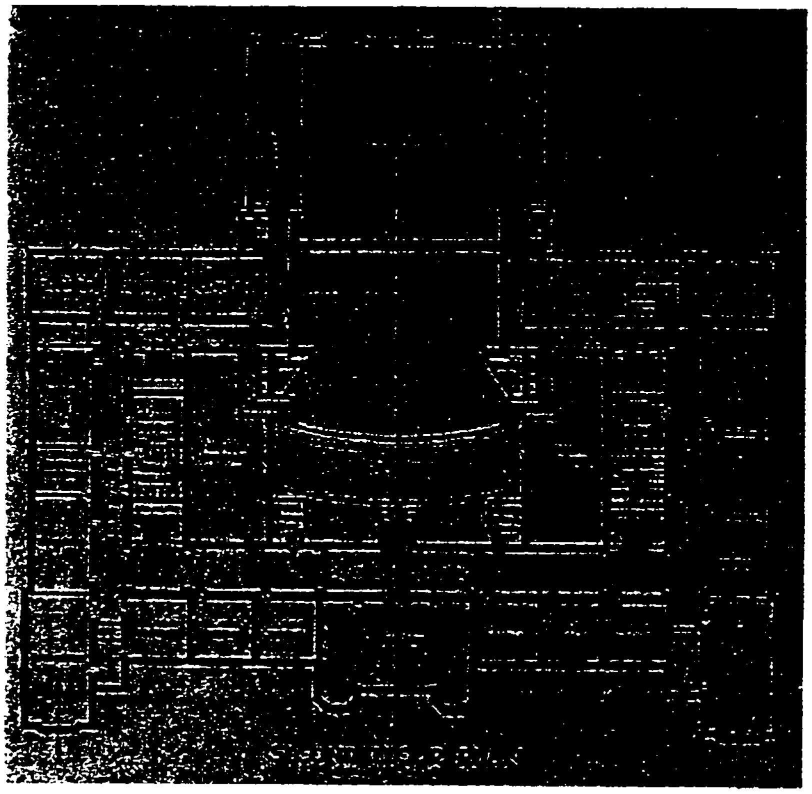


Fig. 2.28. Ittner, Cleveland High School. Second floor plan. [Sixty-First Annual Report of the Board of Education of the City of St. Louis, Missouri, n.p.].

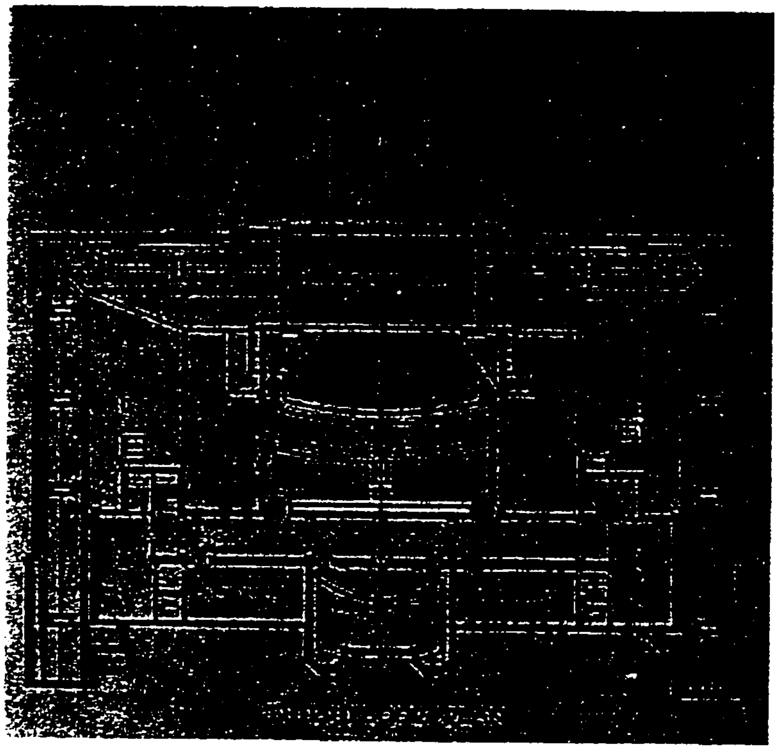


Fig. 2.29. Ittner, Cleveland High School. Third floor plan. [Sixty-First Annual Report of the Board of Education of the City of St. Louis, Missouri, n.p.].

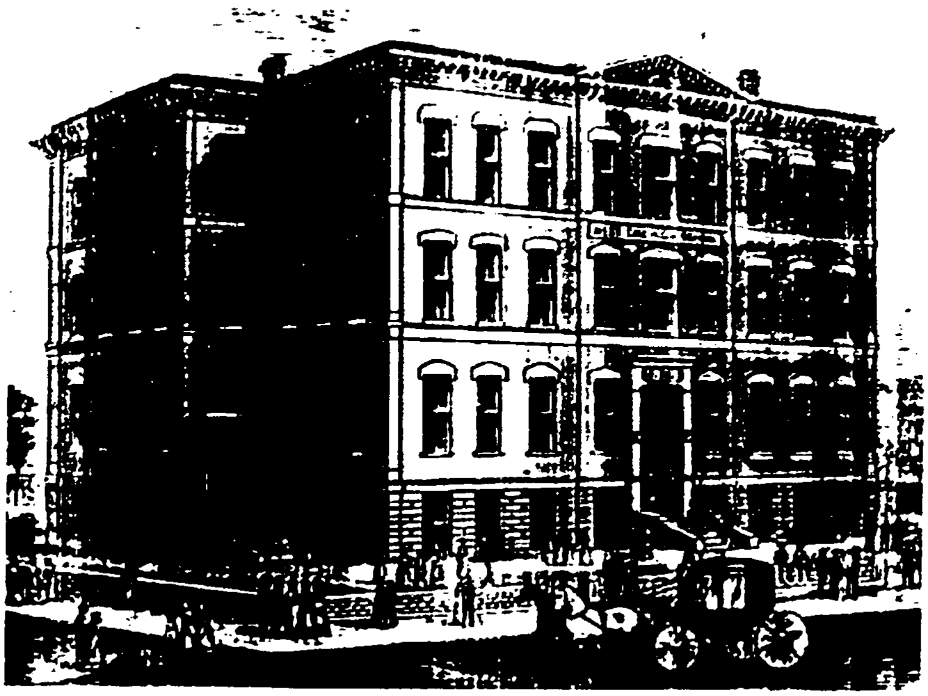


Fig. 2.30. Augustus Bauer?, West Division High School, Chicago, Illinois, 1880. [Twenty-Ninth Annual Report of the Board of Education of the City of Chicago (1882-83) (Chicago: Jameson & Morse, Printers, 1884), 86].

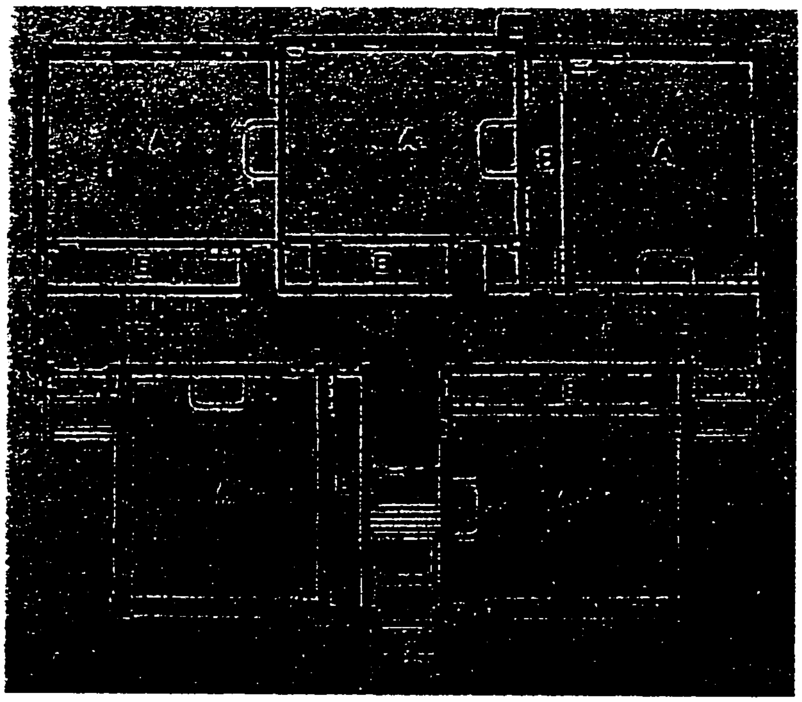


Fig. 2.31. Bauer?, West Division High School. First floor plan. [Twenty-Ninth Annual Report of the Board of Education of the City of Chicago, 88].

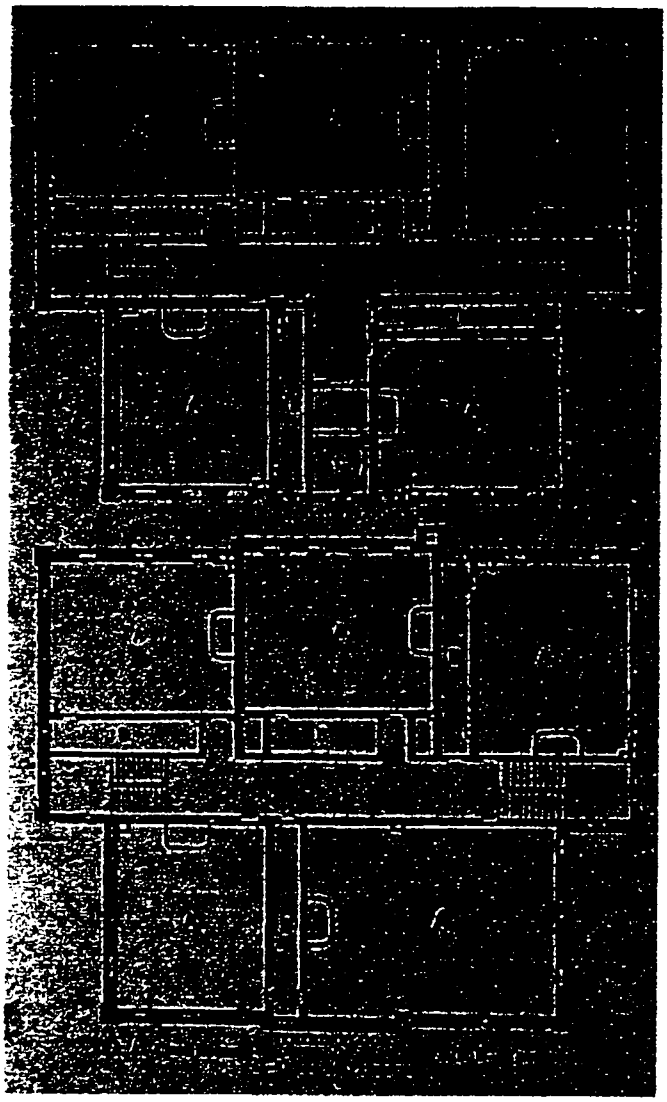


Fig. 2.32. Augustus Bauer?, West Division High School. Second and third floor plans. [Twenty-Ninth Annual Report of the Board of Education of the City of Chicago, 89].

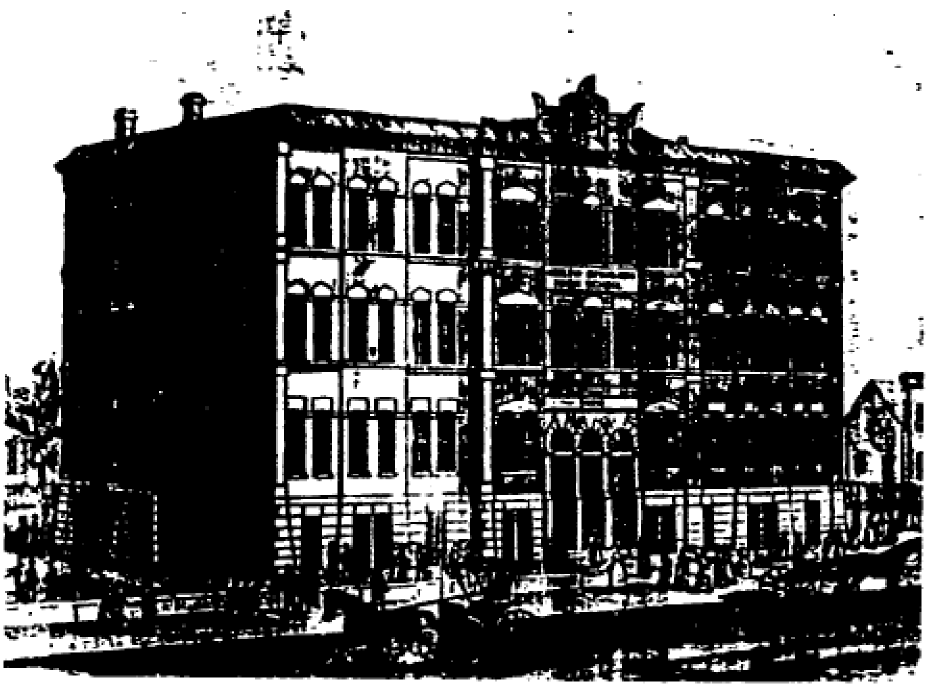


Fig. 2.33 Julius Ender, North Division High School, Chicago, Illinois, 1883. [Twenty-Ninth Annual Report of the Board of Education of the City of Chicago, 70].

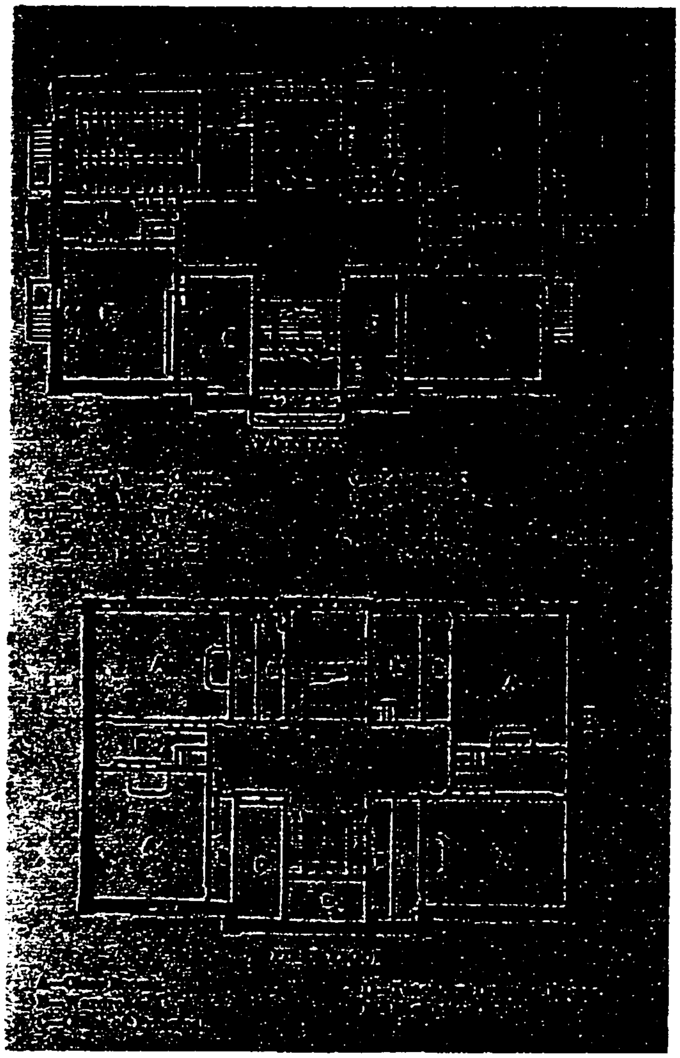
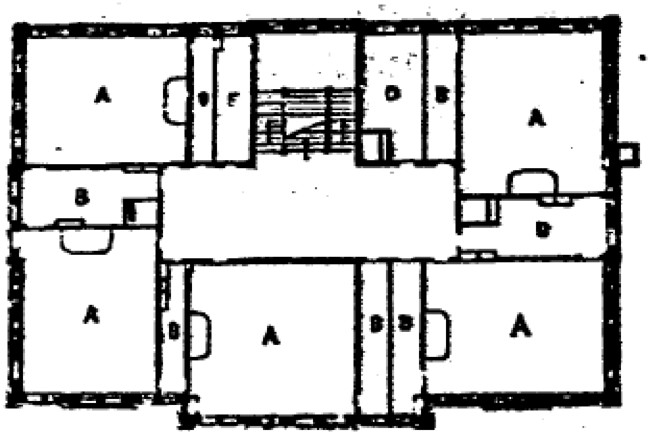
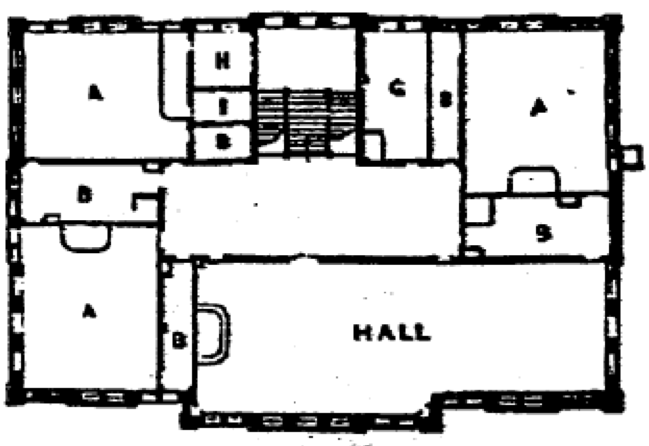


Fig. 2.34. Ender, North Division High School. Basement and first floor plans. [Twenty-Ninth Annual Report of the Board of Education of the City of Chicago, 73].




SECOND FLOOR.




THIRD FLOOR.

Fig. 2.35. Ender, North Division High School. Second and third floor plans. [Twenty-Ninth Annual Report of the Board of Education of the City of Chicago, 74].

Fig. 2.36. James R. Willett, South Division High School, Chicago, Illinois, 1884. [Twenty-Ninth Annual Report of the Board of Education of the City of Chicago, 2].

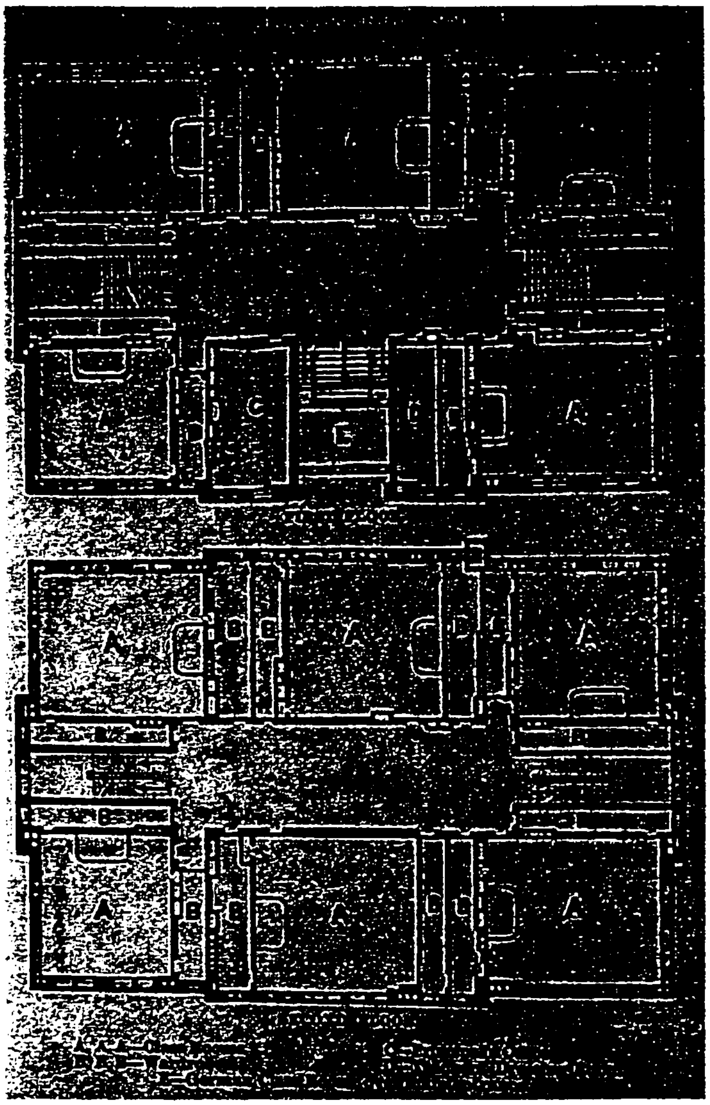


Fig. 2.37. Willett, South Division High School. First and second floor plans. [Twenty-Ninth Annual Report of the Board of Education of the City of Chicago, 77].

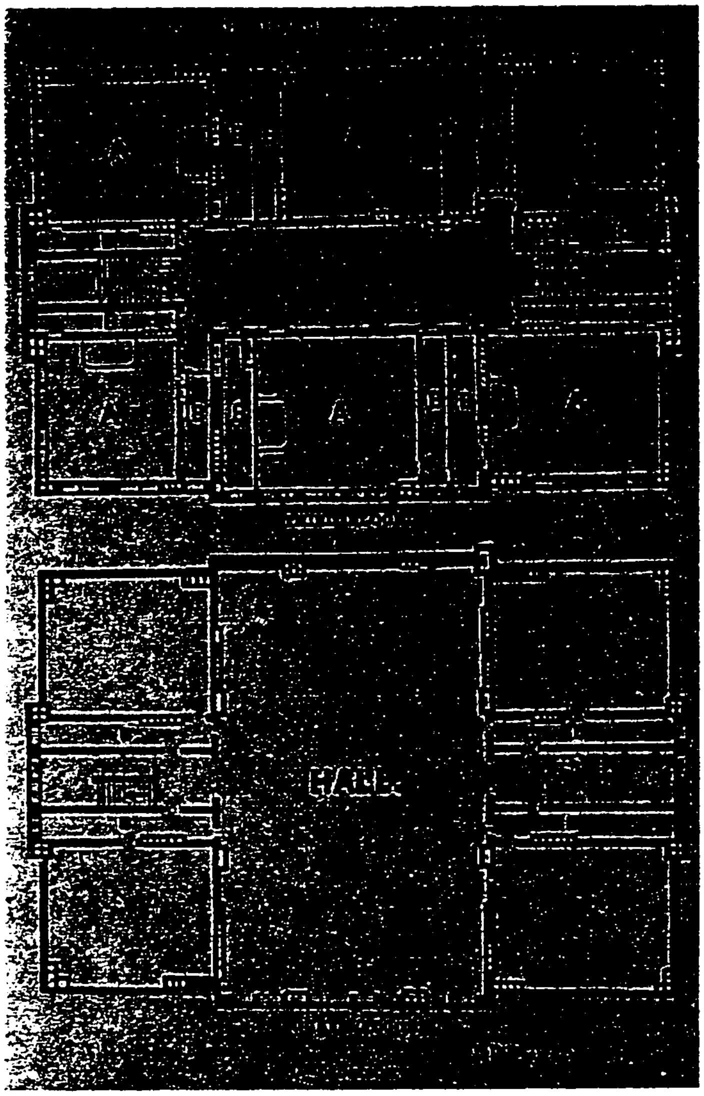



Fig. 2.38. Willett, South Division High School. Third and fourth floor plans. [Twenty-Ninth Annual Report of the Board of Education of the City of Chicago, 78].

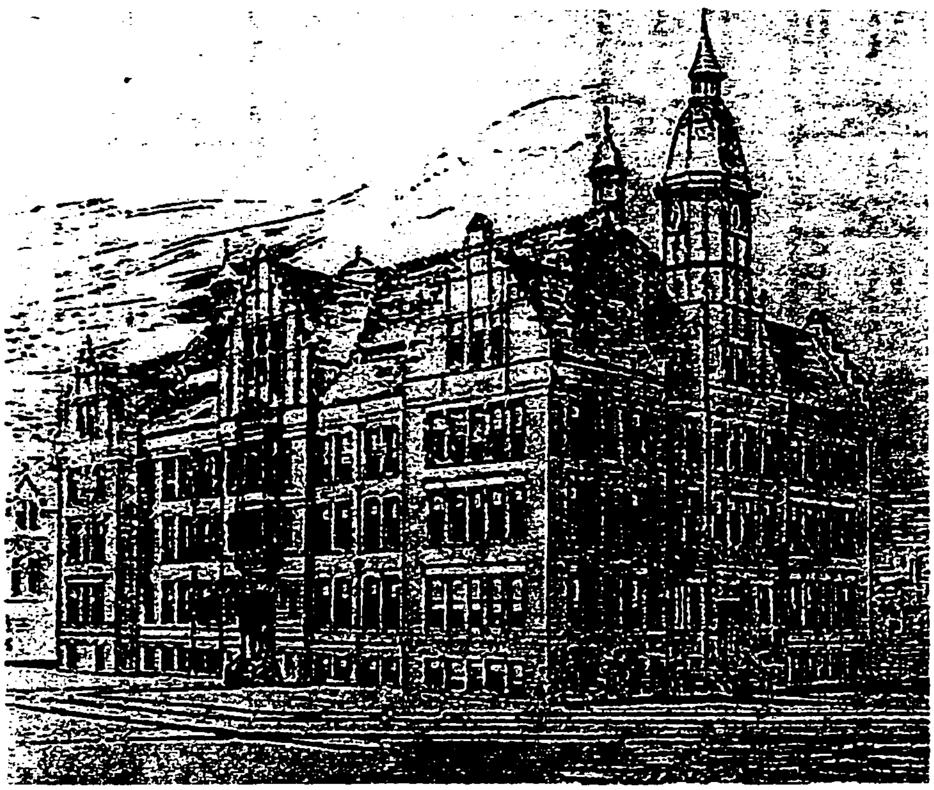


Fig. 2.39. John J. Flanders, West Division High School, Chicago, Illinois, 1886. [Thirty-Second Annual Report of the Board of Education of the City of Chicago (1885-86) (Chicago: George K. Hazlitt & Co., 1887), n.p.].

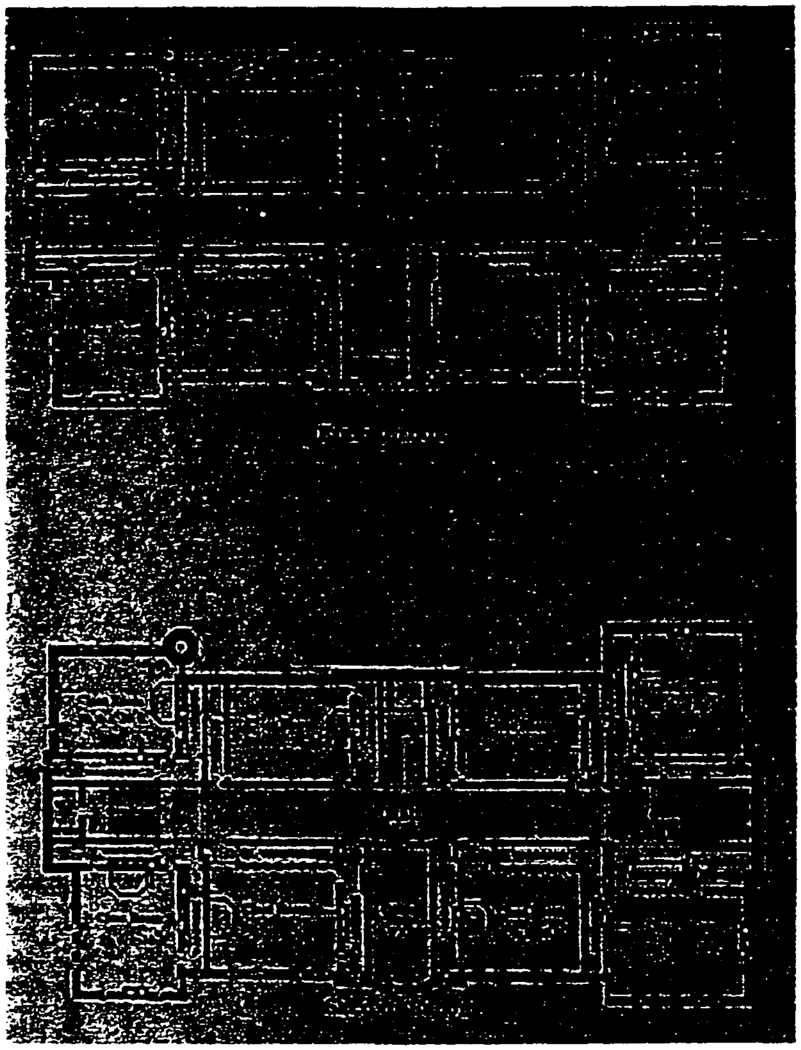


Fig. 2.40. Flanders, West Division High School. First and second floor plans. [Thirty-Second Annual Report of the Board of Education of the City of Chicago, n.p.].

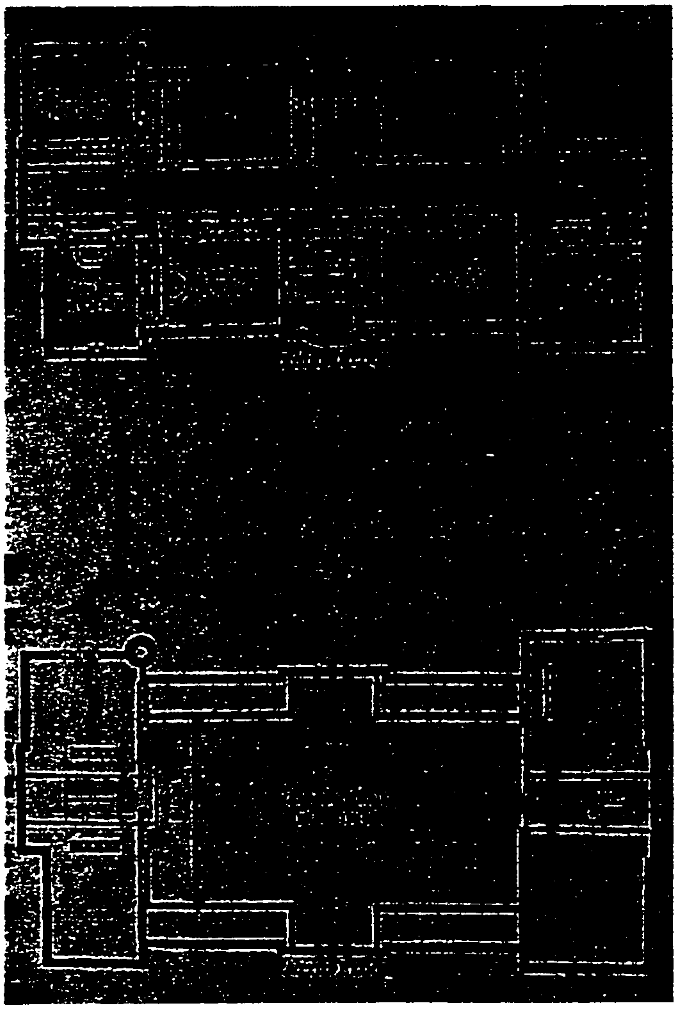


Fig. 2.41. Flanders, West Division High School. Third floor and attic plans. [Thirty-Second Annual Report of the Board of Education of the City of Chicago, n.p.].

Fig. 2.42. Charles Rudolph, North-West Division High School, Chicago, Illinois, 1889. [Thirty-Eighth Annual Report of the Board of Education of the City of Chicago (1891-92) (Chicago: Public Schools of the City of Chicago, 1893), 80].

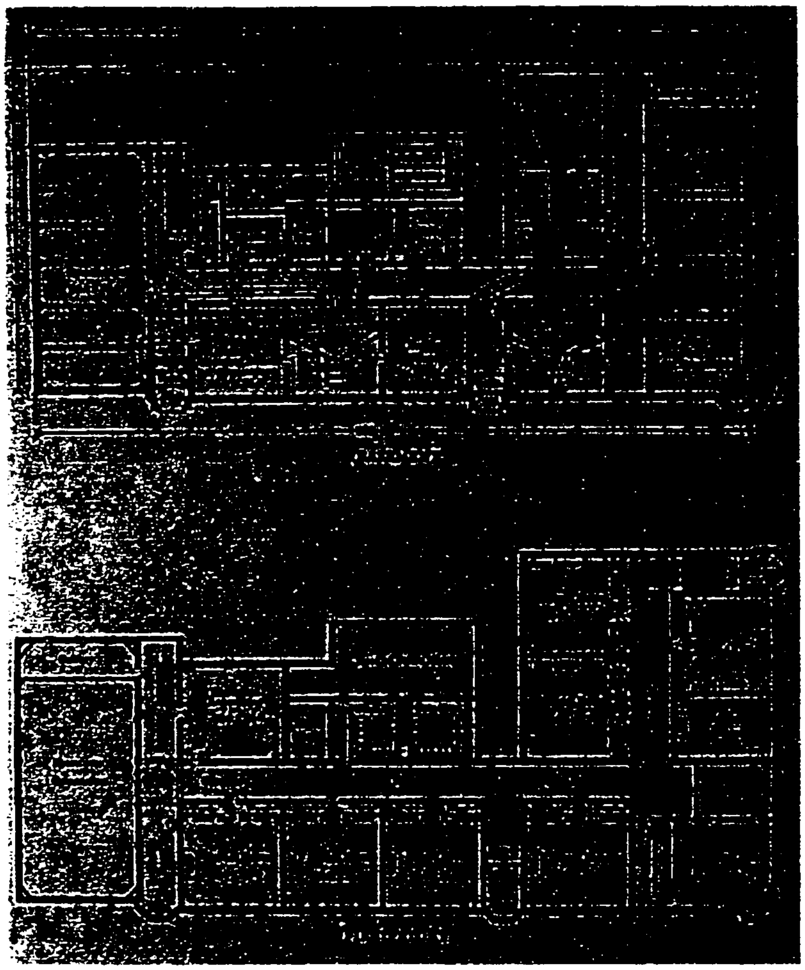


Fig. 2.43. Rudolph, North-West Division High School. Basement and first floor plans. [Thirty-Eighth Annual Report of the Board of Education of the City of Chicago, 134].

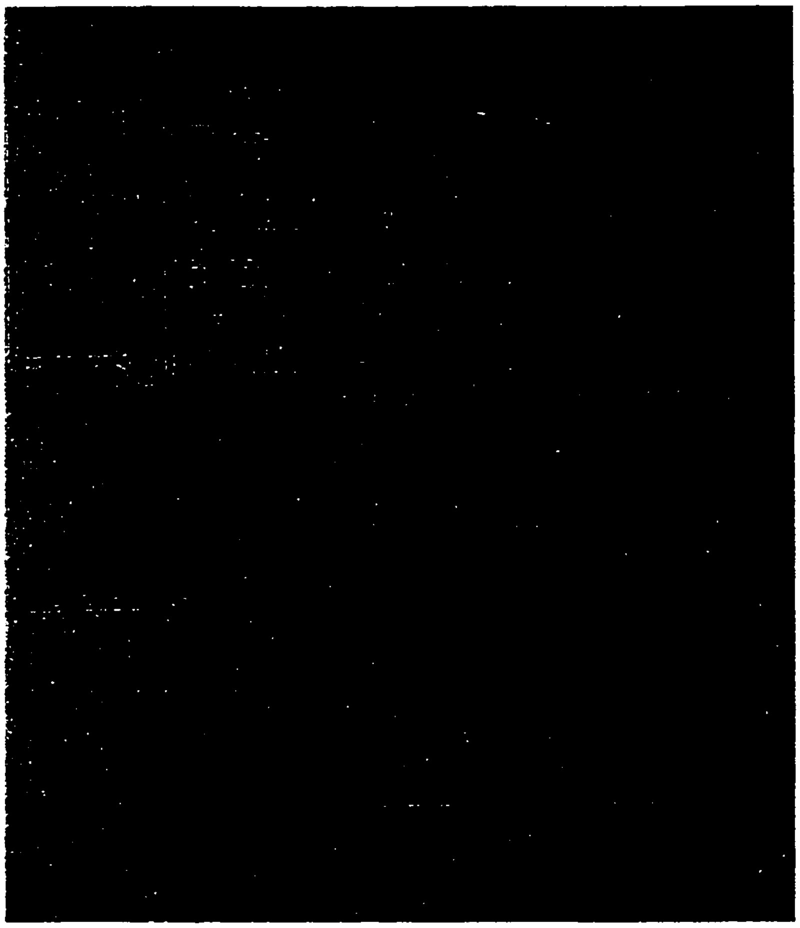


Fig. 2.44. Rudolph, North-West Division High School. Second and third floor plans. [Thirty-Eighth Annual Report of the Board of Education of the City of Chicago, 135].

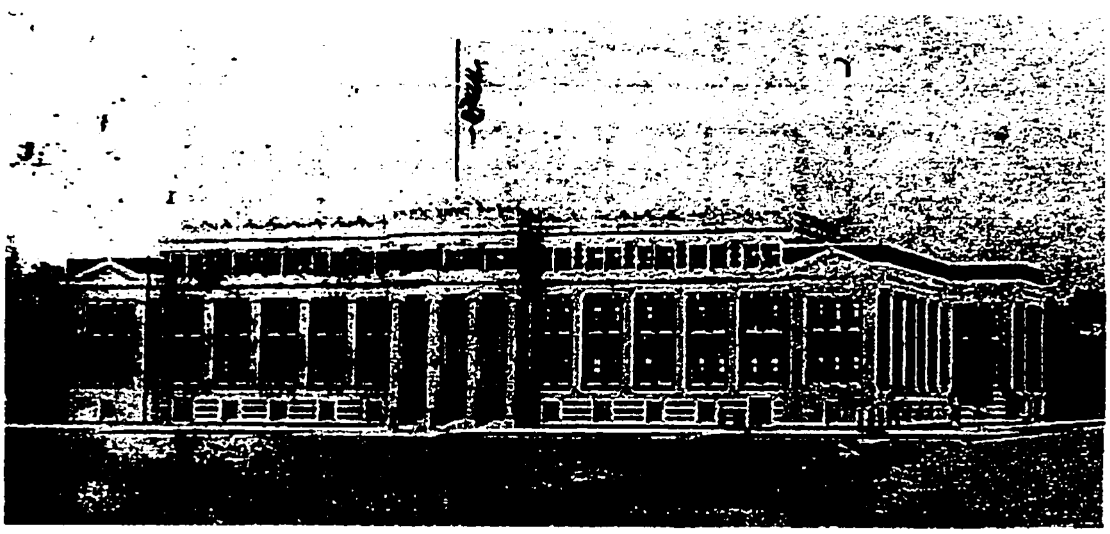


Fig. 2.45. William B. Mundie, Edward Waller High School, Chicago, Illinois, 1898. [Forty-Fifth Annual Report of the Board of Education of the City of Chicago (1898-99) (Chicago: Public Schools of the City of Chicago, 1900), n.p.].

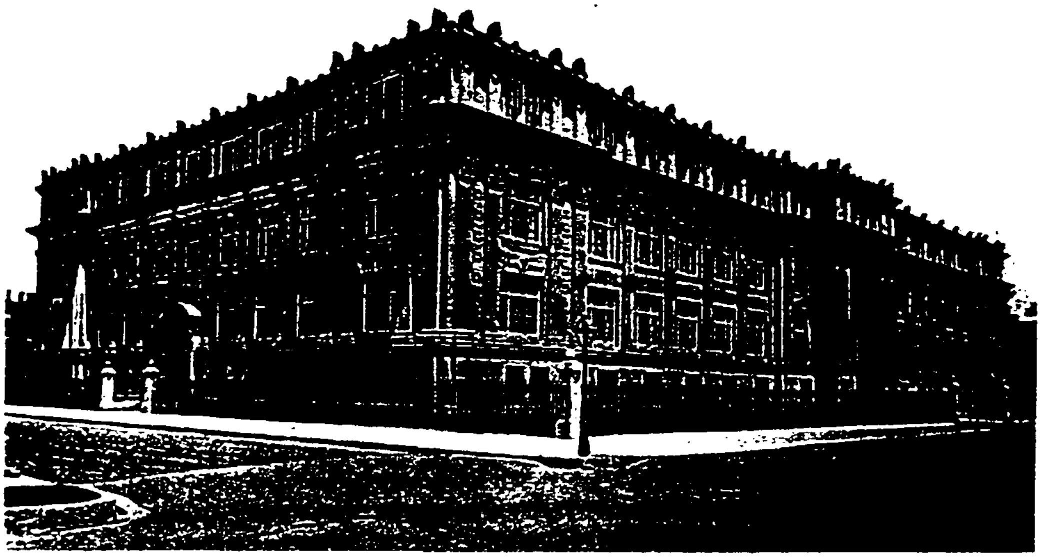


Fig. 2.46. William B. Mundie, William McKinley High School, Chicago, Illinois, 1900.
[The Western Architect 4 (July 1905): n.p.].

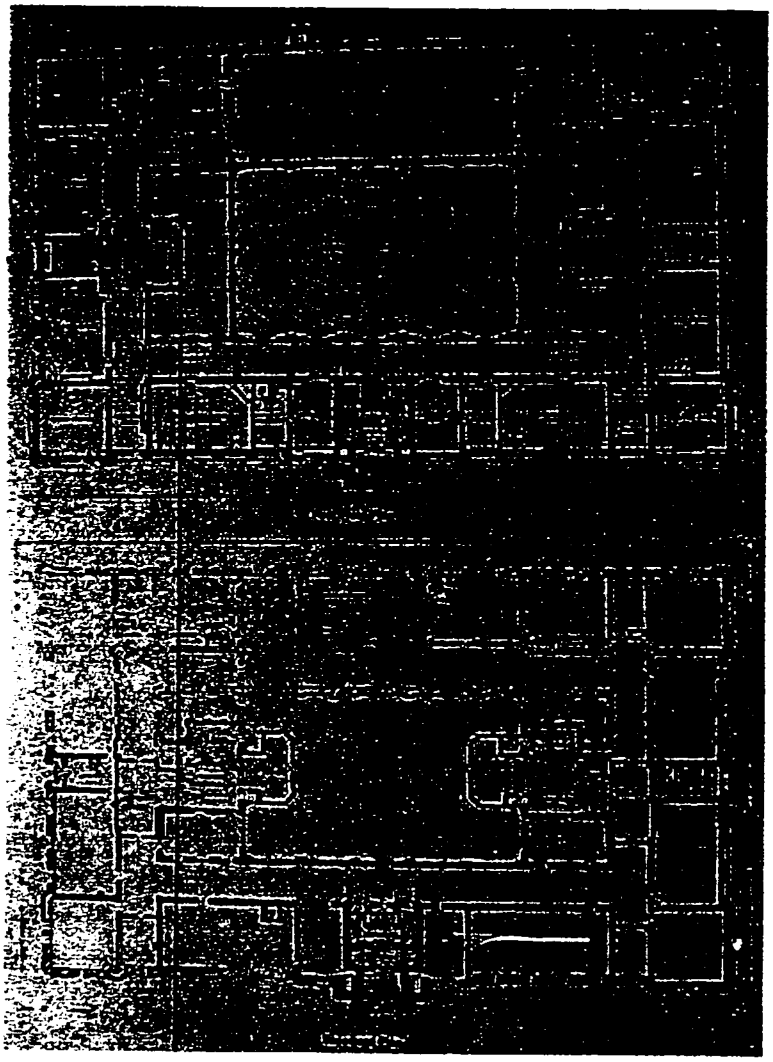


Fig. 2.47. Mundie, McKinley High School. Basement and first floor plans. [The Western Architect 4 (July 1905): n.p.].

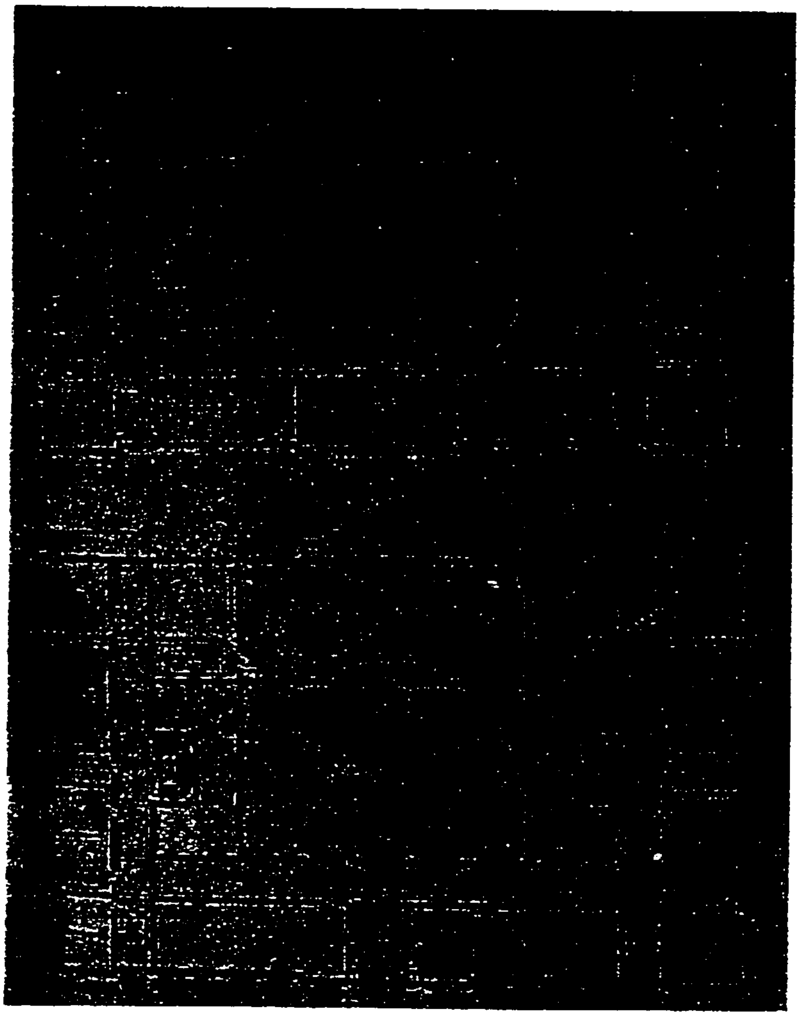


Fig. 2.48. Mundie, McKinley High School. Second and third floor plans. [The Western Architect 4 (July 1905): n.p.].

Fig. 2.49. William B. Mundie, Wendell Phillips High School, Chicago, Illinois, 1902. [The Inland Architect and Building Record 45 (June 1905): n.p.].

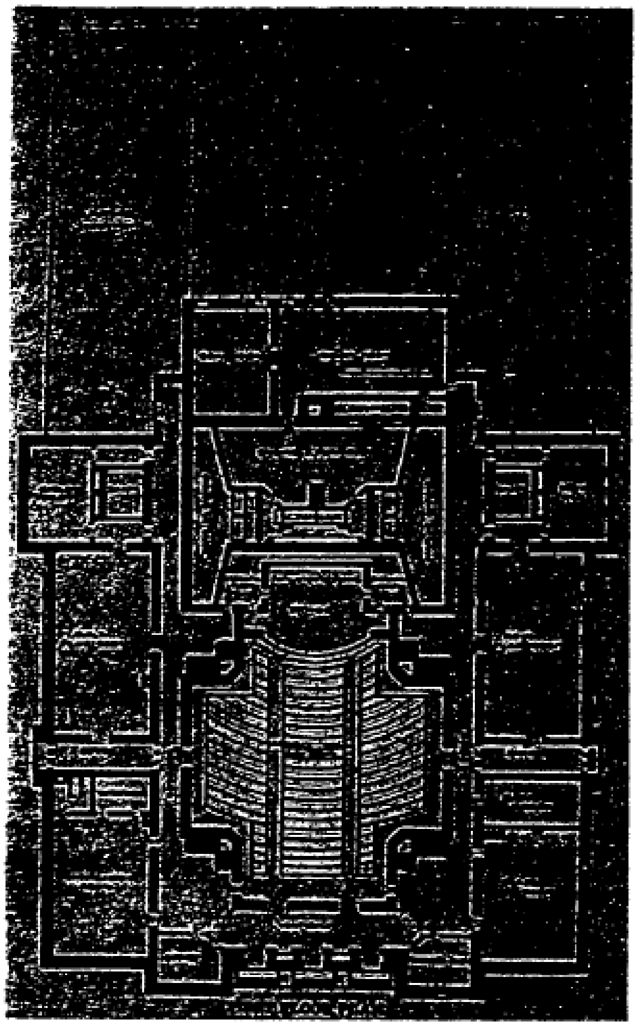


Fig. 2.50. Dwight H. Perkins, George W. Tilton School, Chicago, Illinois, 1906-08. First floor plan. [The American School Board Journal 36 (April 1908): 12].

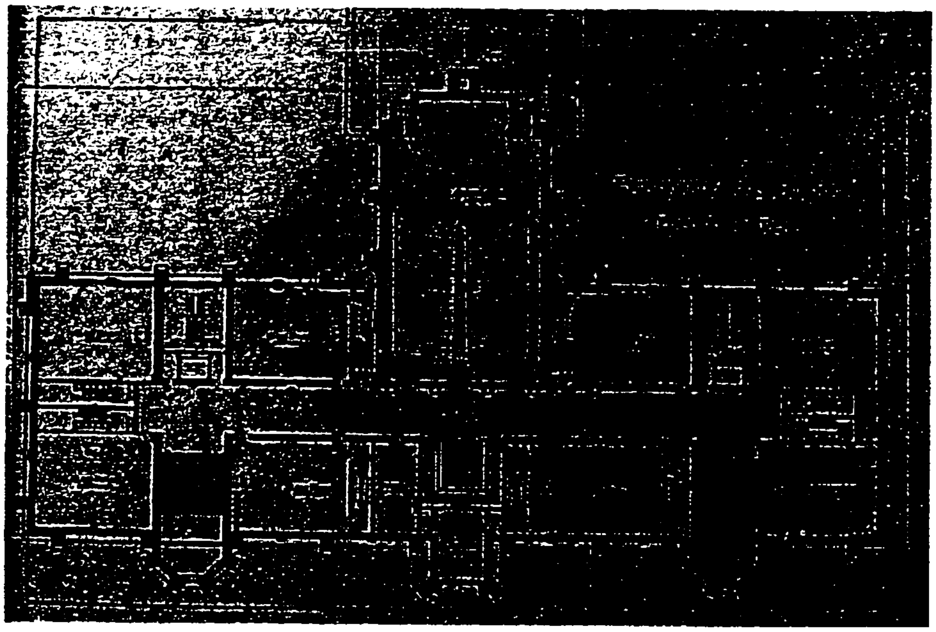


Fig. 2.51. Dwight H. Perkins. Bernhard Moos School, Chicago, Illinois, 1907. First floor plan. [Peter B. Wight, "Public School Architecture at Chicago: The Work of Dwight H. Perkins," Architectural Record 27 (January-June 1910): 499].

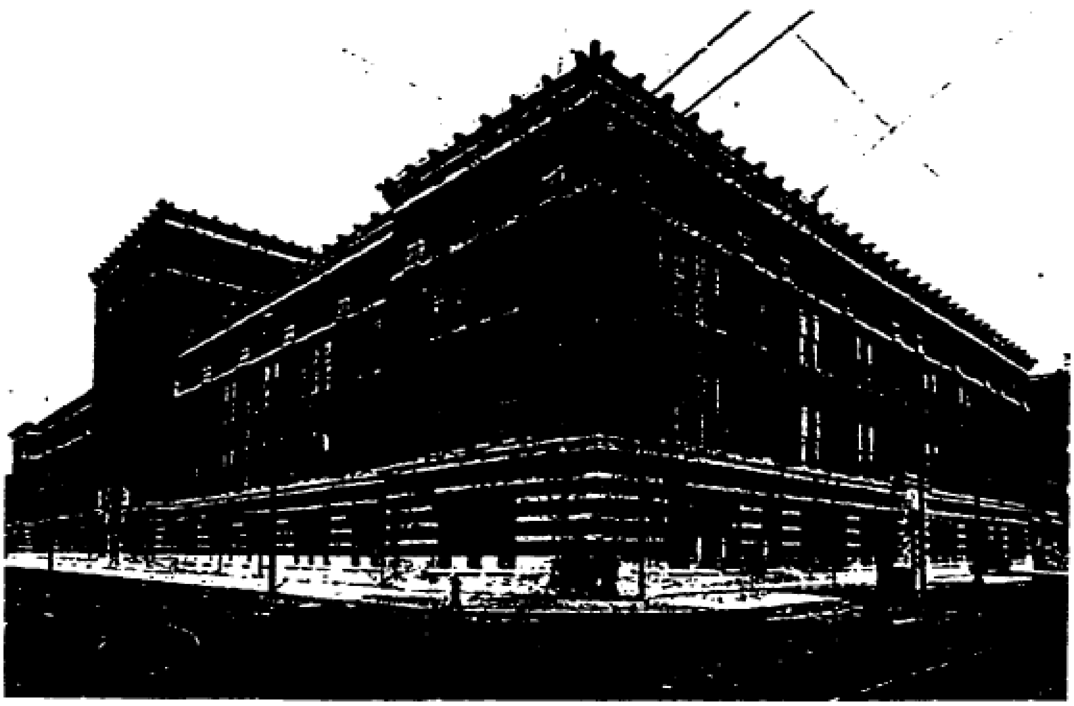


Fig. 2.52. Dwight H. Perkins, Albert Lane Technical High School, Chicago, Illinois, 1908. [Wight, "Public School Architecture at Chicago," 494].

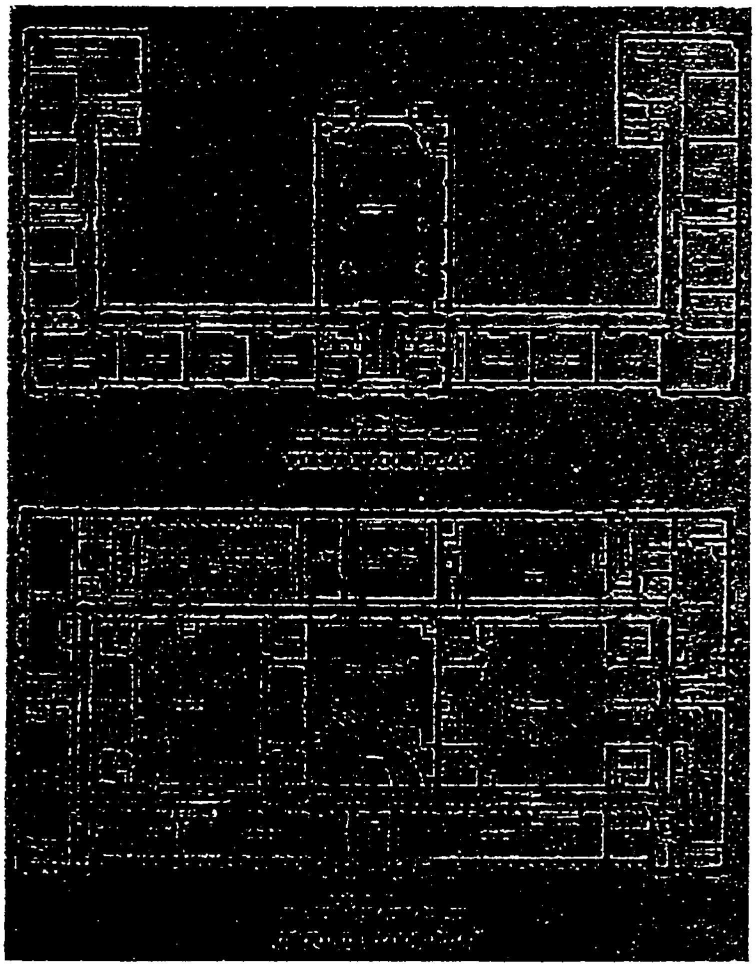


Fig. 2.53. Perkins, Lane Tech High School. Ground and first floor plan. [The American School Board Journal 34 (February 1907): 11].

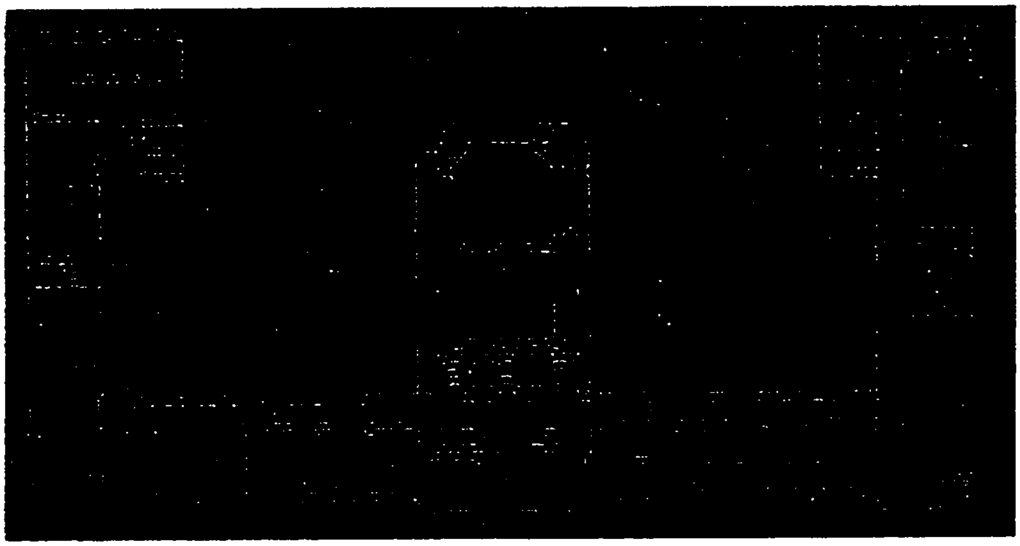


Fig. 2.54. Perkins, Lane Tech High School. Second floor plan. [The American School Board Journal 34 (February 1907): 11].

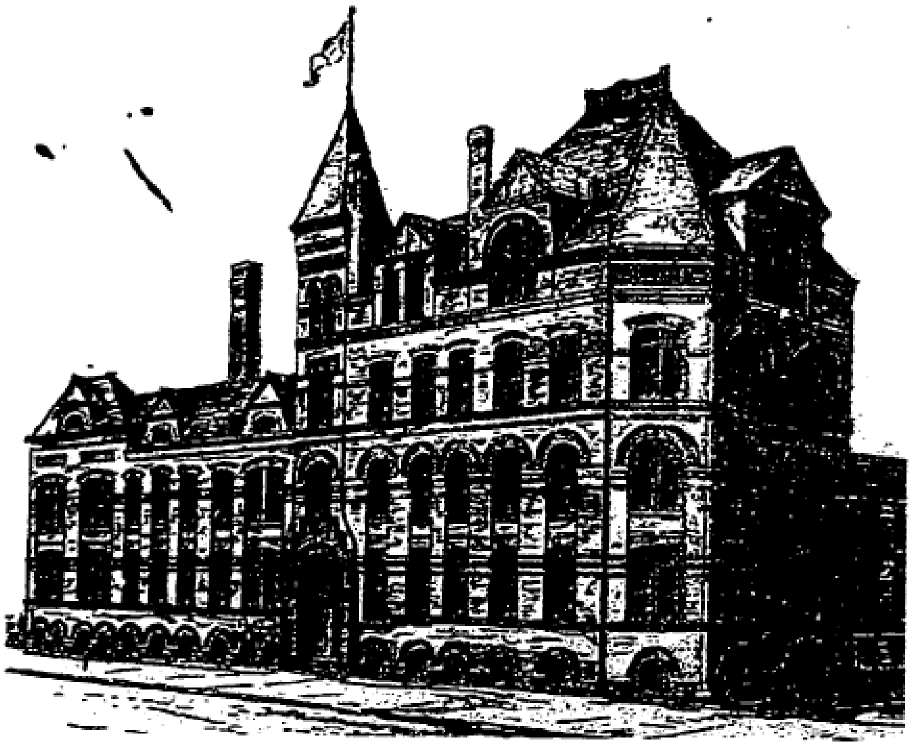


Fig. 2.55. Solon S. Beman, Chicago Manual Training High School, Chicago, Illinois, 1884. [The Inland Architect and Builder 3 (February 1884): n.p.].

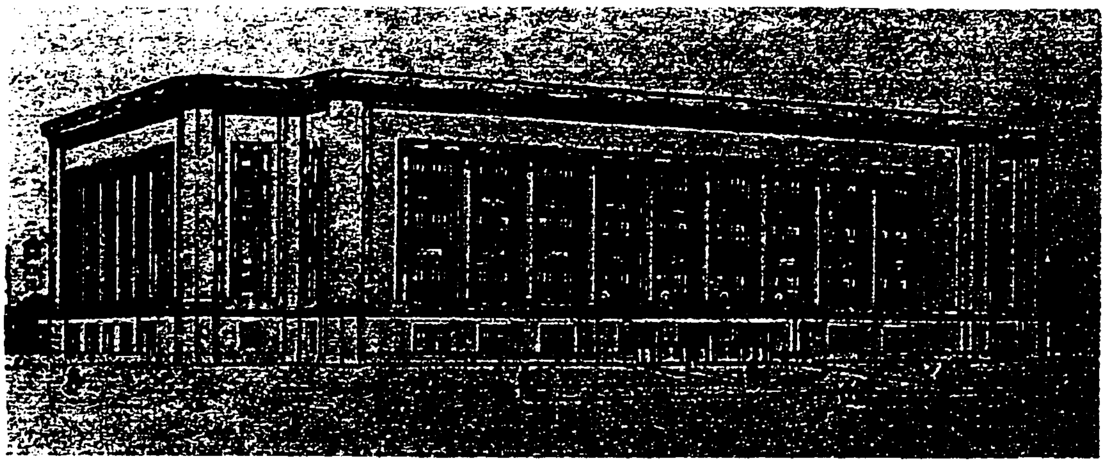


Fig. 2.56. Dwight H. Perkins, James Bowen High School, Chicago, Illinois, 1906. Proposed perspective. [The Inland Architect and News Record 48 (November 1906): plates after page 48.

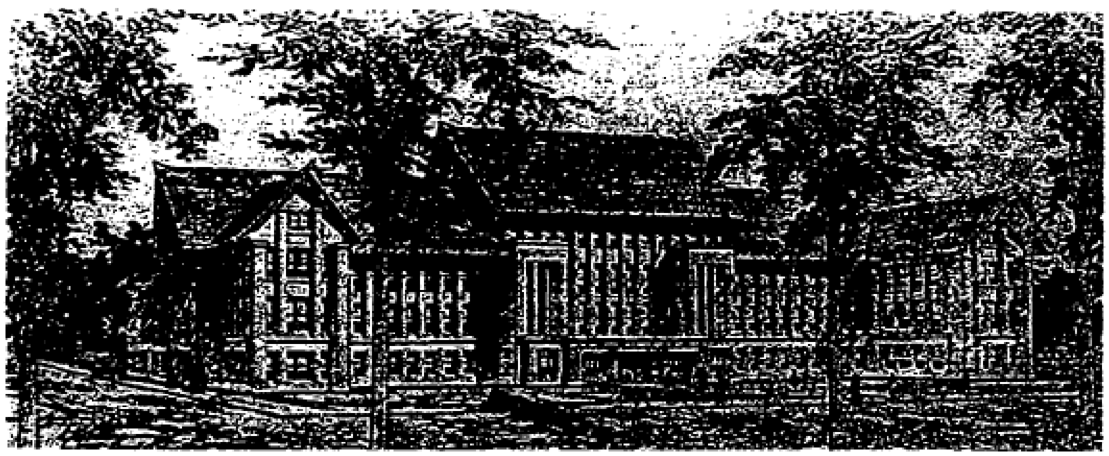


Fig. 2.57. Perkins, Bowen High School, 1910. Final perspective. [Fifty-Fifth Annual Report of the Board of Education of the City of Chicago (1808-09) (Chicago: Public Schools of the City of Chicago, 1910), n.p.].

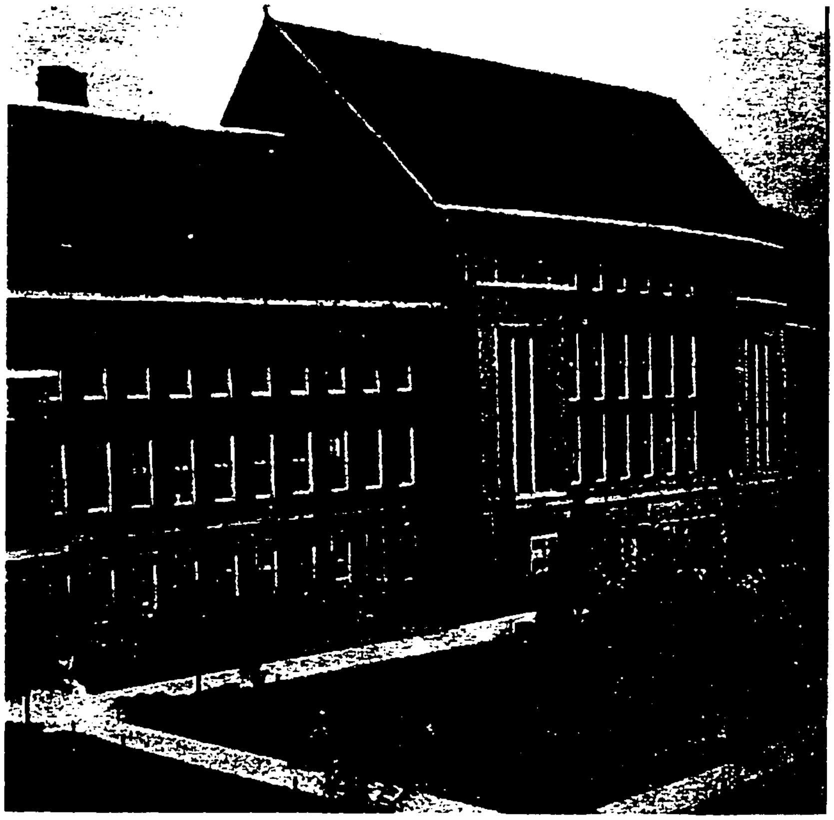


Fig. 2.58. Dwight H. Perkins, Carl Schurz High School, Chicago, Illinois, 1910. [Carl W. Condit, The Chicago School of Architecture (Chicago and London: University of Chicago Press, 1964), Fig. 166].

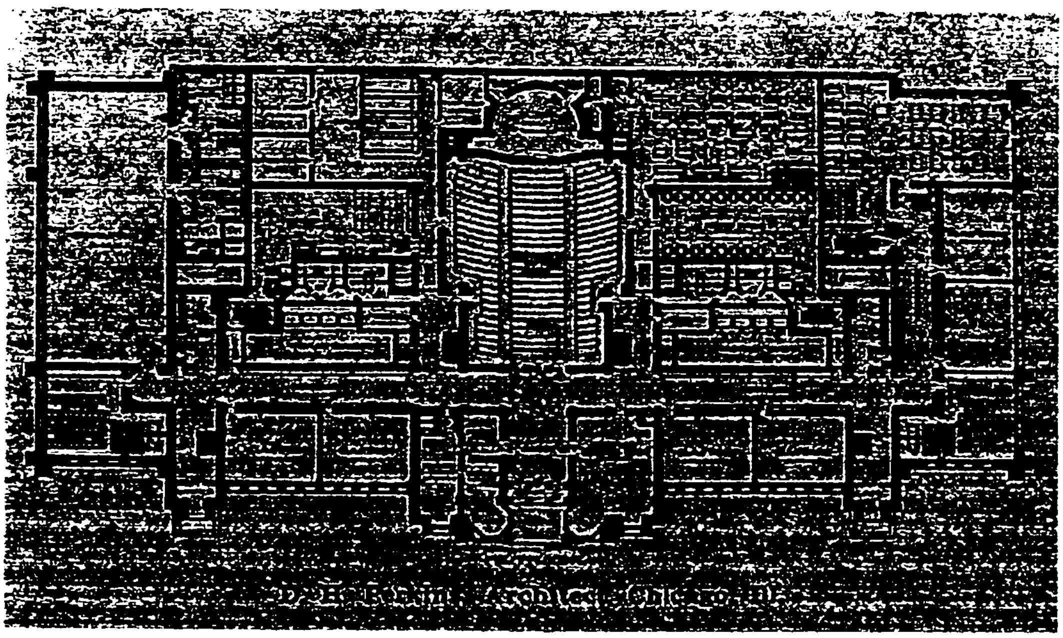


Fig. 2.59. Perkins, Schurz High School. First floor plan. [Pittsburgh Architectural Club Fourth Annual Exhibition, 1907, n.p.].

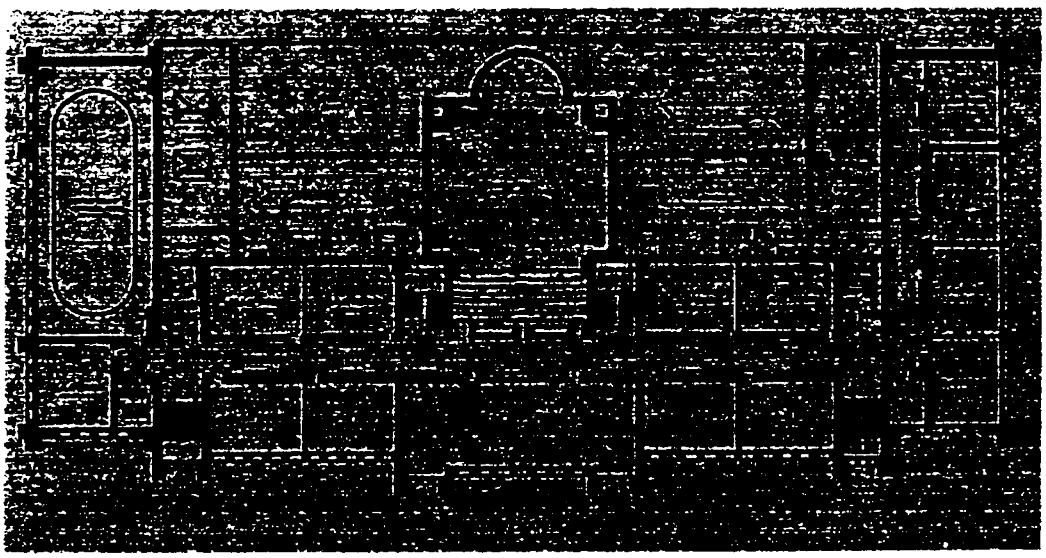


Fig. 2.60. Perkins, Schurz High School. Second floor plan. [Pittsburgh Architectural Club Fourth Annual Exhibition, 1907, n.p.].

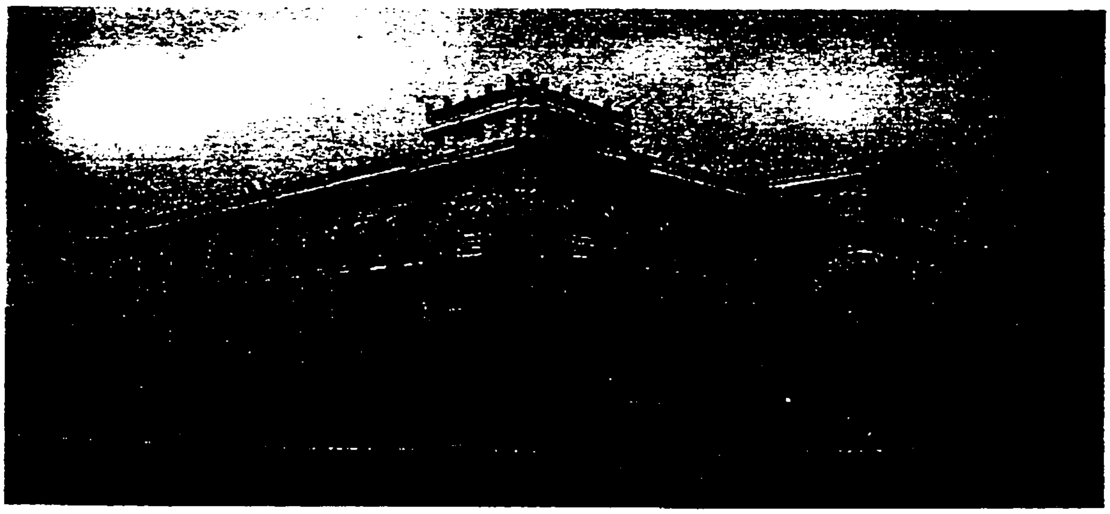


Fig. 2.61. Alfred H. Hussander, Carter Harrison High School, Chicago, Illinois, 1912. [Donovan, et.al., <u>School Architecture</u>, 697].

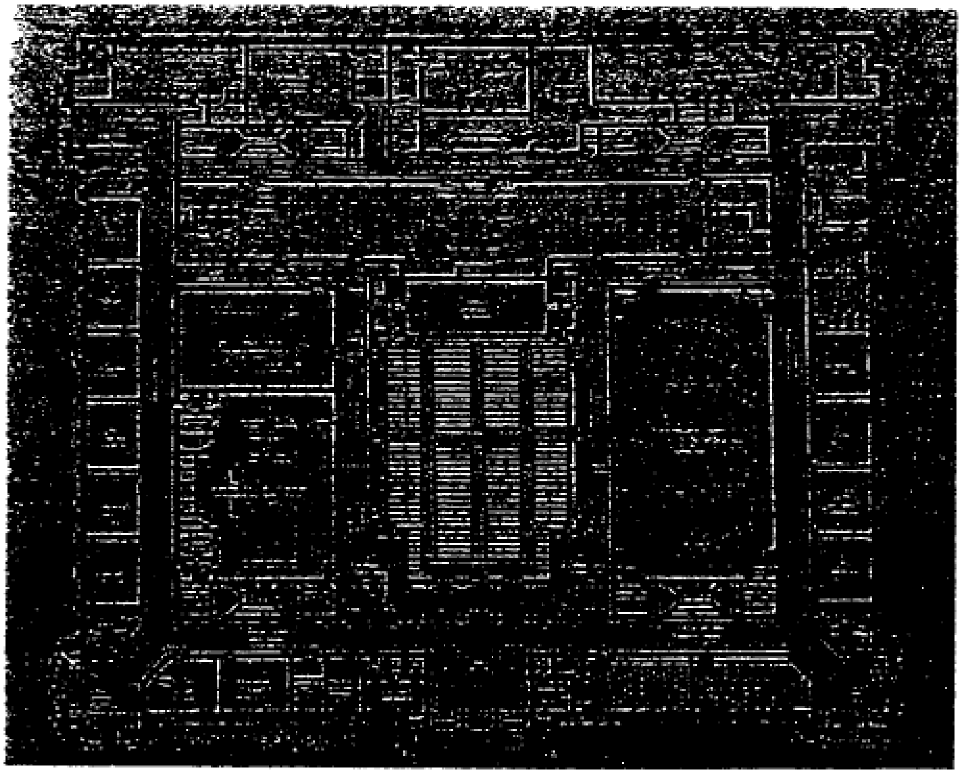


Fig. 2.62. Hussander, Harrison High School. First floor plan. [Mills, American School Building Standards, 528].

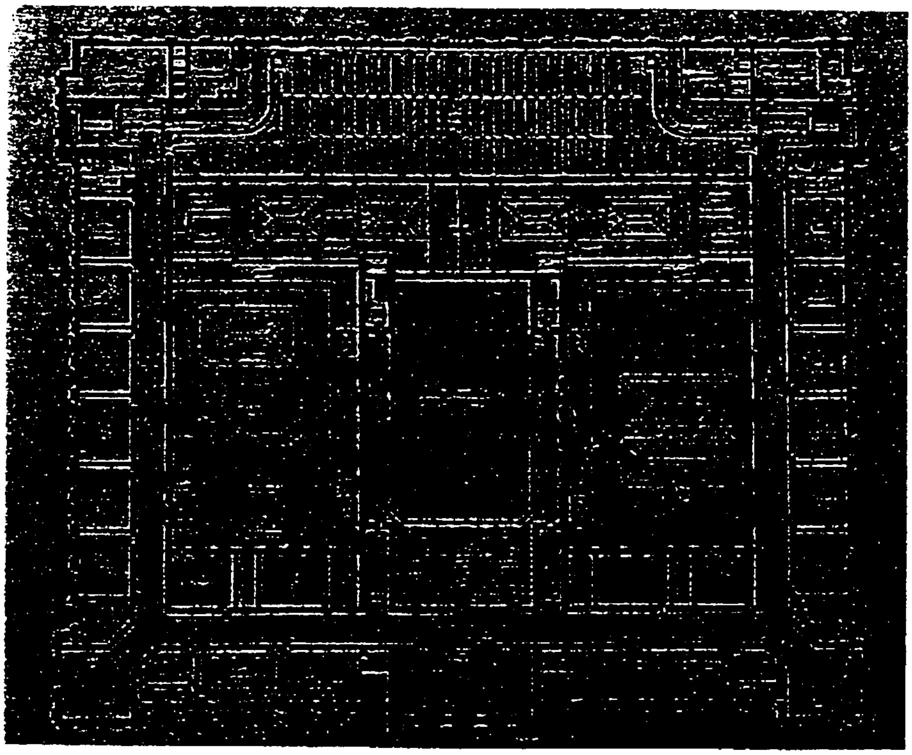


Fig. 2.63. Hussander, Harrison High School. Second floor plan. [Mills, American School Building Standards, 529].

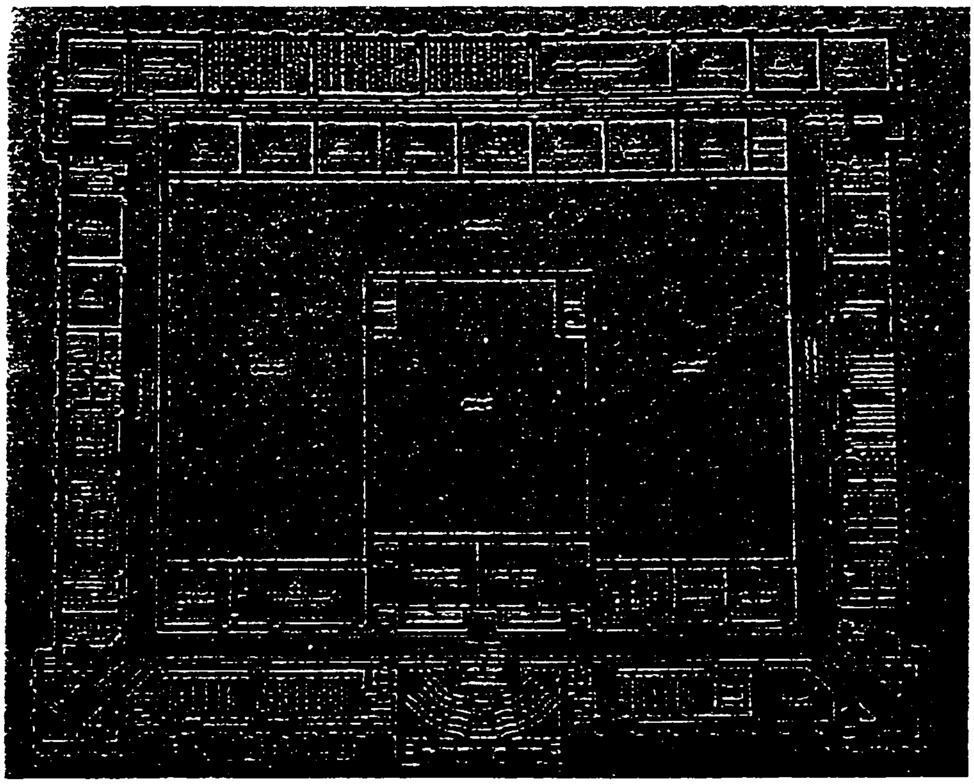


Fig. 2.64. Hussander, Harrison High School. Third floor plan. [Mills, American School Building Standards, 530].

Fig. 2.65. Alfred H. Hussander, Hyde Park High School, Chicago, Illinois, 1913. [Bruce, High School Buildings, 11].

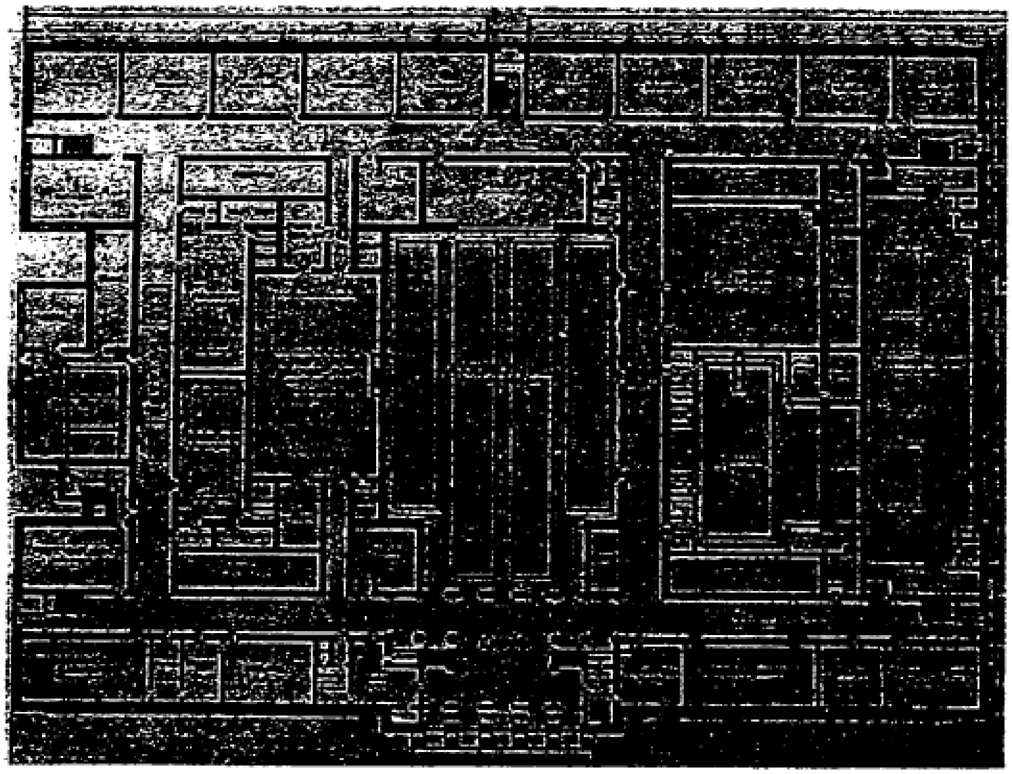


Fig. 2.66. Hussander, Hyde Park High School. First floor plan. [Bruce, High School Buildings, 13].

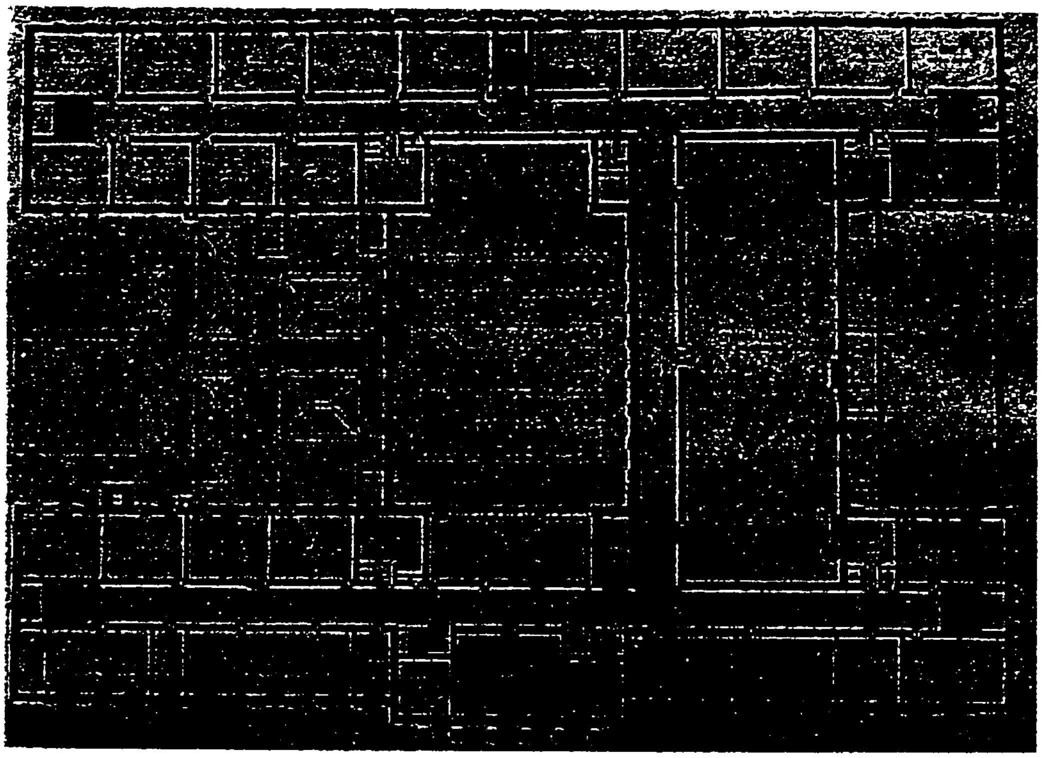


Fig. 2.67. Hussander, Hyde Park High School. Second floor plan. [Bruce, High School Buildings, 12].

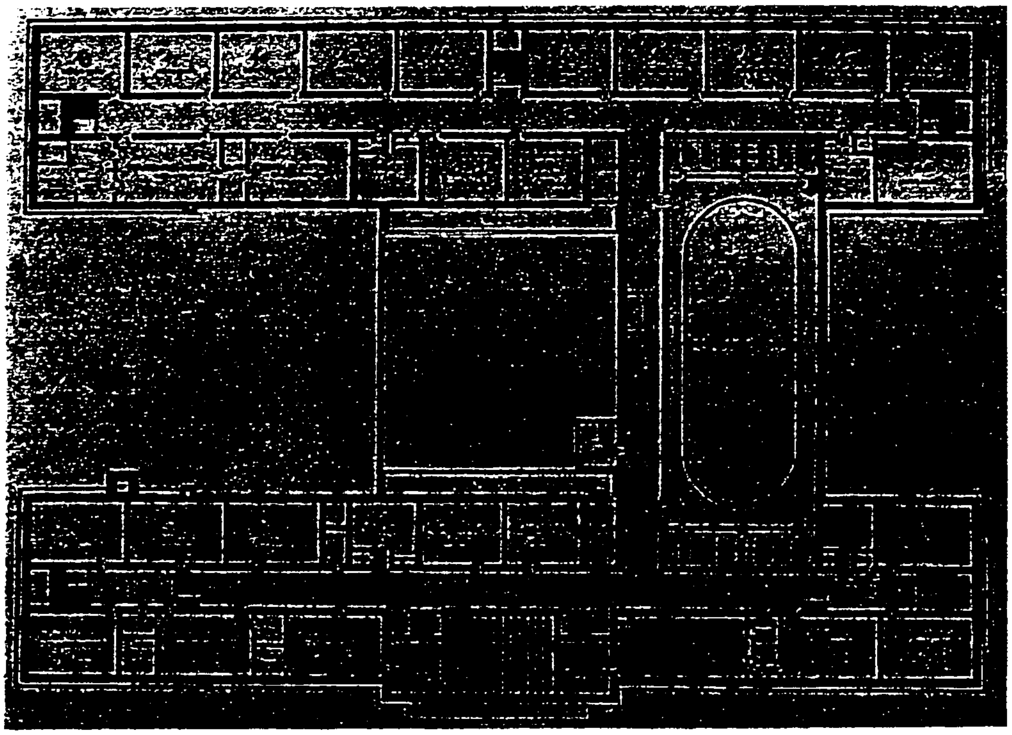


Fig. 2.68. Hussander, Hyde Park High School. Third floor plan. [Bruce, High School Buildings, 12].

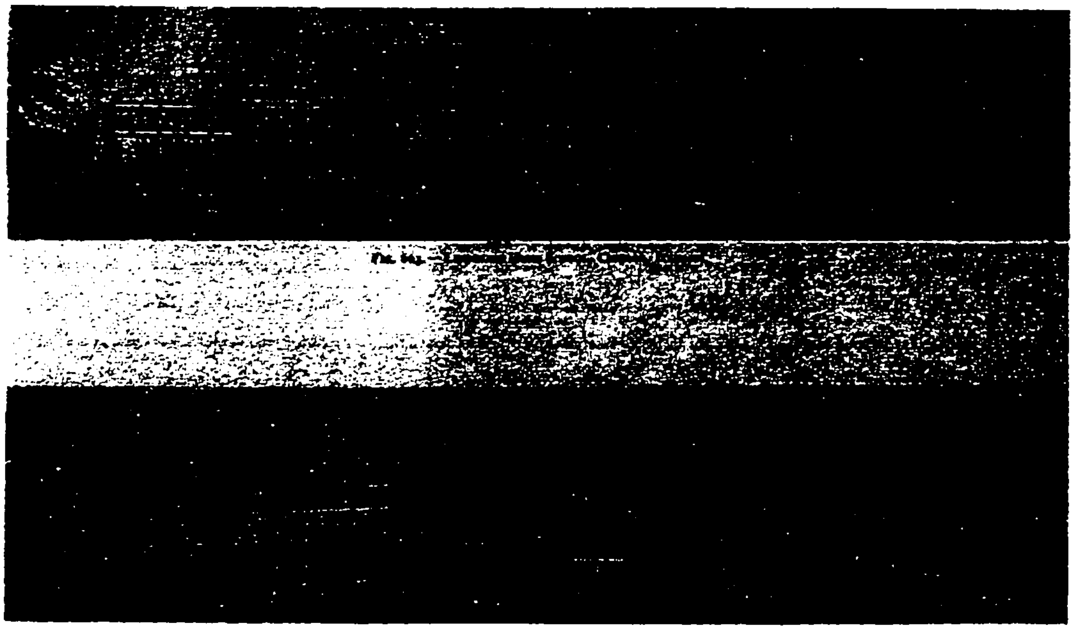


Fig. 2.69. Alfred H. Hussander, Robert Lindblom Technical High School, Chicago, Illinois, 1918. [Donovan, School Architecture, 705].

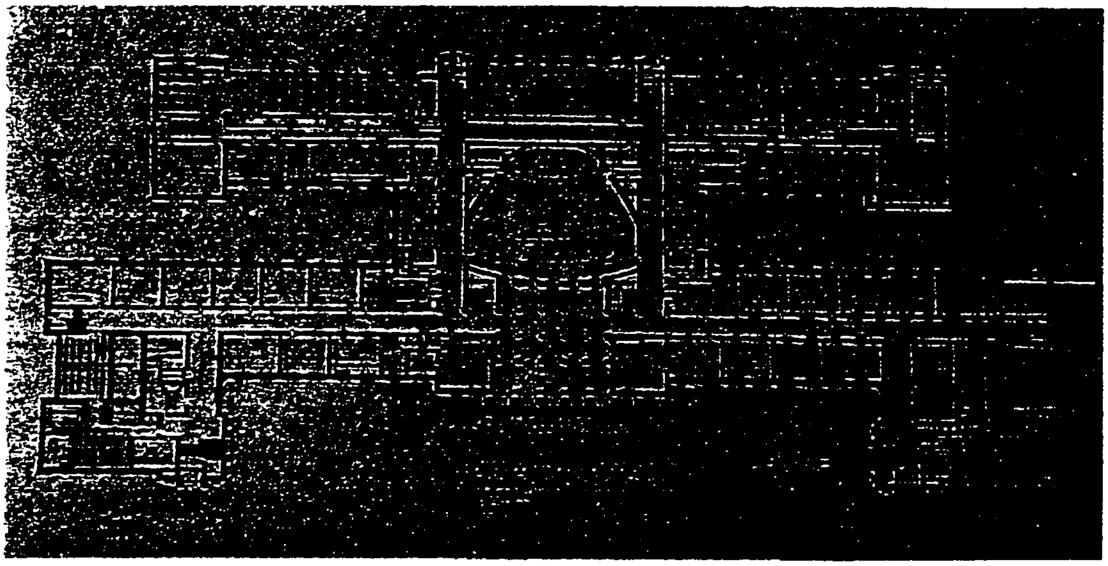


Fig. 2.70. Hussander, Lindblom Tech High School. First floor plan. [Donovan, School Architecture, 708].

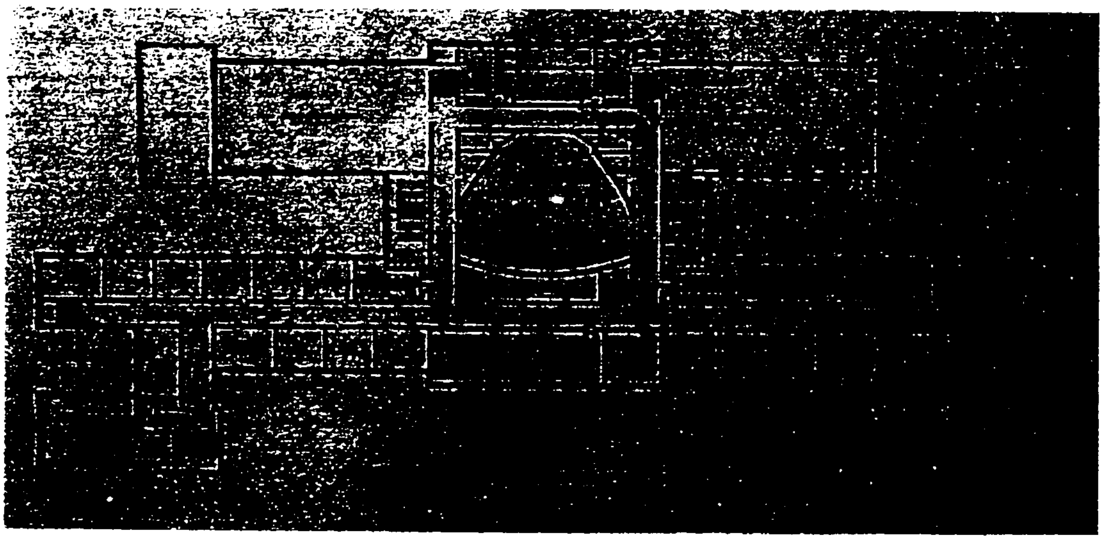


Fig. 2.71. Hussander, Lindblom Tech High School. Second floor plan. [Donovan, School Architecture, 709].

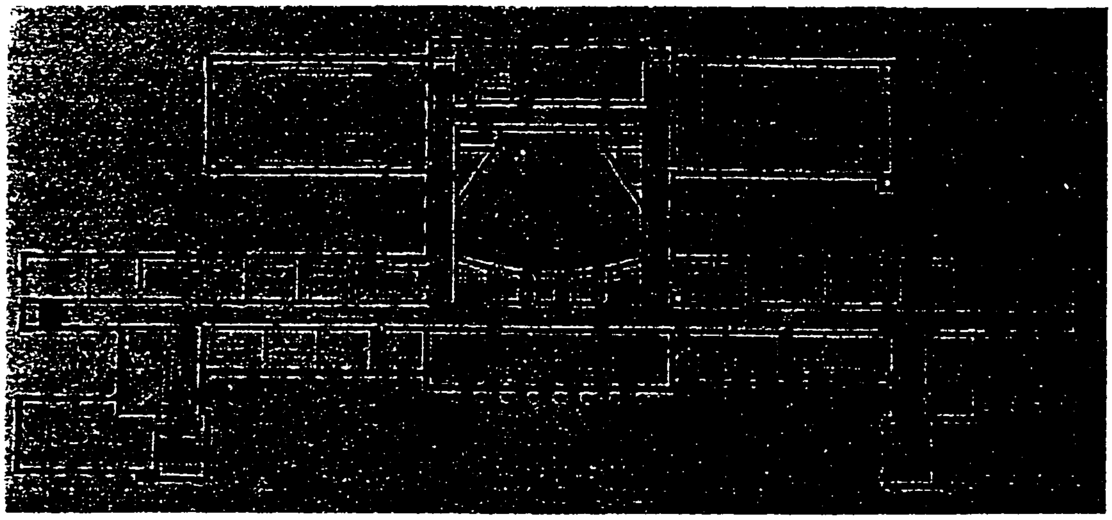


Fig. 2.72. Hussander, Lindblom Tech High School. Third floor plan. [Donovan, School Architecture, 710].

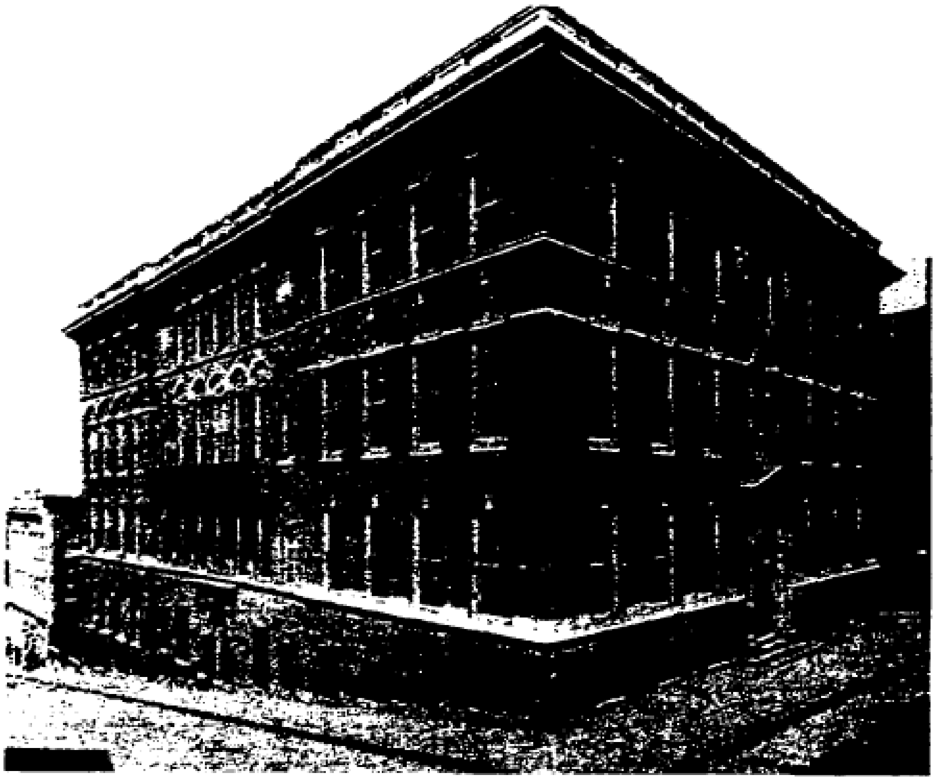


Fig. 3.1. Wheelwright & Haven, Bowdoin School, Boston, Massachusetts, 1895. [Wheelwright, School Architecture, 113].

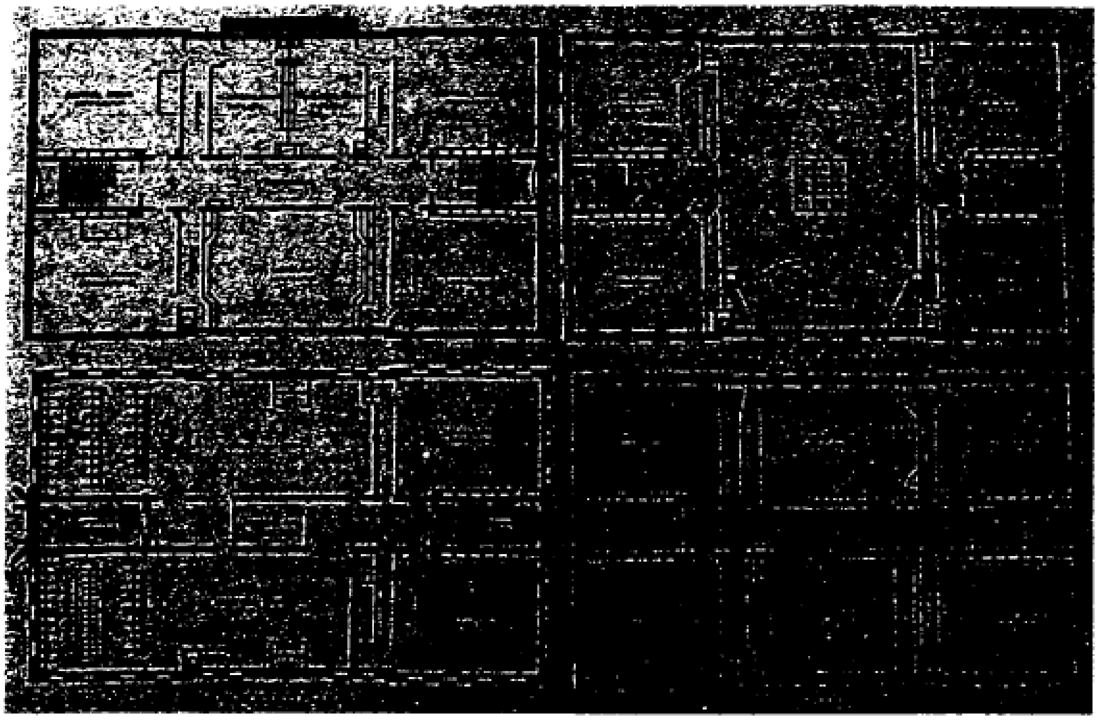


Fig. 3.2. Wheelwright & Haven, Bowdoin School. Basement, first, second and third floor plans. [Wheelwright, School Architecture, 112].

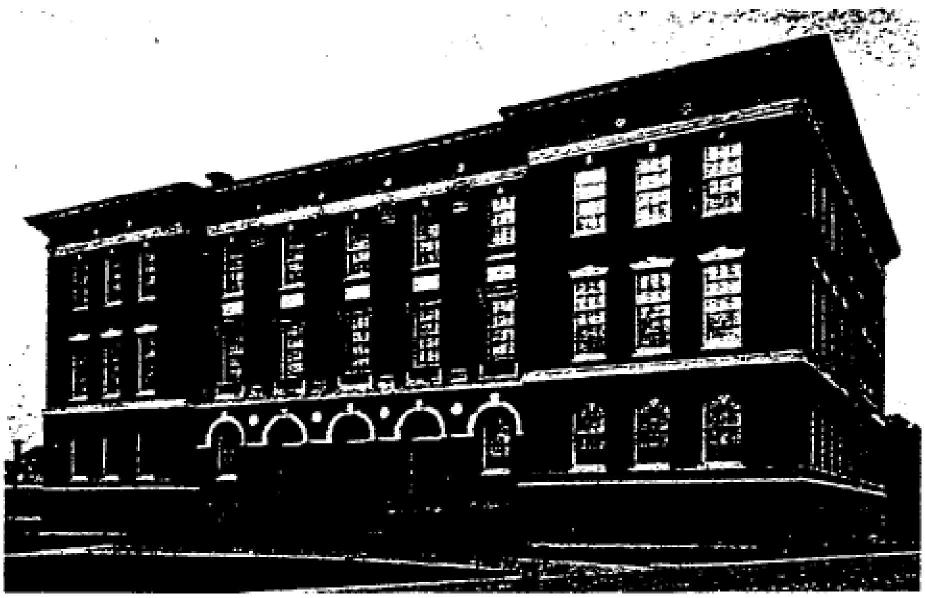


Fig. 3.3. Wheelwright & Haven, Brighton High School, Boston, Massachusetts, 1894. [Wheelwright, School Architecture, 15].

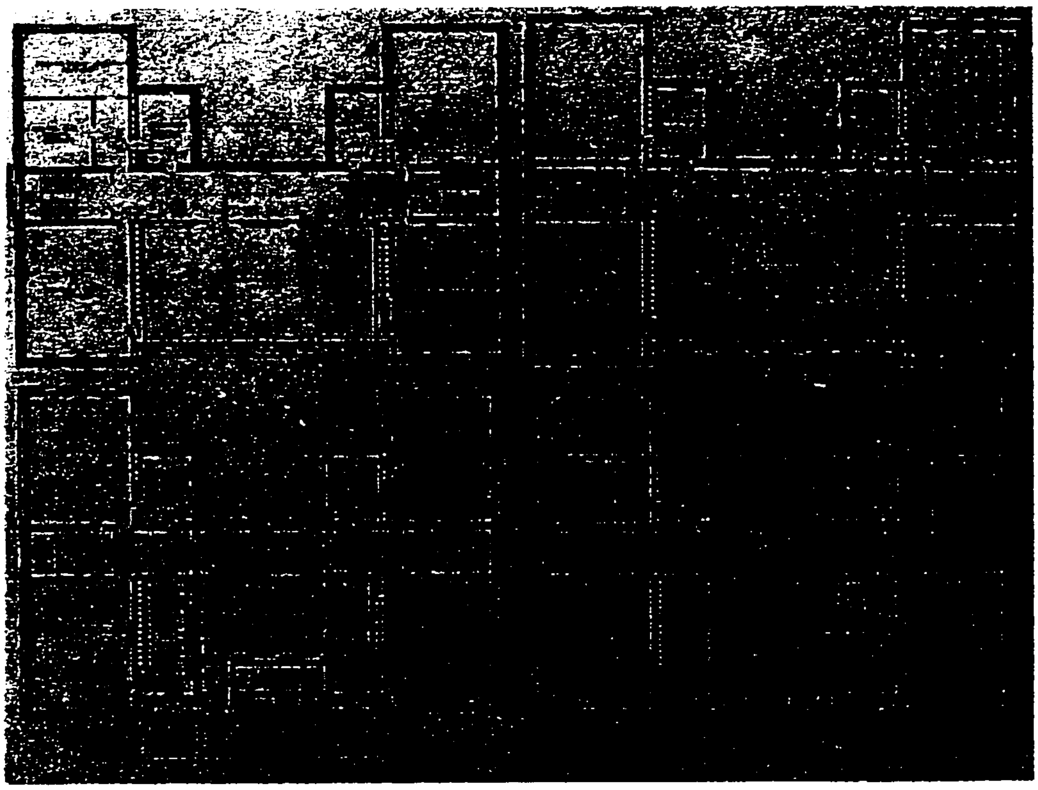


Fig. 3.4. Wheelwright & Haven, Brighton High School. Basement, first, second and third floor plans. [Wheelwright, School Architecture, 207].

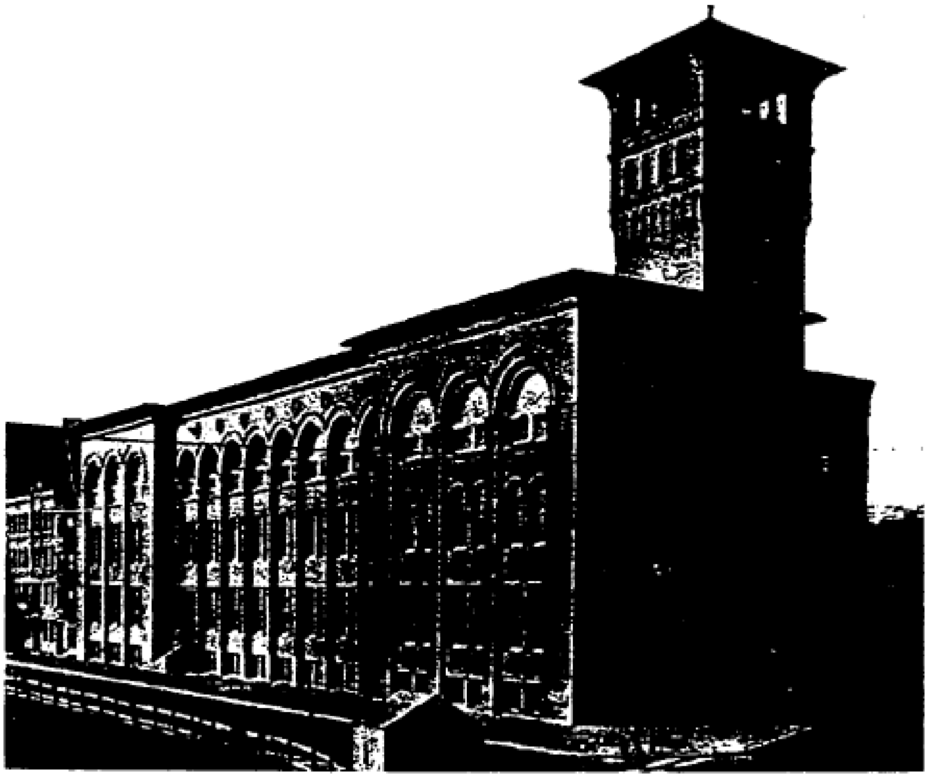


Fig. 3.5. Wheelwright & Haven, Mechanic Arts High School, Boston, Massachusetts, 1893; 1900. [Wheelwright, School Architecture, 222].

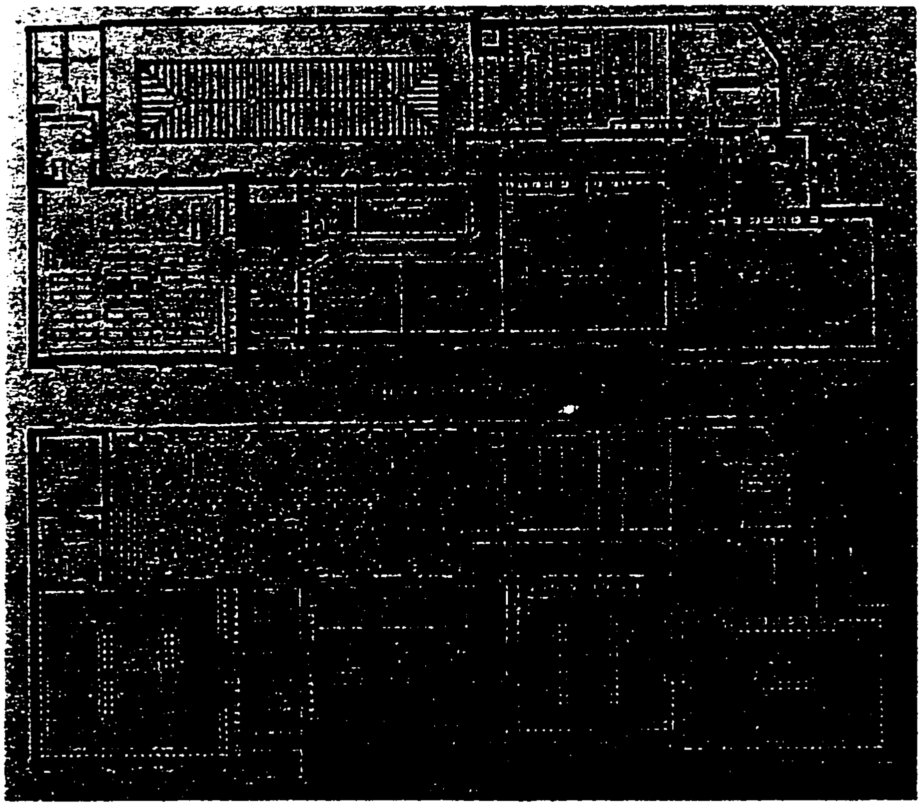


Fig. 3.6. Wheelwright & Haven, Mechanic Arts High School. Basement and first floor plans. [Wheelwright, School Architecture, 223].

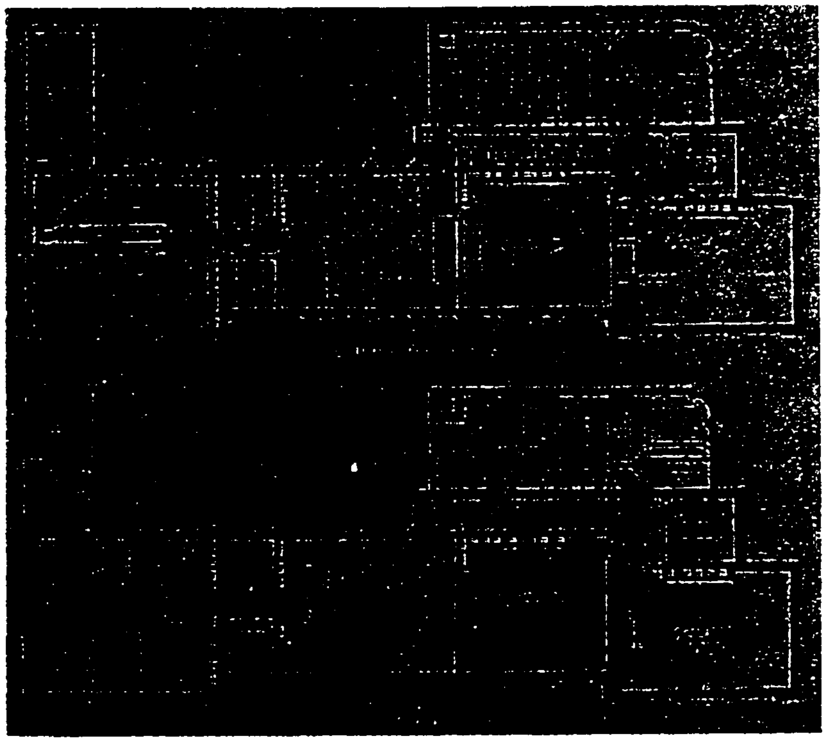


Fig. 3.7. Wheelwright & Haven, Mechanic Arts High School. Second and third floor plans. [Wheelwright, School Architecture, 224].

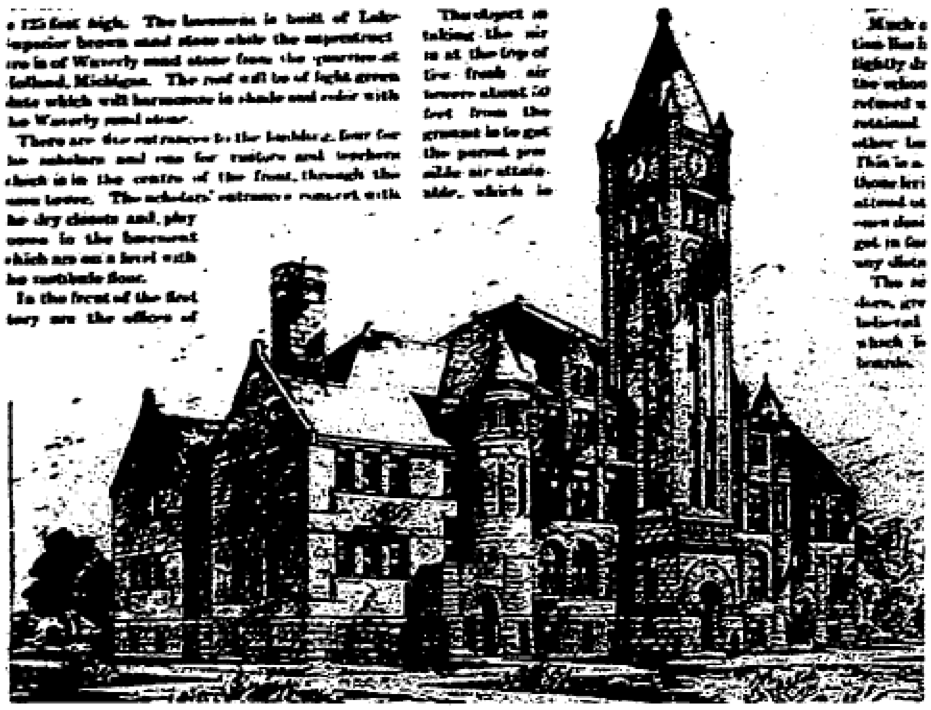


Fig. 3.8. F.S. Allen, Hackley High School, Muskegon, Michigan, 1891-92. ["Hackley School, Muskegon, Mich.," The American School Board Journal 2 (November 1891): 10].

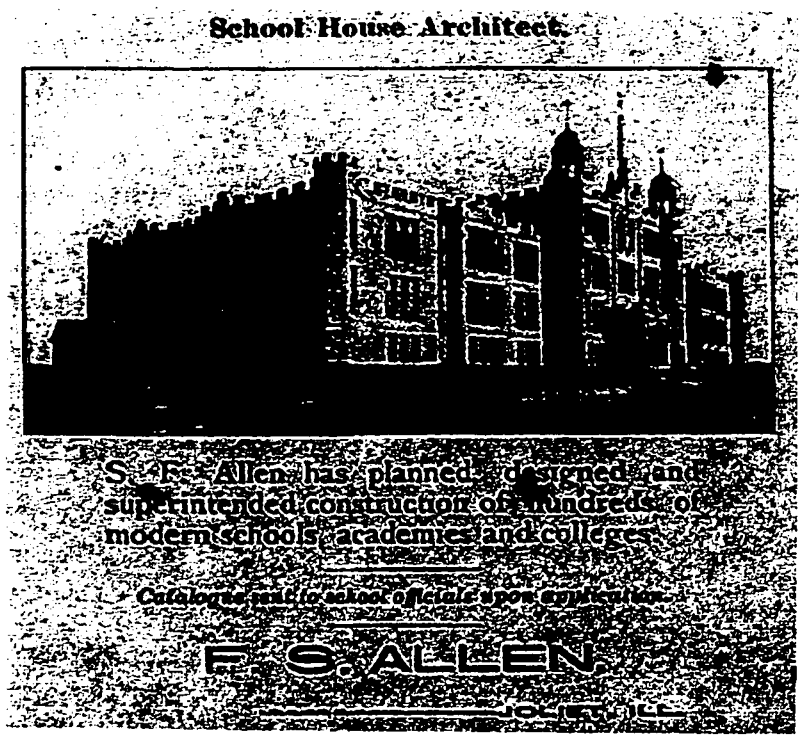



Fig. 3.9. F.S. Allen, advertisement. [The American School Board Journal 74 (May 1902): n.p.].

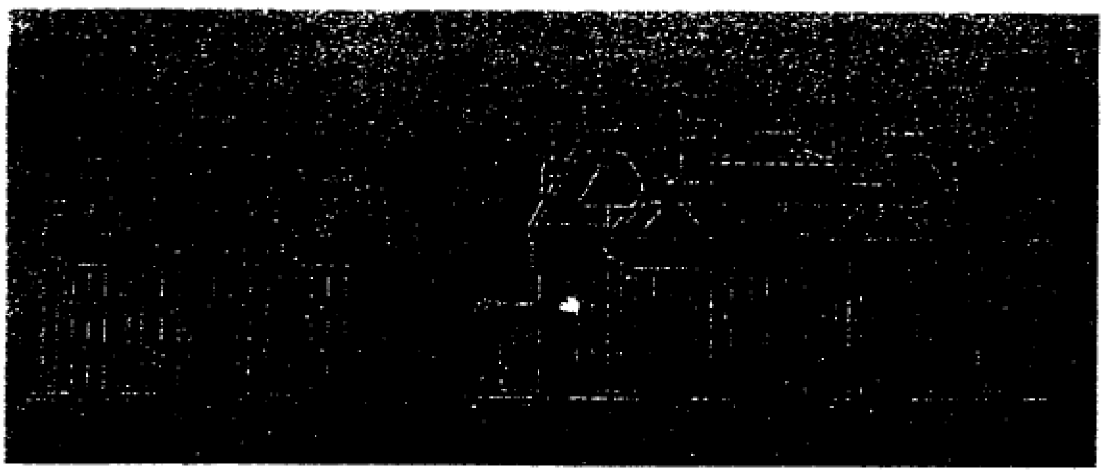


Fig. 4.1. Warren Richard Briggs, Bridgeport High School, Bridgeport, Connecticut, 1879. [Warren Richard Briggs, Modern American School Buildings (New York: John Wiley & Sons, 1899), 187].

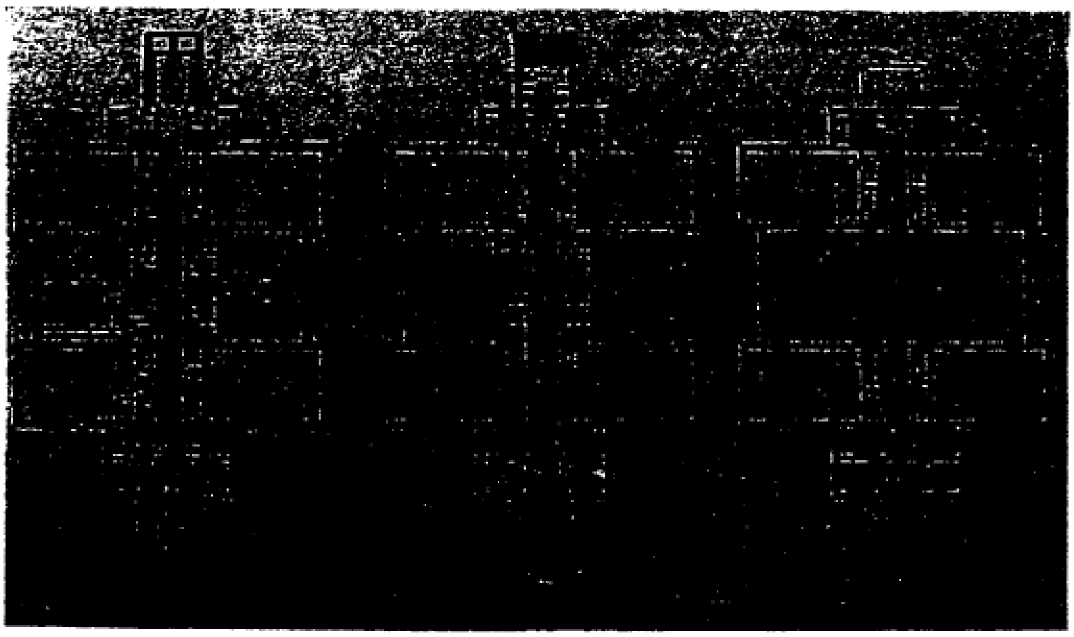


Fig. 4.2. Briggs, Bridgeport High School. Basement, first and second floor plans. [Briggs, Modern American School Buildings, 189].

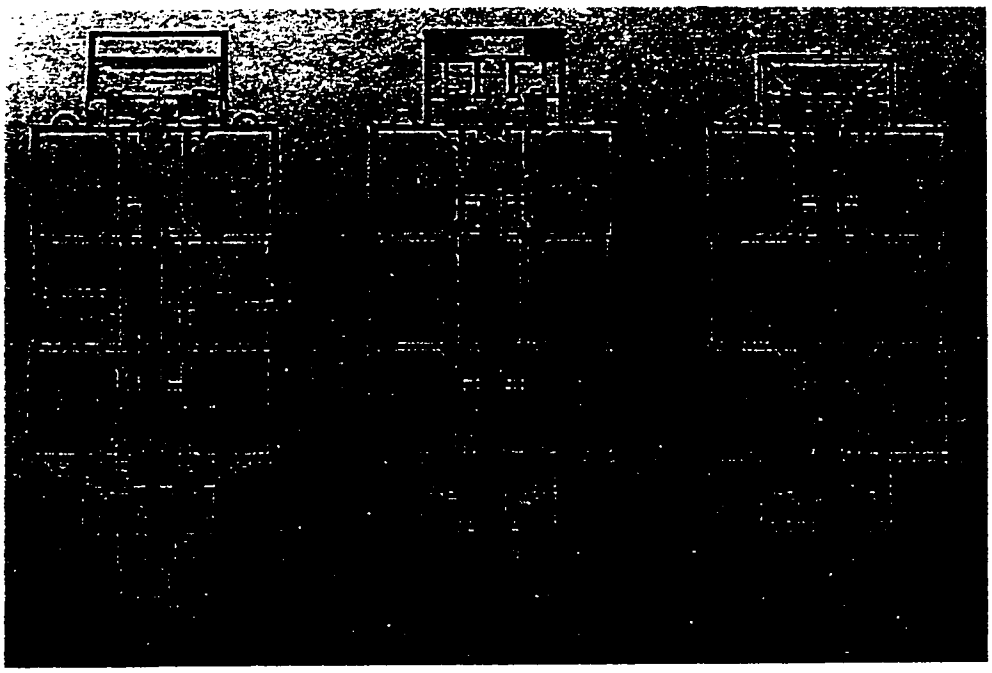


Fig. 4.3. Briggs, Revised Bridgeport High School. [Briggs, Modern American School Buildings, 191].

Fig. 4.4. Briggs, Revised Bridgeport High School. Basement, first and second floor plans. [Briggs, Modern American School Buildings, 193].

Fig. 4.5. Clarence H. Johnston, Sr., Central High School, St. Paul, Minnesota, 1912. [Bruce, <u>High School Buildings</u>, 48].

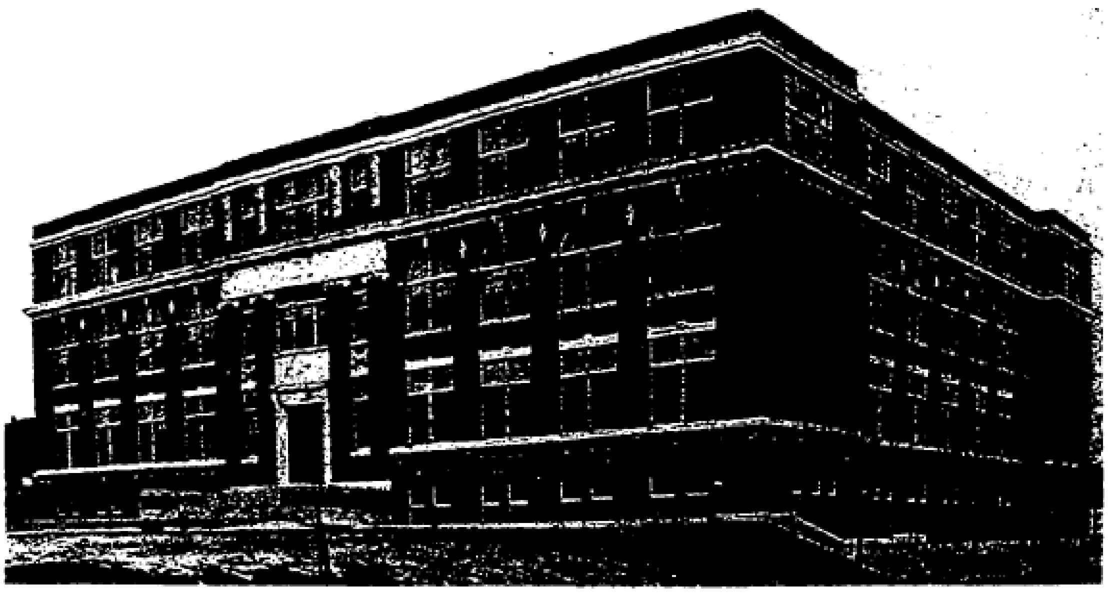


Fig. 4.6. E.F. Guilbert, East Side Commercial and Manual Training High School, Newark, New Jersey, 1911. [Bruce, High School Buildings, 95].

Fig. 4.7. "A class using their rules to measure the distance the eyes must be kept from their work." [Stuart H. Rowe, The Lighting of School-Rooms (New York: Longmans, Green, and Co., 1904) Fig. 30].

Fig. 4.8. George Keller, Hartford Public High School, Hartford, Connecticut, 1883. ["New Building for Hartford Public High School – 1882-83," American Journal of Education 32 (1882): 194].

Fig. 4.9. Keller, Hartford Public High School. Second floor heating and ventilation plan. ["New Building for Hartford Public High School," 200].

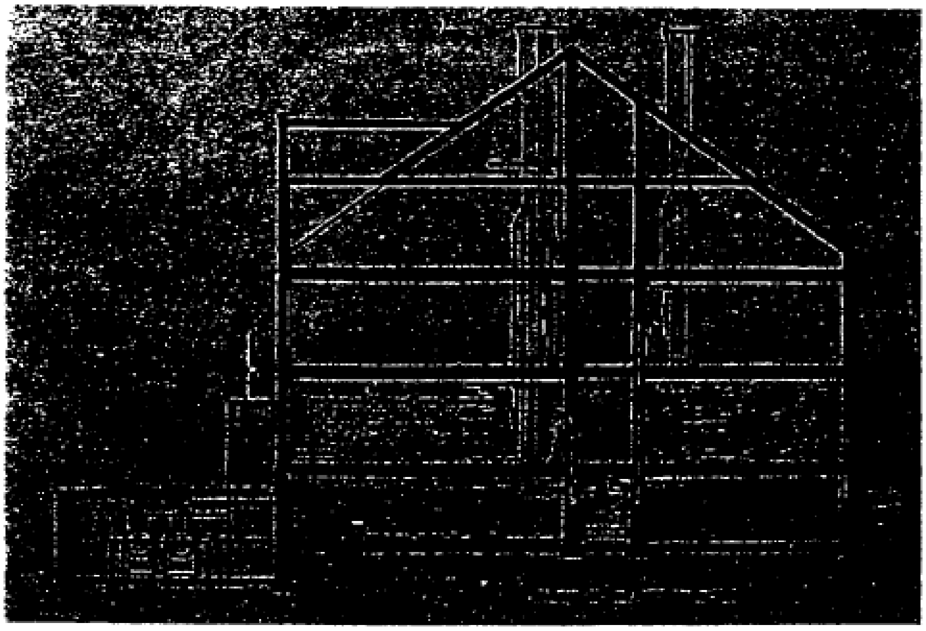


Fig. 4.10. Keller, Hartford Public High School. Section. ["New Building for Hartford Public High School," 203].

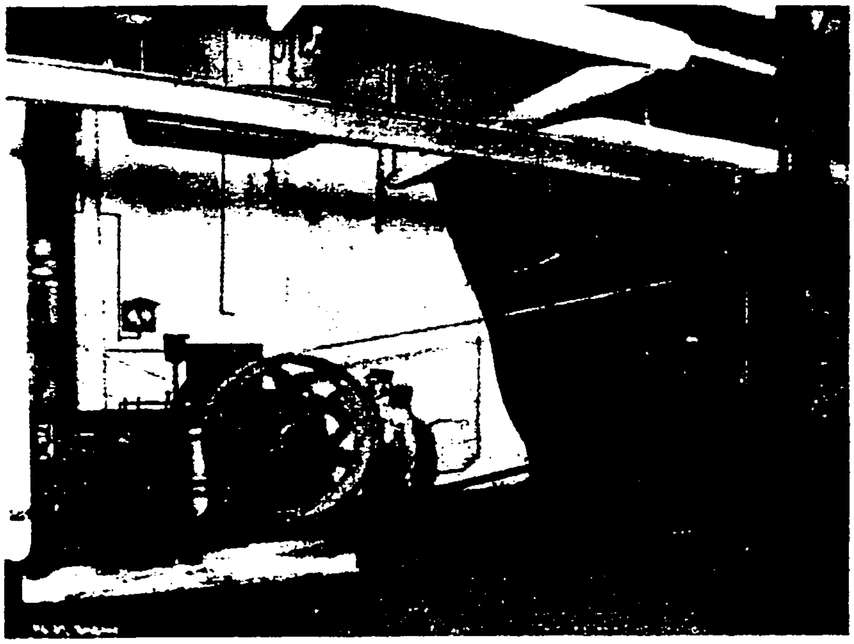


Fig. 4.11. Ventilating fan and engine, Public School No. 37, New York, New York. [Dresslar, American Schoolhouses, Plate 47 B].

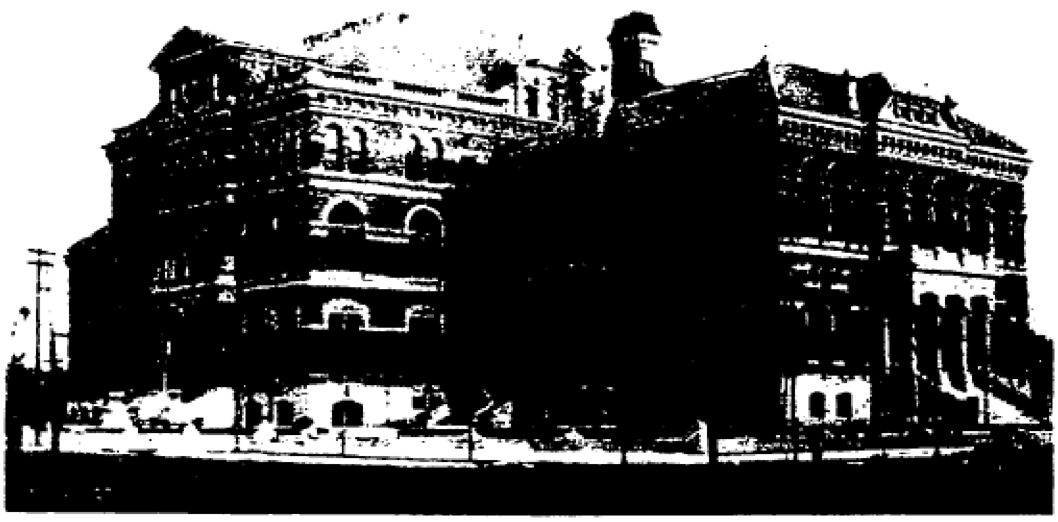


Fig. 4.12. Robert S. Roeschlaub, East Denver High School, Denver, Colorado, 1881-90. [Francine Haber, Kenneth R. Fuller and David N. Wetzel, Robert S. Roeschlaub: Architect of the Emerging West 1843-1923 (Denver: Colorado Historical Society, 1988), 20].

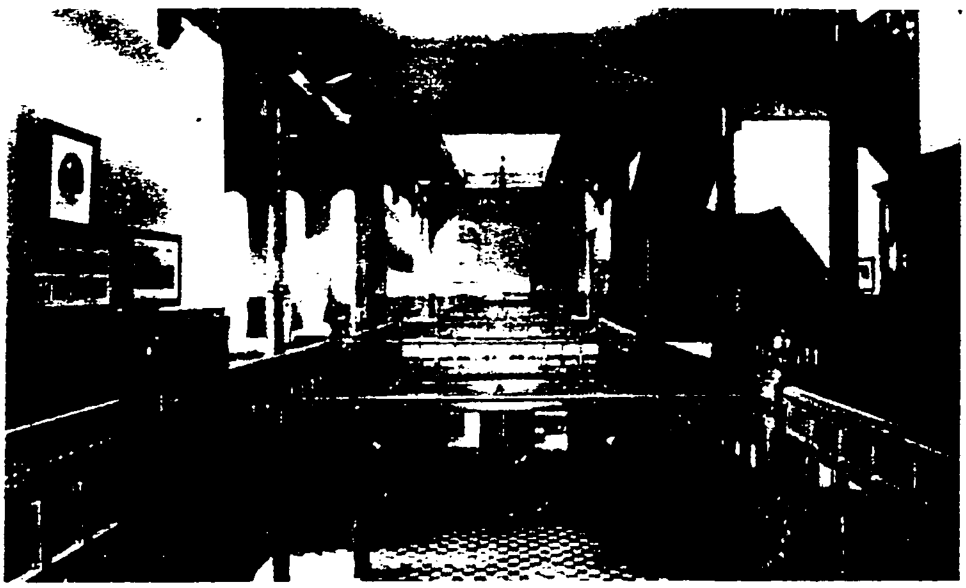


Fig. 4.13. Robert S. Roeschlaub, East Denver High School. Interior. [Haber, et. al., Robert S. Roeschlaub, 98].

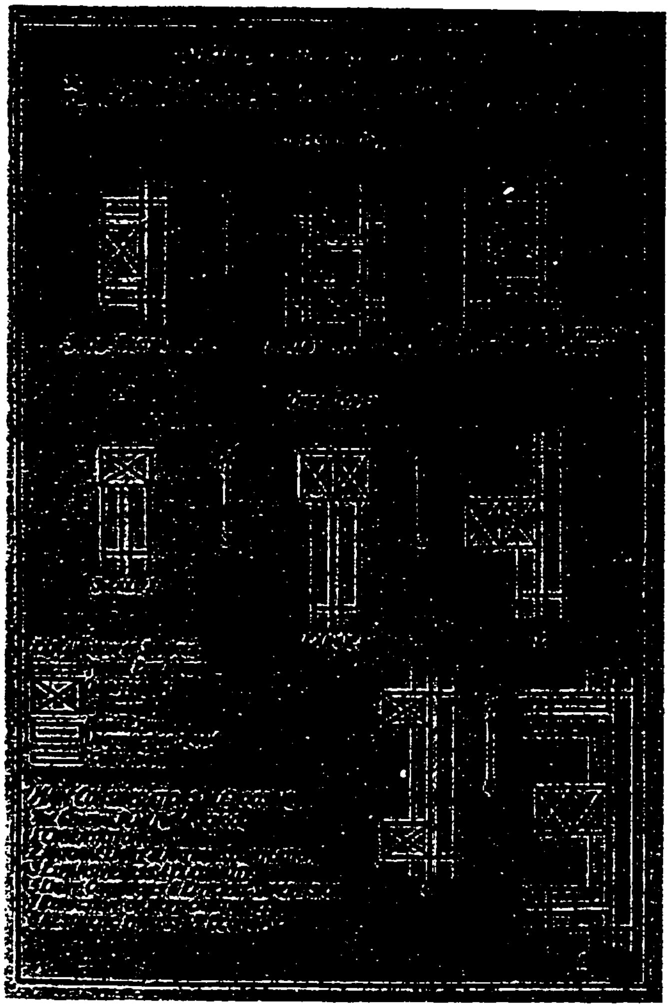


Fig. 4.14. "Choice of the General Plan." [National Education Association Committee on School House Planning and Construction, Report of Committee on School House Planning, Frank Irving Cooper, Chairman (Washington, DC: National Education Association, 1925), 40].

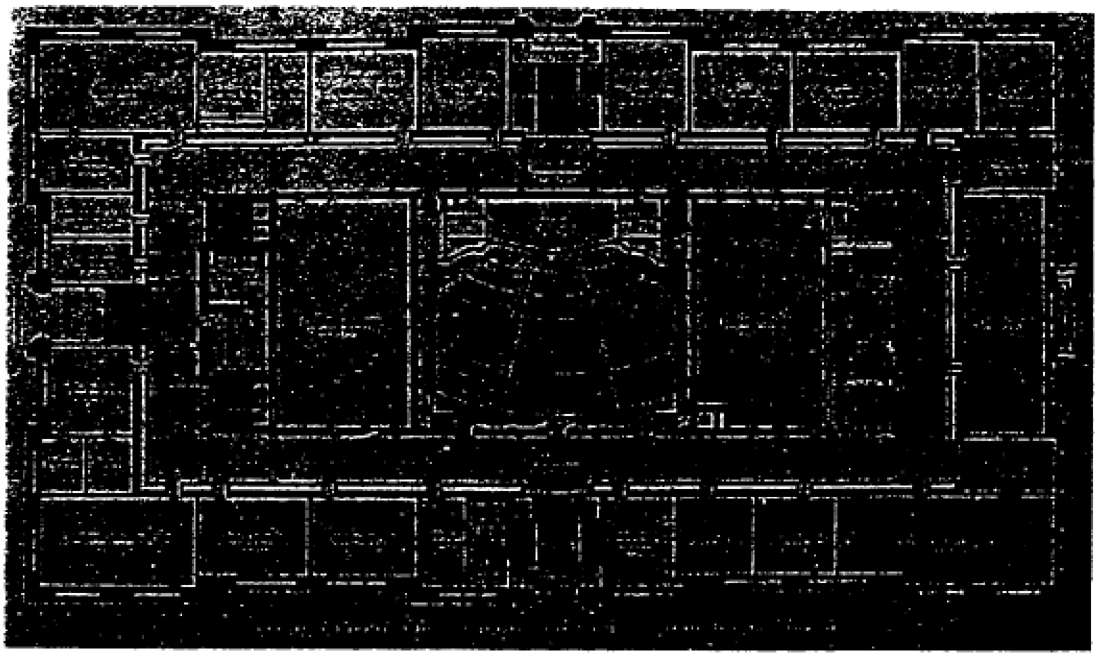


Fig. 4.15. Gustave W. Drach, Woodward High School, Cincinnati, Ohio, 1910. Second floor plan. [Bruce, High School Buildings, 73].

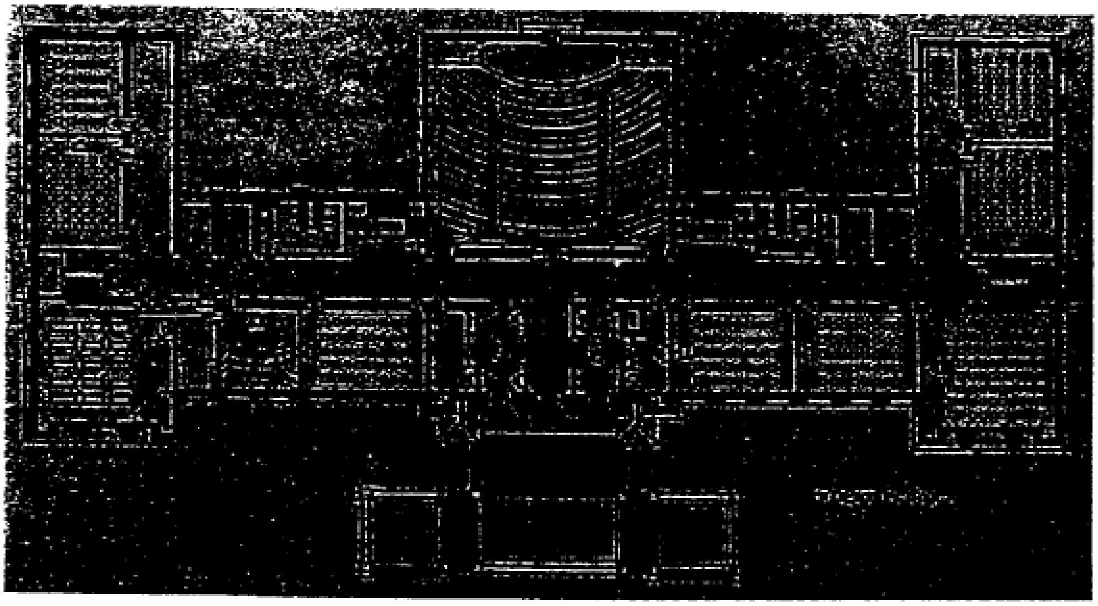


Fig. 4.16. Neff & Thompson, Matthew Fontaine Maury High School, Norfolk, Virginia, 1906-11. First floor plan. [Bruce, High School Buildings, 40].

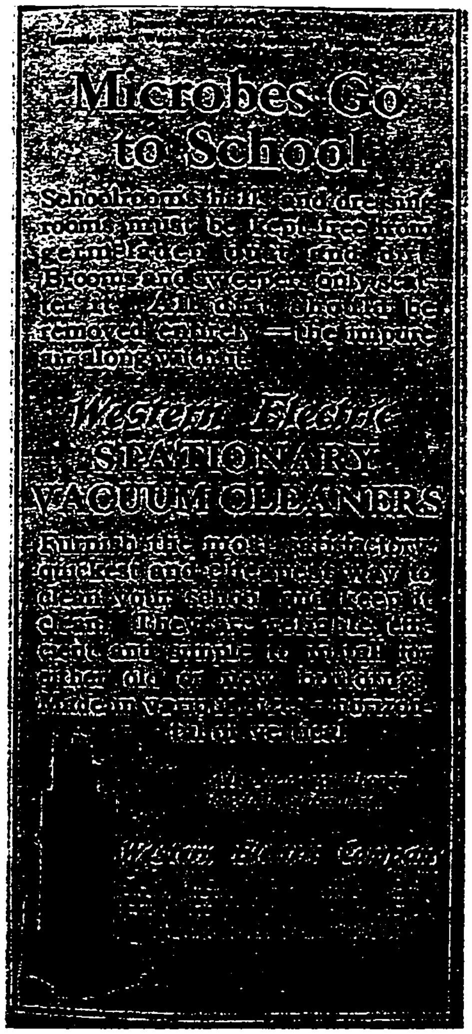



Fig. 4.17. "Microbes Go To School." Advertisement. [The American School Board Journal 53 (August 1916): 69].

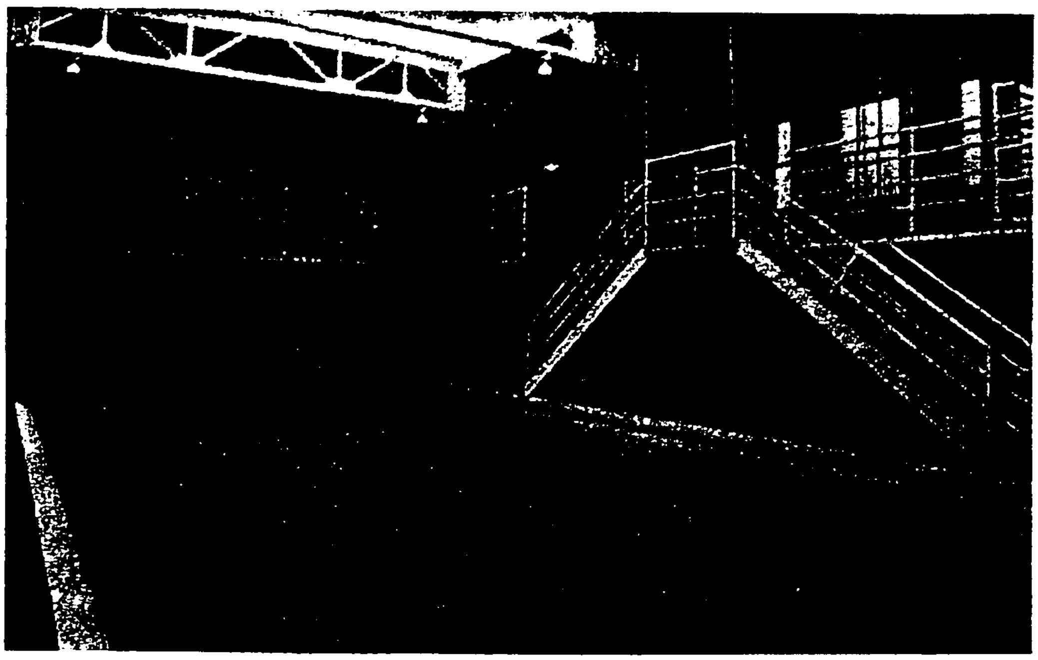


Fig. 4.18. Alfred H. Hussander, Harrison High School, Chicago, Illinois, 1912.
Swimming Pool. [Donovan, et. al., School Architecture, 231].

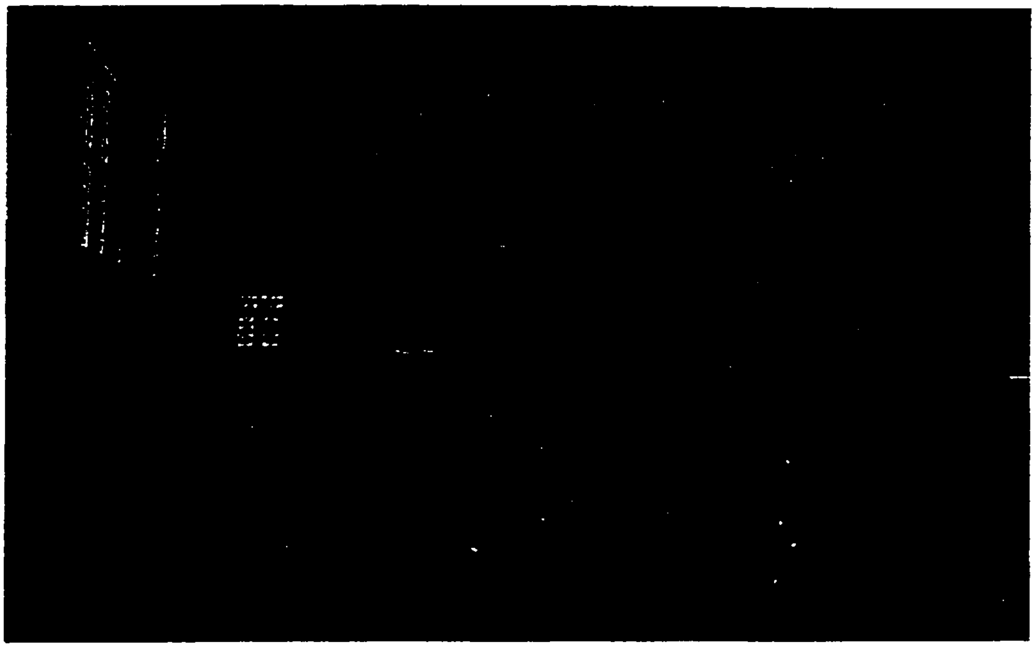


Fig. 4.19. William B. Ittner, Edward Lee McClain High School, Greenfield, Ohio, 1915. Gymnasium. [Donovan, et. al., School Architecture, 230].

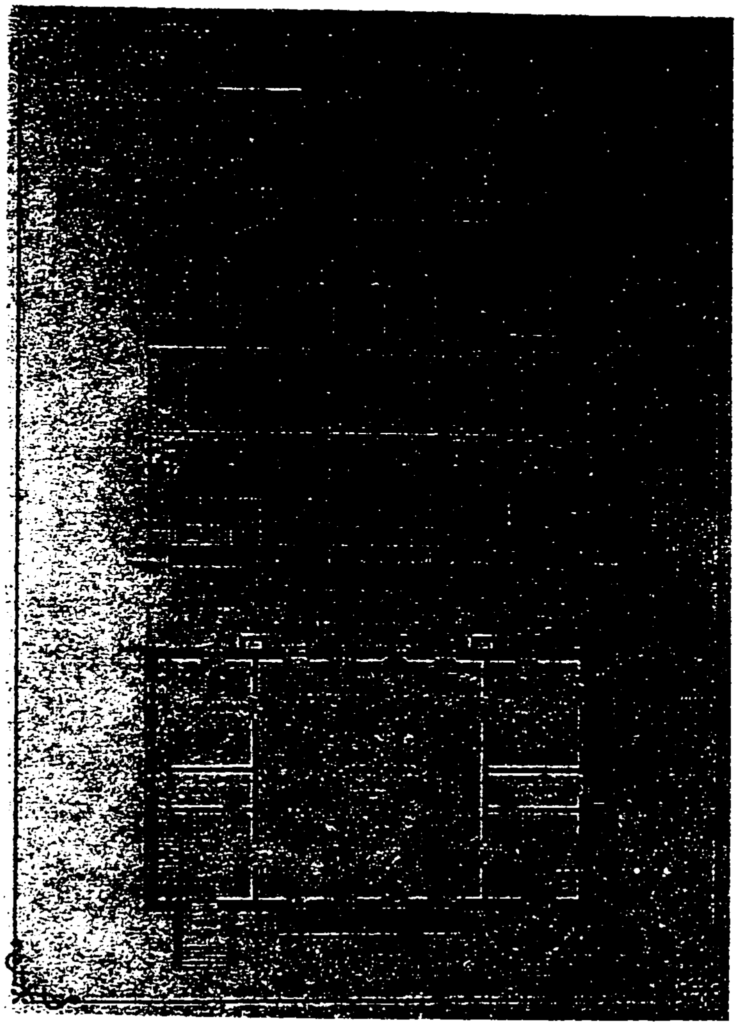


Fig. 4.20. Samuel F. Eveleth, "Design No. 15." [Eveleth, School-house Architecture, Plate No. 51].

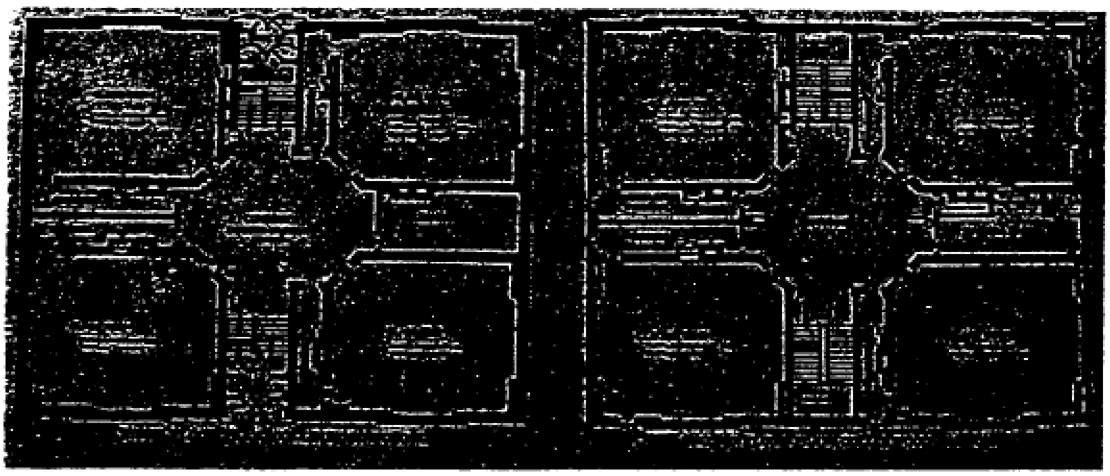


Fig. 4.21. Architect unknown, Lakeview Elementary School, Collinwood, Ohio, date unknown. First and second floor plans. [Willard Hirsh, "The Lesson of the Collinwood Fire," The American School Board Journal 36 (April 1908): 10d].

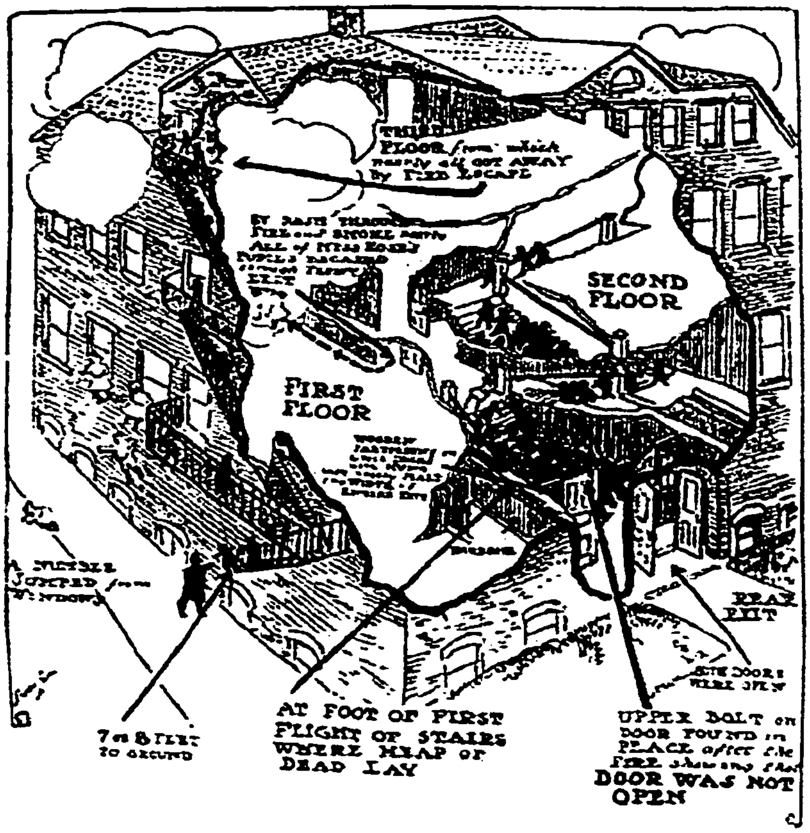



Fig. 4.22. Diagram of the Collinwood fire. [Marshall Everett, Complete Story of the Collinwood School Disaster and How Such Horrors Can Be Prevented (Cleveland: The N.G. Hamilton Publishing Co., 1908), n.p.].


Fig. 4.23. "The Fire Fiend." Cover illustration. [The American School Board Journal 35 (December 1907)].


Fig. 4.24. "Protect the Children." Cover illustration. [The American School Board Journal 36 (April 1908)].

Fig. 5.1. Architect unknown, West Manual Training School, Cleveland, Ohio, 1883. [William J. Akers, Cleveland Schools in the Nineteenth Century. Cleveland: The W.M. Bayne Printing House, 1901), n.p.].

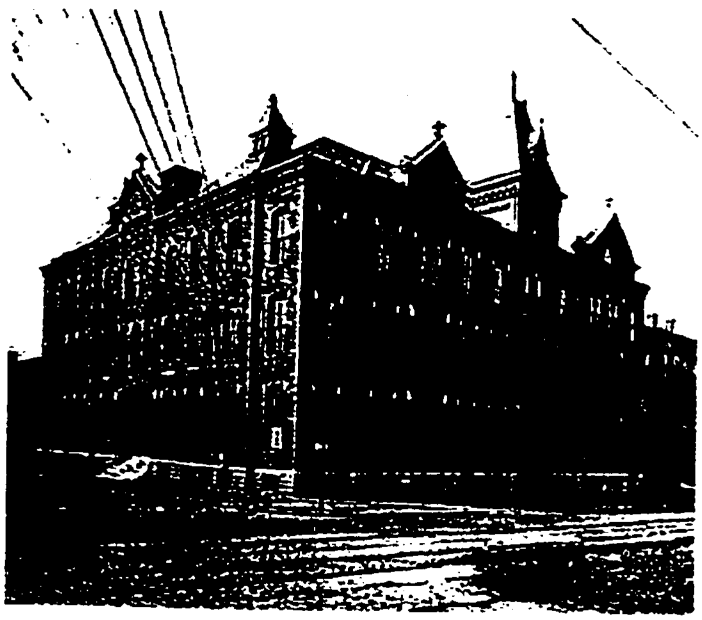


Fig. 5.2. Architect unknown, St. Louis Manual Training School, St. Louis, Missouri, 1879; 1882. [SLPSRC/A].

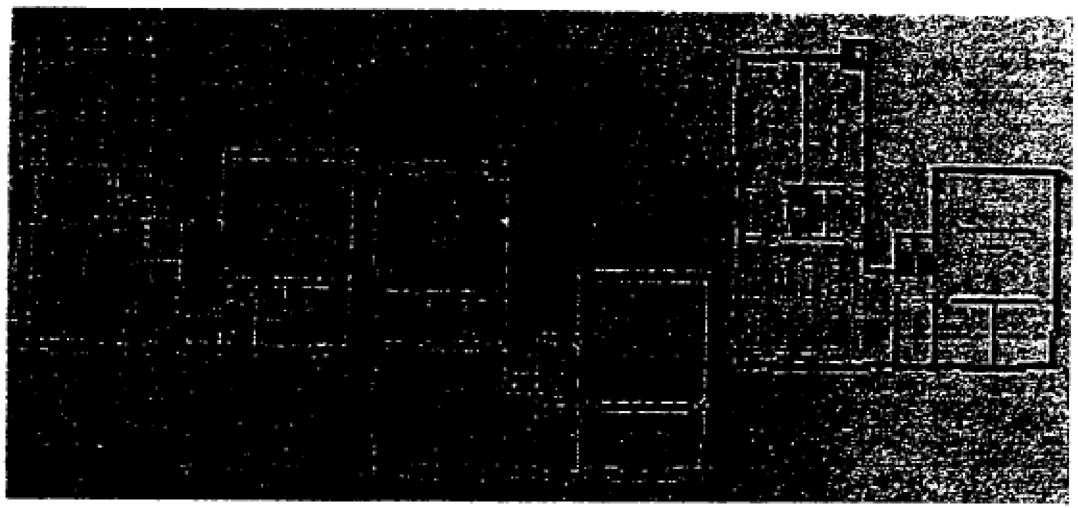


Fig. 5.3. St. Louis Manual Training School. First, second and third floor plans. [Wheelwright, School Architecture, 217].

Fig. 6.1 J. Lyman Silsbee, Thomas Jefferson School, Gary, Indiana, 1907-08. [Calumet Regional Archive, Indiana University Northwest, Gary, Indiana].

Fig. 6.2. William B. Ittner, Ralph Waldo Emerson School, Gary, Indiana, 1908-10. [Mills, American School Building Standards, 533].

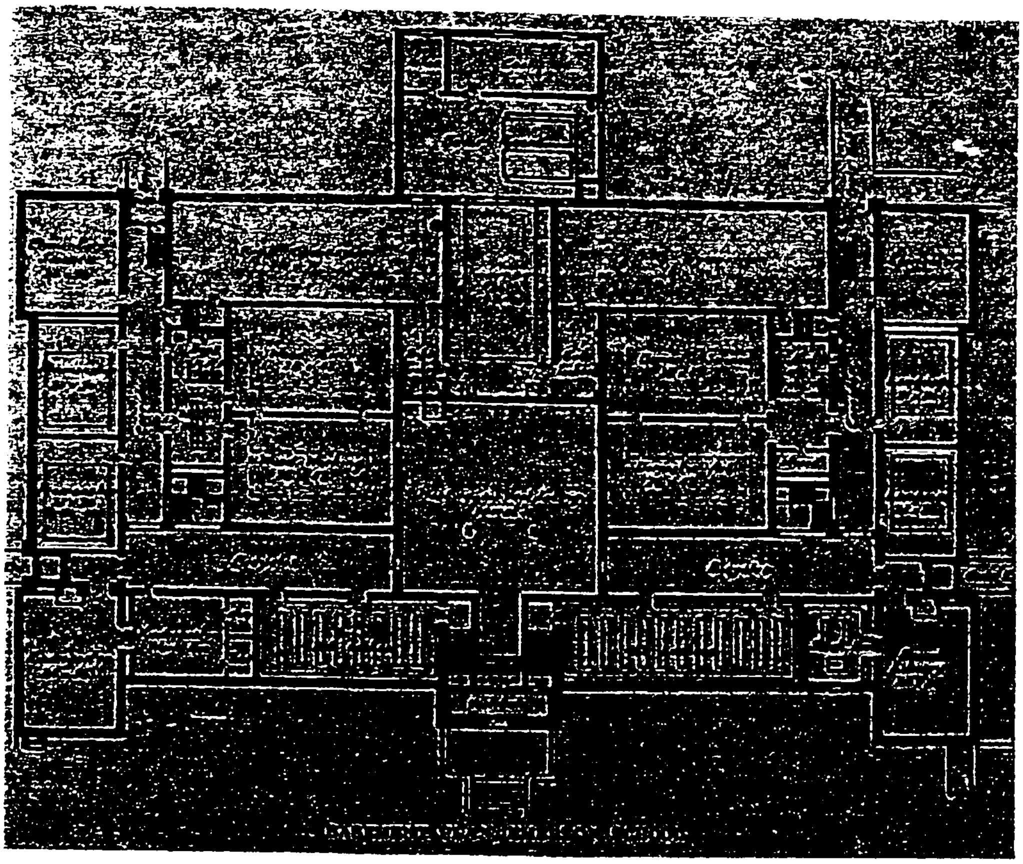


Fig. 6.3. Ittner, Emerson School. Basement plan. ["A Model American School," The American School Board Journal 40 (June 1910): 12.].

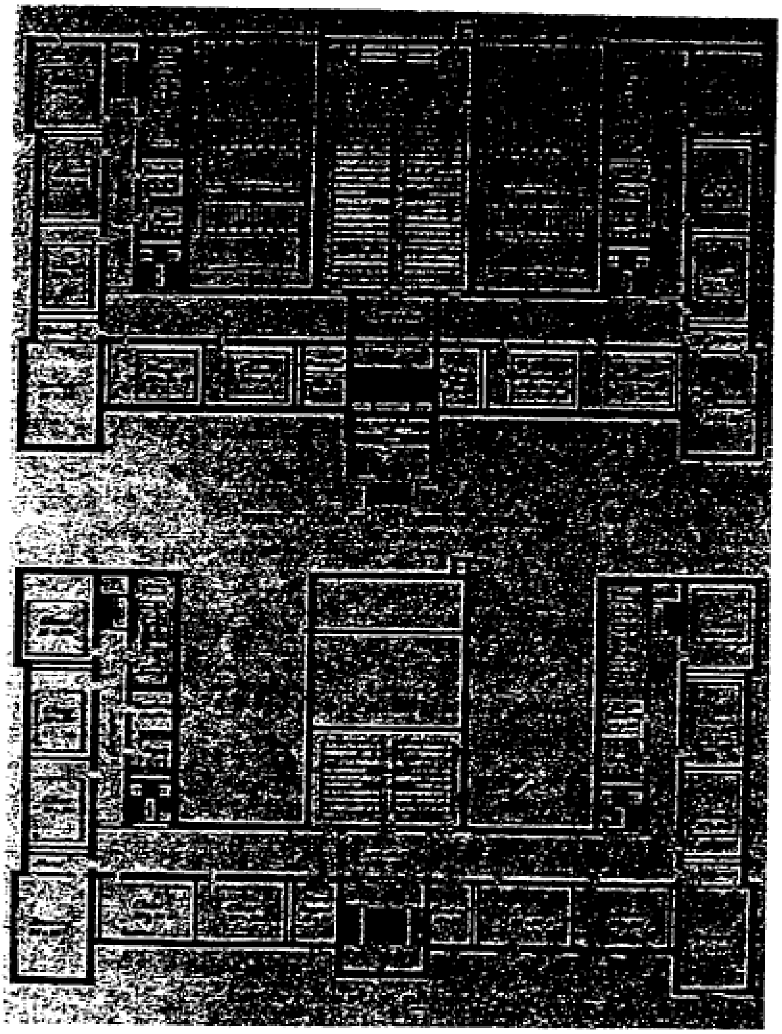


Fig. 6.4. Ittner, Emerson School. First and second floor plans. ["A Model American School," 13].

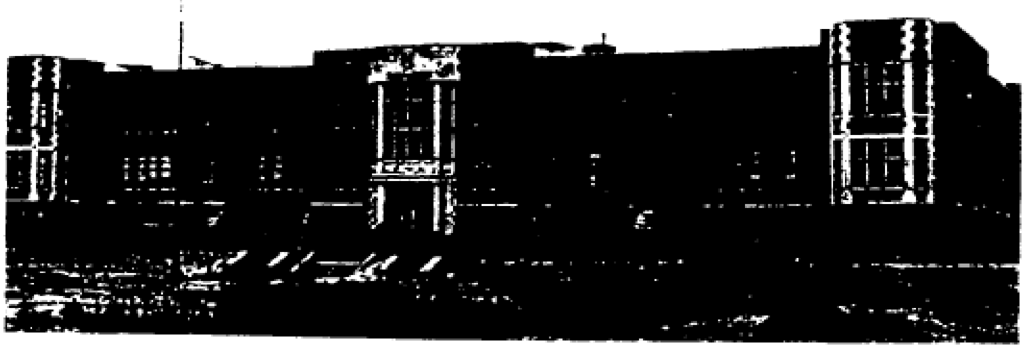
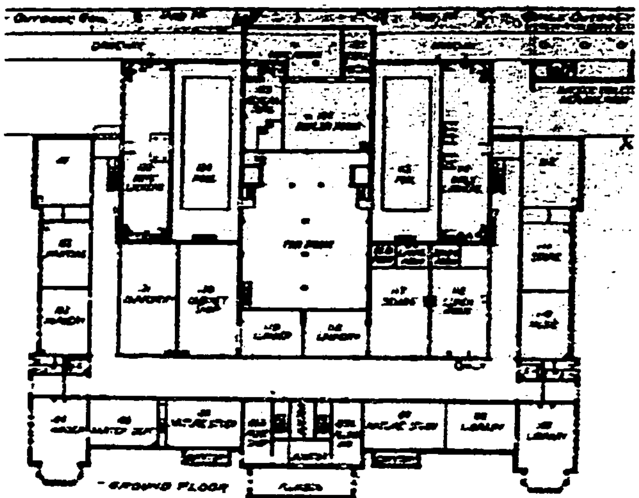
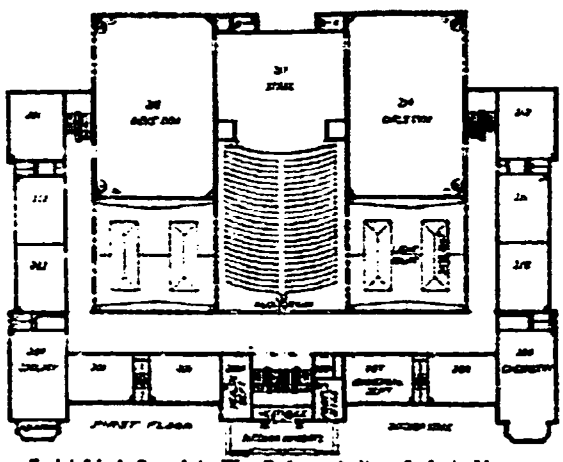


Fig. 6.5. William B. Ittner, Freidrich Froebel School, Gary, Indiana, 1911-12. [Mills, American School Building Standards, 537].




Froebel School, Gary, Ind. Wm. B. Ittner, Architect, St. Louis, Mo.




Froebel School, Gary, Ind. Wm. B. Ittner, Architect, St. Louis, Mo.

Fig. 6.6. Ittner, Froebel School. Ground and first floor plans. [Mills, American School Building Standards, 538-539].

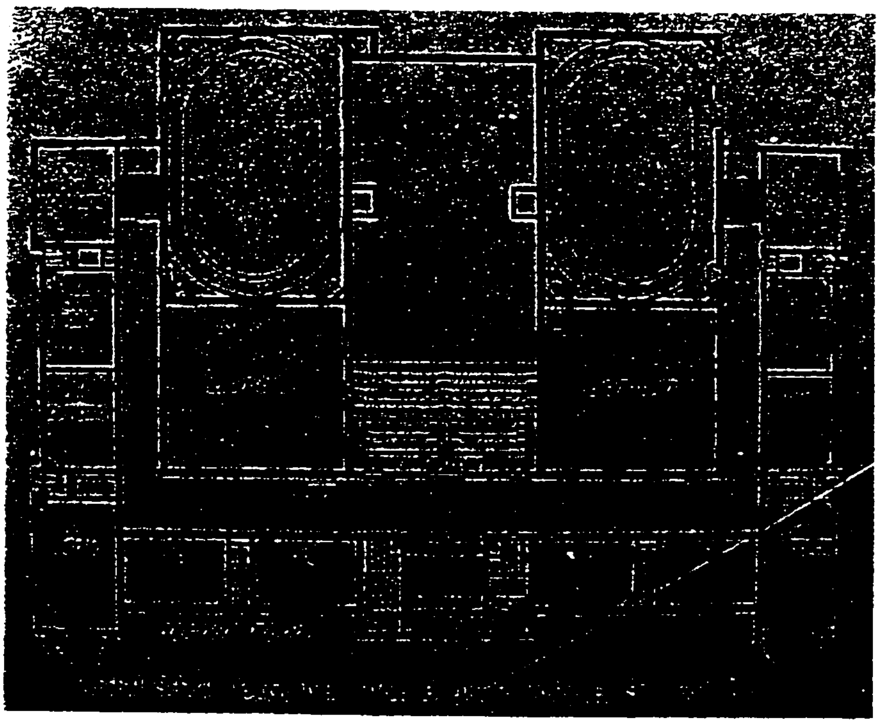


Fig. 6.7. Ittner, Froebel School. Second floor plan. [Mills, American School Building Standards, 540].

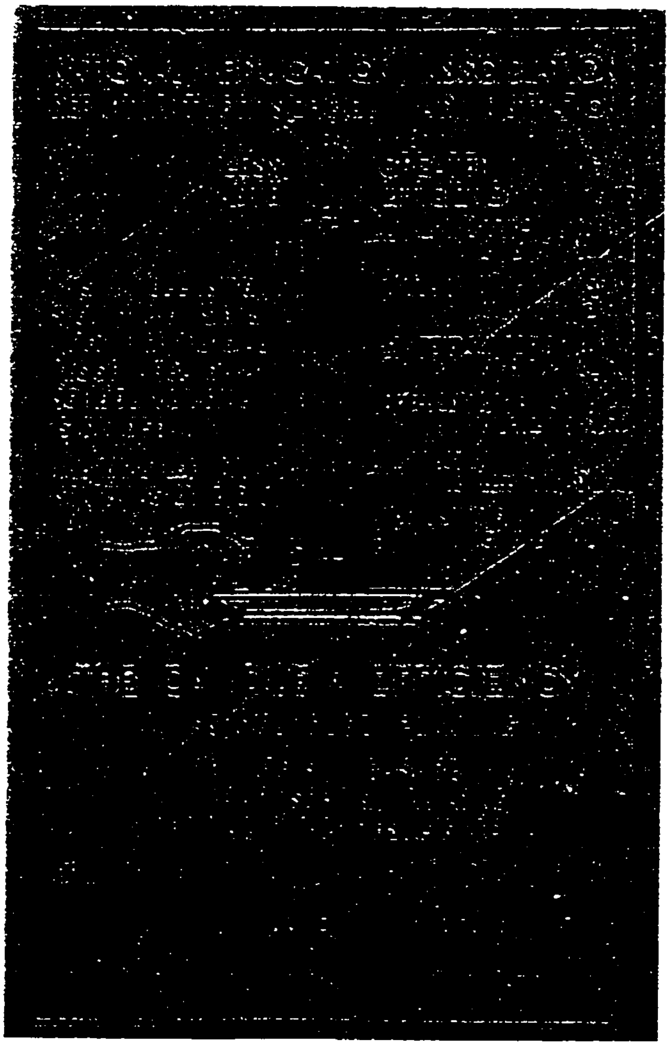


Fig. 6.8. "The Candle of Efficiency in Schoolhouse Planning." [Donovan, et. al., School Architecture, 573].

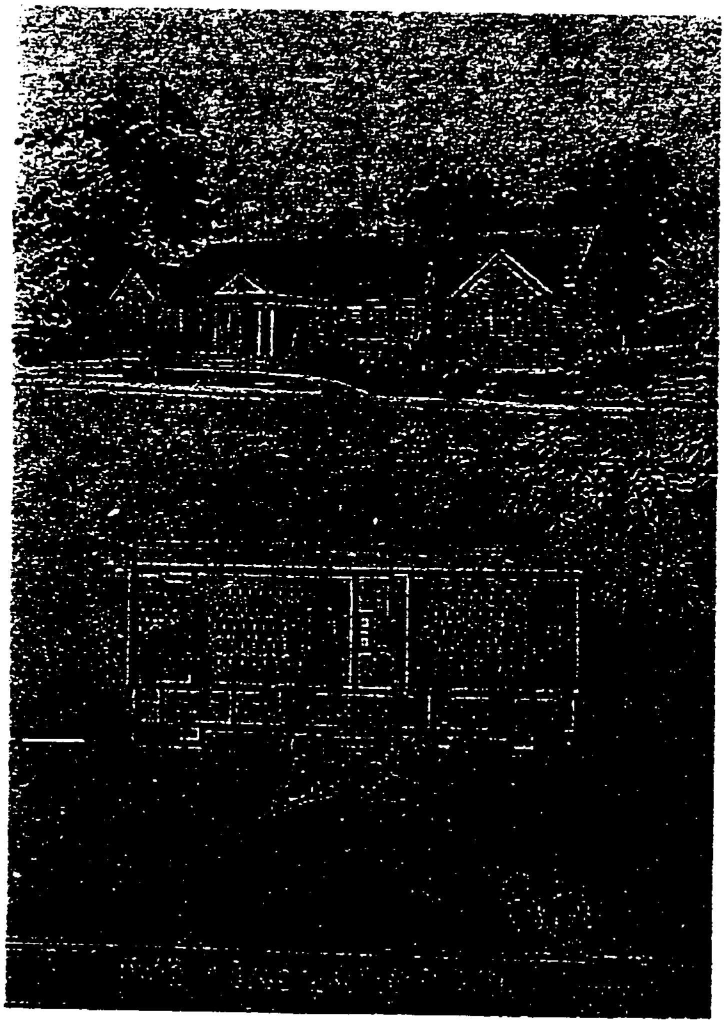


Fig. 6.9. Guilbert & Betelle, "Two Teacher School." [James O. Betelle, "Rural Schools for the State of Delaware." The American School Board Journal 60 (May 1920): 55].

Fig. 7.1. Assembly Hall. [Severance Burrage and Henry Turner Bailey, School Sanitation and Decoration (Boston, New York, Chicago: D.C. Heath and Company, 1899), Plate IV].

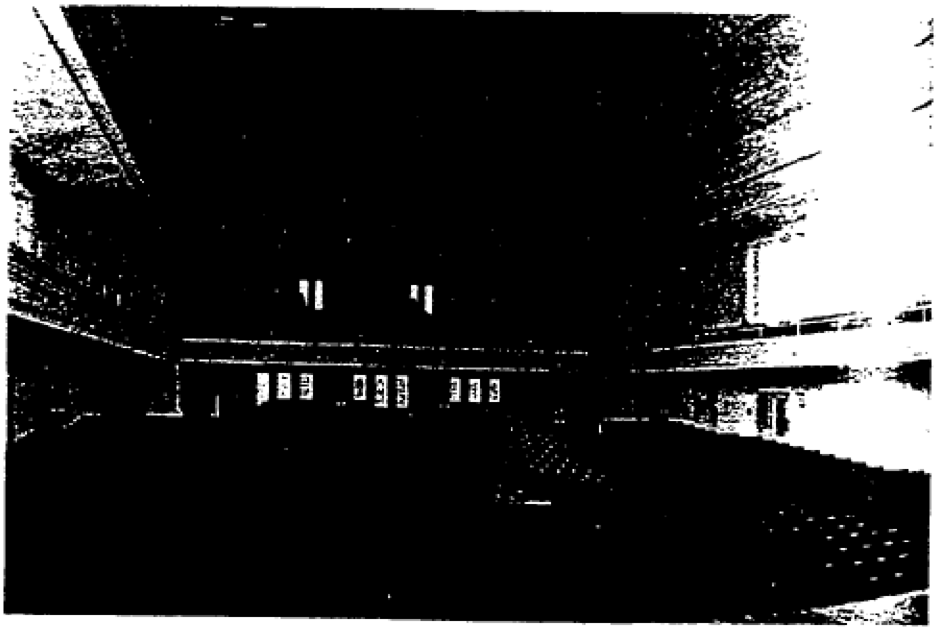


Fig. 7.2. Alfred H. Hussander, Carter Harrison High School, Chicago, Illinois, 1912. Auditorium. [Donovan, et. al., School Architecture, 335].

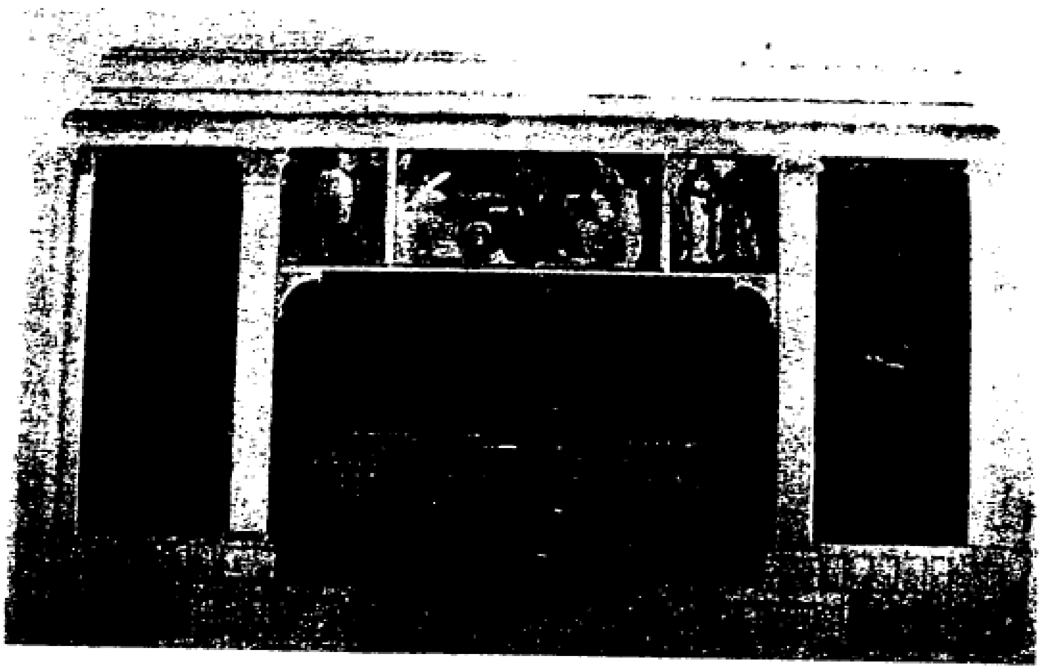


Fig. 7.3. Frederick L. Stoddard, James E. Yeatman Mural, James E. Yeatman High School, St. Louis, Missouri, 1904. [The Western Architect 10 (January 1907): n.p.].

Fig. 7.4. Frederick L. Stoddard, William McKinley Mural, William McKinley High School, St. Louis, Missouri, 1904. [Fiftieth Annual Report of the Board of Education of the City of St. Louis, Mo. (1903-1904), 242].

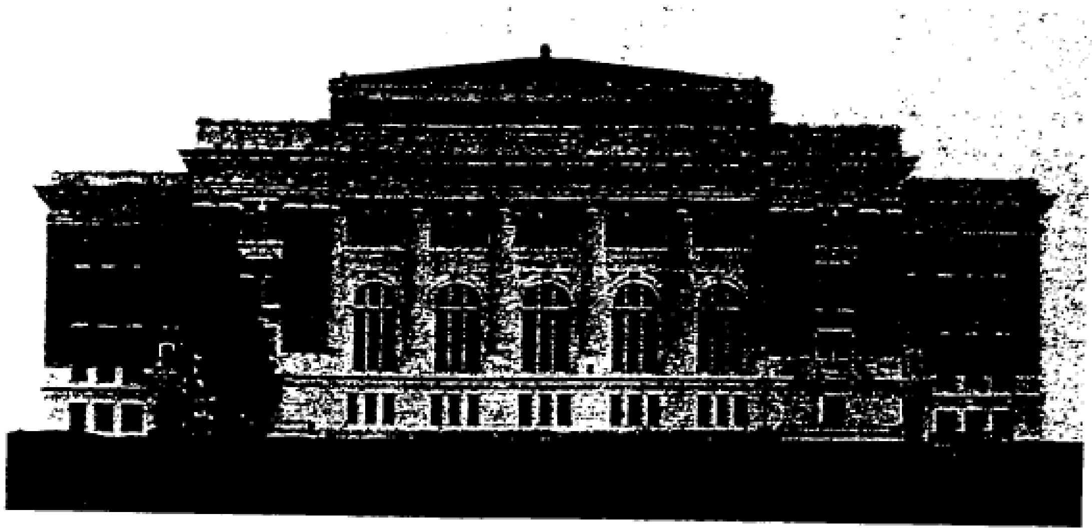


Fig. 7.5. Edgar Blair, Benjamin Franklin High School, Seattle, Washington, 1912. [William C. Bruce, High School Buildings (Milwaukee: The American School Board Journal, 1913), 22].

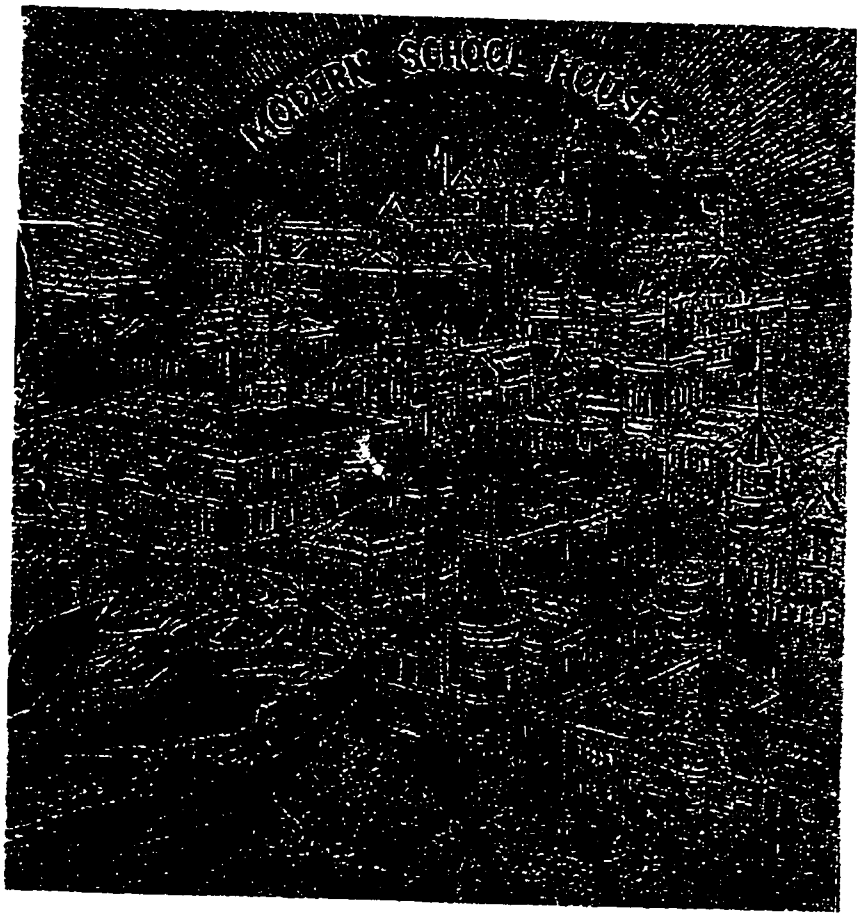



Fig. 7.6. Cover illustration. The American School Board Journal 11 (May 1896).

Fig. 7.7. Cover illustration. The American School Board Journal 61 (August 1920).

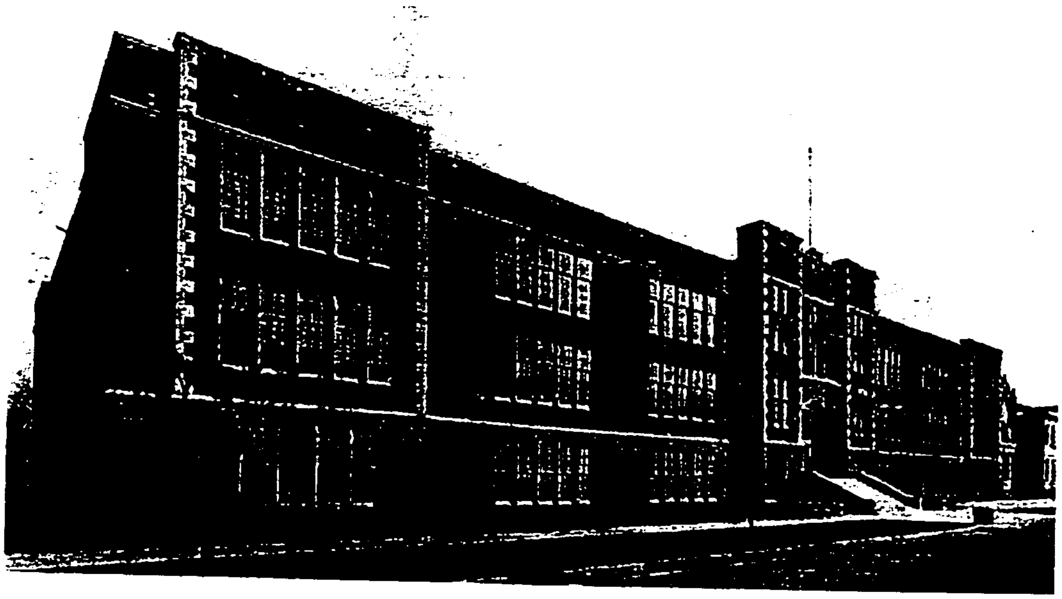


Fig. 7.8. William B. Ittner, Wichita High School, Wichita, Kansas, date unknown. [Bruce, High School Buildings, 63].

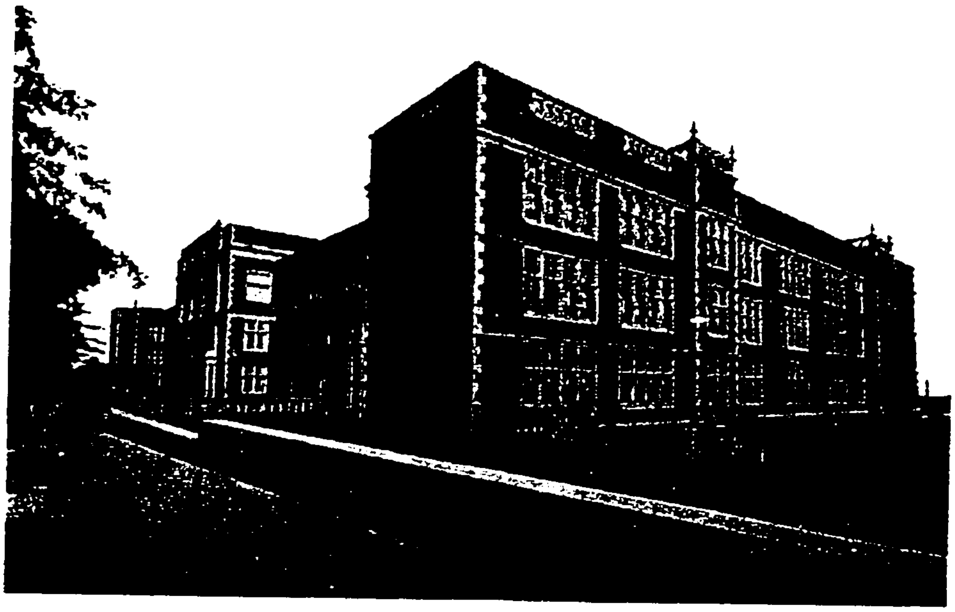


Fig. 7.9. William B. Ittner, Central High School, Washington, D.C., 1914-16. [Donovan, et. al., School Architecture, 52].

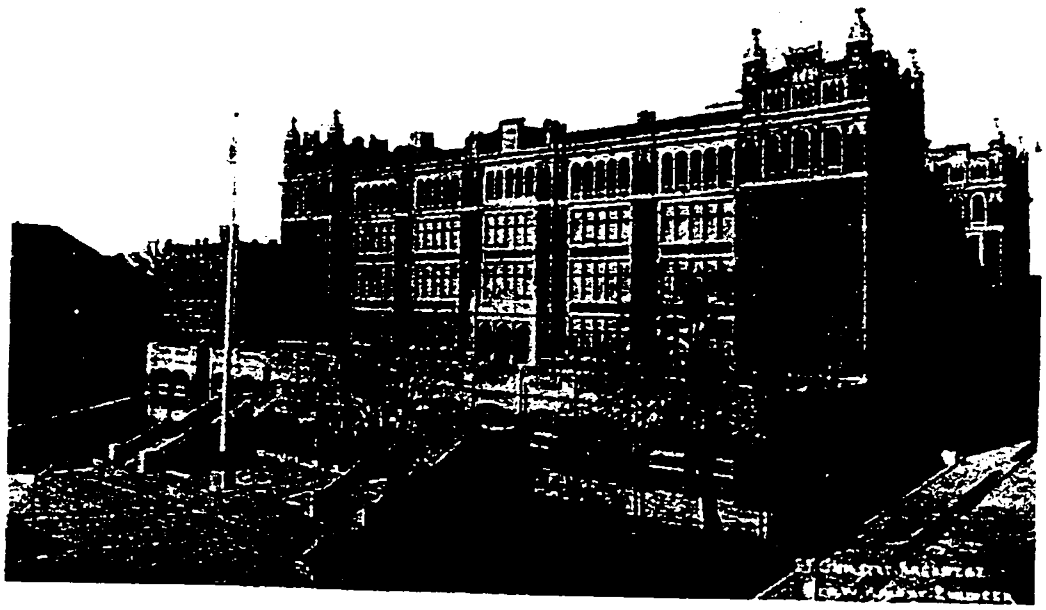


Fig. 7.10. E.F. Guilbert, Central Commercial and Manual Training High School, Newark, New Jersey, date unknown. [Bruce, High School Buildings, 47].

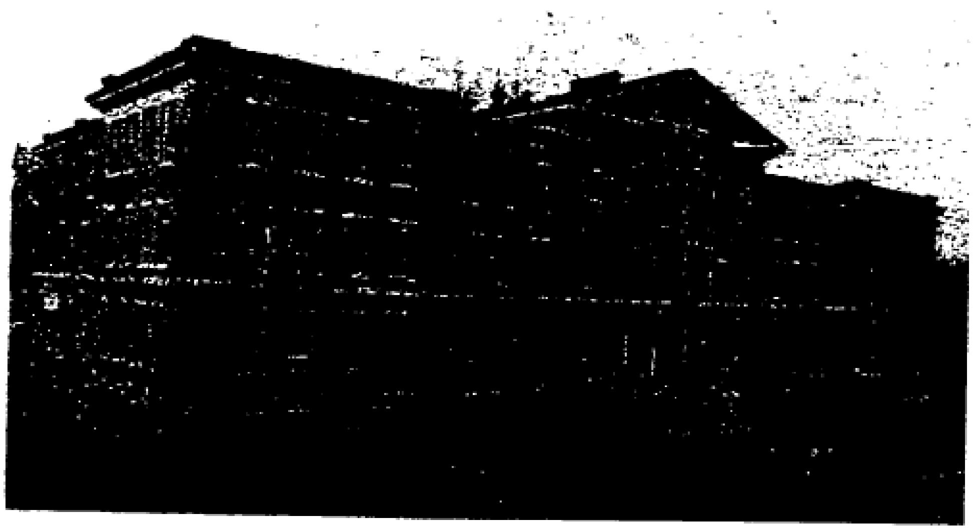


Fig. 7.11. Herbert D. Hale, South Boston High School, Boston, Massachusetts, 1902. [William George Bruce, School Architecture: A Handy Manual for the Use of Architects and School Authorities, 3rd ed. (Milwaukee: Johnson Service Company, 1906), 14].

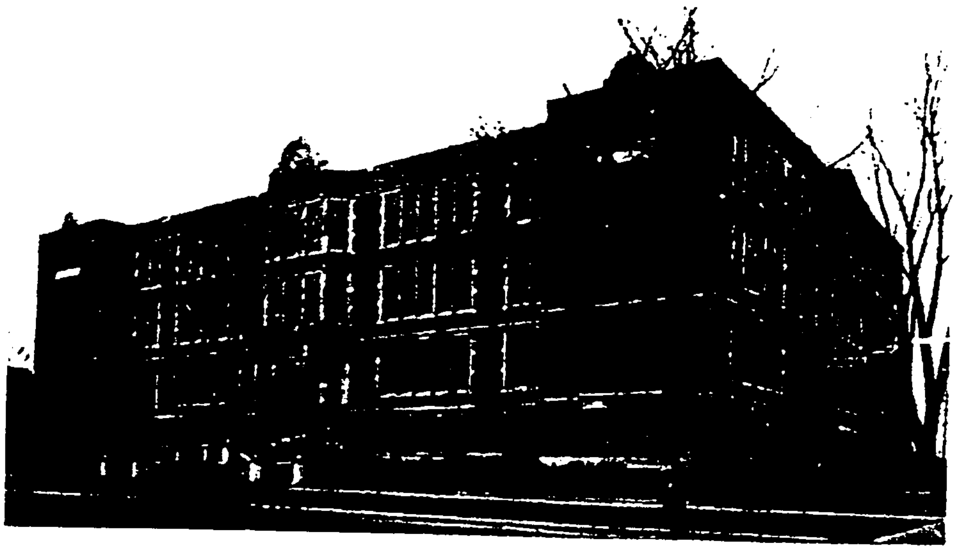


Fig. 7.12. Cass Gilbert, Madison High School, Madison, Wisconsin, 1905. [Bruce, High School Buildings, 67].

Fig. 7.13. J. Walter Stevens, Hughes High School, Cincinnati, Ohio, 1910. [Bruce, High School Buildings, 57].

Fig. 7.14. Vonnegut & Bohn, Shortridge High School, Indianapolis, Indiana, date unknown. [Bruce, High School Buildings, 89].

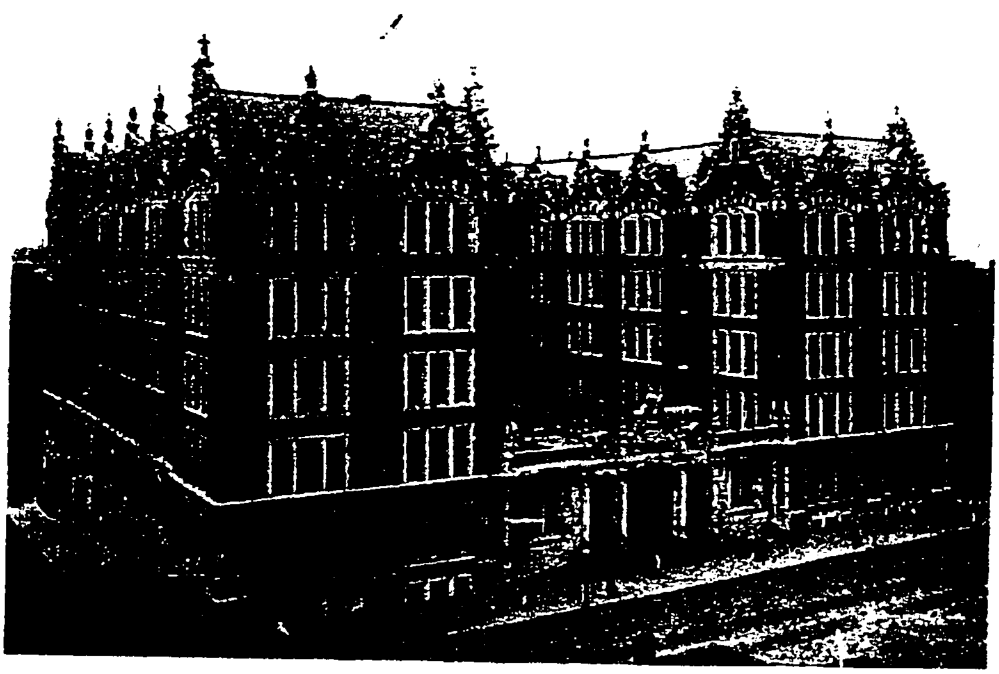


Fig. 7.15. C.B.J. Snyder, De Witt Clinton High School, New York, New York, 1906. [Bruce, High School Buildings, 21].

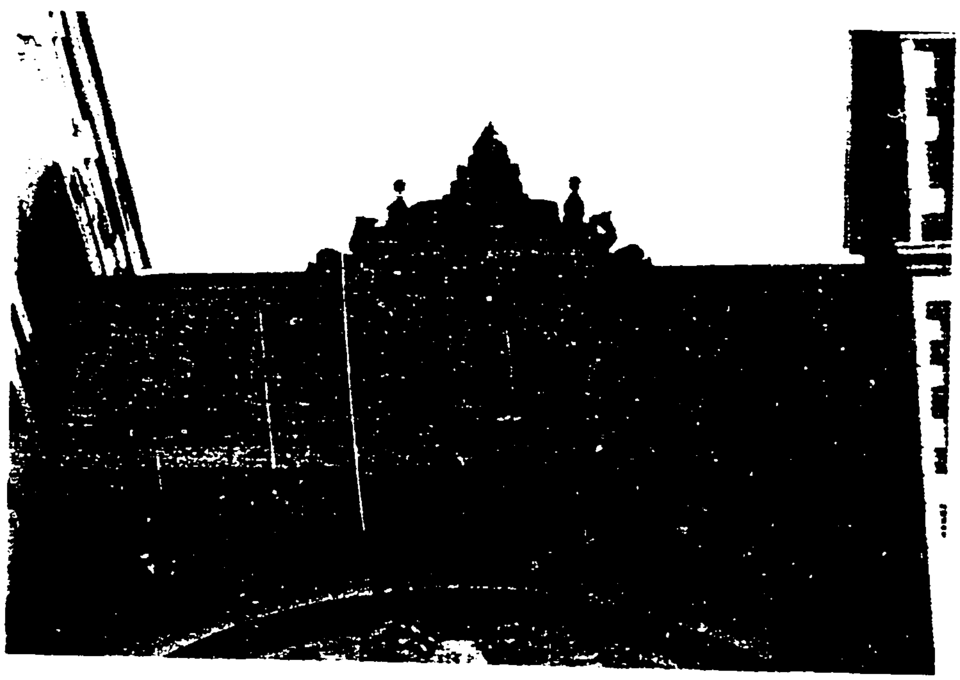


Fig. 7.16. Artist unknown, Ornamental group, James E. Yeatman High School, St. Louis, Missouri, 1904. [Author].

Fig. 7.17. Artist unknown, Pediment sculpture, Frank Louis Soldan High School, St. Louis, Missouri, 1910. [Author].

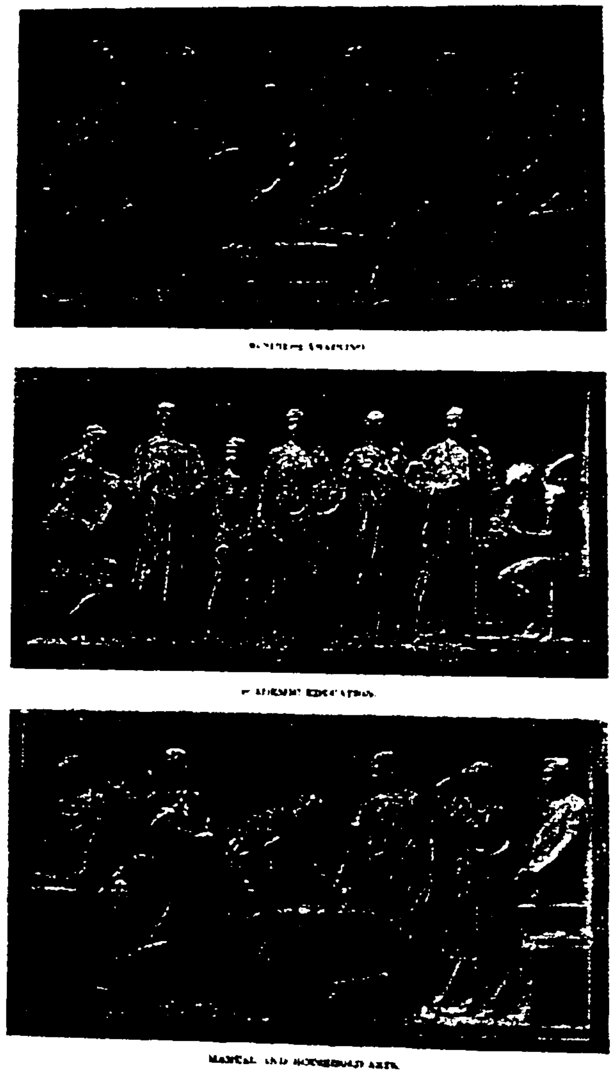


Fig. 7.18. George Julian Zolnay, Sculptural frieze, Central High School, Washington, D.C., 1914-16. ["An Impressive Frieze," The American School Board Journal 52 (January 1916): 18].