# THEORY STUDIES:
# ARCHETYPICAL PRACTICES IN AMERICAN K-12 SCHOOLS

A Thesis
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Master of Arts

by
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**Abstract**

Part of the Intypes (Interior Archetypes) Research and Teaching Project established at Cornell University in 1997, this thesis seeks to identify and name Intypes (Interior Archetypes) found in American schools for children grades 1 through 12. The project focuses on finding reiterative historic design practices that continue to shape our view and understanding of interior design.

The modern school building was born in the middle of the last century around the year 1950. Above all else, the features of school buildings are functional and practical, even as they continue to develop and expand due to the changing trends of education theory in America. While there has been a great deal of research into theories of learning and some investigation into the environmental needs of students, there has been little research put forth on the history of school design or on common interior design practices that serve a functional purpose in school buildings.

This study is the first of its kind to systematically identify and categorize professionals' design practices as they are used in school buildings. In tracking the development, and researching the historic precedent of these Intypes, a design vocabulary is developed, which can be used in both design instruction and professional practice. This encourages greater interaction between academia and the school system, as well as stimulating conversation within the field of architecture and interior design.

In this thesis, five archetypical practices have been identified. Two of these Intypes, Showcase Stair and Marching Order, have been found in other practices. New Intypes identified in this study that may have applications to other practices include Two by Two, Circle Round, and Sun Spine. Each of these five Intypes has been carefully developed historically through a chronological survey of primary and secondary sources. Subsequently, the evolution of these archetypes has been analyzed and recorded, with the history ranging from ancient Greece to the turn of the 20th century. Existing site surveys of schools reveal that all of these practices continue to be found in schools today.

These Intypes have been identified in different spaces within the school, from classroom, to hallway, and including library and lunchroom, with the primary objective of manipulating space and, in the case of Sun Spine, natural lighting.

Research on these Intypes will be available through the website www.intypes.cornell.edu. This site facilitates further research and teaching, with the added goal of making design history and practice accessible to all, student, historian, and practicing professional alike.

## Biographical Sketch

Katherine E. Mooney was born and raised in Harrisburg, Pennsylvania and matriculated at Cornell University in 2007, receiving a Bachelor of Science in Design and Environmental Analysis in 2011. With the hope of furthering her knowledge of design history and theory, she pursued her graduate study at Cornell focusing her attention on the design of K-12 schools. She currently resides in Washington, DC.

To my family and Daniel,
for always looking on the brighter side of things.

**Acknowledgements**

I owe a great deal and a sincere Thank You to Professor Jan Jennings, both as an undergraduate and a graduate student. She peaked my interest in design history and encouraged me to pursue my interests further. She has taught me about the role design plays in history as well as in my daily life, for which I am forever grateful. Many thanks to Professor Lorraine Maxwell for her support, insights, and expertise. Additional thanks to Leah Scolere, for her advice and encouragement and mentoring throughout the past few years. Thank you to Jimena for her cupcakes and encouragement, especially when the going got tough.

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**Chapter 1**
Introduction

## 1.0 The Study

This thesis focuses on the establishment of previously unidentified archetypical interior design practices in kindergarten through grade 12 (K-12) public schools in the United States. These Intypes (interior archetypes) are part of the ongoing Intypes Research and Teaching Project, started in 1997 at Cornell University by Professor Jan Jennings.

By studying the interior design and architecture of American kindergarten through grade 12 schools, this thesis is the first in the Intypes Project to identify reiterative historical archetypes in educational settings. Through extensive analysis of trade journals over the last sixty years, this study systematically develops a series of educational Intypes based on common, repeated practices in educational interior design. With the help of secondary sources, the origins of these practices are developed and further defined.

In addition to providing greater understanding of interior practices, this thesis provides a typological language for the practice of interior design. As education continues to be a hotly debated topic in the twenty-first century, this study provides a value viewpoint from which to analyze the evolution of the modern school building. With deeper comprehension of a school's physical interior environment, designers may be better able to create a functional, efficient educational facility.

The organization of Chapter One is as follows: an introduction and explanation of the study's premise (1.1), a brief history of the of education practice (1.2), a description of the Intypes Research & Teaching Project (1.3), the methodological and theoretical approach (1.4), a literature review (1.5), an analysis of this thesis's findings (1.6), and a conclusion of the thesis (1.7). Following Chapter One, there is a chapter for each individual Intype.

### 1.1 Introduction and Premise

American schools stand apart from their international counterparts, influenced by the waves of immigrants that have traveled to this country and by the uniquely American cultural customs that have developed since its birth as a nation. The American kindergarten through high school system is, in its present state, individual to the United States; most countries have their own unique method and system of schooling, complete with varying curriculum, values, culture, and the like. Therefore it is appropriate that this thesis studies American K-12 schools exclusively.

While K-12 schools in architectural trade journals are occasionally grouped with higher education facilities, this study looks specifically at buildings that serve K-12 students. While higher education could undoubtedly be studied for the Intypes Research and Teaching Project, it is inappropriate to group it with K-12, because both the populations they serve, and the functions they maintain, are completely different. K-12 is a uniquely crafted experience meant to guide its students from childhood to

adulthood, teaching not only academic subjects, but also social skills and cultural values. For this reason, this study examines both public and private K-12 schools. Despite their differences in funding, both public and private schools deliver the same basic skill sets and does of American culture, in addition to feeding into the same university pool at their terminus.

Both public and private school K-12 schools are typically broken down into three groups: primary schools, serving kindergarten through grade five ( ages 4-5 through 9-10); middle or junior high school, serving grade 6 through grade 8 (ages 10-11 through 12-13); high school, serving grades 9 through 12 (ages 13-14 through 17-18). Occasionally, middle school and high schools are combined, to form a junior and senior high school or secondary school. In some private school communities, a lower school serves K-5, while an upper school serves 6-12.

Little has been written about school design from an architectural designer's point of view since William W. Caudill's books on school architecture, such as *Toward Better School Design.* The majority of Caudill's books were published in the decade of 1950. While there has been a significant amount of scholarly research about school planning and design in more recent decades, most of these have sought to influence modern school design through environmental and behavioral research (Rotraut Walden's *Schools for the Future*) or educational theory (Roland S. Barth's *Open Education and*

*the American School*); little has been put forth from the design community in regard to how schools should be designed.

This thesis is the twenty-first in a series of Master of Arts theses at Cornell that have contributed to the Intypes Project, and it is the first Intypes thesis to focus on the interior design and architecture of Schools K-12 as a practice type. It is also the first Intypes study to examine government funded spaces. This thesis on education will likely inform further research on education environments, particularly higher education, as well as institutional settings, and other spaces where spaces seek to shape behavior.

### 1.2 A Brief History of Education

The history of education in America begins with some of its first settlers, followers of the Protestant sect of Christianity, the Puritans. In the 1620s, these American colonists viewed schools and education as key components needed to understand Christianity. Schools existed so that children could learn to read, and thus understand the Bible, a tenet of the Protestant faith. True to its Puritanical roots, the state of Massachusetts was the first colony to pass legislation involving education, with the goal that the heads of household would teach those under their roof to understand Christianity as well as their nation's laws. In these early communities, "the first schools were set up in either

private homes or churches... home schooling and informal education were very common in colonial America."[1]

As the colonies grew, so did the colonist's views of and goals for schools. By the time Benjamin Franklin attended school in the 1720s, schools taught more than just reading for the sake of Christianity. As Americans sought to distance them selves from Great Britain following the Revolution, legislature concerning education was discussed and introduced. Schools began to be viewed as vehicles not only for literacy, but also moral values. During this time period, "the architecture of the small one-room county school building was an appropriate design response that served the basic educational and social needs of small rural communities."[2]

It was not until the early 19th century that legislation in schools becomes a popular subject again. Horace Mann, the Secretary of the Massachusetts State Board of Education, believed that each and every child has the right to education. As such, Mann advocated for publicly funded schools, receiving a great deal of opposition and criticism from the state of Massachusetts. However, Mann's opinions were grounded in his Protestant faith, something that incoming Catholic immigrants of the period

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[1] J.W. Frazer, *The School in the United States: A Documentary History* (New York: Routledge, 2009), 1-16; C. Kenneth Tanner and Jeffrey A. Lackney, *Educational Facilities Planning* (Boston: Pearson Education, Inc., 2006), 4.

[2] Frazer, *The School in the United States*, 4.

disagreed with, resulting in the establishment of Catholic parochial schools throughout the United States.[3]

In this period “students [were] segregated by age into a graded organization... one hundred students might be housed in a single classroom, [which], other than corridor spaces, was often the only type of space in the school.” Schools in this period were purely functional, offering little support outside of academic pursuits. However, toward the end of that century, “hallways were widened to accommodate increased traffic flows, auditoriums were built to support whole-school events, administrative offices were included and cloakrooms were added to classroom layouts.” Slowly, schools became more friendly, humanistic environments.[4]

In 1892, the National Education Act resulted in the appointment of the “Committee of Ten” which was led by Harvard University President Charles Eliot. Although only a quarter of the six or seven percent of the nation’s youth attending high school matriculated to college, the Committee created a standard for college entrance requirements. Eliot pushed beyond the scope of the Committee to regularize the high school curriculum, thereby supporting college admittance. Slowly, education in the US took shape, becoming increasingly regulated and consistent throughout the states.[5]

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[3] J.W. Frazer, *The School in the United States: A Documentary History*, 44-72.

[4] Tanner and Lackney, *Educational Facilities Planning*, 7.

[5] J.W. Frazer, *The School in the United States: A Documentary History*, 139-159.

As the country starts to industrialize, the population swelled with incoming immigrants, the US government saw this as an opportunity to indoctrinate the children of these new citizens with a common culture through schooling. Thus, "the common school movement and large multi-storied classroom buildings provided the necessary educational and architectural response at that time."[6]

Shortly after the turn of the 20th century, a progressive movement led by John Dewey, introduced the idea of "school architecture [that utilized] more child-scaled, flexible, and open environmental settings." Dewey's goal was to make education an experience, rather than something to be endured. Slowly, more auxiliary spaces were added to schools to support extracurricular activities. The American school system as we know it today had begun to form.[7]

Dewey's humanistic, progressive approach continued further into the 20th century when some practitioners discerned that learning might have some relationship to the school environment. "In 1946, fearing that minimum standards would become maximum practice, [a council of school planners] emphasized minimum standards and promoted basic principles of sound educational facility planning with the intent of encouraging

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[6] Tanner and Lackney, *Educational Facilities Planning*, 4.

[7] Tanner and Lackney, *Educational Facilities Planning*, 7-8.

innovation and creativity in planning." From this point on, modern school systems prevailed.

The decade of 1950 was a turning point from which American schools are considered to be a part of the modern architectural movement. According to the architect William Caudill, "1950 represents a year in history when for the first time a large majority of architects and educators throughout the entire nation got together to try to solve their common problem. . . [it] brought a new light to educational architecture."[8]

The decade of 1960 also "witnessed the most dramatic educational reform in America's history in both educational reform in America's history in both educational research and the practice of curriculum and instruction." In the 1960s open plan schooling was implemented, as well as a variety of new concepts in school architecture in planning, shaped by new theories in teaching. These changes slowed in the decades of 1980 and 1990, returning to more traditional styles.[9]

### 1.3 The Intypes Research and Teaching Project

The Intypes (Interior Archetypes) project began in 1997 at Cornell University. The project creates a typology of contemporary interior design practices derived from

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[8] C Tanner and Lackney, *Educational Facilities Planning*, 11, William W. Caudill, *Toward Better School Design* (Ann Arbor, Mich.: F. W. Dodge Corp., 1954), 17.

[9] Tanner and Lackney, *Educational Facilities Planning*, 11.

reoccurring historical interior design methods and strategies that span time, style and culture. Through research, design traits are identified and named, generating a design specific vocabulary, and placing these practices in historical context. Intypes identify contemporary design practices that have not been named, thereby providing designers with an interior-specific history and contemporary design language. The project also seeks to establish a digital database of interior architecture photographs available online at www.intypes.cornell.edu.

This thesis is the twenty-first Master of Arts thesis to have contributed to the Intypes Project at Cornell, and it is the first Intypes' thesis to focus on the interior design and architecture of schools as a practice type. Very little has been written about the history of school design, although it is a topic that affects nearly every person educated in the United States. It is hoped that this study will inform further research about the interior design of education environments, particularly higher education, as well as institutional settings, and other spaces where spaces seek to shape behavior.

### 1.4 Methodological and Theoretical Approach

As a part of the Intypes Research and Teaching Project, this study follows the project's methodological approach to find and group interior design practices.

The methodological approach of the thesis is historical, theoretical, and critical. Thinking about design precedents as a continuum, or a series of replications, owes

much to George Kubler's *The Shape of Time*. Kubler believes that every important work can be regarded both as historical event and as a hard-won solution to some problem. To Kubler, every solution links to a problem to which there have been other solutions. As the solutions accumulate, a conception of a sequence forms. The boundaries of a sequence are marked by the linked solutions describing early and late stages of effort upon a problem. In the long run, a sequence may serve as scaffolding for new design.[10]

Other theorists, such as Robert Maxwell approach design history similarly. According to Maxwell, the dialectic of the new and old is a complex one, "for within the new there is something of the old, which precisely renders the new recognizable; and within the old the new is already pregnant."

There are four stages to the approach:

1.4.1. *To examine the published work of professional designers as composites of traits, research begins with tracing a series of design practices in approximately in 1,200 issues of design trade magazines.* Trade magazines are vitally important to the development of Intypes, because the field of interior design is temporally limited. In contract design an installation remains approximately seven years, less for

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[10] Jan Jennings, "A Case for a Typology of Design: The Interior Archetypes Project," *Journal of Interior Design* 32, no. 3 (2007): 53-55; George Kubler, *The Shape of Time: Remarks on the History of Things* (New Haven: Yale University Press, 1962), 31-82 in Jennings, "A Case for a Typology of Design," 49; Robert Maxwell, *Polemics. The Two Way Stretch: Modernism: Tradition and Innovation* (London: Academy Editions, 1996), 12 in Jennings, "A Case for a Typology of Design," 48-68.

hospitality design in a good economy. Therefore, design and architectural trade magazines provide a longitudinal record of contract work. For example, *Interior Design* began publishing in 1932; *Architectural Record* has been in continuous publication since 1891. Other design trade periodicals are also surveyed, including those in areas of specialization, such as hospitality design, as well as international titles.

1.4.2. *Isolating these traits through analysis of published work results in identification, definition, naming and representing examples chronologically.* Each Intype name and icon must mean something to those who recollect them. Terms are mnemonic. The processes of naming Intypes, visual representation and definition are about reduction. Naming also represents a translation of design practices into a formalized language that stems from research, but with the intent to be accessible to a diversified group of users. When an Intype term is used without explanation or translation or gloss, it is considered an accepted part of design language. The diverse ways in which Intypes will be put to use makes it a language. If the language is engaged by the public, then Intypes become a productive language.

1.4.3. *Intypes under consideration are reviewed in context of on-site observations.* When types begin to take shape, researchers conduct site visits in order to compare printed images with built works. Site visits to the school category are of special importance, because they reveal actual, everyday practices. For example, because of

their modularity and lightweight quality, classroom desks are frequently moved and rearranged in actual practice, but appear perfectly arranged and aligned in trade magazine photographs.

The sites visited for this study include Cumberland Valley High School (Mechanicsburg, Pennsylvania), Good Hope Middle School (Mechanicsburg, Pennsylvania), Cooper Middle School (McLean, Virginia),Churchill Road Elementary School (McLean, Virginia), and Flint Hill High School (Oakton, Virginia).

1.4.4. *Intypes are published on the project's web site, www.Intypes.Cornell.edu.*[11] Digital is how designers work. New knowledge is visualized as icons and an abundance of photographs. The website disseminates research about each Intype, the practice types in which it is found, general and application definitions, sequence and evolution throughout history, environmental effect, and supporting chronological photographs derived from primary sources. The web site is free and open to everyone —researchers, professionals, and students. The Intypes database is organized alphabetically, by element, and by practice type. The Intypes website also provides additional information about the leading research group, the student scholars, and published articles about the project.

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[11] Jan Jennings, "A Case for a Typology of Design: The Interior Archetypes Project," *Journal of Interior Design* 32, no. 3 (2007): 53-55.

## 1.5 Literature Review

The sources used in this thesis are divided into two broad groups, primary sources and secondary sources.

### 1.5.1. *Primary Sources*

Primary sources for this thesis include about 1,000 issues of the trade magazines *Architectural Record, Progressive Architecture,* and *Interior Design.* While not remodeled or redesigned as frequently as some practice types, schools typically undergo changes over time as district needs change and class sizes expand or contract. Trade journals capture important moments and movements in school design, providing an historic basis to establish a longitudinal and chronological sequence for each Intype.

*Architectural Record* is one of the oldest publications available on modern architecture and is well over a hundred years old. Articles from this publication traditionally feature analyses of building plans and shell materials in addition to reviews of interior environments. This publication was responsible for the bulk of my primary source research. With issues printed every month, *Architectural Record* also occasionally releases smaller, practice-specific issues once or twice a year. At least every two years, *Architectural Record* features schools as the main topic of an issue, with several schools in each feature. The decade of 1950 featured more schools per issue than any other decade, with the fewest featured in the decade of 1970. In recent years, schools

have been featured with more frequency, though the ratio of private and charter schools to public schools has increased significantly. Issues from 1948 to 2012 were examined.

*Progressive Architecture* halted publication in 1996, but before then, it provided detailed accounts of modern architecture, with a conceptual project analysis and critical review of projects accompanied by several images in each article. Occasionally, the publication featured school design in an issue, though these occurred only once every four to five years. Issues from 1960 through 1980 were reviewed for the purpose of this thesis, primarily to provide further support to Intypes found in *Architectural Record.*

*Interior Design* has over 1,000 issues to date and provides documentation for a variety of practice types. In a typical article, the conceptual design of a project is described, as are the interior finishes and furniture. While *Interior Design* documents many practice types and contains a wealth of information about interior design, it contains very few articles about schools. Although every issue from 1950 to 2012 was examined, only one article on schools was used from this source.

### 1.5.2. *Secondary Sources*

Secondary sources were typically used to ground each Intype in historic practices or to further understand its effect on behavior and the environment. Books spanned a gamut

of subjects, ranging from those written about school design, education theory and practices, school legislature, to cultural trends, glass curtain walls, Grecian amphitheaters, to name a few. Because research on historically grounded school practices is non-existent and books on historic school design in general are few and far between, these additional sources were necessary to delve into the reasoning behind practices and to further understand the historic basis behind school planning and design decisions.

William W. Caudill's, *Toward Better School Design* (1954), describes the functional requirements of schools, their typical uses, as well as basic design and engineering needs of schools. Not only does Caudill describe and depict typical classroom layouts, he goes so far as to create a list of the ways schools must seek to further develop their students, both intellectually and socially. Caudill also focuses on the role that architecture plays in developing a student's sense of beauty, but points out that architecture should also be functional and cost-saving. As this book spoke from the perspective of a designer, it was invaluable in understanding the methodology behind certain designs in the classroom. Caudill's firm was among the first to implement the Intype Sun Spine in schools and his book provided reasoning for its use.

*Schools for the Future* (2009), edited by Rotraut Walden, links design practices in schools to social science research, explaining how the environment affects students' behaviors and actions. Providing information regarding both environmental factors and

architectural requirements, Walden describes, piece by piece, the requirements of a functioning, healthy, attractive school. The book also illustrates the history of schools in America and details some of the differences between American and German schools. *Schools for the Future* was particularly helpful in developing the Effect section of each Intypes chapter.

*Educational Facilities Planning* by C. Kenneth Tanner and Jeffrey A. Lackney (2006) furnishes a broad history of school design, from its origin in America to educational trends that have affected design in the last sixty years. In addition, the book gives comprehensive principles for planning an educational facility. This book provides a unique blend of both interior design strategies and operational functions of schools.

Thomas Thiis-Evenson's *Archetypes in Architecture* (1987) describes the functions of building components in terms of space and form, as well as the origins of such spaces. He also shows examples from architecturally significant buildings as he describes their functional components. This book was also helpful both in developing histories and origins of Intypes, but also in the Effect section of the book to further an Intype's perceived historic effect.

Francis D.K. Ching's *Architecture Form, Space, and Order* (1996) does as its title suggests and describes building elements in terms of form, space, and their order in the environment. Ching's sketches further illustrate his descriptions of how architectural

components suggest order, boundaries, behaviors, and shape space. This book was similar to Thiis-Evenson's in that it breaks down architecture into digestible components, explaining their effects both on behavior and space.

*The Image of the City* by Kevin Lynch (1960) illustrates how people perceive environments. While Lynch's observations are within the context of a city, they are no less helpful in depicting how people interact with an interior space. The book describes how people use space to guide them, creating nodes, districts, and paths to make sense of their surroundings. I was able to apply Lynch's descriptions to interior space, allowing for greater understanding to the effects of structures in wayfinding and manipulating space.

Other secondary sources included books and studies specific to the histories and effects of each individual Intype. Books on open plans in schools, the history of the staircase and of glass curtain walls, and on Grecian amphitheaters were all used to further this study.

Intypes theses created by previous graduate students at Cornell University were incredibly helpful and provided resources to understand the origins and effects of developed Intypes. They provided a benchmark and goal against which new Intypes could be measured. Several particularly relevant theses are mentioned within the individual Intypes chapters.

## 1.6 Analysis of Findings

Research generated in this thesis resulted in the identification, naming, and development of five school archetypes. Two of these Intypes were identified by previous Intypes researchers: Showcase Stair and Marching Order; the practice types they have been found in are shown in the table below (Table 1.1). There are three new Intypes that have not been identified in other practice types: Circle Round, Two by Two, and Sun Spine.

| | K-12 Schools | Workplace | Retail | Showroom | Hotel | Apartment | House |
|---|---|---|---|---|---|---|---|
| Marching Order | ■ | ■ | ■ | ■ | | | |
| Showcase Stair | ■ | | | | ■ | ■ | ■ |

Table 1.1 **K-12 School Intypes found in other Practice Types**

The ways that these Intypes manipulate space and lend their qualities to furthering the organization school interiors are quite different (Table 1.2). Some of these practices, Two by Two and Circle Round, are found primarily in classrooms, where they are used to organize desks. Showcase Stair and Sun Spine focus on circulation spaces, such as hallways and lobbies, because they relate to wayfinding and the flow of students between class periods. Marching Order, on the other hand, permeates all spaces within

the school, from hallways to classrooms, to libraries to lunchrooms, bringing visual order to all.

| | Marching Order | Circle Round | Two by Two | Sun Spine | Showcase Stair |
|---|---|---|---|---|---|
| Classroom | ■ | ■ | ■ | | |
| Lobby | ■ | | | ■ | ■ |
| Library | ■ | | | | ■ |
| Multi-Purpose/ Lunch Room | ■ | | | | |
| Hallway | ■ | | | ■ | ■ |

Table 1.2 **K-12 School Intypes by Location in School Building**

It is appropriate not only to compare where these Intypes are located, but also to contrast how they are used (Table 1.3). While Two by Two and Circle Round relate to furniture arrangement, Marching Order has wider implications, and is used to structure space. Showcase Stair also manipulates space, but also serves as circulation. SunSpine relates primarily to circulation, but also involves the wall plane, providing both natural lighting and views.

| Element | Marching Order | Circle Round | Two by Two | Sun Spine | Showcase Stair |
|---|---|---|---|---|---|
| Circulation | | | | ■ | ■ |
| Space | ■ | | | | ■ |
| Color | | | | | |
| Material | | | | | |
| Natural Lighting | | | | ■ | |
| Wall | | | | ■ | |
| View | | | | ■ | |
| Furniture Arrangement | ■ | ■ | ■ | | |

Table 1.3 **K-12 School Intypes by Element**

Occasionally, two Intypes are found grouped together, resulting in an Intypes "cluster" (Table 1.4). The practice of school interiors contains a few clusters, but the most prominent relationship seems to be the cluster of other Intypes with Marching Order. Of the few of the school Intypes that cluster, two, Two by Two and Sun Spine,

are found with Marching Order. Two by Two is always found in a cluster, either with Marching Order or with Circle Round. Sun Spine is also almost always found with Marching Order, as the mullions on panes of glass are typically evenly spaced throughout hallways.

| | Marching Order | Circle Round | Two by Two | Sun Spine | Showcase Stair |
|---|---|---|---|---|---|
| Marching Order | | ■ | ■ | ■ | |
| Circle Round | ■ | | ■ | | |
| Two by Two | ■ | ■ | | | |
| Sun Spine | ■ | | | | |
| Showcase Stair | ■ | | | | |

Table 1.4 **K-12 School Intypes Clusters**

The decade of 1950 offers a plethora of photographs and articles on schools in *Architectural Record* (Table 1.5). However, no decade after that came close to having as many articles. In the decades of 1980 through 1990, articles on schools were particularly sparse; Two by Two was not seen again until the 2000s. Marching Order was consistent throughout all the decades, because of its extreme versatility. Sun

Spine, while very popular in the 1950s, did not receive much use again until the beginning of the 21st century, when it is reiterated and popularized again. Unlike most of the other Intypes, which peaked in the 1950s, Showcase Stair slowly increased in popularity, peaking in the 2000s.

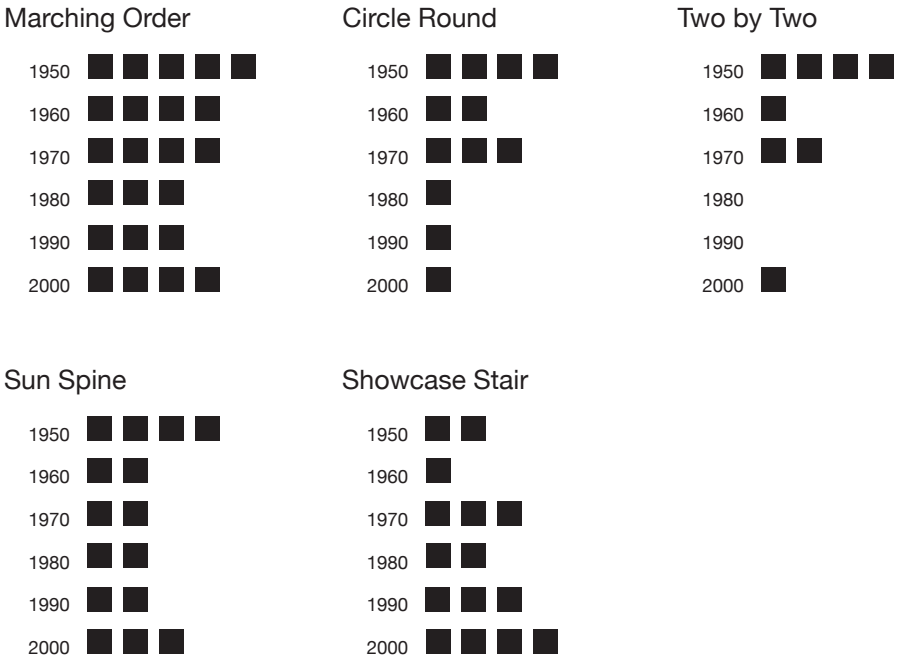



Table 1.5 **K-12 School Prevalence by Decade**

## 1.7 Conclusion

1.7.1. *Recommendations for Future Research and Researchers*

Because American schools are uniquely evolved institutions and not only deal with design, but with complex human behaviors, taking a university course in human development or educational psychology is highly recommended when researching K-12 school architecture and planning. The research and background that these

courses provide are invaluable to understanding the needs and functions of schools and of their students. Schools are the epitome of functional, purposeful design and reflect the path of human development.

Not only are the mental processes of school students important, but the evolution of education in America is important as well. American schools have a long and complicated history, shaped by religion, war, racial relations, scientific research, cultural trends, and much more. To begin to understand these nuances, a university course is highly recommended and perhaps necessary to undergo before writing intelligently about American school design.

I benefitted from working with a fellow Intypes graduate student to cover trade journal articles quickly. By splitting the review of *Interior Design* and *Architectural Record*, the research process went much more quickly and my time was not wasted looking through periodicals that contained few articles on schools. This approach is recommended for future Intypes researchers.

Research on historic school environments and design was difficult to find. While there is much available on the history of schools themselves, there is little mention of the facilities that housed the classrooms. Here, the work of the architecture team CRS was of particular importance. I highly recommend the work of William Caudill, who provides an extensive and thorough review of school design practices. Other helpful books

include research on educational facilities management and planning; outside of Caudill's books, few exist on the sole subject of the history of school design.

Site visits for schools also proved difficult due to accessibility. During the school day, students are present, making the classrooms and hallways hard to photograph. However, classrooms are typically locked before students arrive and shortly after they leave; this would make summer seemingly ideal for site visits, as students not present. Unfortunately, most schools seem to use summer as a time for extensive cleaning and renovation, with classrooms dismantled and furniture stacked in hallways, making site visits difficult once again. Extensive communication with administration or association with a school alumnus is recommended to gain access to private and public schools.

Higher education seems to be the next step in furthering the education practice type in Intypes research. I believe that there will be overlap to some extent, but because university and college buildings offer a wider array of social and large group spaces, I believe the potential for more, varied Intypes is there.

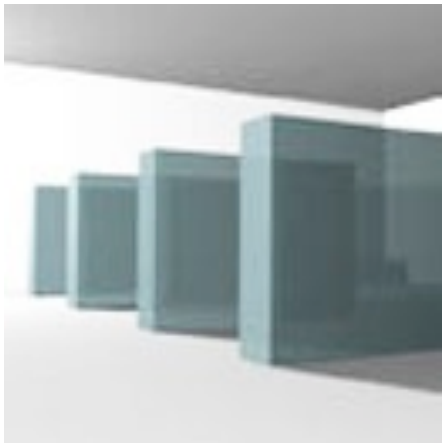
### 1.7.2. *Outcome*

My work on this thesis has allowed me to become a better strategist, a better analyst, uncovering ways in which space can be used to achieve a goal. It has strengthened my sense of design as well; after combing through countless issues of *Architectural Record*, I have a greater grasp and understanding of interior and architectural design. I

have been able to watch the waves of trends come and go, the open plans of the 1960s to the fluorescent color palettes of the 1980s; I've become a more discriminating observer, noting the subtle changes as they occur in design. In my current role as a workplace strategist at Gensler, I feel I am better attuned to people's interactions with space; I'm also more interesting in understanding how the space shapes their behavior.

Above all, this thesis contributes to an expanding lexicon of interior design practices, providing useful communication and design tools to students and practicing professionals. The design strategies described, researched, and named here will be available and accessible to those interested and in need of research on school design. This research makes a contribution to the meager offerings available on the history of school design in America, providing practices used in the past and present that will, due to their cultural longevity and grounding in basic design principles and functional qualities, continue to be used long into the future. This thesis hopes further continue critical thought on school design and encourage further research and depth of understanding.

## Chapter 2
Marching Order



## Definition

Marching Order exists when a number of similar figures are organized in rows, one by one, creating a spatial rhythm and structure within a space.

## Application Definition

Spatial order in large rooms, such as libraries and lunch rooms is crucial to the function of schools, thus, Marching Order is frequently used to give structure to large rooms by aligning shelves or tables. Although not as large, classrooms also make use of Marching Order to maintain their organization throughout the school day.

## Description

Marching Order seeks to control the school environment by giving order to large spaces and structure to smaller spaces. Similar to its use in workplaces, Marching Order in schools "organizes the placement of interior furnishings, such as desks and file cabinets… emphasizing the regularity of the arrangement and communicating strong messages of how one should circulate throughout and interact with the space."[1] In schools, the regulation and treatment of space is key, maintaining organization over both space and students.

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[1] Shuqing Yin, "Theory Studies: Workplace," (M.A. Thesis, Cornell University, 2011), 70; http://www.intypes.cornell.edu/intypesub.cfm?inTypeID=95 (accessed Jul. 11, 2012). Marching Order has also been identified as an archetypical practice in retail and showroom design.

## History & Theory

It is impossible to discern when Marching Order began to be used in schools; after all, "geometric order is a basic human need desired in any planned situation- people instinctively try for such order in furniture arrangement in their homes and expect to find it in offices . . . The human inclination to build on grid-iron plans with rectilinear box forms is actually more a matter of convenience to draftsman, surveyor and builder than the result of any real thought or philosophy."[2] That said, there have been changes in school planning theory.

William Caudill of the famed school design firm, Caudill Rowlett Scott (CRS), writing about the needs of schools in 1951, speaks of the way schools were prior to that time period. "Many years ago classroom space had no need for versatility . . . it had only one job to do, to surround the five rows of fixed desks- and that is about all except possibly to provide some space at the front of the room so that the pupil or teacher could stand by a blackboard." Marching Order was the traditional classroom format, the rows of desks that Caudill references, long before 1950. Although 1950 was a period of reawakening for school design, Marching Order is still used consistently in school buildings.[3]

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[2] John Pile, *Interiors: Second Book of Offices* (New York: Whitney Library of Design, 1969), 261.

[3] William W. Caudill, *Toward Better School Design* (Ann Arbor, Mich.: FW Dodge Corp, 1954), 13-14.

When analyzing various classrooms layouts, Caudill has this to say about "the conventional formal seating arrangement: although [it] is associated with old time teaching methods, there are occasions suited to this, [five rows of fixed desks], arrangement in up-to-date programs. It is good for tests, writing drills, and so on."[4] Caudill's statement is still accurate; Marching Order continues to be used to this day, but not just for the reasons he lists here; the effect Marching Order has on its environment spans beyond just a good arrangement for tests.

In the 1960's, though Marching Order continued to be used, rigid classrooms faded from popularity. "Open plan" classrooms and schools were created. These new schools had fewer interior walls and reconfigurable, flexible environments. They have been identified as being "an arrangement more conducive to student needs," allowing a wider range of seating patterns than a traditional classroom.[5]

Further analysis of Marching Order reveals the theory behind its use. According to architect and author Francis D.K. Ching, "the organizing power of the grid results from the regularity and continuity of its pattern that pervades the elements its organizes... its pattern establishes a stable set or field of reference points and lines in space with which the spaces of a grid organization, although dissimilar in size, form, or function,

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[4] Caudill, *Toward Better School Design*, 141.

[5] C. Kenneth Tanner and Jeffrey Lackney, *Educational Facilities Planning* (Boston: Pearson Education, Inc., 2006), 93.

can share a common relationship."[6] Marching Order is used to visually organize space, allowing for a greater depth of spatial understanding and perception.

Godfrey Thompson's book on library planning and design echoes the insight of Ching and Pile, stating that in libraries, "the aim is to house as many books as possible in conditions convenient to both staff and readers…. it was suggested... that the architect should choose a structural grid which can relate to the module most vital to his client's interest, and that this is the unit of shelving."[7] As in libraries, the grid used in schools provides access and organization for the student, enabling him or her to find their way with greater ease.

Beyond just its organizational qualities, Marching Order serves a beatific purpose as well. The organizational line or grid of identical forms separated by equal intervals creates rhythm. "Architectural rhythm [is] expressed by successive solids and voids . . . [this too is an] important [factor which goes] to make architecture out of mere shelter." Ching echoes Caudill's sentiment, stating that, "the movement may be of our eyes as we follow recurring elements in a composition, or of our bodies as we advance through

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[6] Francis D.K. Ching, *Architecture, Form, Space & Order*, Second Edition, (New York: John Wiley & Sons, Inc.,1996), 230.

[7] Godfrey Thompson, *Planning and Design of Library Buildings*, 3rd Ed., (London: Butterworth & Co. (Publishers) Ltd, 1989), 139.

a sequence of spaces… in either case, rhythm incorporates the fundamental notion of repetition as a device to organize forms and spaces in architecture."[8]

**Effect**

Beyond the "basic human need [for geometric order] in planned situations," there exists some additional research pertaining to schools, as to why Marching Order is needed. According to a study in *Schools for the Future*, "children want varied but not chaotic schools with unconstrained building forms, including non-oppressive ceilings and appealing color schemes." Marching Order keeps schools from becoming chaotic; it establishes, rhythm, order, and organization, thus making the school more appealing both architecturally and to its inhabitants.[9]

Organizing a school using Marching Order also facilitates wayfinding in schools. Kevin Lynch's book, *The Image of the City* discusses the way that people navigate, creating mental maps and using visual markers such as landmarks (such as Showcase Stair[10]), nodes, paths, and districts to figure out their locations. Furniture arranged in rows and with columns may be identified by students as a district. According to Lynch, "districts

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[8] Caudill, *Toward Better School Design*, 141.; Ching, *Architecture, Form, Space & Order*, 230.

[9] Pile, *Interiors: Second Book of Offices,* 261.; Rotraut Walden, *Schools for the Future: Design Proposals from Architectural Psychology* (Germany: Hogrefe and Huber Publishers, 2009), 82.

[10] A Showcase Stair is an extravagantly designed architectural feature in which the stair itself becomes a prominent display element. Its functionality is often secondary to the spatial drama created by the stair's structure, form, materials and lighting. It has been identified in Apartment, Hotel, House, Retail and School design. Katherine Mooney, "Theory Studies: Archetypical Practices in American 1-12 School Design," (M.A. Thesis, Cornell University, 2011), XX.; http://www.intypes.cornell.edu/intypesub.cfm?inTypeID=33 (accessed Jul. 11, 2012).

are the medium-to-large sections of the city, conceived of as having two-dimensional extent, which the observer mentally enters 'inside of,' and which are recognizable as having some common, identifying character... always identifiable from the inside, they are also used for exterior reference if visible from the outside."[11] By identifying these districts, paths and landmarks are more easily distinguished, allowing students to find their way more easily within the school building.

According to Tanner and Lackney, traditional arrangements such as Marching Order reflect "limited space and density issues;" unfortunately, arranging students in Marching Order can involve too much stimulation, lack of privacy, interruptions, and disciplinary problems. While open classrooms may be "more conducive to student needs… research indicates [that] traditional classroom [Marching Order] students outperform open classroom students in academics."[12]

**Chronological Sequence**

Marching Order is an instinctual human response to the built environment. As such, it has been used in schools virtually since their inception, making its origin difficult to trace. As such, it makes sense to trace the history of its use in the modern school building. According to William Caudill, "1950 represents a year in history when for the first time a large majority of architects and educators throughout the entire nation got together to try to solve their common problems . . . the professional journals began to

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[11] Kevin Lynch, *The Image of the City* (Boston: MIT Press, 1960), 47.

[12] C. Kenneth Tanner and Jeffrey Lackney, *Educational Facilities Planning*, 93, 403.

be more discreet in their choice of schools for publication . . . by 1950, the battle between contemporary and traditional was won." Therefore, it makes sense to begin the chronology of Marching Order in the modern school building in 1950.

The first example of Marching Order occurs in 1954 at the Frederick Douglass Stubbs School in Wilmington, Delaware. The school was built to accommodate 800 students. Among the interior finishes used are "plywood, plaster, ceramic tile, [and] asphalt tile." An image of the school shows the cafeteria, wherein five rows of three tables are lined up in rows (Figure 2.1). On the ceiling, there are three strips of lights in addition to two series of skylights, which lie in parallel lines against the wall. Against the far wall, there are a series of glass windows that look out onto the hallway. The light from these windows illuminates a lower hall.[13]

**Figure 2.1.** Fredrick Douglass Stubbs School [1954] Victorian & Samuel Homsey, architect; Wilmington, DE in "Delaware School Profits by Adjoining Park," *Architectural Record* 116, no. 2 (Aug. 1957): 168; PhotoCrd: Joseph W. Molitor.

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[13] Fredrick Douglass Stubbs School [1954] Victorian & Samuel Homsey, architect; Wilmington, DE in "Delaware School Profits by Adjoining Park," *Architectural Record* 116, no. 2 (Aug. 1957): 165-68**;** PhotoCrd: Joseph W. Molitor.

Another example of Marching Order comes from the Mattie Lively Elementary School in Statesboro, Georgia in 1955. The school was built for the low cost of $207,823 and is 23,954 square feet in size. Like the previous example (Figure X.1), Marching Order is found in the school's cafeteria, where tables are arrayed in a grid of four columns by three rows (Figure 2.2). Around the tables are evenly spaced metal folding chairs. The room also acts as an auditorium, hence at the far end of the image is a large, upraised stage. against the adjacent wall are large windows, leading from railing height up to the ceiling.[14]

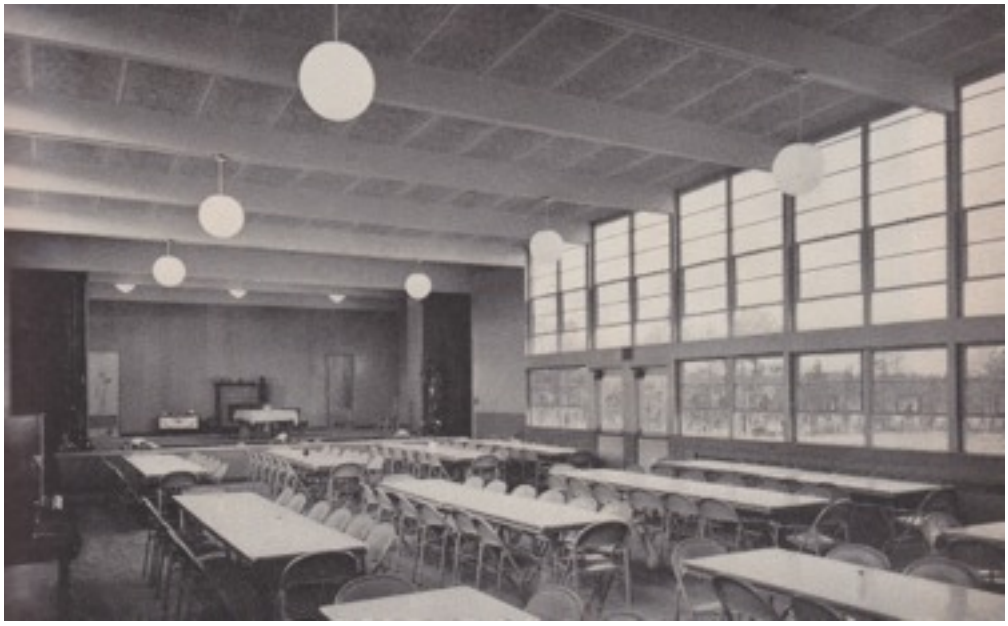

**Figure 2.2.** Mattie Lively Elementary School [1955] Aeck Associates, architect; Statesboro, GA in "Two Similar Elementary Schools in Rural Georgia," *Architectural Record* 117, no. 2 (Feb. 1955): 199; PhotoCrd: Joseph W. Molitor.

[14] Mattie Lively Elementary School [1955] Aeck Associates, architect; Statesboro, GA in "Two Similar Elementary Schools in Rural Georgia," *Architectural Record* 117, no. 2 (Feb. 1955): 198-200; PhotoCrd: Joseph W. Molitor.

Winner of a First Honor Award for school design in the Gulf States in 1956, the Horace Mann School of Little Rock, Arkansas has a wedge-shaped plan that created a series of courtyards onto which classrooms looked out. One such classroom contains a large number of desks arrayed in a grid (Figure 2.3). These desks face a large chalkboard that runs along the front wall of the space. A series of beams march across the ceiling plane and reach out past the window plane to support the roofline. Windows line the wall adjacent to the chalkboard, from railing height to the ceiling. Several light fixtures are also seen in the ceiling plane, arranged in a grid of 2 x 3.[15]

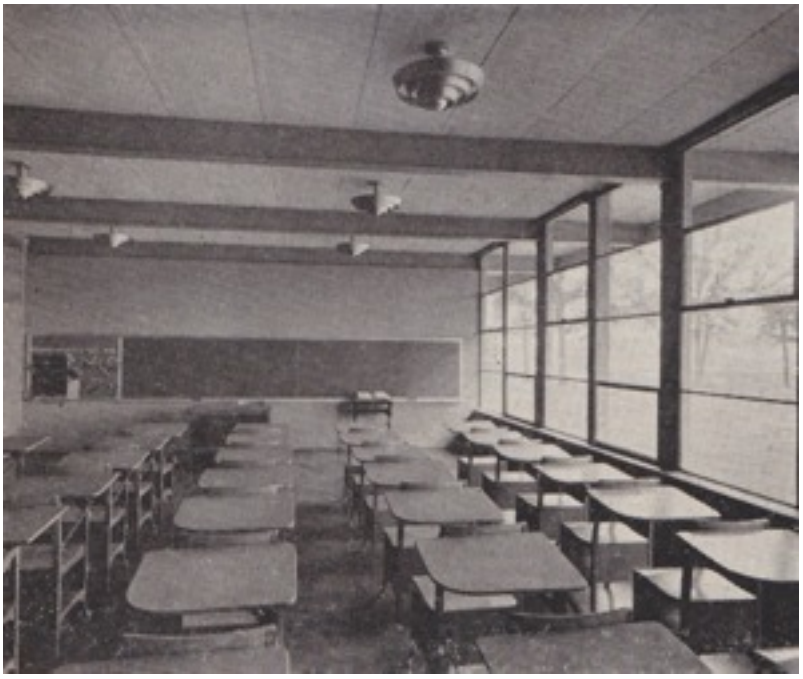

**Figure 2.3.** Horace Mann High School [1956] Erhart, Eichenbaum, Ranch, and Blass, architect; Little Rock, AK in "Courtyards Integrate Low-budget School," *Architectural Record* 122, no. 4 (Oct. 1957): 191; PhotoCrd: Earl Saunders.

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[15] Horace Mann High School [1956] Erhart, Eichenbaum, Ranch, and Blass, architect; Little Rock, AK in "Courtyards Integrate Low-budget School," *Architectural Record* 122, no. 4 (Oct. 1957): 189-94**;** PhotoCrd: Earl Saunders.

Another school planned around a series of courtyards, Union High School was built in 1958 in Lodi, California. “The organization of the plan, say the architects, was based on ‘mass movements’ within the school.” An image from the school depicts the cafeteria, which looks out onto the main courtyard (Figure 2.4). Upward of seven rows of tables are pictured, with multiple tables composing each row and numerous chairs placed on opposite sides of the tables. Along the far wall of the cafeteria are windows that come to about nine feet in height and look out onto the rest of the school. Rhythm is created in the space through the use of beams in the ceiling and the windows’ mullions.[16]

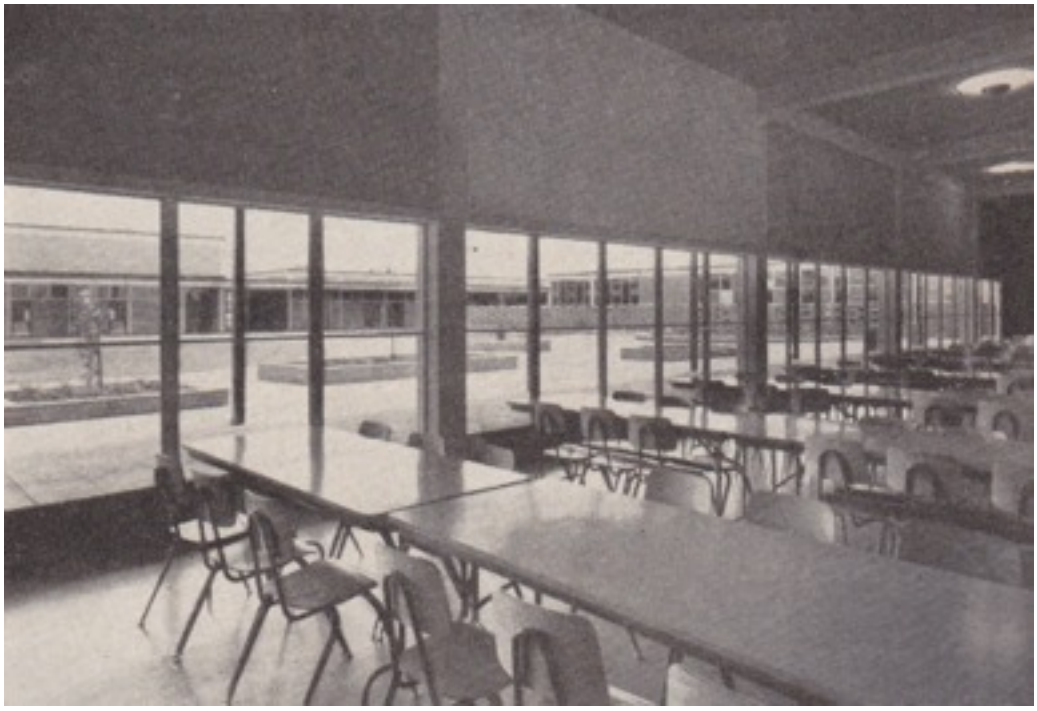

**Figure 2.4.** Union High School [1958] Falk & Booth, architect; Lodi, CA in “Courts Give Abundantly Varied Outdoor Space,” *Architectural Record* 123, no. 2 (May 1958): 219; PhotoCrd: Roger Sturtevant.

[16] Union High School [1958] Falk & Booth, architect; Lodi, CA in “Courts Give Abundantly Varied Outdoor Space,” *Architectural Record* 123, no. 2 (May 1958): 216-19; PhotoCrd: Roger Sturtevant.

In Bloomfield Hills, Minnesota, the Bloomfield Hills Junior High School was built in 1959. It features “bright, highly pleasant indoor and outdoor teaching areas [that] avoid monotony.” One of the school’s classrooms features desks that are arrayed in a Marching Order grid; all are spaced evenly apart to create aisles in between columns and rows. The desks are spread the width of the classroom (Figure 2.5). Due to the placement of classrooms in plan in a “checkerboard fashion,” the classroom has windows on at least two sides, possibly three sides, with one wall having chalkboards below a string of windows. Fluorescent lights run parallel to one another across the ceiling plane. Each desk has its own, removable chair that fits neatly under the desk.[17]

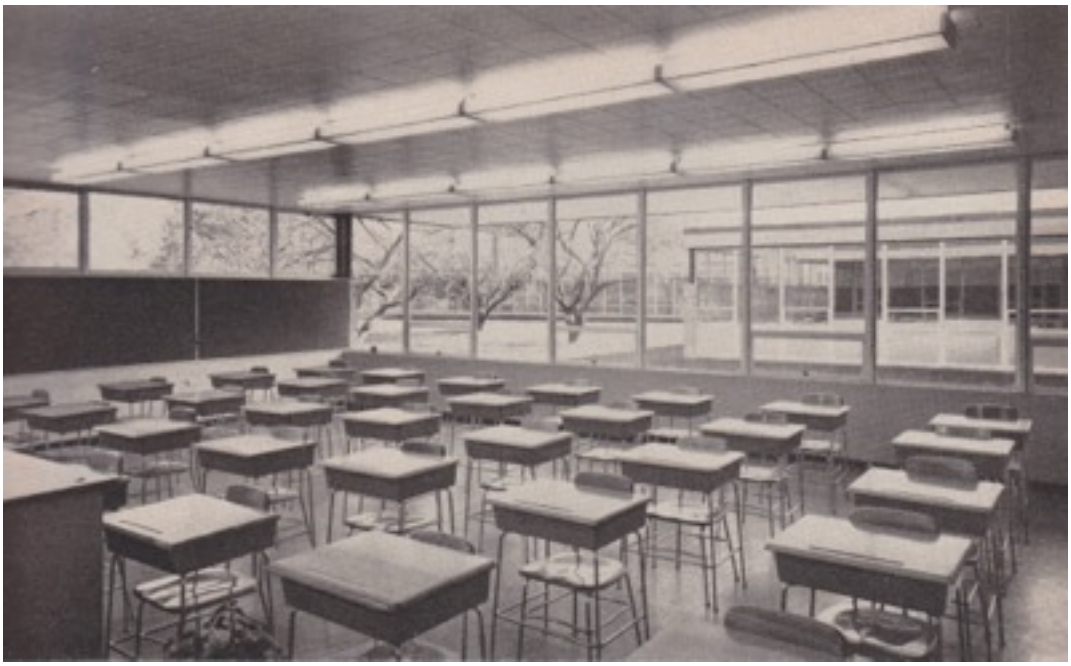

**Figure 2.5.** Bloomfield Hills Junior High School [1959] Linn Smith Associates, Inc., architect; Bloomfield Hills, MI in “Roof Shapes Highlight Flexible School,” *Architectural Record* 126, no. 2 (Aug. 1959): 163; PhotoCrd: Lens Art.

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[17] Bloomfield Hills Junior High School [1959] Linn Smith Associates, Inc., architect; Bloomfield Hills, MI in “Roof Shapes Highlight Flexible School,” *Architectural Record* 126, no. 2 (Aug. 1959): 162-64; PhotoCrd: Lens Art.

The Robert E. Lee Senior High School in Tyler, Texas, “reflects the wide open character of Texas… spreading out over a large area of the site.” Meant for a large number of students, the school’s gym seats more than 2000. This is reflected in the size of the cafeteria, which features more than seven long rows of tables (Figure 2.6). Large floor-to-ceiling windows take up one wall of the space, from which the rows of tables are aligned. There is some variation in the ceiling plane; part of it drops lower to, seemingly, create a zone above the tables. In this, canned lights are set in a diagonal pattern, at an angle to the seating below. The photo described features only “the enclosed portion of the cafeteria.”[18]

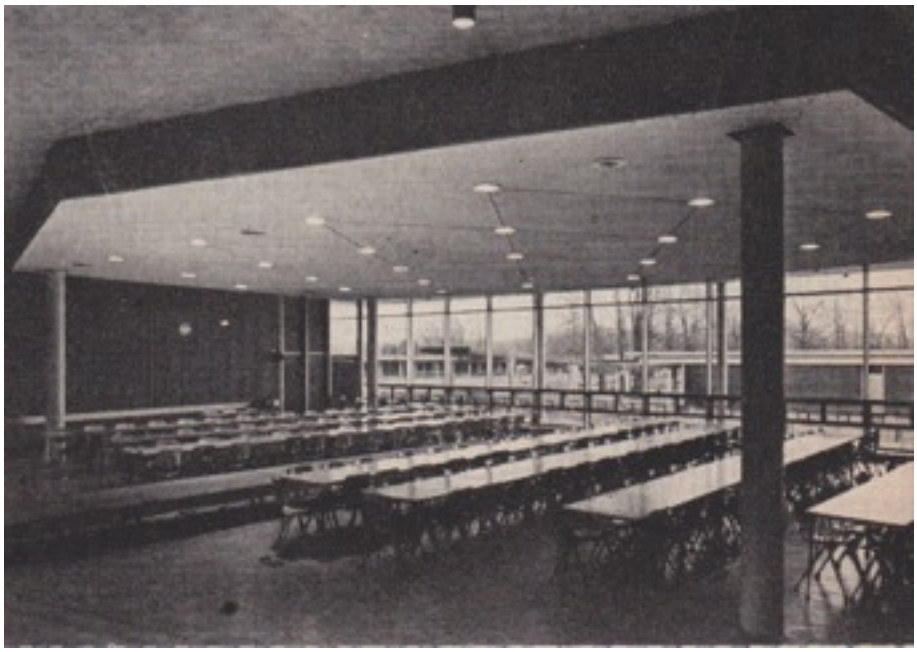

**Figure 2.6.** Robert E. Lee Senior High School [1960] Caudill, Rowlett & Scott, architect; Tyler, TX in “Large School Accents Outdoor Learning,” *Architectural Record* 127, no. 5 (May 1960): 209; PhotoCrd: Jay Oistad & Assoc. photos.

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[18] Robert E. Lee Senior High School [1960] Caudill, Rowlett & Scott, architect; Tyler, TX in “Large School Accents Outdoor Learning,” *Architectural Record* 127, no. 5 (May 1960): 206-09; PhotoCrd: Jay Oistad & Assoc. photos.

Marching Order was used in the library of the Smithtown Central High School, built in 1960 in Smithtown, New York. Adjoining the commons room, the library has a high ceiling and windows on at least two sides, with many reaching from floor to ceiling (Figure 2.7). Rectangular tables, seating four chairs each are arrayed in a grid down the length of the room. Large fixtures hang from the ceiling, in addition to cans that run parallel to the room. Bookshelves are located on the walls of the space.[19]

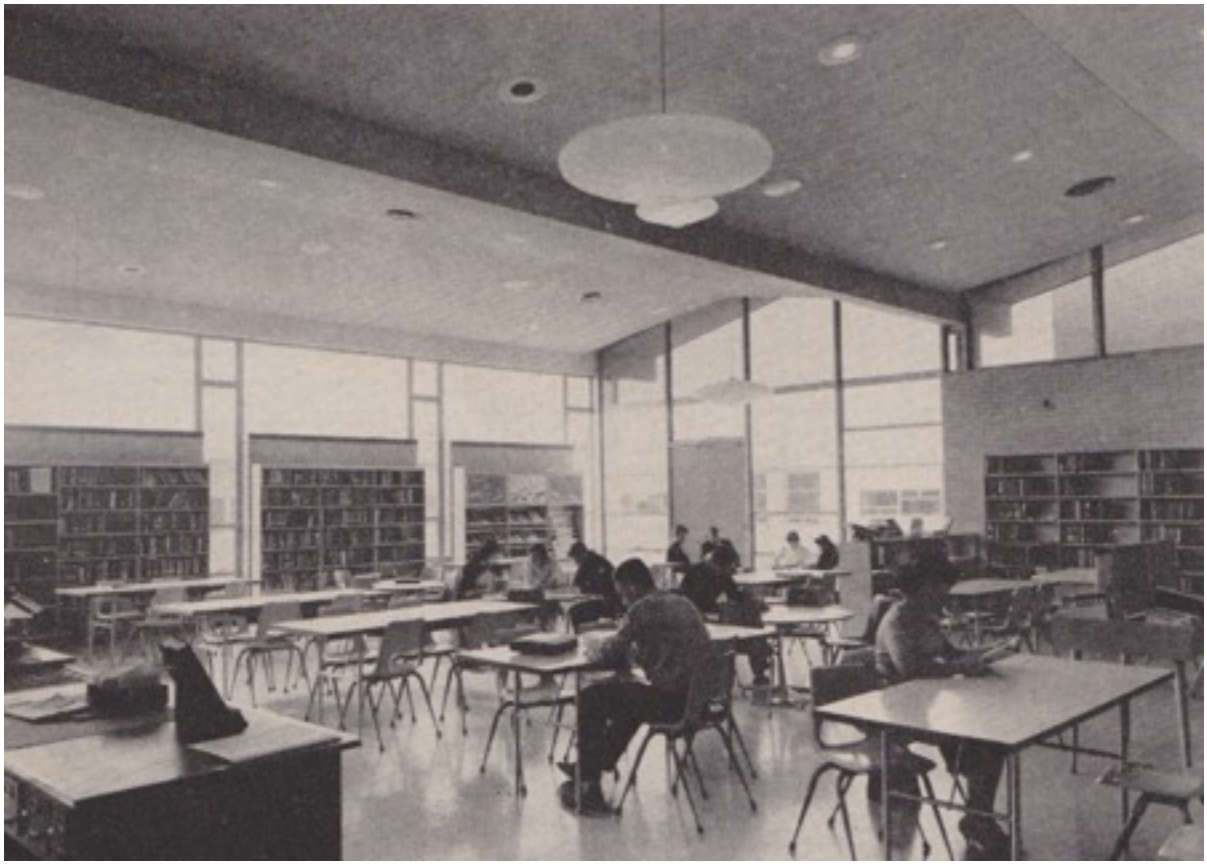

**Figure 2.7.** Smithtown Central High School [1960] Ketchum & Sharp, architect; Smithtown, NY in "Two High Schools Share Activity Areas," *Architectural Record* 127, no. 5 (May 1960): 211; PhotoCrd: G. Amiaga photos.

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[19] Smithtown Central High School [1960] Ketchum & Sharp, architect; Smithtown, NY in "Two High Schools Share Activity Areas," *Architectural Record* 127, no. 5 (May 1960): 209-11; PhotoCrd: G. Amiaga photos.

Not only did the J.S. Clark Junior High School feature Marching Order in the arrangement of its library's tables, it also features them in the book stacks as well (Figure 2.8). The school, built in 1960 in Shreveport, Louisiana serves 1500 students and houses grades seven through nine. The library is large, with windows reaching from railing-height up to the ceiling and columns punctuating the space, ending with large, circular columns. The grid of rectangular wooden tables, which appear to seat four each, run perpendicular to the line of bookshelves. Lights in the ceiling run parallel to the shelves as well.[20]

**Figure 2.8.** J.S. Clark Junior High School [1960] William B. Wiener, Morgan & O'Neal, architect; Shreveport, LA in "Schools," *Architectural Record* 128, no. 2 (Aug 1960): 195; PhotoCrd: Film Arbor Studio.

In Euless, Texas, the Midway Park Elementary School, built in 1967, featured Marching Order in the arrangement of the desks in its classrooms (Figure 2.9, 2.10). The school was, at its inception, "the first completely round building with classrooms trapezoidal in shape." In its classrooms, the desks are considered mobile, easily moved into a variety of arrangements. Pictures from the classrooms show a room with desks arrayed in a

[20] J.S. Clark Junior High School [1960] William B. Wiener, Morgan & O'Neal, architect; Shreveport, LA in "Schools," *Architectural Record* 128, no. 2 (Aug. 1960): 194-95; PhotoCrd: Film Arbor Studio.

grid, with hanging fluorescent lighting running perpendicular to the columns of desks. There are chalkboards at both the front of the room and the sides, with tackable space in back and built-in storage closets along the other side of the wall.[21]

**Figure 2.9. (left)** Midway Park Elementary School [1967] Woodward & Associates, architect; Euless, TX in "School in the Round," *Interior Design* 36, no. 12 (Dec. 1967): 110; PhotoCrd: Anonymous. **Figure 2.10. (right)** Midway Park Elementary School [1967] Woodward & Associates, architect; Euless, TX in "School in the Round," *Interior Design* 36, no. 12 (Dec. 1967): 111; PhotoCrd: Anonymous.

Low Heywood School, built in Stamford, Connecticut, stands as an example of the new ideas in school planning recorded by the firms Perkins & Will and SMS Architects in 1970. Despite the new directions that schools were heading in, they still incorporated Marching Order into their plans. An image of such a school features a classroom adjacent to a hallway (Figure 2.11). The ceiling of the hall is lowered, providing some delineation between the two spaces. In the classroom area, the desks are arrayed neatly in a grid. Doors at the back of the classroom space appear to lead to a library.

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[21] Midway Park Elementary School [1967] Woodward & Associates, architect; Euless, TX in "School in the Round," *Interior Design* 36, no. 12 (Dec. 1967): 110-15; PhotoCrd: Anonymous.

While the school has a more free-flowing plan, Marching Order continued to be used to order space.[22]

**Figure 2.11.** Low Heywood School [1970] SMS, architect; Stamford, CT in "New Directions in School Planning," *Architectural Record* 148, no. 5 (Nov. 1970): 132; PhotoCrd: Ezra Stoller Photos.

In 1975, the Burlington Senior High School was built in Burlington, Massachusetts. Its innovative plan called for "open and closed plan spaces [to allow] a variety of teaching opportunities." The large school utilizes Marching Order in its library, which is "three levels high… [and is] designed as a high and dramatic space as an economical and practical way to give the library identity, or a sense of place" (Figure 2.12). Images from

[22] Low Heywood School [1970] SMS, architects**;** Stamford, CT in "New Directions in School Planning," *Architectural Record* 148, no. 5 (Nov. 1970): 121-34; PhotoCrd: Ezra Stoller Photos.

the library show a large open room with skylights covering the ceiling and a monolithic, multi-story stair descending into it. Visible on the first floor, adjacent to the open space and separated by columns, are a series of bookshelves in Marching Order. A series of desks are visible in front of the columns, also set up in Marching Order. Study carrels are also shown in the foreground of the image.[23]

**Figure 2.12.** Burlington Senior High School [1975] Architects Design Group, Inc, architect; Burlington, MA in "More for Less," *Architectural Record* 158, no. 6 (Dec. 1975): 91; PhotoCrd: Steve Rosenthal photos.

[23] Burlington Senior High School [1975] Architects Design Group, Inc., architect; Burlington, MA in "More for Less," *Architectural Record* 158, no. 6 (Dec. 1975): 90-91; PhotoCrd: Steve Rosenthal photos.

Fremont High School of East Oakland, California was built in 1980 and designed for a population of 1500 students, though in reality, it services over 1800. The school's cafeteria are centrally located and contain a series of tables arrayed in Marching Order with six chairs pushed up to each table (Figure 2.13). The space is punctuated by a series of columns that correspond to the ceiling height of the space, which goes from a standard height near the food service area to half a story higher in the eating area. There, hanging fluorescent lights run parallel to the tables.[24]

**Figure 2.13.** Fremont High School [1980] Charles Davis of Esherick, Homsey, Dodge, and Davis, architect; East Oakland, CA in "Four Schools with Thought," *Architectural Record* 168, no. 2 (Aug. 1980): 113; PhotoCrd: Peter Aaron, ESTO Photographics, Inc.

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[24] Fremont High School [1980] Charles Davis of Esherick, Homsey, Dodge, and Davis, architect; East Oakland, CA in "Four Schools with Thought," *Architectural Record* 168, no. 2 (Aug. 1980): 109-13; PhotoCrd: Peter Aaron, ESTO Photographics, Inc.

Designed by Gwathmey Siegel & Associates, the Westover School in Middlebury, Connecticut, built in 1985, made use of Marching Order in its library space. The new space includes a “soon-to-be-necessary new library” and “the transformation of an existing infirmary into the needed science facility.” The multi-level library features a series of bookshelves in Marching Order, adjacent to large floor-to-ceiling windows that overlook the nearby fields (Figure 2.14). Looking down on this space are a series of square tables and low bookshelves. Above this, a series of three large circular skylights overlook the tables. The space features white walls and wood trim in a clean, modern design.[25]

**Figure 2.14.** Westover School [1985] Gwathmey Siegel & Associates, architect; Middlebury, CT in “A Lesson in Deportment,” *Architectural Record* 173, no. 2 (Feb. 1985): 131; PhotoCrd: Timothy Hursley/ The Arkansas Office photos.

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[25] Westover School [1985] Gwathmey Siegel & Associates, architect; Middlebury, CT in “A Lesson in Deportment,” *Architectural Record* 173, no. 2 (Feb. 1985): 124-33; PhotoCrd: Timothy Hursley/The Arkansas Office photos.

Another photograph from the Westover school shows one of the new science classrooms. Here, the chairs have small writing surfaces attached to them, allowing for greater flexibility (Figure 2.15). Despite the change in furniture, the desks are arrayed in a Marching Order grid. A clerestory window in the back of the space brings in light from an adjacent lab. Cabinets line the wall below, with plenty of counter space. Near the window on the adjacent side are two long counters with built in sinks and built-in outlets, ready for experiments. A similar instructor's counter sits at the front of the room. Lights in the ceiling are arranged in lines, perpendicular to the counters on the adjacent wall.[26]

**Figure 2.15.** Westover School [1985] Gwathmey Siegel & Associates, architect; Middlebury, CT in "A Lesson in Deportment," *Architectural Record* 173, no. 2 (Feb. 1985): 132; PhotoCrd: Timothy Hursley/ The Arkansas Office photos.

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[26] Westover School [1985] Gwathmey Siegel & Associates, architect; Middlebury, CT in "A Lesson in Deportment," *Architectural Record* 173, no. 2 (Feb. 1985): 124-33; PhotoCrd: Timothy Hursley/The Arkansas Office photos.

In Lawrence, Massachusetts, Arlington Elementary School, built in 1988, architect Earl Flansburgh has designed a school that was the "result of carefully studied massing, detailing, colors, and textures." At the juncture of the school's wings for older children and younger children is a library (Figure 2.16). Like many of the other libraries, this one also utilizes Marching Order in the alignment of its bookshelves, which are set in rows in the center space of the room. A second floor looks down from above, accessible from a large stair to the far left. Beams in the ceiling run parallel to the shelves and skylights running along the front wall let in natural light.[27]

**Figure 2.16.** Arlington Elementary School [1988] Earl R. Flansburgh Associates, Inc., architect; Lawrence, MA in "Varied Textures and Subtle Color Enrich a Conservative Pattern," *Architectural Record* 176, no. 10 (Sep. 1988): 112; PhotoCrd: Sam Sweezy Photos.

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[27] Arlington Elementary School [1988] Earl R. Flansburgh Associates, Inc., architect; Lawrence, MA in "Varied Textures and Subtle Color Enrich a Conservative Pattern," *Architectural Record* 176, no. 10 (Sep. 1988): 112-13, PhotoCrd: Sam Sweezy Photos.

Built in 1991 in Hope, Indiana, Hope Elementary School fulfilled administrators' wishes for "a one-story structure that [is] economical but at the same time eye-catching," as well as teachers' desire for "classrooms with lots of windows, lots of chalkboard space, and lots of storage." One such classroom contains desks arrayed in a Marching Order grid, facing a chalkboard at the front of the room (Figure 2.17). Fluorescent lights are also arrayed in parallel rows in the ceiling plane, illuminating the space. The classroom can be seen from a window linking the space to the adjacent hallway.[28]

**Figure 2.17.** Hope Elementary School [1991] Taft Architects, architect; Hope, IN in "Hearing the Community," *Architectural Record* 179, no. 1 (Jan. 1991): 104; PhotoCrd: Paul Warchol Photos.

[28] Hope Elementary School [1991] Taft Architects, architect; Hope, IN in "Hearing the Community," *Architectural Record* 179, no. 1 (Jan. 1991): 102-05; PhotoCrd: Paul Warchol Photos.

Troy High School, designed by Perkins & Will for the community of Troy, Michigan in 1993. The school follows the trend “toward creating educational parks on larger sites and using the facilities as cultural and recreational centers.” Marching Order was used in the school’s cafeteria, which is “south and east-facing [and] has larger [windows than the classrooms]” (Figure 2.18). An image of the space shows white walls and ceiling, with a series of columns lining a circulation path to the left. The blocks that compose the wall surfaces give texture to the space. To the right, long tables stand in Marching Order, surrounded by mobile stools.[29]

**Figure 2.18.** Troy High School [1993] Perkins & Will, architect; Troy, MI in “School Sprit,” *Architectural Record* 181, no. 8 (Aug. 1993): 102; PhotoCrd: Balthazar Korab Photography.

[29] Troy High School [1993] Perkins & Will, architect; Troy, MI in “School Sprit,” *Architectural Record* 181, no. 8 (Aug. 1993): 96-103; PhotoCrd: Balthazar Korab Photography.

A 1997 renovation of the Lick-Wilmerding School includes “a new library [as the] top priority on the school’s long list of physical needs.” The school, located in San Francisco, California, hoped that the library would keep keep in mind their motto of “head, heart, and hands” and believed that the architects’ decision to “expose the structural elements at the library’s vaulted roof and cement-panel fasteners, [and] choice of materials, such as Italian artisan plaster and stained concrete, which evidence technique and weathering” fit with that concept (Figure 2.19, Figure 2.20). The library’s many stacks are arrayed in Marching Order, with circulation paths to the left side and down the middle of the two columns of shelves. Changes in the floor’s coloring also denote circulation paths. Large windows abut the other side of the space. Fluorescent lights are hung in a Marching Order grid from the ceiling, perpendicular to the shelves.[30]

**Figure 2.19. (left)** Lick-Wilmerding School [1997] Simon Martin-Vegue Finkelstein Moris, architects**;** San Francisco, CA in “Schools,” *Architectural Record* 185, no. 10 (Oct. 1997): 104**;** PhotoCrd: Tim Griffith.
**Figure 2.20. (right)** Lick-Wilmerding School [1997] Simon Martin-Vegue Finkelstein Moris, architects**;**

[30] Lick-Wilmerding School [1997] Simon Martin-Vegue Finkelstein Moris, architect; San Francisco, CA in “Schools,” *Architectural Record* 185, no. 10 (Oct. 1997): 102-05; PhotoCrd: Tim Griffith.

San Francisco, CA in “Schools,” *Architectural Record* 185, no. 10 (Oct. 1997): 105**;** PhotoCrd: Tim Griffith.

Site visits confirmed the existence of Marching Order outside of trade magazines. The library of the Flint Hill School in Oakton, Virginia, was built in 2001 and features square tables arrayed in a Marching Order grid in its library (Figure 2.21). On top of desks were placed two lamps to provide adequate lighting. A balcony space overlooks the library with stacks, also in Marching Order, arrayed on the far side of the room.

**Figure 2.21.** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

Evidence of Marching Order was also found in the classrooms of Cumberland Valley High School in Mechanicsburg, Pennsylvania, which was renovated by Liberty Engineering in 2003. Here, desks were arrayed in even rows in the classroom, facing a

large chalkboard at the front of the room (Figure 2.22). These rows fill the room to capacity, leaving only space in front of the chalkboard and on one side for circulation.

**Figure 2.22.** Cumberland Valley High School [2003] Liberty Engineering, Project Architects; Mechanicsburg, PA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

“The first independent school in Manhattan to build a new facility in decades,” the Lycée Français in New York City maximizes space through the use of stacking and skylights. The school’s “commons, a large room vital to maintaining community” are illuminated by skylights and, in addition, are “bordered by a two-story glass curtain wall” which allows the courtyard above the commons to appear as though it is “floating” in the center of the school (Figure 2.23). Inside the commons itself, tables are arranged in a Marching Order grid, with eight chairs placed at each collapsible table.

Walls of the school are white, with accents provided by metal and colored furniture in more subdued hues.[31]

**Figure 2.23.** Lycée Français [2004] Polshek Partnership Architects, architect; New York City in "Environment Counts," *Architectural Record* 192, no. 3 (Mar. 2004): 134; PhotoCrd: Richard Barnes.

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[31] Lycée Français [2004] Polshek Partnership Architects, architect; New York City in "Environment Counts," *Architectural Record* 192, no. 3 (Mar. 2004): 131-34; PhotoCrd: Richard Barnes.

In 2005, Perkins & Will designed the new Roger Ludlowe Middle School for the town of Fairfield, Connecticut. Among the features of the new building are “simple, airy classrooms [that] collect reflected light, thanks to 11-foot, floor-to-ceiling windows and exterior cedar fins that function as bries-soleils.” An image of one such classroom features desks and chairs arrayed in a familiar grid pattern (Figure 2.24). On the far side of the classroom, a window overlooks the rest of the school and a courtyard. In the corner of the room sits a teacher’s desk and above it, a television hangs from the ceiling. The walls, floor, and ceiling are all a neutral color. At the front of the room, the desks face a large white board and its adjacent tackable surfaces.[32]

**Figure 2.24.** Roger Ludlowe Middle School [2005] Perkins Eastman, architect; Fairfield, CT in “Back to the Future,” *Architectural Record* 193, no. 12 (Dec. 2005): 151; PhotoCrd: Woodruff/Brown.

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[32] Roger Ludlowe Middle School [2005] Perkins Eastman, architect; Fairfield, CT in “Back to the Future,” *Architectural Record* 193, no. 12 (Dec. 2005): 148-51; PhotoCrd: Woodruff/Brown.

St. Matthew's Parish School, renovated in 2009 in Pacific Palisades California, was designed to accommodate "325 students from prekindergarten through eight grade." Among the additions made is a 9,850-square-foot library, which became "a magnet on campus, [and] addresses all of the children, with a storytelling nook, stacks, and worktables" (Figure 2.25, 2.26). The library has a wood-paneled roof, from which a series of large light fixtures hang down into the atrium space. To the left of the stair, the ceiling is lowered to one story; here, there are a series of bookshelves arrayed in Marching Order with hanging fluorescent lights in parallel above. Windows look out to the left and to the far wall of the space.[33]

**Figure 2.25. (left)** St. Matthew's Parish School [2009] Lake/Flato Architects and Gensler, architect; Pacific Palisades, CA in "Building on the Past," *Architectural Record* 197, no. 7 (Jul. 2009): 91; PhotoCrd: Benny Chan. **Figure 2.26. (right)** St. Matthew's Parish School [2009] Lake/Flato Architects

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[33] St. Matthew's Parish School [2009] Lake/Flato Architects and Gensler, architect; Pacific Palisades, CA in "Building on the Past," *Architectural Record* 197, no. 7 (Jul. 2009): 87-91; PhotoCrd: Benny Chan.

and Gensler, architect; Pacific Palisades, CA in "Building on the Past," *Architectural Record* 197, no. 7 (Jul. 2009): 91; PhotoCrd: Benny Chan.

In North Hollywood, California, the Roy Romer Middle School was built to consolidate sixth through eighth graders that had formerly attended several separate schools. The school's library utilizes Marching Order in the arrangement of its stacks, which have "long views out across the fields . . . [while the windows] facing the schoolyard evoke openness and transparency" (Figure 2.27). Adjacent to the windows, the stacks are lined up parallel to the grid of fluorescent lights above them. Wood beams lie perpendicular across the space. In the central space, a large counter with a wall behind it serves as a librarian's desk; in front, two six-person tables are lined up next to one another.[34]

**Figure 2.27.** Roy Romer Middle School [2010] Johnson Fain-Scott Johnson, architect; North Hollywood, CA in "Schools of the 21st Century," *Architectural Record* 198, no. 1 (Jan. 2010): 97; PhotoCrd: Fotoworks/Benny Chan.

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[34] Roy Romer Middle School [2010] Johnson Fain-Scott Johnson, architect; North Hollywood, CA in "Schools of the 21st Century," *Architectural Record* 198, no. 1 (Jan. 2010): 93-97; PhotoCrd: Fotoworks/Benny Chan.

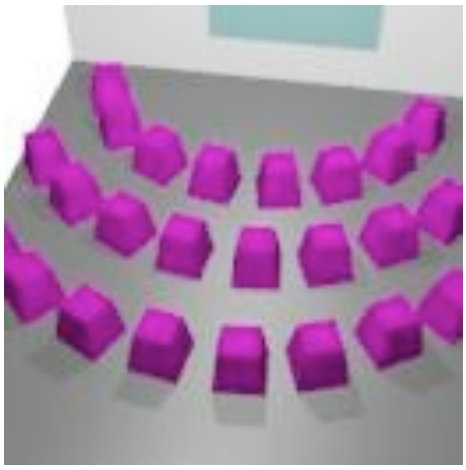
Marching Order is a natural solution to interior design, which has been to a greater degree supported by research into educational environments. It continues to be used frequently in schools, demonstrated here from 1950 to the present, making it a widely accepted and relevant practice in the field of architecture and education.[35]

[35] Evidence for the archetypical use and the chronological sequence of Marching Order in 1-12 schools was developed from the following sources: **1950** Fredrick Douglass Stubbs School [1954] Victorian & Samuel Homsey, architect; Wilmington, DE in "Delaware School Profits by Adjoining Park," *Architectural Record* 116, no. 2 (Aug. 1957): 168; PhotoCrd: Joseph W. Molitor.; Mattie Lively Elementary School [1955] Aeck Associates, architect; Statesboro, GA in "Two Similar Elementary Schools in Rural Georgia," *Architectural Record* 117, no. 2 (Feb. 1955): 199; PhotoCrd: Joseph W. Molitor.; Horace Mann High School [1956] Erhart, Eichenbaum, Ranch, and Blass, architect; Little Rock, AK in "Courtyards Integrate Low-budget School," *Architectural Record* 122, no. 4 (Oct. 1957): 191; PhotoCrd: Earl Saunders.; Union High School [1958] Falk & Booth, architect; Lodi, CA in "Courts Give Abundantly Varied Outdoor Space," *Architectural Record* 123, no. 2 (May 1958): 219; PhotoCrd: Roger Sturtevant.; Bloomfield Hills Junior High School [1959] Linn Smith Associates, Inc., architect; Bloomfield Hills, MI in "Roof Shapes Highlight Flexible School," *Architectural Record* 126, no. 2 (Aug. 1959): 163; PhotoCrd: Lens Art.; **1960** Robert E. Lee Senior High School [1960] Caudill, Rowlett & Scott, architect; Tyler, TX in "Large School Accents Outdoor Learning," *Architectural Record* 127, no. 5 (May 1960): 209; PhotoCrd: Jay Oistad & Assoc. photos.; Smithtown Central High School [1960] Ketchum & Sharp, architect; Smithtown, NY in "Two High Schools Share Activity Areas," *Architectural Record* 127, no. 5 (May 1960): 211; PhotoCrd: G. Amiaga photos.; J.S. Clark Junior High School [1960] William B. Wiener, Morgan & O'Neal, architect; Shreveport, LA in "Schools," *Architectural Record* 128, no. 2 (Aug 1960): 195; PhotoCrd: Film Arbor Studio.; Midway Park Elementary School [1967] Woodward & Associates, architect; Euless, TX in "School in the Round," *Interior Design* 36, no. 12 (Dec. 1967): 110; PhotoCrd: Anonymous.; Midway Park Elementary School [1967] Woodward & Associates, architect; Euless, TX in "School in the Round," *Interior Design* 36, no. 12 (Dec. 1967): 111; PhotoCrd: Anonymous. **1970** Low Heywood School [1970] SMS, architect; Stamford, CT in "New Directions in School Planning," *Architectural Record* 148, no. 5 (Nov. 1970): 132; PhotoCrd: Ezra Stoller Photos.; Burlington Senior High School [1975] Architects Design Group, Inc, architect; Burlington, MA in "More for Less," *Architectural Record* 158, no. 6 (Dec. 1975): 91; PhotoCrd: Steve Rosenthal photos.; **1980** Fremont High School [1980] Charles Davis of Esherick, Homsey, Dodge, and Davis, architect; East Oakland, CA in "Four Schools with Thought," *Architectural Record* 168, no. 2 (Aug. 1980): 113; PhotoCrd: Peter Aaron, ESTO Phographics, Inc.; Westover School [1985] Gwathmey Siegel & Associates, architect; Middlebury, CT in "A Lesson in Deportment," *Architectural Record* 173, no. 2 (Feb. 1985): 131; PhotoCrd: Timothy Hursley/The Arkansas Office photos.; Westover School [1985] Gwathmey Siegel & Associates, architect; Middlebury, CT in "A Lesson in Deportment," *Architectural Record* 173, no. 2 (Feb. 1985): 132; PhotoCrd: Timothy Hursley/The Arkansas Office photos.; Arlington Elementary School [1988] Earl R. Flansburgh Associates, Inc., architect; Lawrence, MA in "Varied Textures and Subtle Color Enrich a Conservative Pattern," *Architectural Record* 176, no. 10 (Sep. 1988): 112; PhotoCrd: Sam Sweezy Photos.; **1990** Hope Elementary School [1991] Taft Architects, architect; Hope, IN in "Hearing the Community," *Architectural Record* 179, no. 1 (Jan. 1991): 104; PhotoCrd: Paul Warchol Photos.; Troy High School [1993] Perkins & Will, architect; Troy, MI in "School Sprit," *Architectural Record* 181, no. 8 (Aug. 1993): 102; PhotoCrd: Balthazar Korab Photography.; Lick-Wilmerding School [1997] Simon Martin-Vegue Finkelstein Moris, architects; San Francisco, CA in "Schools," *Architectural Record* 185, no. 10 (Oct. 1997): 104;

PhotoCrd: Tim Griffith.; Lick-Wilmerding School [1997] Simon Martin-Vegue Finkelstein Moris, architects**;** San Francisco, CA in “Schools,” *Architectural Record* 185, no. 10 (Oct. 1997): 105**;** PhotoCrd: Tim Griffith.; **2000** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.; Cumberland Valley High School [2003] Liberty Engineering, Project Architects; Mechanicsburg, PA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.; Lycée Français [2004] Polshek Partnership Architects, architect; New York City in “Environment Counts,” *Architectural Record* 192, no. 3 (Mar. 2004): 134**;** PhotoCrd: Richard Barnes.; Roger Ludlowe Middle School [2005] Perkins Eastman, architect; Fairfield, CT in “Back to the Future,” *Architectural Record* 193, no. 12 (Dec. 2005): 151**;** PhotoCrd: Woodruff/Brown.; St. Matthew’s Parish School [2009] Lake/Flato Architects and Gensler, architect; Pacific Palisades, CA in “Building on the Past,” *Architectural Record* 197, no. 7 (Jul. 2009): 91**;** PhotoCrd: Benny Chan.; St. Matthew’s Parish School [2009] Lake/Flato Architects and Gensler, architect; Pacific Palisades, CA in “Building on the Past,” *Architectural Record* 197, no. 7 (Jul. 2009): 91**;** PhotoCrd: Benny Chan.; **2010** Roy Romer Middle School [2010] Johnson Fain-Scott Johnson, architect; North Hollywood, CA in “Schools of the 21st Century,” *Architectural Record* 198, no. 1 (Jan. 2010): 97**;** PhotoCrd: Fotoworks/Benny Chan.

**Chapter 3**

Circle Round



## Definition

Circle Round refers to the semi-circular grouping or shaping of furniture around a single focal point. Circle Round focuses attention on a specific, central source, blocking out visual distraction.

## Application Definition

In K-12 school classrooms, Circle Round references the placement of furniture, typically desks and chairs, in a curved shape around a single focal point, typically a teacher, a chalkboard or projection screen, where instruction occurs.

## Description

Circle Round facilitates a distraction-free environment, focusing the attention of the students on a single physical point. Instances of Circle Round typically occur in a classroom instruction environment, where desks are lightweight and easily manipulated into a variety of seating patterns. Circle Round is found more often in elementary than secondary environments, as younger children are more likely to be distracted and because the nature of instruction is more variable. It is also more frequently found in private schools or schools with few students per classroom, as the arrangement takes up more space than other desk arrangements such as Marching Order.[1]

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[1] *Marching Order* is a sequence of repeating forms organized consecutively, one after another, that establish a measured spatial order. It has been established as an archetypical practice in retail, showroom and workplace design. The Interior Archetypes Research and Teaching Project, Cornell University, http://www.intypes.cornell.edu/intypesub.cfm?inTypeID=95 (accessed May 29, 2012).

Like Two by Two[2], Circle Round is frequently the result of the Intype Shuffle[3], the informal movement of lightweight furniture to accommodate various group sizes and spatial configurations.

**History & Theory**

The archetype Circle Round finds its origin in the ancient form of auditoriums, which may be traced back to the classical amphitheaters of ancient Greece and Rome. These amphitheaters, used primarily for entertainment, contained rows of curved, sometimes elevated, seating, focused around a central, circular orchestra. This traditional plan has been used not only in classical auditoriums and renaissance theater, but continues to inform the design of stages, opera halls, and cinemas as we know them today.

Ancient Greek amphitheaters were originally used to celebrate religious festivals honoring the god of wine, Dionysus. Most amphitheaters consisted of three parts; a stage, an orchestra, and finally, seating, in the from of concentric rows of benches.[4]

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[2] The Intype Two by Two is a furniture arrangement that pairs two people into a small working group with a two-person table or by pushing two tables side-by-side. It has been established elsewhere in this thesis as an archetypical practice in 1-12 schools.

[3] Carla Wells, "Theory Studies: Bar and Club Design," (M.A. Thesis, Cornell University, 2012); Intypes Research and Teaching Project, http://www.intypes.cornell.edu/expanded.cfm?erID=214.

[4] B.H. Stricken, "The Origin of the Greek Theatre," *The Journal of Egyptian Archaeology* 41 (Dec. 1955): 35; Michael Forsyth, *Auditoria: Designing for the Performing Arts* (Ann Arbor, Mich.: Van Nostrand Reinhold, 1987), 12.

While the shape of the orchestra has evolved over time, it was originally a circle. From this, the rows of curved seating derive their shape.

While “the theatre at Athens… provided accommodation for no less than fourteen thousand persons... [and] is considered the prototype of all other [amphitheaters],” this sixth century theatre takes its shape from an even earlier form. “The smooth surfaced circular shape of the Greek orchestra has recently been explained [by] the form of the threshing floor… it is possible that gay dances at religious festivals and particularly at harvest time were performed in the same place where oxen had trodden out the grain or the grapes had been dried.”[5]

Crowds of people would gather to watch these festival performances, annually honoring Dionysus. As Bieber states, “these people would celebrate the harvest by dancing in the same circle in which they threshed their grain. Over time, these festivals became grander, eventually evolving into the classical amphitheaters famous in Greek and Roman history. Often, these amphitheaters were just “a simple arrangement of benches set in the bowl of a hillside, with the slope built up artificially where the hill was insufficient.”[6] Some, like that at Athens (Figure 3.1), evolved from wooden benches to the stones that we see in ruins today.

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[5] Stricken, *The Origin of Greek Theatre*, 36; Margarete Bieber, *The History of the Greek and Roman Theatre*, (Princeton: Princeton University Press, 1939), 54.

[6] Forsyth, *Auditoria*, 12.

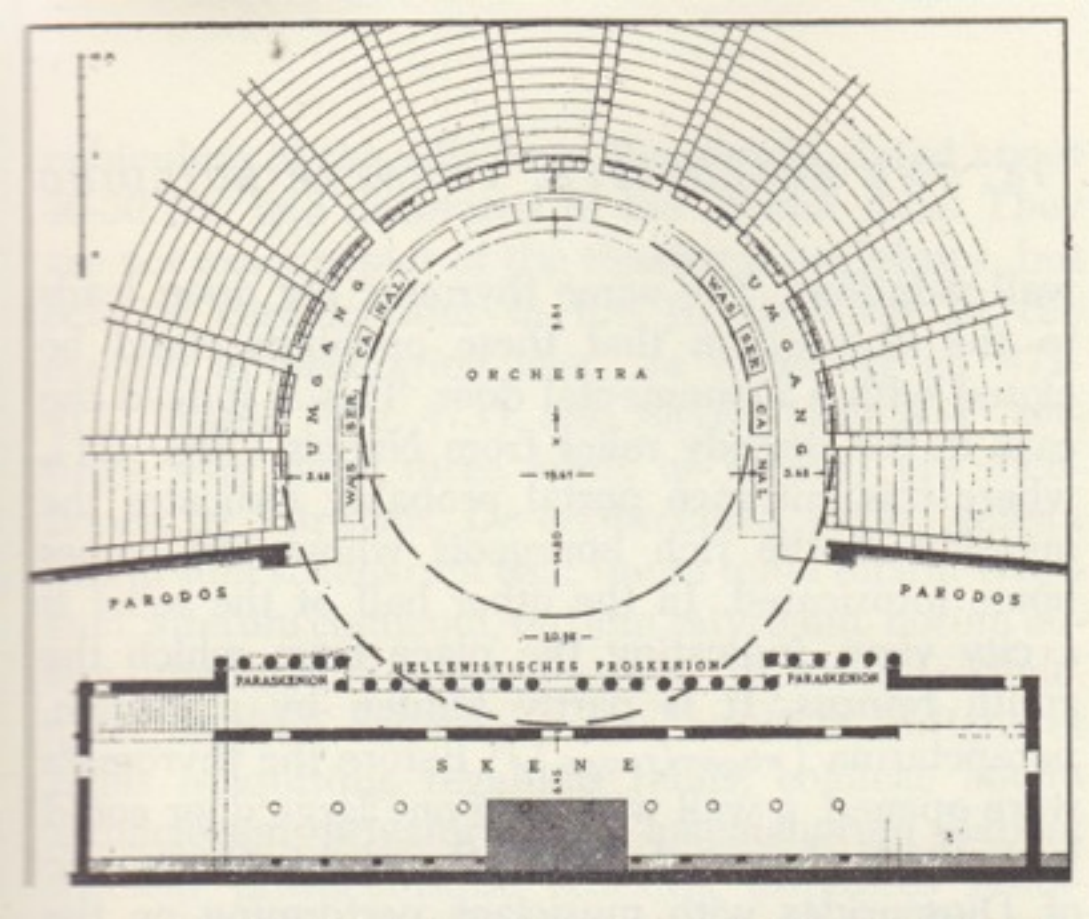


**Figure 3.1.** Theater of Dionysus at Athens [c150 BC] Anonymous architect; Athens, Greece; Plan of the Hellenistic Theatre in August Carl Mahr, *The Origin of Greek Tragic Form: A Study of the Early Theater in Attica* (New York: Prentice Hall, 1938), Fig. 29.

Classical Greek and Roman drama saw a revival during the Italian Renaissance. Opulently wealthy Italian princes showcased these dramas in "temporary structures built within existing palaces… [later], permanent theaters were built [in] the mid-sixteenth century." These later theaters had their own, unique character, but were still patterned after the traditional amphitheaters. One of the earliest surviving examples of these Italian theaters is Andrea Palladio's Teatro Olympico (1580-1584) in Vincenza

(Figure 3.2).[7] This iconic building served as a precedent, not only for theaters, but for European opera houses as well; it remains one of the most iconic forms of theater today.

**Figure 3.2.** Teatro Olimpico [1580-84] Andrea Palladio, architect; Vincenza, Italy; PhotoCrd: Fototecnica, Vincenza.

In describing the reiterations of auditoriums that have since been created, Forsyth speculated that "the criterion of visual intimacy generates a short, broad auditorium… for sightlines, the raked fan-shape is ideal."[8] Circle Round is characterized, as Forsyth

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[7] Forsyth, *Auditoria*, 12.

[8] Forsyth, *Auditoria*, 14.

suggests, by a feeling of intimacy and closeness. In some circumstances, this closeness couples with the focus of the audience, creating an environment free of distraction.

**Effect**

In the classrooms of K-12 schools, Circle Round, as an educational and design strategy, creates a fan-shaped seating arrangement allowing children to focus visual attention on their instructor. While “open spaces [can be] divided by rolling equipment-storage cabinets, chalkboards, tackboards, [etc],” the use of Circle Round enacts the inherent benefits of the circle, “a centralized, introverted figure that is normally stable and self centering in its environment.” Circles are particularly useful in large, open plans as “[placing] a circle in the center of a field reinforces its inherent centrality.”[9]

Educational studies also show that “furniture and equipment should accommodate the arrangement of group work zones and discussion circles, not encumber these.” Publications on open plan schools, schools that utilize “vast, wide-open areas… [grouped into] classroom clusters or pods,” mention the importance of using

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[9] American Association of School Administration, *Open Space Schools* (Washington, DC: sAmerican Association of School Administrators, 1971), 33.; Francis D.K. Ching, *Architecture, Form, Space & Order*, Second Edition, (New York: John Wiley & Sons, Inc.,1996), 39, 39.

"trapezoidal tables because they open more avenues of creative and functional arrangement." Such tables are shown later in this chapter (Figure X.8, X.9).[10]

**Chronological Sequence**

In mid-20th century America, changes in architectural design coupled with a change in traditional views of education " . . . brought a new light to educational architecture, a new movement based on the needs of the pupil . . . it can certainly be said that 1950 represents a year in history when for the first time a large majority of architects and educators throughout the entire nation got together to try to solve their common problems."[11] William W. Caudill, an architect, educator and author of twelve books in his field, including *Space for Teaching* and *Toward Better School Design*, led architects in research studies and collaborations with educators. According to Caudill, school design did not join the modernist architectural movement until around 1949, when suddenly, architects and interior designers reconsidered the rigid rows of seating used since the one room schoolhouse.

The collaboration between architects and educators, and the role of furniture manufacturers, resulted in the concept of an "open plan" (having no or few dividing walls between areas) in schools. To make use of the newly opened structure, as well as

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[10] Rotraut Walden, *Schools for the Future: Design Proposals from Architectural Psychology* (Germany: Hogrefe and Huber Publishers, 2009), 90.; American Association of School Administration, *Open Space Schools*, 33.

[11] William W. Caudill, *Toward Better School Design* (Ann Arbor, Mich.: FW Dodge Corp, 1954), 13-14,17.

to accommodate ever-changing educational doctrines, architects created larger classrooms that could adapt to a wide variety of education curriculums. “Instead of regimented desks, [the modern classroom would have] chairs and tables light enough for children to move easily... the self-contained classroom is bigger than classrooms used to be, and different in shape. It opens to... become bigger and even more informal.”[12] Because chairs and tables were now easily moved, teachers could feel free to experiment with classroom layouts. The Intype Circle Round is a result of this experimentation.

In 1956 Architectural Record published the first example of Circle Round in a school setting, the Pocantico Hills Central School in Pocantico, New York. A photograph records the use of a classroom organization in which desks were arranged into a crescent-shaped row with a blackboard at the center (Figure 3.3). Each individual student had her or his own desk, allowing for a more precise curve to the circle. Although children are posed sitting in a Circle Round, they do not appear to be interacting with the space, but to be focused on the lesson. Instruction in this time period and for secondary school students such as these remained formal. Although Circle Round in the Pocantico Hills Central School signified a structured arrangement, it represented the beginning of a new era that moved furniture arrangement out of a grid. Just as importantly perhaps was the role the publication made in disseminating a new mode of arrangement to an audience of architects. It should also be noted that Perkins

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[12] Caudill, *Toward Better School Design,* 28.

+ Will was the architectural firm for the school, not Caudill's CRS (Caudill, Rowlett, Scott & Associates). [13]

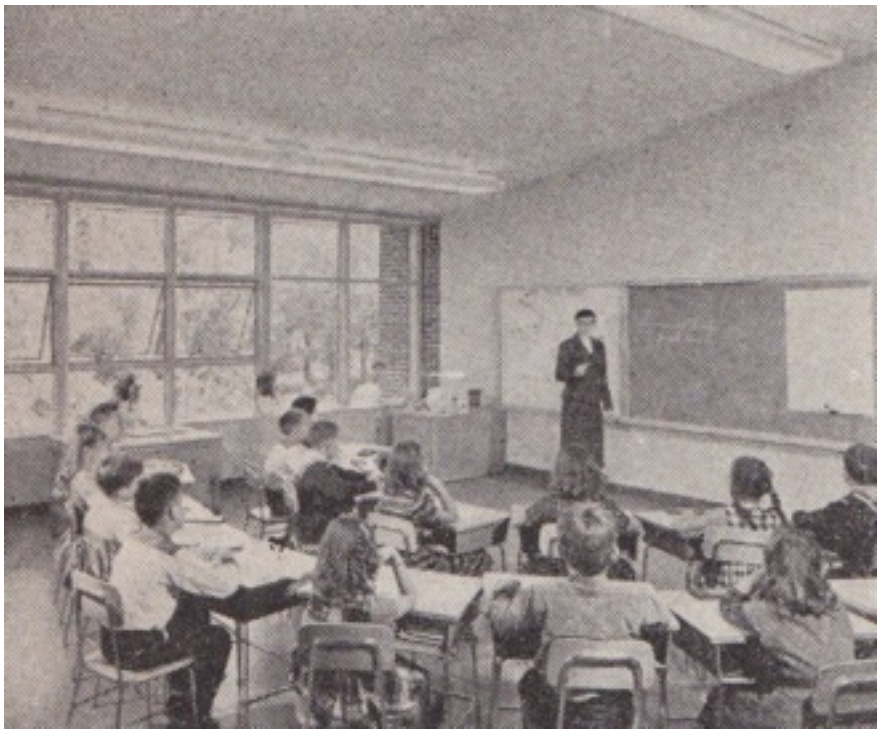

**Figure 3.3.** Pocantico Hills Central School [1956] Perkins + Will, architect; Pocantico, NY in "Schools," *Architectural Record* 119, no. 4 (Apr. 1956): 242; PhotoCrd: Hedrich-Blessing.

By 1957, furniture manufacturers began to create furniture that reflected new educational practices. A photograph (Figure 3.4) published of Kissam Lane, a primary school in Glen Head, New York, depicts a Circle Round focused on a blackboard and composed of curved tables meant to sit two students per desk.[14] The lower right corner of the picture reveals another Circle Round configuration, this one with its back to the other. Kissam Lane's much larger classroom than Pocantico Hills facilitated two

[13] Pocantico Hills Central School [1956] Perkins + Will, architect; Pocantico, NY in "Schools," Architectural Record 119, no. 4 (Apr. 1956): 239-242; PhotoCrd: Hedrich-Blessing.

[14] Kissam Lane School [1957] Caudill, Rowlett, Scott & Associates; Glen Head, NY in "Importance of Quality Design," *Architectural Record* 121, No. 4 (Apr. 1957) 242-243; PhotoCrd: Lawrence S. Williams.

groups receiving instruction simultaneously. This school (designed by CRW), and also published in *Architectural Record*, sent two design messages to architects. One is the reiteration of the Circle Round practice. The second is a large classroom in which two Circle Rounds operate together.

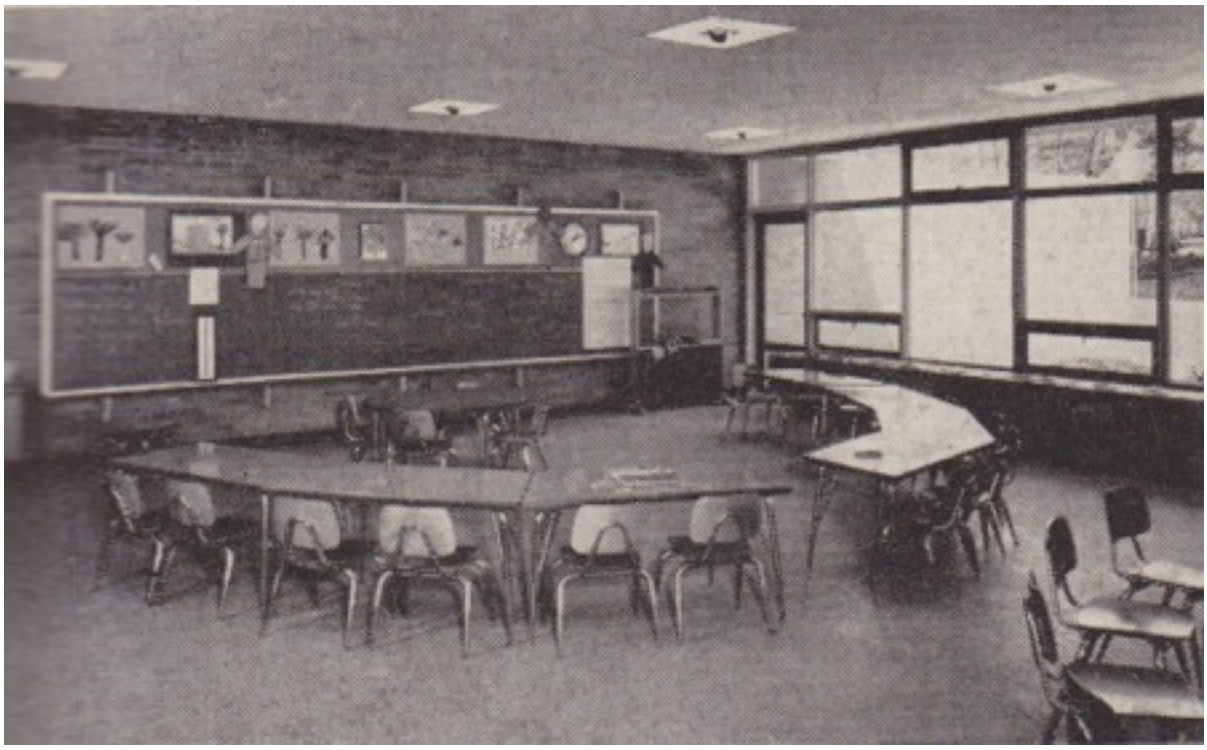

**Figure 3.4.** Kissam Lane School [1957] Caudill, Rowlett, Scott & Associates; Glen Head, NY in "Importance of Quality Design," *Architectural Record* 121, No. 4 (Apr. 1957) 243; PhotoCrd: Lawrence S. Williams.

Not all schools were as generously proportioned as the Kissam Lane School; Hilltop Elementary School (1960) in Wyoming, Ohio, just north of Cincinnati, shows options for the Circle Round arrangement when less space is available (Figure 3.5). Rather than being arrayed in a semi-circle, the children are seated in a more linear U-shape. The desks are similar to those seen in the Pocantico Hills School; each individual desk was

lightweight, mobile, and easily reconfigured into a variety of seating patterns. According to the article, “all areas [of the school] are of adequate size to function efficiently.”[15] The image shows the students turned to face the far corner of the room, where the teacher sits at a piano. Behind the piano, on the wall toward which all of the desks are positioned, is a chalkboard. The photograph is posed (the guard over the piano’s keyboard is down). It assumes that, when teaching a class, the instructor is typically at the blackboard. Circle Round’s intention is to purposefully direct students’ forward, so one assumes that in reality the teacher would not have configured her students into this shape, only to have them turned backwards as they are in this photograph.

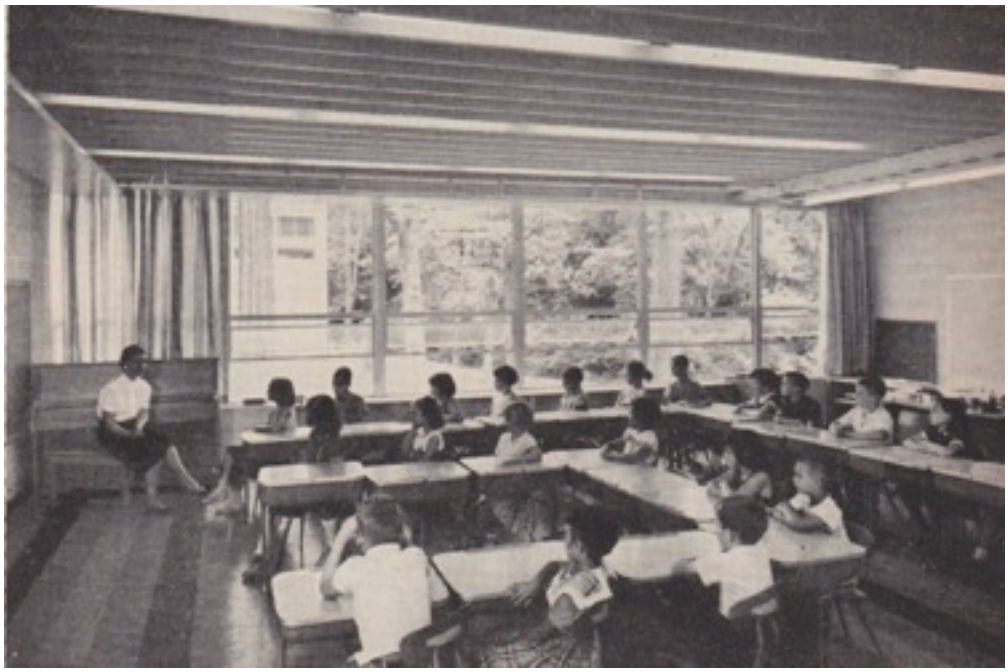

**Figure 3.5.** Hilltop Elementary School [1960] Charles Burchard, A.M. Kinney Associates, architects; Wyoming, Ohio in “Campus School in Scale for Small Children,” *Architectural Record* 127, no. 5 (May 1960): 205; PhotoCrd: Joseph W. Molitor.

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[15] Hilltop Elementary School [1960] Charles Burchard, A.M. Kinney Associates, architects; Wyoming, Ohio in “Campus School in Scale for Small Children,” *Architectural Record* 127, no. 5 (May 1960): 202-205; PhotoCrd: Joseph W. Molitor.

The Chippewa Middle School (1962) in Saginaw Township, Michigan illustrates the "open end" classroom designed by Caudill, Rowlett, and Scott (Figure 3.6). Such a classroom was part of a movement in educational theory that called for classrooms with "large open spaces with no fixed interior elements [and] operable partitions, demountable partitions, rolling cabinet or screen units, [that] divide or shape [the] open plan to fit the [school's] program." The photograph shows a group of students seated at desks that were arranged into concentric, circular rows around the center of the classroom. At the front of the classroom, the teacher stands near her blackboard. Similar to Hilltop, the students crane their heads to see the instructor. The set up of the classroom in this instance was most likely temporary and for a specific purpose, such as a "dramatization... a wonderful learning medium as well as a splendid opportunity for self expression." Although the desks formed a nearly complete circle, it is considered a variation of Circle Round, because the desks are organized to focus on a central point in the classroom.[16]

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[16] American Association of School Administration, *Open Space Schools*, 33.; Chippewa Middle School [1962] Caudill, Rowlett, Scott & Associates; Saginaw Township, MI in "Caudill's Two Middle Schools are Completed," *Architectural Record* 131, No. 2 (Feb. 1962): 136-137; PhotoCrd: Bradford-LaRiviere, Inc.; Caudill, *Toward Better School Design,* 29.

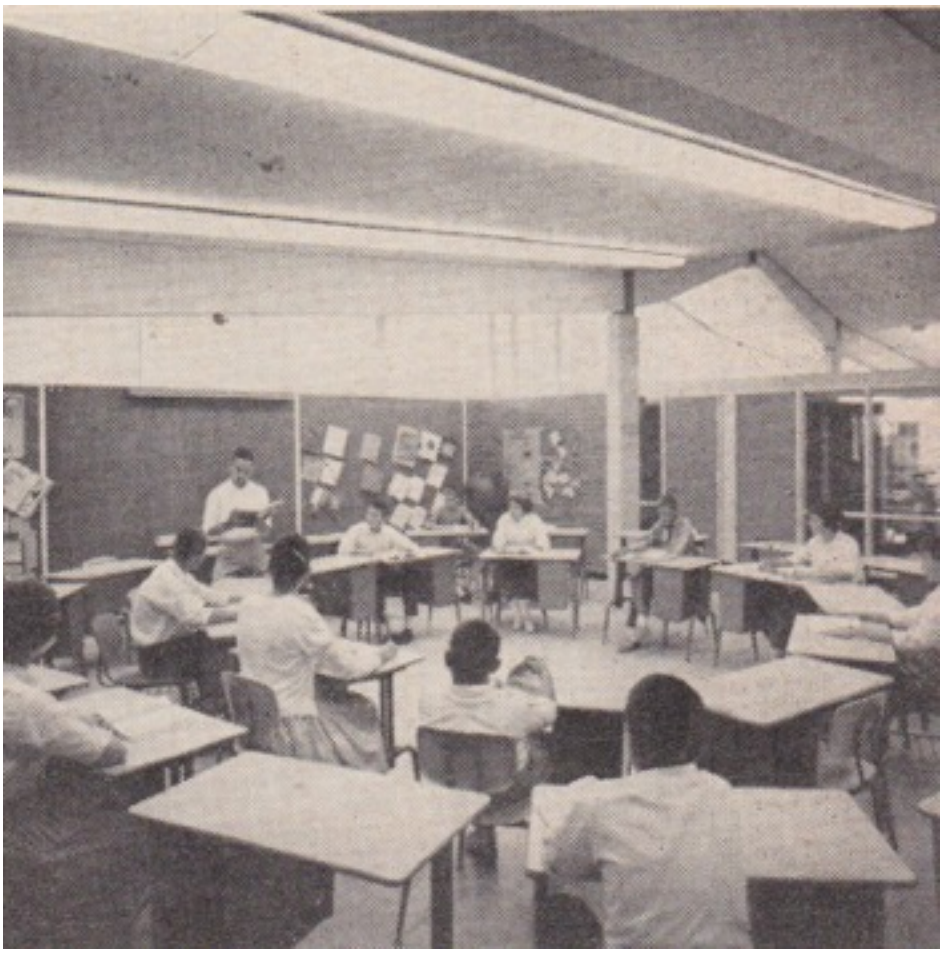

**Figure 3.6.** Chippewa Middle School [1962] Caudill, Rowlett, Scott & Associates; Saginaw Township, MI in "Caudill's Two Middle Schools Are Completed," *Architectural Record* 131, No. 2 (Feb. 1962): 137; PhotoCrd: Bradford-LaRiviere, Inc.

The Henry M. Gunn Senior High school in Palo Alto, California utilized Marching Round in 1965 in one of its many classrooms. An image from this school features desks curved in arched rows around a corner of the room (Figure 3.7). Unlike previous examples, these desks are attached to their chairs. At the front corner of the room are two chalkboards, as well as some storage and a single desk that appears to have been used as a podium for class lectures or speeches.[17]

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[17] Henry M. Gunn Senior High School [1965] Ernest J. Kump Associates, Inc., architects; Palo Alto, CA in "High School: Educational Reform and its Architectural Implications," *Progressive Architecture* 46, no. 8 (Aug. 1965): 141; PhotoCrd: William C. Eymann.

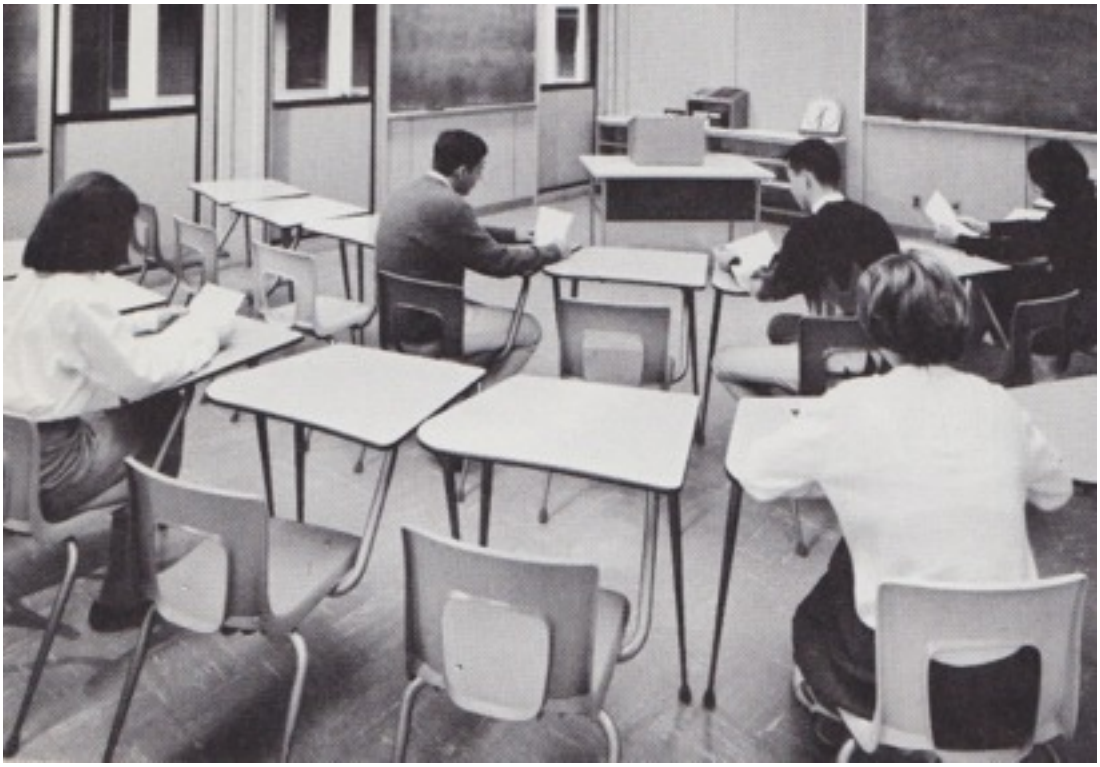

**Figure 3.7.** Henry M. Gunn Senior High School [1965] Ernest J. Kump Associates, Inc., architects; Palo Alto, CA in "High School: Educational Reform and its Architectural Implications," *Progressive Architecture* 46, no. 8 (Aug. 1965): 141; PhotoCrd: William C. Eymann.

In 1972, Durham Anderson Freed designed three elementary schools, Maple, Beacon Hill and Commodore Kimball Schools, within one school district in Seattle, Washington. These open plan schools provided for each group of students a "'learning station' with two walls (for black-and-tack board use) and a common area." One of the elementary schools photographed in *Architectural Record's* special issue (New Ideas in Education Ask New Planning Solutions for Schools) exemplified a new popular style of learning (Figure 3.8). Designed to "permit flexible grouping of both pupils and schedules... each group of three [teaching] stations is oriented to the resource center, facilities use." This picture is important, because it illustrates another instance of Circle Round, and also

because it demonstrates the need for a very focused individual environment within an open plan. In the background of the image, a second class can be seen, also seated in Circle Round, and also grouped around its instructor. [18]

**Figure 3.8.** Maple, Beacon Hill, & Commodore Kimball School [1972] Durham Anderson Freed Company, P.S., architects; Seattle, WA in "Alcoves Provide Each Learning Station with Two Walls for Teaching," *Architectural Record* 152, no. 2 (Aug. 1972): 109; PhotoCrd: Hugh Stratford Photos.

A photograph of a classroom in the Wilbur Cross- East Rock School (1976) in New Haven, Connecticut illustrates the furniture manufacturers' contribution to the continuation of two educational and design practices, namely, the open plan and Circle Round. The image also reveals the use of a new desk shape, the isosceles trapezoid,

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[18] Maple, Beacon Hill, & Commodore Kimball School [1972] Durham Anderson Freed Company, P.S. Architects; Seattle, WA in "Alcoves Provide Each Learning Station with Two Walls for Teaching," *Architectural Record* 152, no. 2 (Aug. 1972): 107-109; PhotoCrd: Hugh Stratford Photos.

to facilitate Circle Round and a variety of other configurations (Figure 3.9). Trapezoidal tables were thought to be “particularly useful since [they] allow for grouping in a variety of configurations.” These tables facilitated multiple configurations throughout the school, providing for a variety of environments and interactions. The manufacturer, American Seating, and the unidentified manufacturer who produced the curved desks in the Kissam Lane School (1957) enabled both teachers and students to define or redefine the shape of their classrooms (Figure 3.4). These trade sources also reinforced concepts from architects, designers and educators about what a successful classroom should be. This is fitting as this school was built to focus “not only as an academic facility but also as a community recreation and service center for the surrounding neighborhood.” The photograph (Figure 3.9) is of a “conventional classroom space” with desks in curved rows face toward one of the room’s tack board surfaces. According to the article, “in the interior design and space planning, flexibility for future expansion and changing classroom situations was the major objective.” The library space (Figure X.10) used by the “lower grades” had no tables, just simple chairs informally grouped around a large chair for the teacher. [19]

[19] Wilbur Cross- East Rock School [1976] Edward Larabee Barnes, architect, ISD Incorporated with Mary Barnes, interiors: “Wilbur Cross- East Rock School,” *Interior Design* 47, no. 8 (Aug. 1976): 106-111; PhotoCrd: Jaime Ardiles-Acre.

**Figure 3.9. (left)** Wilbur Cross- East Rock School [1976] Edward Larabee Barnes, architect, ISD Incorporated with Mary Barnes, interior design; New Haven, CT in "WilburCross- East Rock School," *Interior Design* 47, no. 8 (Aug. 1976): 109; PhotoCrd: Jaime Ardiles-Acre.

**Figure 3.10. (right)** Wilbur Cross- East Rock School [1976] Edward Larabee Barnes, architect, ISD Incorporated with Mary Barnes, interior design; New Haven, CT in "WilburCross- East Rock School," *Interior Design* 47, no. 8 (Aug. 1976): 110; PhotoCrd: Jaime Ardiles-Acre.

By late in the decade of 1980, another Circle Round reiteration brought the archetypical practice back full circle to its amphitheater origins. Architects Earl R. Flansburgh Associates created an amphitheater space for the Arlington Elementary School in Lawrence, Massachusetts (Figure 3.11). Flansburgh's interpretation resulted in a circular configuration of tiered and carpeted fixed seats (that also served as steps) located around an open space in the school's center. This recurrence of the amphitheater concept heralded a more traditional turn in school design that replaced the "imaginative school planning" that became de rigueur in the decade of the 1960 and of 1970.[20] Although the amphitheater was a group space, it was the antithesis of the flexible and movable furniture that emerged in the 1950s in response to the open plan. Nevertheless, the amphitheater, also dependent on a Circle Round concept,

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[20] Arlington Elementary School [1988] Earl R. Flansburgh Associates, Inc., architects; Lawrence, MA in "Varied Textures and Subtle Color Enrich a Conservative Pattern," *Architectural Record* 176, no. 10 (Sep. 1988): 112-13; PhotoCrd.: Sam Sweezy Photos.

represents a new kind of dynamic environment, a dedicated space for teachers and students to put on presentations and plays. The size of also allowed for a variety of uses, as it can easily accommodate both larger and smaller groups.

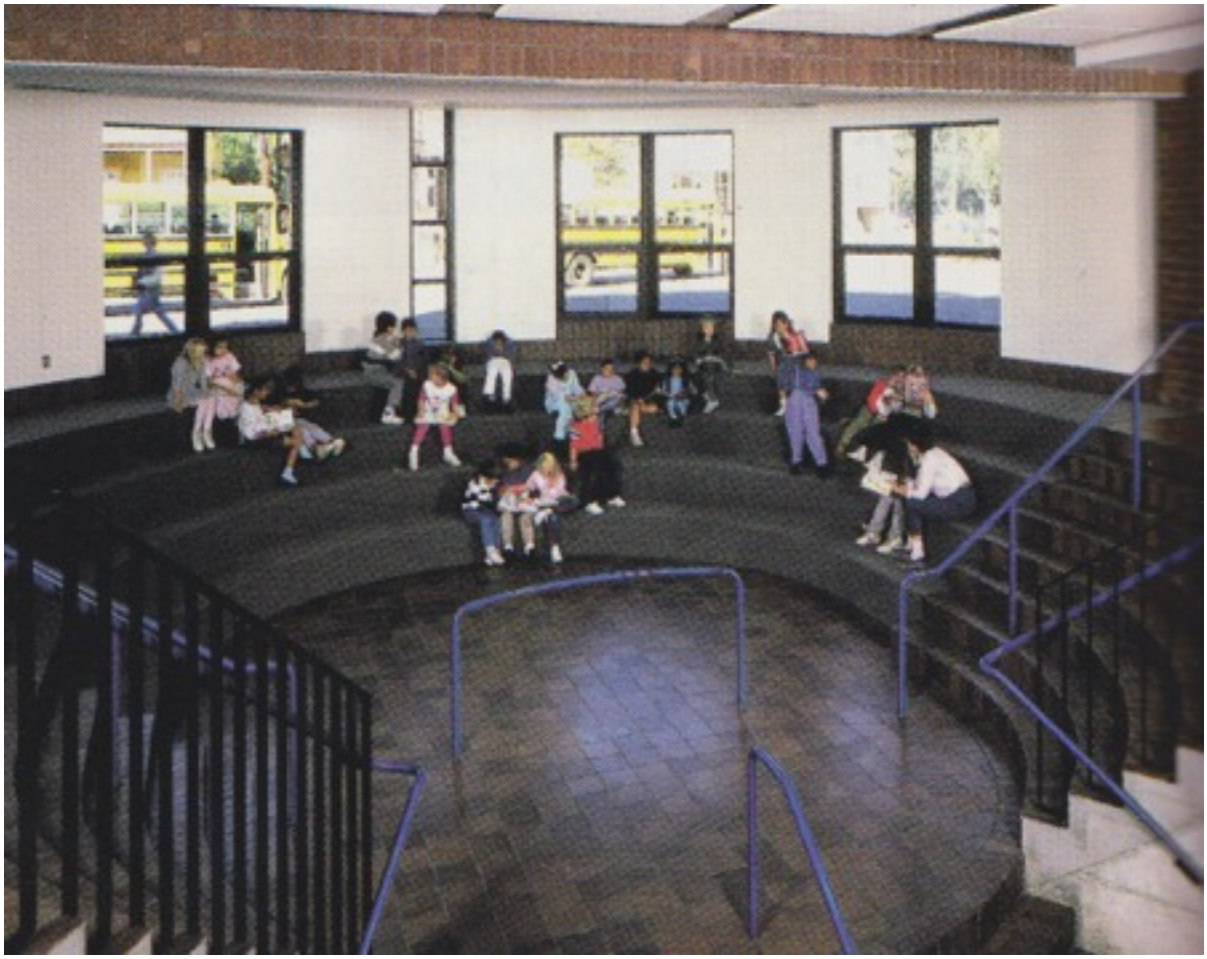

**Figure 3.11.** Arlington Elementary School [1988] Earl R. Flansburgh Associates, Inc., architects; Lawrence, MA in "Varied Textures and Subtle Color Enrich a Conservative Pattern," *Architectural Record* 176, no. 10 (Sep. 1988): 112; PhotoCrd.: Sam Sweezy Photos.

In 1999, the Wilbert Snow Elementary School was updated to better integrate the buildings that made up the large, several-building campus. The original school "was built in 1954 [and] embodied the era's progressive thinking regarding modern

architecture's role in public education."[21] Like the Arlington Elementary School (Figure 3.11), Wilbert Snow also contained a more permanent variation of Circle Round. In the elementary school's library, two rows of curved step seating are nestled behind similarly curved bookshelves, creating a dedicated story-reading space (Figure 3.12). Setting this configuration apart from the rest of the library, a separate purposeful Circle Round space was created. As in the Wilbur Cross- East Rock School, this library space once again demonstrated the need for a focused environment within a larger space.

**Figure 3.12.** Wilbert Snow Elementary School [1999] Jeter, Cook & Jepson, Architect; Middletown, CT; "Open Door Policies: Wilbert Snow School, Middletown, Connecticut," *Architectural Record* 187, no. 11 (Nov. 1999): 121; PhotoCrd: Woodruff/Brown Photography.

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[21] Wilbert Snow Elementary School [1999] Jeter, Cook & Jepson, Architect; Middletown, CT; "Open Door Policies: Wilbert Snow School, Middletown, Connecticut," *Architectural Record* 187, no. 9 (Sep. 1999): 118- 121; PhotoCrd: Woodruff/Brown Photography.

Between 1980 and 2000, Circle Round almost faded from publications, but in 2006, it was revived for the Reece School for children “with emotional disorders, learning disabilities, and speech or occupational impairments.” These unique student needs called for specialized classrooms designed to accommodate “six to eight students and two teachers.” [22] Combining three sets of two rectangular desks, a U-shaped seating arrangement was formed, allowing students to focus on the chalkboard in front of them (Figure 3.13). Once again, Circle Round emerged as the appropriate organization for creating a supportive and distraction-free environment.


**Figure 3.13.** The Reece School [2007] Platt Byard Dovell White Architects; New York City, NY in “Making the Grade: The Reece School, New York City,” *Architectural Record* 195, no. 7 (Jul. 2007): 143; PhotoCrd: Jonathan Wallen.

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[22] The Reece School [2007] Platt Byard Dovell White Architects; New York City, NY in “Making the Grade: The Reece School, New York City,” *Architectural Record* 195, no. 7 (Jul. 2007): 140-144; PhotoCrd: Jonathan Wallen.

Circle Round was also found in the classrooms of the Flint Hill School in Oakton, Virginia, during a site visit in August 2012; the school itself was constructed in 2001. Both a more formal arrangement (Figure 3.14) and evidence of a less formal (Figure 3.15) Circle Round were found in the classrooms there. The more formal arrangement shows desks arranged in three straight rows arrayed in a U-shape and facing the center of the ninth grade English classroom. Each row is composed of approximately six or seven desks with chairs pulled up to them.


**Figure 3.14.** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

The less formal arrangement is found in a tenth grade science classroom where seats with desks attached are circled around a lecturn at the center of the room. There appears to be an adjacent arrangement of tables in the back of the classroom as well.

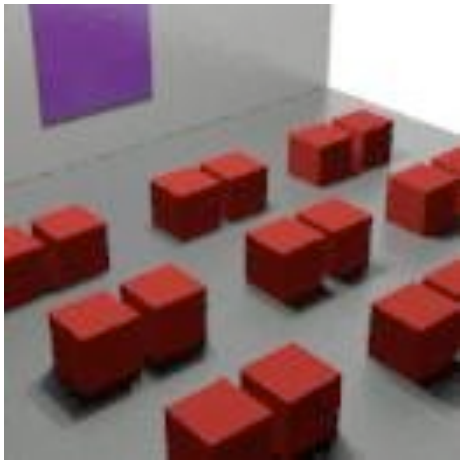
**Figure 3.15.** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

## Conclusion

Circle Round is a specific interior design solution that responded to educational research. Now in its sixth decade, it is used less frequently, but has not entirely faded from use. It remains an acceptable practice in both educational and architectural professions. [23]

[23] Evidence for the archetypical use and the chronological sequence of Circle Round in school design was developed from the following primary sources: **1950** Pocantico Hills Central School [1956] Perkins + Will, architect; Pocantico, NY in "Schools," *Architectural Record* 119, no. 4 (Apr. 1956): 242; PhotoCrd: Hedrich-Blessing.; Kissam Lane School [1957] Caudill, Rowlett, Scott & Associates; Glen Head, NY in "Importance of Quality Design," *Architectural Record* 121, No. 4 (Apr. 1957) 243; PhotoCrd: Lawrence S. Williams.; **1960** Hilltop Elementary School [1960] Charles Burchard, A.M. Kinney Associates, architects; Wyoming, Ohio in "Campus School in Scale for Small Children," *Architectural Record* 127, no. 5 (May 1960): 205; PhotoCrd: Joseph W. Molitor.; Chippewa Middle School [1962] Caudill, Rowlett, Scott & Associates; Saginaw Township, MI in "Caudill's Two Middle Schools Are Completed," *Architectural Record* 131, No. 2 (Feb. 1962): 137; PhotoCrd: Bradford-LaRiviere, Inc.; Henry M. Gunn Senior High School [1965] Ernest J. Kump Associates, Inc., architects; Palo Alto, CA in "High School: Educational Reform and its Architectural Implications," *Progressive Architecture* 46, no. 8 (Aug. 1965): 141; PhotoCrd: William C. Eymann.; **1970** Maple, Beacon Hill, & Commodore Kimball School [1972] Durham Anderson Freed Company, P.S., architects; Seattle, WA in "Alcoves Provide Each Learning Station with Two Walls for Teaching," *Architectural Record* 152, no. 2 (Aug. 1972): 109; PhotoCrd: Hugh Stratford Photos.; Wilbur Cross- East Rock School [1976] Edward Larabee Barnes, architect, ISD Incorporated with Mary Barnes, interior design; New Haven, CT in "WilburCross- East Rock School," *Interior Design* 47, no. 8 (Aug. 1976): 109; PhotoCrd: Jaime Ardiles-Acre.; Wilbur Cross- East Rock School [1976] Edward Larabee Barnes, architect, ISD Incorporated with Mary Barnes, interior design; New Haven, CT in "WilburCross- East Rock School," *Interior Design* 47, no. 8 (Aug. 1976): 110; PhotoCrd: Jaime Ardiles-Acre.; **1980** Arlington Elementary School [1988] Earl R. Flansburgh Associates, Inc., architects; Lawrence, MA in "Varied Textures and Subtle Color Enrich a Conservative Pattern," *Architectural Record* 176, no. 10 (Sep. 1988): 112; PhotoCrd.: Sam Sweezy Photos.; **1990** Wilbert Snow Elementary School [1999] Jeter, Cook & Jepson, Architect; Middletown, CT; "Open Door Policies: Wilbert Snow School, Middletown, Connecticut," *Architectural Record* 187, no. 11 (Nov. 1999): 121; PhotoCrd: Woodruff/ Brown Photography.; **2000** The Reece School [2007] Platt Byard Dovell White Architects; New York City, NY in "Making the Grade: The Reece School, New York City," *Architectural Record* 195, no. 7 (Jul. 2007): 143; PhotoCrd: Jonathan Wallen.; The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.; The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

**Chapter 4**
Two by Two



## Definition

Two by Two is a furniture arrangement that pairs two people in a small working group with a two-person table or by pushing two tables side-by-side.

## Application Definition

Two by Two is typically created in classrooms in schools grades one-to-twelve by pushing two desks, side-by-side, together. In laboratory environments one large table accommodates two students.

## Cluster

Two by Two + Marching Order

Two by Two + Circle Round

## Research

Two by Two is typically used in conjunction with Marching Order[1], although it can also be found with Circle Round,[2] a semi-circular grouping. When used in conjunction with Marching Order, desks that seat two are ordered in rows to create spatial order in the

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[1] *Marching Order* is a sequence of repeating forms organized consecutively, one after another, that establish a measured spatial order. It has been established as an archetypical practice in retail, showroom and workplace design. The Interior Archetypes Research and Teaching Project, Cornell University, http://www.intypes.cornell.edu/intypesub.cfm?inTypeID=95 (accessed May 29, 2012).

[2] *Circle Round* refers to the semi-circular grouping or shaping of furniture around a single focal point. Circle Round focuses attention on a specific, central source, blocking out visual distraction. It has been established elsewhere in this thesis as an archetypical practice in K-12 schools. Katherine Mooney, "Theory Studies: Archetypical Practices in American K-12K-12 School Design," (M.A. Thesis, Cornell University, 2011), XX.

classroom. With either formation, students are able to work in groups more easily due to closer proximity to a partner. The creation of student groups in the classroom typically accomplishes multiple educational objectives. Found in elementary and secondary schools, Two by Two is applicable to both younger and older classes.

The history of collaborative student education, as it has been used in American schools, dates back to the one room schoolhouse. Because school teachers were not found in abundance in this time period, nor were they inexpensive, teachers frequently found themselves instructing large groups of students at one time in a single cramped classroom. To overcome the age disparity, students were grouped in rows by age, with the youngest in the front rows and the oldest at the back. Teachers directed instruction toward a few students at a time. During the periods between classes, older students would take turns sitting at the end of each row, monitoring or helping the younger students through their lessons. Grouping students in this manner, older mentoring younger, was a practical means of accomplishing the instruction of a large group of students; the practice is still used today and continues to be used in classrooms of all ages. “Because cooperative learning emphasizes peer tutoring, collaborative learning, and interactive social skills, students feel that their abilities are valued and respected.”[3]

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[3] John W. Sipple, Lecture, “1800s and Common Schools and The Teacher,” Cornell University, Ithaca, New York, (Sep. 16, 2011).; James L. Cooper, *Small Group Instruction in Higher Education: Lessons from the Past, Visions for the Future* (Stillwater, Okla.: New Forums Press, 2003), 40-41.

## Effect

In grades K-12, teachers structure seating in a Two by Two configuration to aid in collaborative learning in the classroom; by seating students in pairs, students can easily work with one another to complete tasks. A well-recognized education method, collaborative or cooperative learning can be defined as a "structured, systematic instructional strategy in which small groups work together to produce a common product". According to Cooper, a significant amount of research has been done, with the results espousing that "students exposed to cooperative strategies demonstrated significantly higher gains in achievement and attitude toward the subject matter and significantly lower attrition rates than students receiving more traditional instructional approaches such as the lecture."[4]

Not only do students achieve more in groups, but they also learn valuable skills applicable later in life. "Positive interdependence means that students- often because of carefully structured mutual goals, division of tasks, role interdependence, or group rewards- have a vested interested in working cooperatively together."[5] These life-long tools may be utilized later by students as they continue their education and head into the workplace.

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[4] Cooper, *Small Group Instruction in Higher Education,* 3, 27.

[5] Cooper, *Small Group Instruction in Higher Education,* 40-41.

The development of social skills is an important goal of school environments. In *Toward Better School Design*, architect William Caudill lists one of the goals for American youth as the "need to develop respect for other persons, to grow in their insight into ethical values and principles, to be able to live and work cooperatively with others, and to grow in moral and spiritual values of life." By positioning students in groups and allowing them to interact with one another, teachers have the opportunity to focus on and model social skills, in addition to "discussing their value directly so that students know how to interact in a group, particularly as they give constructive feedback or ask probing questions."[6]

While the idea of grouping two together in the classroom might be more recent, the concept of pairs is age-old. According to the Christian Bible, God chose to "make [Adam, the first man], a helper comparable to him" and as a result, created woman, his companion. Later in Genesis, God commands Noah to gather animals to put on the ark, and "*two by two* they went into the ark to Noah, male and female, as God had commanded."[7] From both the ancient and modern times, the importance of groups, specifically pairs, and the relationships they form cannot be underestimated and can be judged to be integral to the way we function as a species.

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[6] William W. Caudill, *Toward Better School Design* (Ann Arbor, Mich.: FW Dodge Corp, 1954), 35; Cooper, *Small Group Instruction in Higher Education,* 41.

[7] Genesis 2:18-24, New King James Version; Genesis 7:1-9.

Scientific analysis of human relationships in pairs can be found in books published more recently; writing about managerial and organizational psychology, Harold J. Leavitt writes that "[In organizations], the central unit is the pair rather than the individual . . . and the space between two members is the territory we call [a] relationship; relationships are characterized by dependency . . . We can define relationships as situations in which individuals or groups seek mutually to satisfy needs."[8]

Collaborative learning environments, created through the use of Two by Two, are an integral and important part of grade-school education, as the practice promotes the development of communication skills, student investment in education, and social acclimation.

**Chronological Sequence**

Teachers and students began to free themselves from the tyranny of traditional rows of desks during the decade of 1950, as the open plan became increasingly popular in school design, and flexibility became the buzzword of school architects such as William Caudill of Caudill Rowlett Scott. During this period desks also became lightweight, movable, modular units. According to Caudill, "[the modern, "self-contained classroom" has], instead of regimented desks, chairs and tables light enough for the children to

[8] Harold J. Leavitt, *Managerial* Psychology (Chicago, Ill.: University of Chicago Press, 1978), 114.

move easily."[9] For this reason, and the fact that schoolrooms before 1950 were not published in design trade magazines before 1950, the chronological sequence of Two by Two begins about 1950.

One of the first instances of Two by Two is found in the Mattie Lively Elementary School in Statesboro, Georgia in 1955. The school has a more traditional layout; fourteen rectangular classrooms were located on both sides of a single corridor. The teacher of the classroom (Figure 4.1) created three modular blocks of Two by Two, three rows wide and six rows deep. Moreover, the arrangement was situated on an angle; the blocks of desks faced a corner of the room with a wall of windows located behind the students. "Jumbo brick, a local product, [was] used for corridor partitions and exterior walls, unfinished except for paint inside [the] classrooms; classroom partitions of staggered studs [were] surfaced with fir plywood rubbed with green paint and varnished." The classroom ceiling sloped to reveal a clerestory on the higher wall and operable windows flank the other side of the classroom. Younger elementary-age children populated the classroom.[10]

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[9] Caudill, *Toward Better School Design,* 37; Caudill, *Toward Better School Design,* 28.

[10] Mattie Lively Elementary School [1955] Aeck Associates, architects; Statesboro, GA in "Two Similar Elementary Schools in Rural Georgia," *Architectural Record* 117, no. 2 (Feb. 1955): 199-200; PhotoCrd: Joseph W. Molitor.

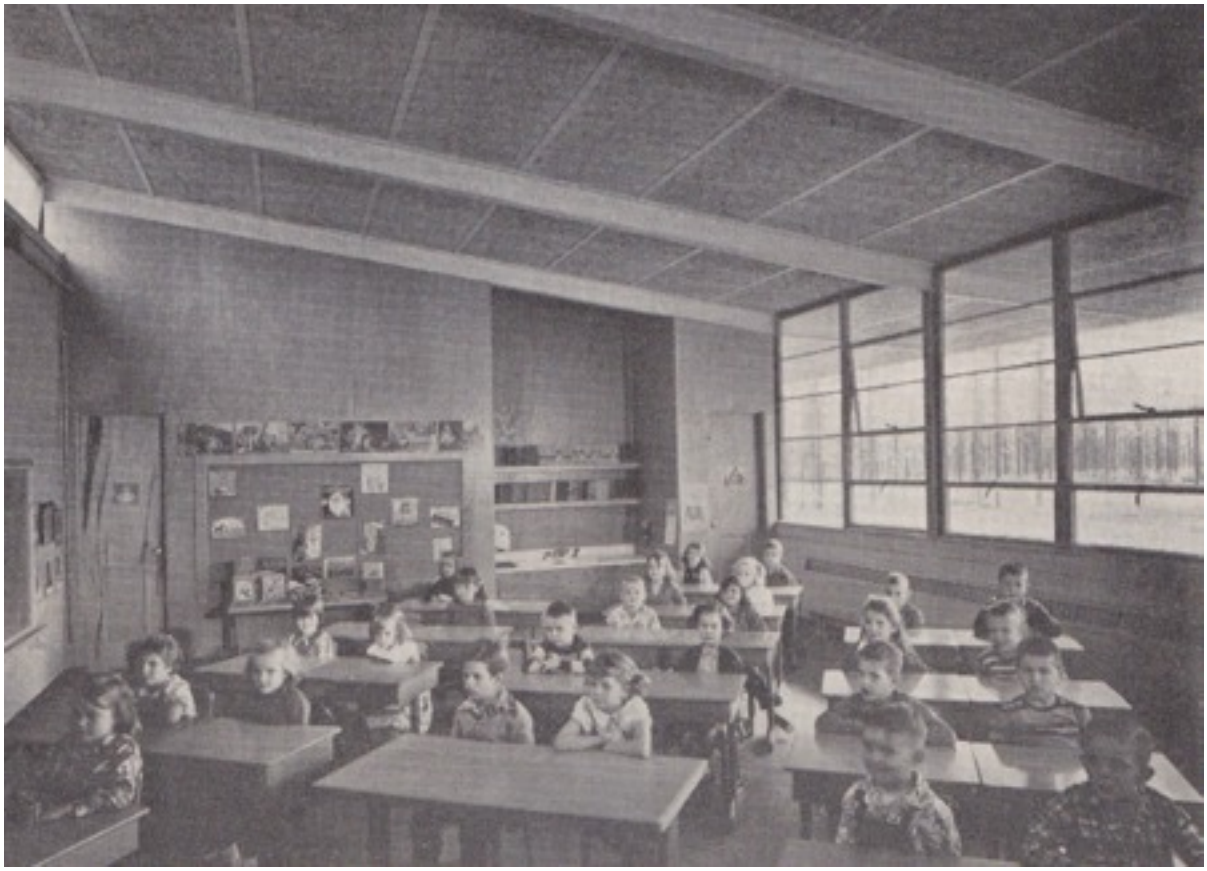

**Figure 4.1.** Mattie Lively Elementary School [1955] Aeck Associates, architect; Statesboro, GA in "Two Similar Elementary Schools in Rural Georgia," *Architectural Record* 117, no. 2 (Feb. 1955): 200; PhotoCrd: Joseph W. Molitor.

The West Charlotte High School in Charlotte, North Carolina, designed by a local architectural firm, Graves & Toy, won an A.I.A. Merit Award in 1955. West Charlotte housed more than 600 high school-age pupils. The Biology Lab, located in the Science Building, separate from the standard Academic building, was arranged Two by Two (Figure 4.2). Here, students sit in pairs at stone-topped two-person tables. The classroom accommodated a gridded arrangement of three tables across and six rows of tables back, between two walls of operable, metal-framed windows. In the back of

the classroom, built in shelving held lab equipment for the class. Fluorescent lights dropped down from the ceiling, running parallel along exposed beams.[11]

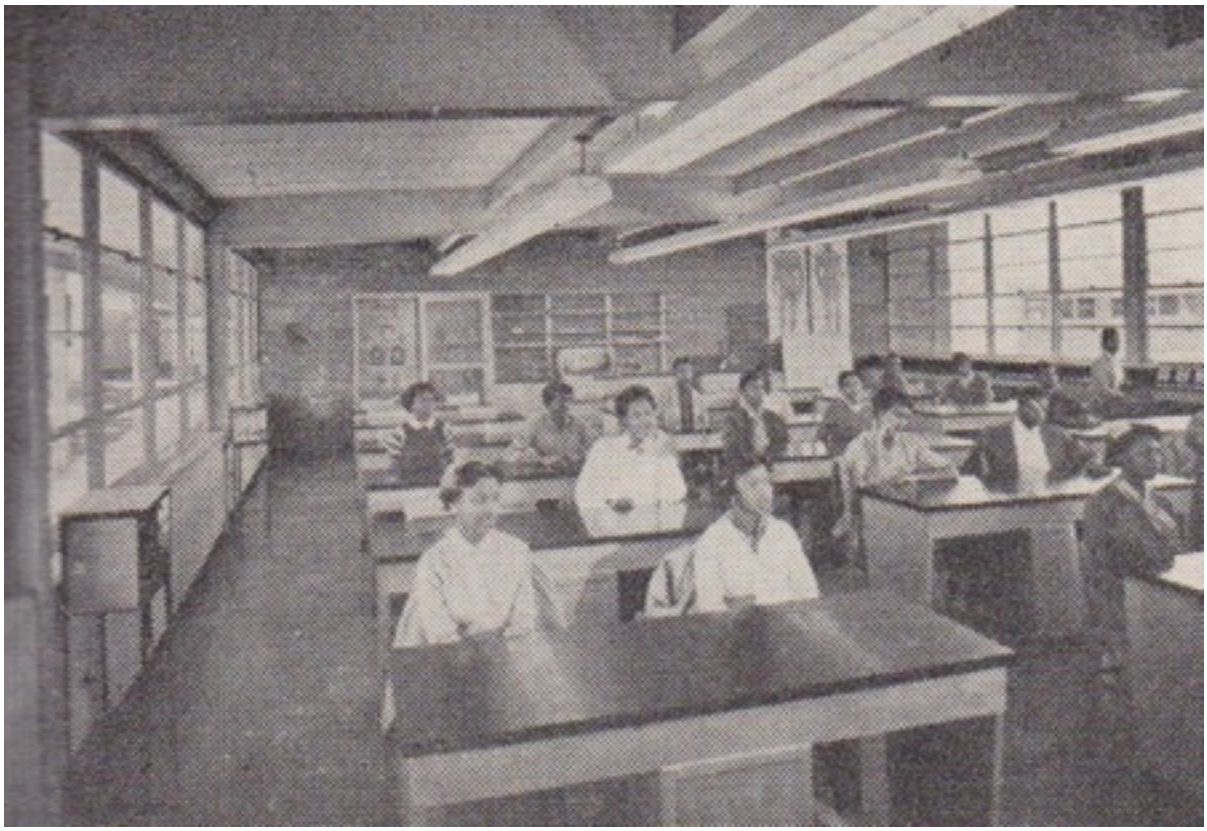

**Figure 4.2.** West Charlotte Senior High School [1955] Graves & Toy, architects; Charlotte, NC in "West Charlotte Senior High School: Preplanning Produces Results," *Architectural Record* 117, no. 4 (Apr. 1955): 180; PhotoCrd: Joseph L. Molitor.

A third instance of Two by Two in 1955 shows a classroom, one of twenty-five, in McDonogh School No.36, a school that served mostly kindergarten to sixth grade students in New Orleans, Louisiana (Figure 4.3). In this example, pairs of desks were arranged in a grid, of four rows wide and five rows deep, with a single desk, presumably the teacher's, located at the front of the classroom. Like the Mattie Lively

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[11] West Charlotte Senior High School [1955] Graves & Toy, architect; Charlotte, NC in "West Charlotte Senior High School: Preplanning Produces Results," *Architectural Record* 117, no. 4 (Apr. 1955): 180; PhotoCrd: Joseph L. Molitor.

Elementary school, the desks are individual modular units that are arranged in pairs. Each desk has a matching chair placed behind it. The desks face the front wall of the room where there is a movable chalkboard and shelves of built-in storage. The base of the adjacent wall provides built-in shelving, with operable windows above it that extend to the ceiling, meant to provide “natural ventilations to answer the demands of the climate.”[12]

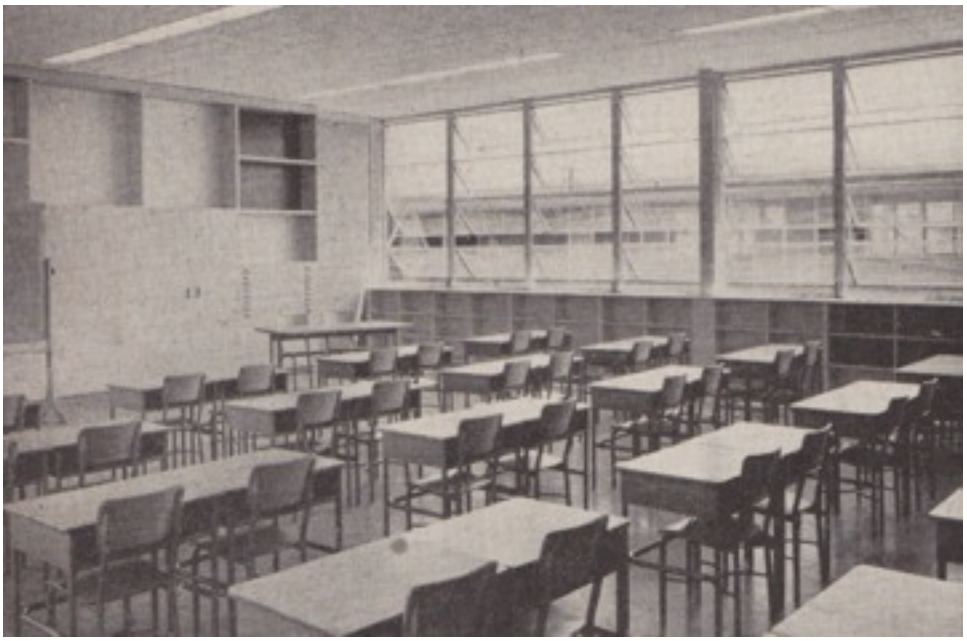

**Figure 4.3.** McDonogh School No. 36 [1955] Sol Rosenthal, architect, Charles R. Colbert, associate architect; New Orleans, LA in “Appropriately Designed for the Deep South,” *Architectural Record* 118, no. 6 (Dec. 1955): 144; PhotoCrd: Ulrich Meisel.

In 1962, Hillspoint Elementary in Westport, Connecticut utilized Two by Two in a wood-paneled classroom (Figure 4.4). The innovative open-plan school was shaped like a tricorn, with classrooms on the edges and in the large, wide, circulation spaces. In the

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[12] McDonogh School No. 36 [1955] Sol Rosenthal, architect, Charles R. Colbert, associate architect; New Orleans, LA in ”Appropriately Designed for the Deep South,” *Architectural Record* 118, no. 6 (Dec. 1955): 144; PhotoCrd: Ulrich Meisel.

classroom, an exposed plenum reveals the heating system, water supply and vent pipes in the ceiling plane. “Continuous light valances [illuminated] the tackboards and chalkboards below and the ceiling above... the white fir decking [acted] as a reflector lighting all the major spaces.”[13] Metal desks are grouped in sets of two three rows wide and four rows deep facing the chalkboard at the front of the classroom. Plastic-backed metal chairs are placed behind each desk. Along the side of the classroom, a circular table sits next to the teacher’s large, rectangular desk. At the very front of the classroom, two individual desks are placed on an angle, not quite perpendicular to one another, in front of a small mobile chalkboard, but still grouped closely together.

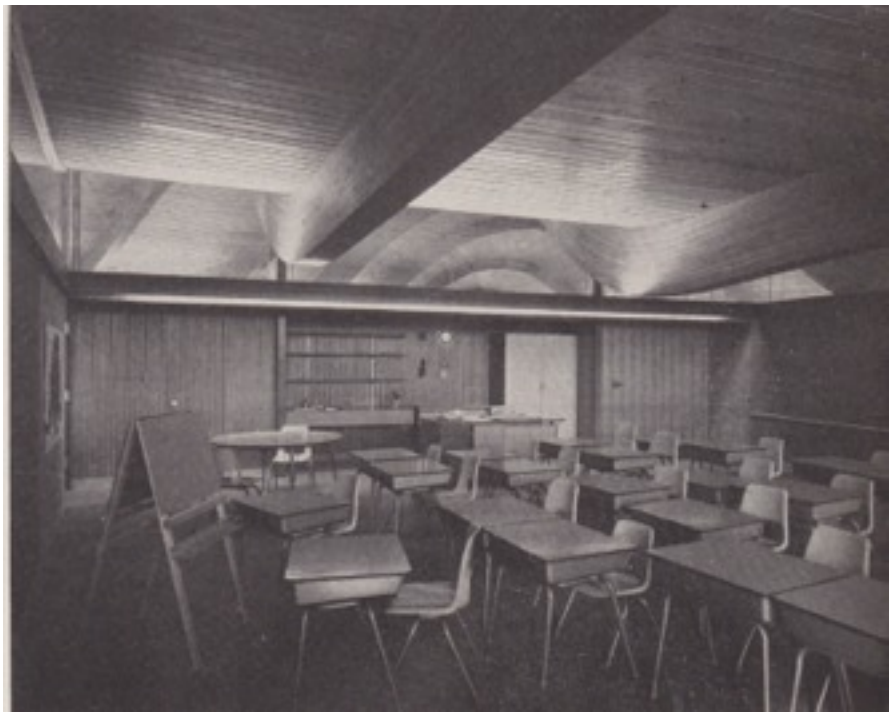

**Figure 4.4.** Hillspoint Elementary School [1962] Victor A. Lundy, architect; Westport, CT in ”Tricorn for Teaching,” *Progressive Architecture* 43, no. 6 (Jun. 1962): 131; PhotoCrd: George Cserna.

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[13] Hillspoint Elementary School [1962] Victor A. Lundy, architect; Westport, CT in ”Tricorn for Teaching,” *Progressive Architecture* 43, no. 6 (June 1962): 131; PhotoCrd: George Cserna.

Another image from the June 1962 issue of *Progressive Architecture* depicts Two by Two in a typewriting classroom (Figure 4.5) in Mount Tahoma Senior High School in Mount Tacoma, Washington. Desks are placed close together in sets of two with a typewriter placed on top of each workspace. The desks are arrayed in rows that stretch out at an angle from the far wall. The ceiling plane is broken by several thin beams with evenly spaced fluorescent lights perpendicular to them. “All beams and columns [were] stained signal red… accent colors on the interior [were] two shades of blue, white, gold, and signal red.”[14] Along the far wall, glass curtain walls rise up to the high ceiling. Behind a partially extended accordion screen, another class is visible, but facing the opposite direction. The instructor’s desk is located off to the side, near the accordion wall, and in front of some built-in storage.

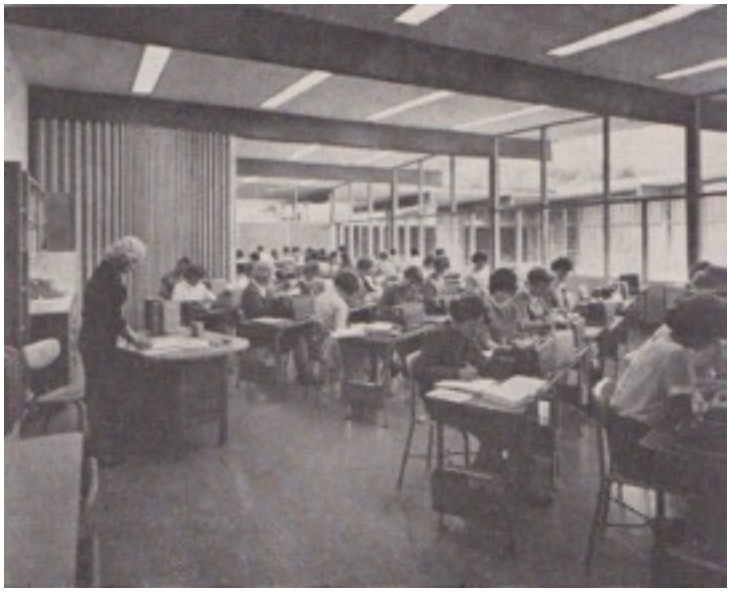

**Figure 4.5.** Mount Tahoma Senior School [1962] Robert Billsborough Price, architect; Tacoma, WA in ”Subdivision by Grades,” *Progressive Architecture* 43, no. 6 (Jun. 1962): 124; PhotoCrd: Morley Baer.

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[14] Mount Tahoma Senior School [1962] Robert Billsborough Price, architect; Tacoma, WA in ”Subdivision by Grades,” *Progressive Architecture* 43, no. 6 (Jun. 1962): 124; PhotoCrd: Morley Baer.

An open plan school designed by the firm Durham Anderson Freed in Seattle in 1972 depicts Two by Two in differently than previous images (Figure 4.6). In this instance, elementary-age students are seated at isosceles-trapezoid-shaped tables. These child-height desks are then arrayed in a Circle Round configuration facing a teacher seated in front of the class. In the background, a second class can be seen, arranged in a similar manner to the class in the foreground. Although the desks appear capable of being joined together to create rows, the majority of the desks in this arrangement are not aligned in this manner; most tables are separated, with only two students seated at each table. In the distance, a larger space, possibly for circulation or larger events, can be seen, with the "distinction between [this] commons area and the learning stations accentuated by a difference in ceiling height and lighting; over the commons area the ceiling [was] higher and indirect light [was] used in the ceiling cove."[15]

[15] Maple, Beacon Hill, & Commodore Kimball School [1972] Durham Anderson Freed Company, P.S., architect; Seattle, WA in "Alcoves Provide Each Learning Station with Two Walls for Teaching," *Architectural Record* 152, no. 2 (Aug. 1972): 108, PhotoCrd: Hugh Stratford Photos.

**Figure 4.6.** Maple, Beacon Hill, & Commodore Kimball School [1972] Durham Anderson Freed Company, P.S., architects; Seattle, WA in "Alcoves Provide Each Learning Station with Two Walls for Teaching," *Architectural Record* 152, no. 2 (Aug. 1972): 109; PhotoCrd: Hugh Stratford Photos.

One of the largest vocational schools in the nation in 1976, Greater Lowell Regional Vocational Technical School used Two by Two in one of its drafting classrooms (Figure 4.7). The classroom shows drafting tables grouped in sets of two in a grid five rows deep and three rows across the room. While there was some space between each individual drafting table and its neighbor, the tables are spaced much farther apart. At the head of the classroom, an instructor sits at a desk facing the students. Fluorescent lighting is suspended from the ceiling, parallel to the rows of seats. The exposed plenum increases the height of the space, allowing views to the ceiling beams and electric wiring. Across the back wall, there appear to be regularly recessed panels, some containing doors, others containing storage or white boards. These large doors

may have been due in part to the need to “provide delivery access to the [shop]” that may be located adjacent to this classroom.[16]

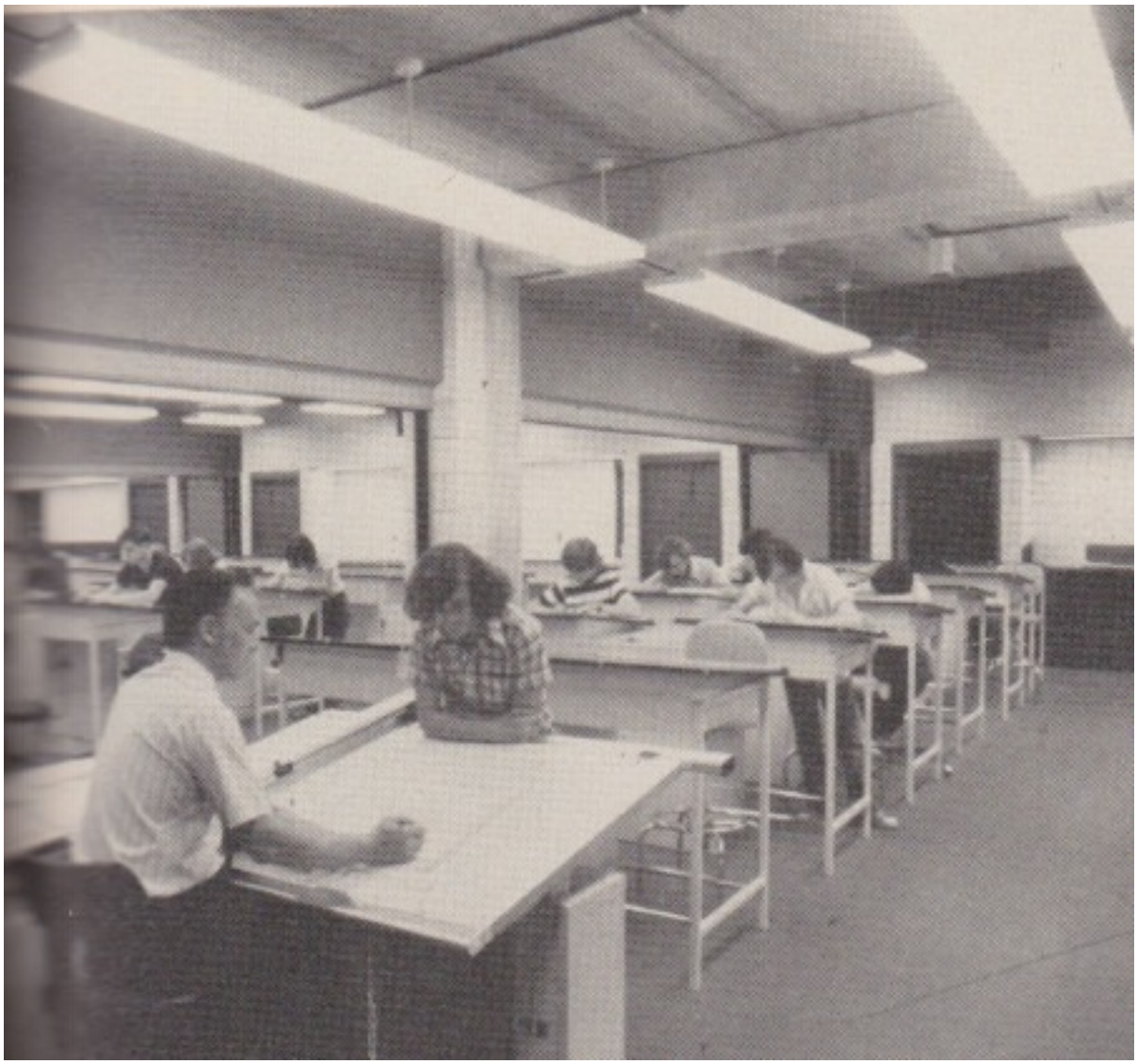

**Figure 4.7.** Greater Lowell Regional Vocational Technical School [1976] Drummey Rosane Anderson, Inc., architect; Tyngsboro, MA in ”Vocational Schools: A Progress Report,” *Architectural Record* 159, no. 3 (Mar. 1976): 133; PhotoCrd: Wayne Sovern’s Photos.

[16] Greater Lowell Regional Vocational Technical School [1976] Drummey Rosane Anderson, Inc., architect; Tyngsboro, MA in ”Vocational Schools: A Progress Report,” *Architectural Record* 158, no. 3 (Mar. 1976): 133; PhotoCrd: Wayne Sovern’s Photos.

Little evidence of Two by Two in trade magazines is found in the decades between 1980 and 2010. This is due, not to an absence of the Intype, but rather a lack of articles featuring schools in interior design and architecture trade publications. The articles during this time period typically depicted schools' more extraordinary spaces, such as school libraries or Showcase Stairs[17] rather than the traditional classrooms featured in the preceding decades. It can be assumed, however, that Two by Two continued to be used, in part because collaborative learning continued to be practiced. Two by Two resurfaced in a January 2012 article in *Architectural Record*, proving that that the Intype continues to be used, particularly in school laboratory environments.

Two by Two was still used in practice during this period and can be found in at least two schools constructed in the early 2000's. The Flint Hill School in Oakton, Virginia, (Figure 4.8) which was built in 2001 by Chatelain Architects and Cumberland Valley High School (Figure 4.9), renovated in 2003 by Liberty Engineering. Photos of both classrooms show tables seating two people each lined up in a Marching Order grid facing a teacher's desk at the front of the classroom. The picture from the Flint Hill School shows a standard classroom with a whiteboard at its head and book storage on the far wall under a window. The Cumberland Valley High School image shows a

[17] A *Showcase Stair* is an extravagantly designed architectural feature in which the stair itself becomes a prominent display element. Its functionality is often secondary to the spatial drama created by the stair's structure, form, materials and lighting. Showcase Stair is an archetypical practice in Apartment, Hotel, House, Retail and School. The Interior Archetypes Research and Teaching Project, Cornell University, http://www.intypes.cornell.edu/intypesub.cfm?inTypeID=33 (accessed May 29, 2012).

science classroom where the teacher's desk is a large laboratory station set in front of a white board.

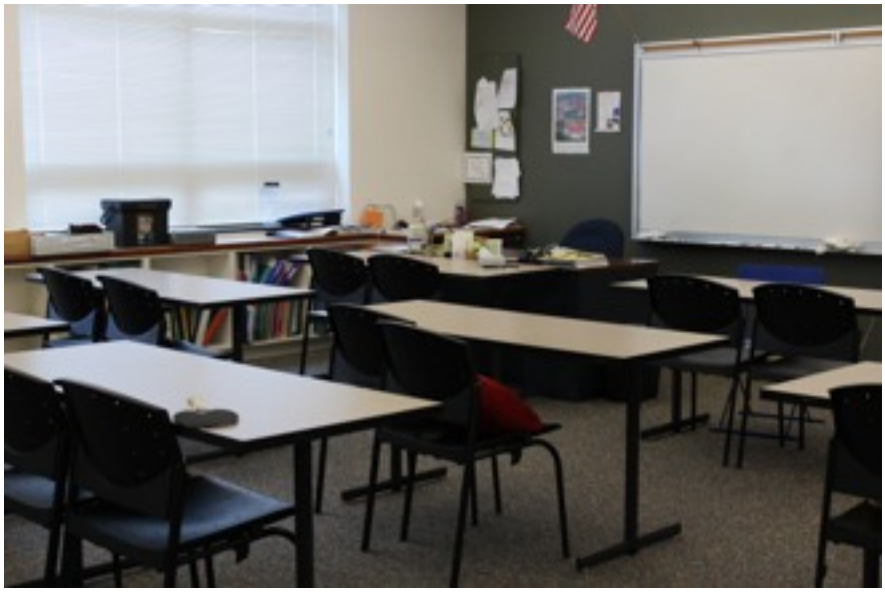

**Figure 4.8.** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

**Figure 4.9.** Cumberland Valley High School [2003] Liberty Engineering, Architects; Mechanicsburg, PA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

The Pritzker Science Center, a part of Milton Academy, was completed in August 2010 to house the prep school's science classroom-labs. These spaces "combine seminar tables and group lab benches in a single room to promote hands-on learning." Each lab station's tables are large enough to accommodate (Figure 4.10) two stools on each side of the table. "Garage doors connect classroom-labs, which feature "Harkness" seminar tables next to lab benches, underscoring the school's commitment to active learning." In the lab space, visible through garage doors, there are tables that seat two students at lab stools. The overall design of the classroom of "abundant floor-to-ceiling glass brings classroom activity out to the hall and carries light into the core, as do clerestories and skylights." Storage for lab equipment is located around the edge of the room and at the ends of lab stations. [18]

**Figure 4.10.** Pritzker Science Center, Milton Academy [2012] William Rawn Associates Architects; Milton, MA in "Schools of the 21st Century," *Architectural Record* 200, no. 1 (Jan. 2012): http://

[18] Pritzker Science Center, Milton Academy [2012] William Rawn Associates Architects; Milton, MA in "Schools of the 21st Century," *Architectural Record* 200, no. 1 (Jan. 2012): http://archrecord.construction.com/projects/building_types_study/k-12/2012/pritzker-science-center.asp (accessed May 29, 2012); PhotoCrd: Robert Benson.

archrecord.construction.com/projects/building_types_study/k-12/2012/pritzker-science-center.asp (accessed May 29, 2012); PhotoCrd: Robert Benson.

Despite a brief chronological absence, Two by Two remains a relevant archetypical practice in grades K-12 school classrooms. Its significance for group work makes it an Intype that will continue to be found in the future, and with the potential for application in the workplace. [19]

[19] Evidence for the archetypical use and the chronological sequence of Showcase Stair in K-12 schools was developed from the following sources: **1950** Mattie Lively Elementary School [1955] Aeck Associates, architect; Statesboro, GA in "Two Similar Elementary Schools in Rural Georgia," *Architectural Record* 117, no. 2 (Feb. 1955): 200; PhotoCrd: Joseph W. Molitor.; West Charlotte Senior High School [1955] Graves & Toy, architects; Charlotte, NC in "West Charlotte Senior High School: Preplanning Produces Results," *Architectural Record* 117, no. 4 (Apr. 1955): 180; PhotoCrd: Joseph L. Molitor.; McDonogh School No. 36 [1955] Sol Rosenthal, architect, Charles R. Colbert, associate architect; New Orleans, LA in "Appropriately Designed for the Deep South," *Architectural Record* 118, no. 6 (Dec. 1955): 144; PhotoCrd: Ulrich Meisel.; **1960** Hillspoint Elementary School [1962] Victor A. Lundy, architect; Westport, CT in "Tricorn for Teaching," *Progressive Architecture* 43, no. 6 (Jun. 1962): 131; PhotoCrd: George Cserna.; Mount Tahoma Senior School [1962] Robert Billsborough Price, architect; Tacoma, WA in "Subdivision by Grades," *Progressive Architecture* 43, no. 6 (Jun. 1962): 124; PhotoCrd: Morley Baer.; **1970** Maple, Beacon Hill, & Commodore Kimball School [1972] Durham Anderson Freed Company, P.S., architects; Seattle, WA in "Alcoves Provide Each Learning Station with Two Walls for Teaching," *Architectural Record* 152, no. 2 (Aug. 1972): 109; PhotoCrd: Hugh Stratford Photos.; Greater Lowell Regional Vocational Technical School [1976] Drummey Rosane Anderson, Inc., architect; Tyngsboro, MA in "Vocational Schools: A Progress Report," *Architectural Record* 159, no. 3 (Mar. 1976): 133; PhotoCrd: Wayne Sovern's Photos.; **2010** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.; Cumberland Valley High School [2003] Liberty Engineering, Architects; Mechanicsburg, PA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.; Pritzker Science Center, Milton Academy [2012] William Rawn Associates Architects; Milton, MA in "Schools of the 21st Century," *Architectural Record* 200, no. 1 (Jan. 2012): http://archrecord.construction.com/projects/building_types_study/k-12/2012/pritzker-science-center.asp (accessed May 29, 2012); PhotoCrd: Robert Benson.

**Chapter 5**
Showcase Stair

## Definition

Showcase Stair is an eye-catching architectural feature achieved when the stair's function becomes secondary to its role as a design element.

## Application Definition

As it exists in schools, Showcase Stair creates spatial drama in locations where its effect is valued over the cost of space. In these spaces, it becomes an architectural focal point. Typically found in areas of the school frequently seen and used by the public, school lobbies and libraries are the most popular locations for Showcase Stair.

## Description

Showcase Stair evokes a feeling of grandeur, bringing to mind that the school serves a public function for the greater good. Found in a variety of school buildings, regardless of geographic location, grade level, or curriculum, Showcase Stair also serves as a landmark within the school, a wayfinding feature for students that breaks the normal repetition of corridors and classrooms. Used in conjunction with materiality and lighting, the stair becomes an object of architectural beauty.

## History & Theory

The origin of Showcase Stair begins with the development of the standard stair. "Evident in the architecture of prehistory, as at Knossos in Crete (1600-1400 BC), [the stair was seen] in a succession of civilizations [and remained] an essentially static

monolithic arrangement of steps." It wasn't until several centuries later that the stair evolved from a merely functional form of circulation to an architectural focal point.[1]

According to Michael Spens, the turning point occurred in Europe during the Baroque period. "In Vienna in the early eighteenth century, Lukas von Hildebrandt (1668-1745) had brought a new baroque spatial emphasis to bear upon the staircase, in the Upper Belvedere; and it was in Germany, soon after, that Balthasar Neumann (1687-1753) made the staircase a central feature in his composition for the palaces at both Wurzburg and at Bruchsal . . . Increasingly, the staircase occupied a central role in the expression of spatial form in great public buildings in Europe."[2]

As the staircase began to be seen as an architectural focal point, its purpose in buildings evolved, transcending simply circulation and becoming a symbol of power. "Such centrality for the staircase now seems a natural characteristic of the grandeur of the imperial architectures of the eighteenth and nineteenth-century European powers, with the need for rhetoric, procession and display by those in power . . . that it persisted into the twentieth century, extended into the major civic buildings of both East and West, comes as no surprise."[3] As the origin of schools was as public or semi-public institutions, it makes sense that this dictum of grand staircases in civic buildings

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[1] Michael Spens, *Staircases* (London: Academy Editions, 1995), 7.

[2] Spens, *Staircases*, 7-8.

[3] Spens, *Staircases*, 8-9.

would make its way into educational facilities, demonstrating the power of both teachers and government in each place.

The stair as a symbol of power extends beyond an individual's understanding of architectural history and has seeped into our cultural understanding of architecture. In his book *Archteypes in Architecture,* theorist Thiis-Evenson states that, "Broad stairs are described as monumental and considered suitable for public display… [a broad stair] is not meant for just one person at a time but many, the individual being just part of a potential crowd . . . [it] is generous; it offers space and is inviting."[4] The broad stair in schools serves both a functional purpose as well as an architectural one.

Thiis-Evensen and architect/theorist Christopher Alexander describe stairs as expressing movement. Alexander asks us to think about stairs as a stage, a live-in space that connects one interior space to another. Thiis-Evensen believes that various stair types give one a sense of "motion impulses." That is, stairs not only impart a spontaneous climbing impulse, but the form of a stair may convey a sense of an appropriate pace, for example, movement up a broad flight of stairs is slow, measured, ceremonial.[5]

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[4] Thomas Thiis-Evensen, *Archteypes in Architecture* (Oxford: Norwegian University Press, 1987), 95.

[5] Thiis-Evensen, Archetypes in Architecture, 87-113.

It wasn't until the turn of the 20th century that schools truly began increasing in size, as education legislation became a hot topic and schooling became an increasingly important requirement for the American workforce. While architects were certainly brought in to create school buildings, it wasn't until 1950 that school architecture really took flight. According to architect William Caudill, "from 1915 to 1945, progress in school planning slowed up."[6] But by 1950, "the professional journals began to be more discreet in their choices of schools for publication" and architecture in schools began to be viewed as more than purely functional; it became clear to architects such as Caudill that school facilities needed to do more than just house students. At this juncture, Showcase Stairs appeared in schools, elevating them from mere buildings to architecture.

**Effect**

William Caudill has written extensively on the needs of school buildings, spending a significant amount of time discussing the need for a building to fulfill student needs of both form and function. A frontrunner among architects as they began to collaborate with teachers around 1950, Caudill saw the need for aesthetically pleasing buildings that functioned according to educational needs. In his book *Toward Better School Design*, Caudill makes his feelings on school design clear: "the question is repeatedly asked, "can a functional school building be beautiful?" And there is only one answer to

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[6] John W. Sipple, "1800s & Common Schools & The Teacher" (Lecture, Cornell University, Ithaca, New York, Sep.16, 2011).; William W. Caudill, *Toward Better School Design* (Ann Arbor, Mich.: FW Dodge Corp, 1954), 13-14.

that question... if a school building is truly functional, it is, as a part of its function, beautiful . . . If it is not beautiful, it is not truly functional."[7]

Contemporary studies further support Caudill's claims. According to a study by Rittelmeyer cited in *Schools for the Future*, "Children want varied but not chaotic schools with unconstrained building forms, including non-oppressive ceilings and appealing color schemes . . . a school would be considered friendly/pleasant/inviting and beautiful if it could be perceived, in form and color design as varied and stimulating, unconstrained and liberating, and warm and soft."[8] This finding comes from a study wherein "200 students were asked to assess schoolhouse facades and interior spaces [on a] polar scale with 25 steps." Hence, aesthetically satisfactory stairs that break from the norm with some amount of variation would be considered beautiful to school children; a Showcase Stair would again be as functional as it is visually pleasant.

The variation created by a Showcase Stair serves an additional function. Because of its variation and the size of its form in space, Showcase Stairs become landmarks within a school, helping children navigate what can be an otherwise confusing, monotonous space. The term landmark has been used by Kevin Lynch to describe the ways in

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[7] Caudill, *Toward Better School Design*, 141.

[8] C. Rittelmeyer, *Positive School Design: How pupils experience color and form* (Wiesbaden: Bauverlag, 1994), 47.; Rotraut Walden, *Schools for the Future: Design Proposals from Architectural Psychology* (Germany: Hogrefe and Huber Publishers, 2009), 82.

which people go about navigating space. He states that, “the Duomo of Florence is a prime example of a distant landmark: visible from near and far, by day or night; unmistakable; dominant by size and contour; closely related to the city’s traditions; coincident with the religious and transit center; paired with its campanile in such a way that the direction of view can be gauged from a distance.” Like the Duomo, Showcase Stair acts as a landmark, visible from afar, and unique within schools, acting as “a stable anchor for the perception of the complex.”[9]

**Chronological Sequence**

The importance of aesthetically pleasing school buildings was not a focus of architects until around 1950. It was also during this time period that architectural digests began to be more selective in the schools they showed in print, seeking out those that demonstrated planning and collaboration between architects, planners, and school administrators and staff. For this reason, the research into the chronological sequence of Showcase Stair begins in 1950.

One of the first examples of a Showcase Stair published in *Architectural Record* is the Kellogg High School in Kellogg, Idaho in 1957. The site of the Perkins & Will designed building was chosen for its “cost, convenience, and beauty of surroundings.”[10] Meant

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[9] Kevin Lynch, *The Image of the City* (Boston: MIT Press), 82, 101.

[10] Kellogg High School [1957] Perkins & Will, architects; Kellogg, ID in “The Problems of School Sites,” *Architectural Record* 121, no. 1 (Jan. 1957): 200-14; PhotoCrd.: Hedrick-Blessing.

to incorporate elements from the surrounding natural landscape, an image from the school shows a back wall made of stone, with a floor-to-ceiling glass wall adjacent (Figure 5.1). Descending from the ceiling is the lower half of a staircase, supported only from the landing above; the drama of its position is increased by the lack of support underneath it. The railings of the staircase run along both sides of the stair with both upper and lower rails forming thin lines parallel to the stairs direction. The upper half of the stair can be seen receding at an angle into the ceiling.

**Figure 5.1.** Kellogg High School [1957] Perkins & Will, architects; Kellogg, ID in "The Problems of School Sites," *Architectural Record* 121, no. 1 (Jan. 1957): 202; PhotoCrd.: Hedrick-Blessing.

Northeast Junior High School built in 1958 accommodated 1,200 students in Minneapolis, Minnesota and is situated around a small interior courtyard. In the central building, where the majority of the "noisy activities requiring large amounts of space"

are located, a Showcase Stair descends from a second floor space into the lunchroom (Figure 5.2).[11] Similar to the Kellogg High School stair (Figure X.1), this stair contains no supports underneath it; it is merely attached to the floor above it and to the floor at its base. The room it descends into appears to be a lunchroom, tables seating six people are arrayed in Marching Order below the stair. Behind the stair, the school's central courtyard is seen through floor-to-ceiling windows. A second photograph from Northeast Junior High shows the stair from another angle, this time including a second stair that mirrors the original (Figure 5.3). Both stairs descend dramatically into a large lunchroom. Both are broad with steps that appear to be shallow, meant to convey large numbers of students at the same time.

**Figure 5.2. (left)** Northeast Junior High School [1958] Thorshov & Cerny, architects; Minneapolis, MN in "Limited Urban Site Calls for Consolidation," *Architectural Record* 123, no. 5 (May 1958): 238; PhotoCrd.: Warren Reynolds, Infinity, Inc.

**Figure 5.3. (right)** Northeast Junior High School [1958] Thorshov & Cerny, architects; Minneapolis, MN in "Limited Urban Site Calls for Consolidation," *Architectural Record* 123, no. 5 (May 1958): 241; PhotoCrd: Warren Reynolds, Infinity, Inc.

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[11] Northeast Junior High School [1958] Thorshov & Cerny, architects; Minneapolis, MN in "Limited Urban Site Calls for Consolidation," *Architectural Record* 123, no. 5 (May 1958): 238-41; PhotoCrd: Warren Reynolds, Infinity, Inc.

Sarasota Senior High School, was built in 1960 as part of a larger initiative to update the schools in Sarasota, Florida. The school's architects attempted to create a building that took advantage of the natural climate, minimizing its heat and humidity, maximizing its direct sunlight. An image of the school (Figure 5.4) depicted the main stair that is "located in the entrance area lobby . . . at the head of the stair [is] a balcony overhanging the lobby area."[12] Two planters flanked the broad base of the stair. Behind the concrete stairs is a large, floor-to-ceiling window, the light from which causes the stair to stand out even further from its background. Halfway up the rise, a large balcony cantilevers over the stair, providing a lowered ceiling for the first run of steps and the landing.

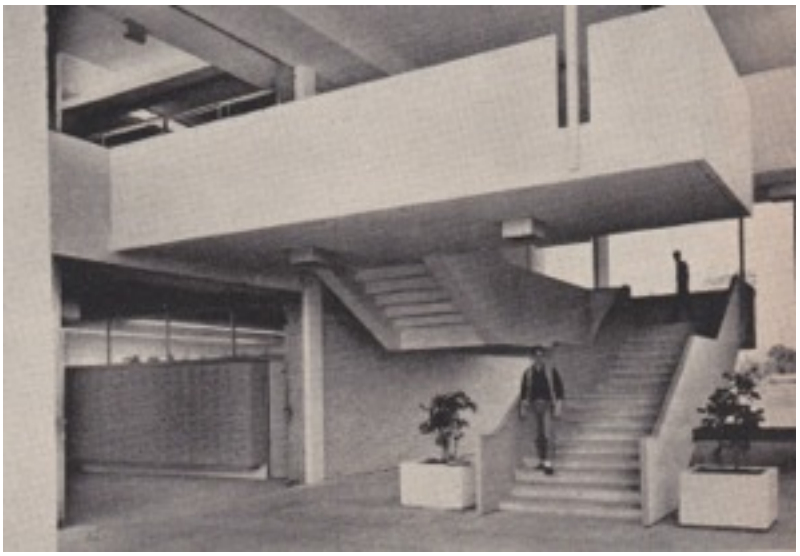

**Figure 5.4.** Sarasota Senior High School [1960] Paul Rudolph, architect; Sarasota, FL in "School Designed to Control Florida Climate," *Architectural Record* 127, no. 5 (May 1960): 201; PhotoCrd.: Joseph W. Molitor.

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[12] Sarasota Senior High School [1960] Paul Rudolph, architect; Sarasota, FL in "School Designed to Control Florida Climate," *Architectural Record* 127, no. 5 (May 1960): 201-02; PhotoCrd.: Joseph W. Molitor.

Georgian Hills Junior High School (1964) in Memphis, Tennessee, was built to accommodate grades seven through nine. The school incorporates large, multi-use spaces that double as both gymnasiums, lobbies, and band space.[13] A Showcase Stair descends from an upper corridor space down into a large, open gymnasium (Figure 5.5). The Double-Return stair is composed of two separate flights that came from opposite ends of the upper space and come together to form a single landing before descending into two separate lower stairs. The coffered ceiling and an abstractly patterned wall opposite the stairwell soften the monolithic concrete space.

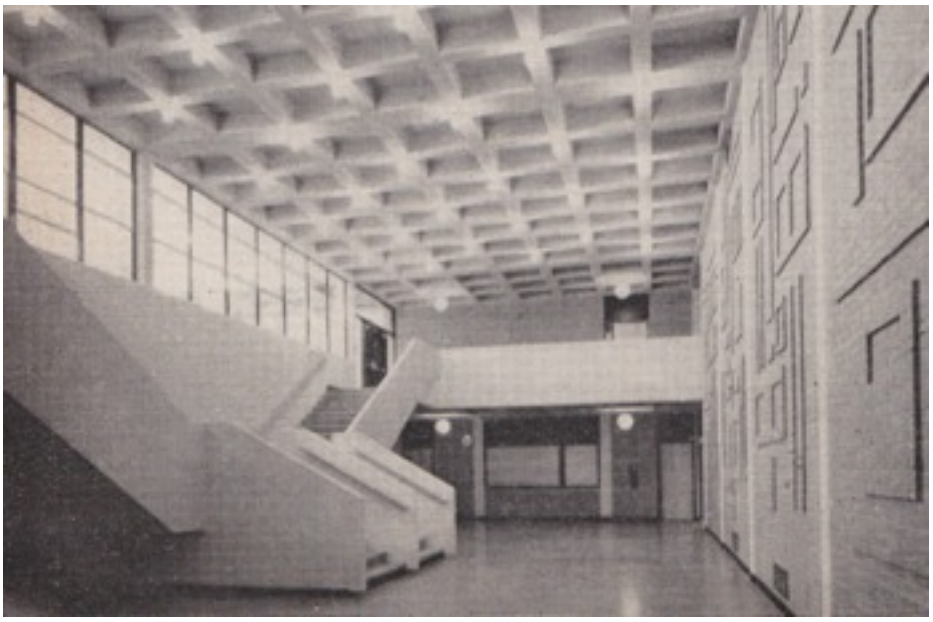

**Figure 5.5.** Georgian Hills Junior High School [1964] Gassner/Nathan/Browne, architects**;** Memphis, TN in "Compact Three Level Design Achieved at Moderate Cost," *Architectural Record* 136, no. 3 (Sep. 1964): 238**;** PhotoCrd: API photos.

Designed for the town of Hamden, Connecticut, the Shepherd Glen School was built in 1973. It is composed of several "Learning Center [Units] . . . [which] provide space and

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[13] Georgian Hills Junior High School [1964] Gassner/Nathan/Browne, architects; Memphis, TN in "Compact Three Level Design Achieved at Moderate Cost," *Architectural Record* 136, no. 3 (Sep. 1964): 238-39; PhotoCrd: API photos.

facilities for 125 students" each. A large "instructional Material Center, capable of accommodating 400 students is the focal point of the academic area."[14] This space has shelving for materials, as well as several large stairs that descend the two floors down into the space (Figure 5.6, Figure 5.7). Five separate stairs are used in the space to provide egress and to conform to Connecticut's building code. Skylights permeate the ceiling plane of the central study space, letting light into the interior space. Each stair has closed sides, making each stair appear more monumental in space.

**Figure 5.6. (left)** Shepherd Glen School [1973] Carlin, Pozzi, & Associates, architects; Hamden, CT in "Laminated Timber and Lighting Geometries Complement Each Other," *Architectural Record* 153, no. 6 (Jun. 1973): 161; PhotoCrd.: Robert E. Fischer.
**Figure 5.7. (right)** Shepherd Glen School [1973] Carlin, Pozzi, & Associates, architects; Hamden, CT in "Laminated Timber and Lighting Geometries Complement Each Other," *Architectural Record* 153, no. 6 (Jun. 1973): 161; PhotoCrd.: Robert E. Fischer.

In 1975, the Cleveland Heights and University Heights public school district underwent a mass renovation project that resulted in "one high school, three junior high schools, and eleven elementary schools." A goal of the project was to "open up the old cellular

[14] Shepherd Glen School [1973] Carlin, Pozzi, & Associates, architects; Hamden, CT in "Laminated Timber and Lighting Geometries Complement Each Other," *Architectural Record* 153, no. 6 (Jun. 1973): 158-61; PhotoCrd.: Robert E. Fischer photos.

buildings as much as possible, not in the glib sense of creating barns, but in a way designed to improve sharing… what resulted architecturally is pleasing inter-penetration of space with mezzanines and stairs, and a sense of lightness and vibrancy."[15] The new Noble Elementary School features a stair tower that descends from the ceiling to a lower structure that stands as a sort of polygonal column where the stair turns and descends into space (Figure 5.8). The stair descends boldly into space and is set far away from the room's walls. The upper half of the stair's exterior is painted yellow, the lower half of the exterior is painted red, a contrast to the white walls in the rest of the interior.

**Figure 5.8.** Noble Elementary School [1975] Richard Fleischman Architects, Inc, architects; Cleveland Heights, OH in "Mass Producing Renovation: Fifteen Schools at Once," *Architectural Record* 157, no. 5 (May 1975): 135**;** PhotoCrd.: anonymous.

[15] Noble Elementary School [1975] Richard Fleischman Architects, Inc, architects; Cleveland Heights, OH in "Mass Producing Renovation: Fifteen Schools at Once," *Architectural Record* 157, no. 5 (May 1975): 134-35; PhotoCrd.: anonymous.

A second photo from Noble Elementary shows the stair from afar; from this angle, all the exterior planes of the stair appear to be yellow (Figure 5.9). The stair seems to be a new addition to what is clearly an older, renovated space; the color of the stair sets it apart as a newer, separate structure. The lower half of the stair, coming from a small landing, extends down into the space as a ramp.

**Figure 5.9.** Noble Elementary School [1975] Richard Fleischman Architects, Inc, architects; Cleveland Heights, OH in "Mass Producing Renovation: Fifteen Schools at Once," *Architectural Record* 157, no. 5 (May 1975): 135; PhotoCrd: Anonymous.

Perkins & Will designed the North End Community School, built in 1978 in Springfield, Massachusetts. The school exemplifies "the trend of using educational facilities to help solve urban planning problems and community needs." Designed to branch physical

and racial neighborhood gaps, the school was built partially underground to connect three different school sites; the final plan included not only a school, but neighborhood facilities as well, such as day care and parks. “A big, skylighted, three-story open space with exhibits, auditorium, [and] cafeteria” acts as a central mall for the space and wisas connected directly to the school (Figure 5.10). More than three stories high, a large staircase descends two stories from a skywalk to the first floor. The layout of the space is dynamic, drawing attention to the large staircase. Beams criss-cross the ceiling plane, while above, skylights let in natural light. The interior appears to consist largely of concrete.[16]

**Figure 5.10.** North End Community School [1978] Perkins & Will, architects; Springfield, MA in “Elementary School and Community Center Link Separated Parts of City on an Improbable Site,” *Architectural Record* 164, no. 2 (Aug. 1978): 117; PhotoCrd: Nathaniel Lieberman.

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[16] North End Community School [1978] Perkins & Will, architects**;** Springfield, MA in “Elementary School and Community Center Link Separated Parts of City on an Improbable Site,” *Architectural Record* 164, no. 2 (Aug. 1978): 116-19; PhotoCrd.: Nathaniel Lieberman.

Winner of he 1978 Bard Award “for local architectural and urban-design excellence,” the Harlem School of the Arts in New York City provides a cultural center for between 700 and 800 students, with the goal of highlighting culture and providing positive accomplishments for the neighborhood.”[17] A large staircase descends into a large open space beneath a large skylight that ran the length of the stair’s upper rise (Figure 5.11). Descending from above, the stair has a large, rounded landing, from which the lower stair juts out at an angle toward a circulation path, inviting students to climb it. A bench near the base of the landing provides a place of solace for students. The far wall appears to be textured with some kind of concrete or brick, while a small corner window is made of glass brick.

**Figure 5.11.** Harlem School of the Arts [1979] Ulrich Franzen, architect; Harlem, New York City, NY in “Harlem School of the Arts,” *Architectural Record* 165, no. 5 (May 1979): 96; PhotoCrd: Norman McGrath.

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[17] Harlem School of the Arts [1979] Ulrich Franzen, architect; Harlem, New York City, NY in “Harlem School of the Arts,” *Architectural Record* 165, no. 5 (May 1979): 96-100; PhotoCrd: Norman McGrath.

Barnstable Middle School, designed by Caudill Rowlett Scott and built in 1979 in Hyannis, Massachusetts, is “a two-story, L-shaped building” that holds 1200 students organized into four “houses” of 300 students each. The school is “oriented towards a landscaped pond… meant to encourage the extension of eating, teaching, and other student activities to the outdoors as weather permits.” The four houses are centered around a “double-height student lounge and display area.” In this space, a large staircase descends from an upper walkway down into space (Figure 5.12). Though the stair doubles back on itself, it still looms large in the space. The halfway point on the stair has a large balcony on which students congregate. Adjacent to the stair, there appears to be a corridor going off in one direction and a lunchroom in the other.[18]

**Figure 5.12.** Barnstable Middle School [1979] Caudill, Rowlett, Scott, architects; Hyannis, MA in “Schools,” *Architectural Record* 165, no. 7 (Jun. 1979): 133; PhotoCrd.: Nick Wheeler.

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[18] Barnstable Middle School [1979] Caudill, Rowlett, Scott, architects; Hyannis, MA in “Schools,” *Architectural Record* 165, no. 7 (Jun. 1979): 132-33; PhotoCrd.: Nick Wheeler.

Built in 1980 for 2,600 students, the Cambridge Rindge and Latin High School in Cambridge, Massachusetts was the result of combining two schools, Rindge Tech and Cambridge High and Latin. The school, designed by Eduardo Catalano, combines the two previously existing buildings into one large high school, creating significantly more open space within the school. One such space was the student lounge, which has a U-shape Showcase Stair linking it to the floor above (Figure 5.13). The metal stair comes down into the space and featured relatively open sides, enclosed only by a balustrade of metal bars and a wood railing. At the landing, the stair doubles back along itself, providing a small gathering spot for students on the stair. The rest of the interior is brightly colored, contrasting the cement blocks that the stair runs alongside.[19]

**Figure 5.13.** Cambridge Rindge and Latin High School [1980] Eduardo Catalano, architect; Cambridge, MA in "Four Schools with Thought," *Architectural Record* 168, no. 2 (Aug. 1980): 116; PhotoCrd.: Eduardo Catalano photos.

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[19] Cambridge Rindge and Latin High School [1980] Eduardo Catalano, architect; Cambridge, MA in "Four Schools with Thought," *Architectural Record* 168, no. 2 (Aug. 1980): 114-16; PhotoCrd.: Eduardo Catalano photos.

“Regretting that a return to traditional ‘bells and cells’ [are] replacing the imaginative school planning in the 1960s and early ‘70s,” Earl Flansburgh designed Arlington Elementary School in Lawrence, Massachusetts. The school houses K-8 students and was completed in 1988. The school’s library is a large, open, two-story space, with study desks located on the second floor, looking down into the stacks below. A Showcase Stair connects the two spaces, descending into the first floor, with a curved support below (Figure 5.14). The walls in the space are white, with sunlight coming in through skylights and clerestory windows; attention is drawn to the stair due to the dark carpeting on the stair and the dark painted railings on its sides.[20]

**Figure 5.14.** Arlington Elementary School [1988] Earl R. Flansburgh Associates, Inc., architects; Lawrence, MA in “Varied Textures and Subtle Color Enrich a Conservative Pattern,” *Architectural Record* 176, no. 10 (Sep. 1988): 112; PhotoCrd.: Sam Sweezy Photos.

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[20] Arlington Elementary School [1988] Earl R. Flansburgh Associates, Inc., architects; Lawrence, MA in “Varied Textures and Subtle Color Enrich a Conservative Pattern,” *Architectural Record* 176, no. 10 (Sep. 1988): 112-13; PhotoCrd.: Sam Sweezy Photos.

Another Perkins & Will design is the Warsaw Community High School in Warsaw, Indiana (1991). The symmetrical structure was built to serve a large farming community. The firm strived to incorporate natural light into the building at the request of teachers and staff.[21] The stairwell is quite large and filled with light; both behind and in front of the stair are large, multi-story glass windows (Figure 5.15, Figure 5.16). The stair is positioned in a place of prominence, with the upper half of the stair descending to a light-filled landing, then splitting and doubling back on itself to reach the lower floor. The railings are painted a teal color, contrasting the white walls of the interior and the dark floor.

**Figure 5.15. (left)** Warsaw Community High School [1991] Perkins & Will, architect; Warsaw, IN in "Prairie Tech," *Architectural Record* 179, no. 1 (Jan. 1991): 97; PhotoCrd.: Gregory Murphey Photos.

[21] Warsaw Community High School [1991] Perkins & Will, architect; Warsaw, IN in "Prairie Tech," *Architectural Record* 179, no. 1 (Jan. 1991): 94-97; PhotoCrd: Gregory Murphey Photos.

**Figure 5.16. (right)** Warsaw Community High School [1991] Perkins & Will, architect; Warsaw, IN in "Prairie Tech," *Architectural Record* 179, no. 1 (Jan. 1991): 97; PhotoCrd.: Gregory Murphey Photos.

A stair similar to Warsaw Community High School's can be found in yet another Perkins & Will designed building, Troy High School in Troy, Michigan. Built in 1993, this school exemplifies a national trend of schools as "educational parks [with] facilities [used by the community] as cultural and recreational centers." The interior and exterior of the school features brick, "a response to local market conditions: a surfeit of unemployed Detroit bricklayers made the design cost-effective." One of the school's many stairs descends prominently near the school's cafeteria. Painted white railings and materials set the stair apart from the darker walls, but allow it to fit in with the white floor and ceiling plane. In a photo, the stairs descend from the upper floor in a single stair, then split at a landing to double back on either side, providing plenty of circulation space for students (Figure 5.17).[22]

[22] Troy High School [1993] Perkins & Will, architects; Troy, MI in "School Sprit," *Architectural Record* 181, no. 8 (Aug. 1993): 96-03; PhotoCrd.: Balthazar Korab Photography.

**Figure 5.17.** Troy High School [1993] Perkins & Will, architects; Troy, MI in "School Sprit," *Architectural Record* 181, no. 8 (Aug. 1993): 102; PhotoCrd.: Balthazar Korab Photography.

In Far Hills, New Jersey, the Far Hills Country Day School was given an update in 1999 that gave the school "more classroom space, a safer and more efficient traffic flow, and code improvements. The school's Upper and Lower Schools house grades 6-8 and K-5, respectively. The architect, Ford Farewell Mills and Gatsch strove to "provide a dynamic series of spaces that proclaim the excitement of the kids' mission and incorporate the whole drama of a school day." One such space is the "double-height interior commons," a space lit from above by clerestory windows (Figure 5.18). A stair descends from the upper floor and runs along a white wall; it was enclosed by another white wall in front of it that runs at waist-heigh along the other side of the stair, creating

a zig-zag shape. The stair covers the length of the wall, and in front of it sits curved steps that provide auditorium-like seating. The exposed ceiling plane and the seating are both made of wood, contrasting the white walls in the rest of the space.[23]

**Figure 5.18.** Far Hills Country Day School [1999] Ford Farewell Mills and Gatsch, architects; Far Hills, NJ in "Open Door Policies," *Architectural Record* 188, no. 11 (Nov. 1999): 128; PhotoCrd: Chuck Choi.

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[23] Far Hills Country Day School [1999] Ford Farewell Mills and Gatsch, architects; Far Hills, NJ in "Open Door Policies," *Architectural Record* 188, no. 11 (Nov. 1999): 126-128; PhotoCrd.: Chuck Choi.

A site visit to the Flint Hill School, built in 2001 in Oakton, Virginia by Chatelain Architects revealed a set of Showcase Stairs in the school's library (Figure 5.19, Figure 5.20). The stairs descend from either side of an upper level which looks down onto the library's first floor. The stairs run straight down and punctuate the space, appearing with its green metal rail appearing against the library's white walls.

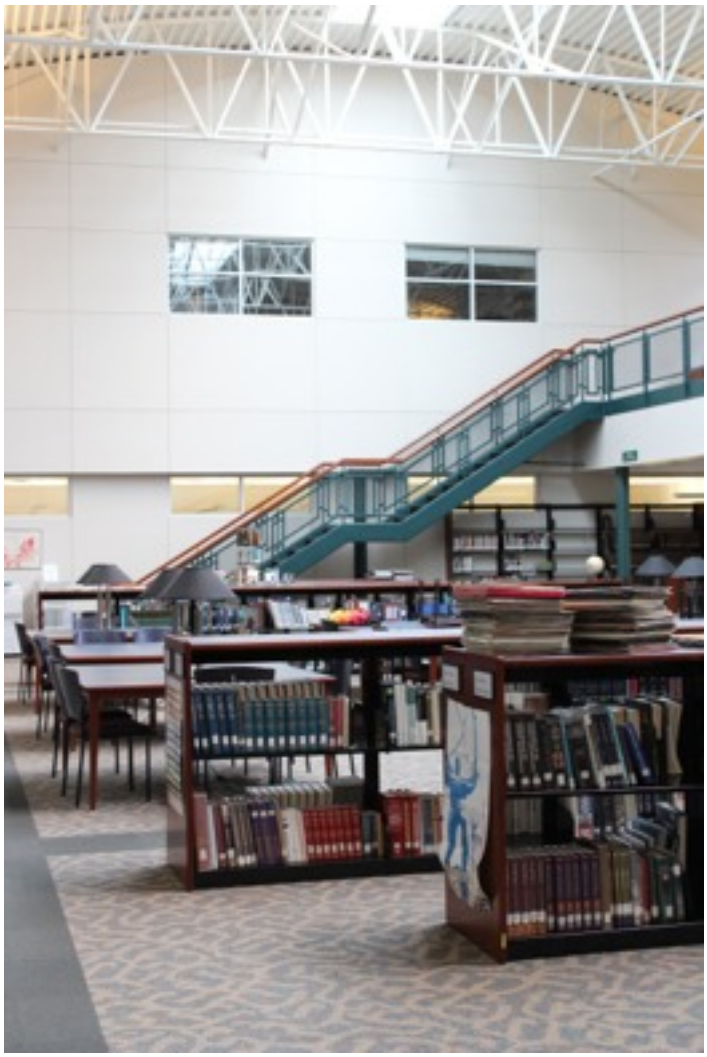

**Figure 5.19.** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

**Figure 5.20.** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

P.S. 156, a school in Brooklyn, New York, was designed to accommodate “200 gifted seventh and eight graders and 900 K-6 students.” With the help of an Annenberg grant, the school offers multidisciplinary art education, which is reflected in the school’s interior. “The most visibly compelling part of the building, a two-story wall of glass tiles designed by noted sculptor Ned Smyth overlooks the prominent grand stairway marking the main entrance… Illuminated at night and prominently visible to the community through a glazed wall, it fronted Sutter Avenue, one of the main arteries in Brownsville” (Figure 5.21, 5.22). Images of this wall show the large, extra wide staircase

descending along the wall, with a large glass wall of windows opposite it. Metal bannisters flank the staircase and run down its middle.[24]

**Figure 5.21. (left)** P.S. 156, I.S. 392 [2003] Mitchell/Giurgola Architects, architect**;** Brooklyn, NY in "Building Types Study: K-12 Schools," *Architectural Record* 191, no. 3 (Mar. 2003): 142**;** PhotoCrd.: Kevin Chu/KCJP. **Figure 5.22. (right)** P.S. 156, I.S. 392 [2003] Mitchell/Giurgola Architects, architect**;** Brooklyn, NY in "Building Types Study: K-12 Schools," *Architectural Record* 191, no. 3 (Mar. 2003): 142**;** PhotoCrd.: Kevin Chu/KCJP.

Another city school, Lycée Français is located on Manhattan's Upper East Side and holds the distinction of being "the first independent school in Manhattan to build a new facilty in decades." The school, built in 2003, accomodates 1250 students and faculty in a Modern-style building. "Light penetrated the building's commons from above and from all sides," illuminating the space's large Showcase Stair that run along glass walls adjacent to the lunchroom (Figure 5.23). The stair's metal structure and mesh sides are a contrast to the white walls, ceiling, and beams, as well as the colored furniture in the interior. The staircase spans two stories, with relatively few supports beneath it.[25]

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[24] P.S. 156, I.S. 392 [2003] Mitchell/Giurgola Architects, architect**;** Brooklyn, NY in "Building Types Study: K-12 Schools," *Architectural Record* 191, no. 3 (Mar. 2003): 140-143**;** PhotoCrd: Kevin Chu/KCJP.

[25] Lycée Français [2004] Polshek Partnership Architects, architects**;** New York City, NY in "Environment Counts," *Architectural Record* 192, no. 3 (Mar. 2004): 132-135**;** PhotoCrd: Richard Barnes.

**Figure 5.23.** Lycée Français [2004] Polshek Partnership Architects, architects; New York City in "Environment Counts," *Architectural Record* 192, no. 3 (Mar. 2004): 134; PhotoCrd.: Richard Barnes.

The Jeremiah E. Burke High School built in 2010 in Boston, Massachusetts is among the first to exemplify the mayor's Community Learning Initiative which hoped to "promote education and literacy across the city." Architects Schwartz/Silver "used a light hand in the renovation, restoring exterior masonry, updating interiors and systems, and expanding the cafeteria." Among the newer parts of the facility is the library, which contains a Showcase Stair; "the school library [is] linked to the old building by a glass-and-aluminum bridge and can be accessed from the public library below by a long stair

running through its center" Figure 5.24). The stair desends into the space from three floors above and runs straight to the ground floor, with a brief opening at the second floor. A transparent red plastic covers the sides of the stair, distinguishing it from the rest of the space; the rest of the walls and ceiling are white, with the library shelving and the stair's treads in a natural wood.[26]

**Figure 5.24.** Jeremiah E. Burke High School [2010] Schwartz/Silver, architects; Boston, MA in "Schools of the 21st Century," *Architectural Record* 198, no. 1 (Jan. 2010): 93; PhotoCrd: Alan Karchmer.

"Located in the heart of downtown Phoenix, the Phoenix Union Bioscience High School provides Arizona's most ethnically diverse school district with a highly specialized campus that takes full advantage of the city's rapid growth as a hotbed for

[26] Jeremiah E. Burke High School [2010] Schwartz/Silver, architects; Boston, MA in "Schools of the 21st Century," *Architectural Record* 198, no. 1 (Jan. 2010): 90-93; PhotoCrd.: Alan Karchmer.

biotechnical research and development." Built in 2010, the school incorporates large, flexible spaces for student use. Among them is a "large, three-story high, light-filled 'town hall' along the south wall [that served] as a cafeteria and assembly area and [was] lined with three garage-style roll-up doors… a monolithic steel staircase ascends all the way to the school's top floor" (Figure 5.25). Supported from the ceiling, the large Showcase Stair has a landing at the second floor on the way down. Red painted metal sets the staircase apart from the white-painted interior. Black metal mesh and black metal railings line either side of the stair.[27]

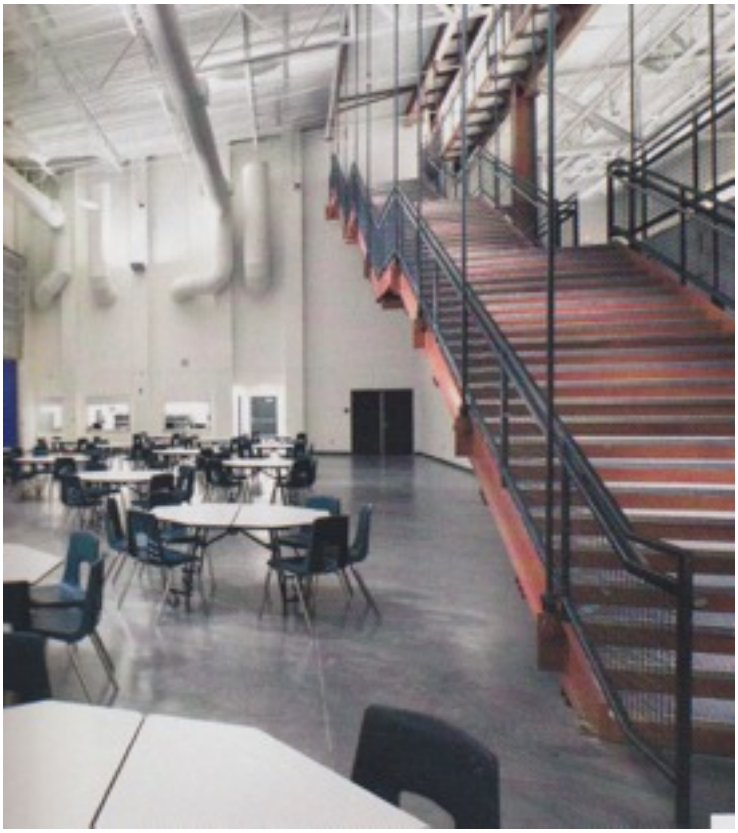

**Figure 5.25.** Phoenix Union Bioscience High School [2010] Orcutt | Winslow, architects; Phoenix, AZ in "Schools of the 21st Century," *Architectural Record* 198, no. 1 (Jan. 2010): 107; PhotoCrd.: A.F. Payne.

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[27] Phoenix Union Bioscience High School [2010] Orcutt | Winslow, architects; Phoenix, AZ in "Schools of the 21st Century," *Architectural Record* 198, no. 1 (Jan. 2010): 106-10; PhotoCrd: A.F. Payne.

## Conclusion

Found in every decade since 1950, architects employed a variety of historical stair types to create Showcase Stairs in school buildings. All of the published stairs express a manipulation of space and an implied motion. Some stairs that open on both sides make staircases objects in space. Those that are open on one side provide visual focus and act as a spatial connector.[28] Broad stairs, in some cases allowing four people abreast to ascend and descend, and low risers suggest motion that is ceremonial. Of the twenty interiors analyzed here, Perkins & Will led the architectural pack in designing four (Kellogg High School, 1957; North End Community School, 1978; Warsaw Community High School, 1991; Troy High School, 1993). Schools attracted other big name architects, as well, including Paul Rudolf (Sarasota Senior High School, 1960). Surprisingly, the influential school architects, Caudill, Rowlett, Scott, designed only one (Barnstable Middle School, 1979) typically preferring to create sprawling, one-story schools without a need for stairs. From these examples from 1957 to 2010, Showcase Stairs exemplified whatever style of architecture was prominent, from International Style to the low-cost, concrete Brutalist architecture and including Postmodern. The Showcase Stair is firmly established as an archetypical practice in school design.[29]

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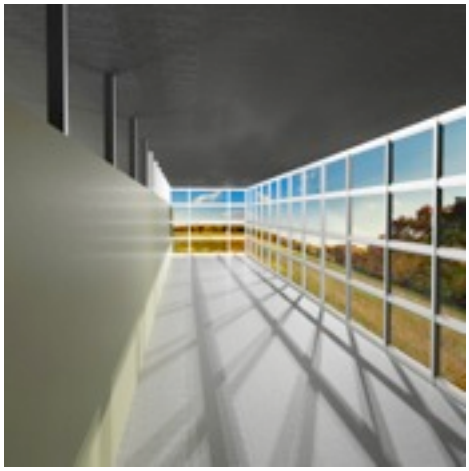
[28] John Templer, *The Staircase: History and Theories* (Cambridge: MIT Press, 1994), 19-34.

[29] Evidence for the archetypical use and the chronological sequence of Showcase Stair in 1-12 schools was developed from the following sources: **1950** Kellogg High School [1957] Perkins & Will, architects; Kellogg, ID in "The Problems of School Sites," *Architectural Record* 121, no. 1 (Jan. 1957): 202; PhotoCrd.: Hedrick-Blessing.; Northeast Junior High School [1958] Thorshov & Cerny, architects; Minneapolis, MN in "Limited Urban Site Calls for Consolidation," *Architectural Record* 123, no. 5 (May 1958): 238; PhotoCrd.: Warren Reynolds, Infinity, Inc.; Northeast Junior High School [1958] Thorshov & Cerny, architects; Minneapolis, MN in "Limited Urban Site Calls for Consolidation," *Architectural Record* 123, no. 5 (May 1958): 241; PhotoCrd: Warren Reynolds, Infinity, Inc.; **1960** Sarasota Senior High School [1960] Paul Rudolph, architect; Sarasota, FL in "School Designed to Control Florida Climate," *Architectural Record* 127, no. 5 (May 1960): 201; PhotoCrd.: Joseph W. Molitor.; Georgian Hills Junior High School [1964] Gassner/Nathan/Browne, architects**;** Memphis, TN in "Compact Three Level Design Achieved at Moderate Cost," *Architectural Record* 136, no. 3 (Sep. 1964): 238**;** PhotoCrd: API photos.; **1970** Shepherd Glen School [1973] Carlin, Pozzi, & Associates, architects; Hamden, CT in "Laminated Timber and Lighting Geometries Complement Each Other," *Architectural Record* 153, no. 6 (Jun. 1973): 161; PhotoCrd.: Robert E. Fischer.; Shepherd Glen School [1973] Carlin, Pozzi, & Associates, architects; Hamden, CT in "Laminated Timber and Lighting Geometries Complement Each Other," *Architectural Record* 153, no. 6 (Jun. 1973): 161; PhotoCrd.: Robert E. Fischer.; Noble Elementary School [1975] Richard Fleischman Architects, Inc, architects; Cleveland Heights, OH in "Mass Producing Renovation: Fifteen Schools at Once," *Architectural Record* 157, no. 5 (May 1975): 135**;** PhotoCrd.: anonymous.; Noble Elementary School [1975] Richard Fleischman Architects, Inc, architects; Cleveland Heights, OH in "Mass Producing Renovation: Fifteen Schools at Once," *Architectural Record* 157, no. 5 (May 1975): 135**;** PhotoCrd: anonymous.; North End Community School [1978] Perkins & Will, architects; Springfield, MA in "Elementary School and Community Center Link Separated Parts of City on an Improbable Site," *Architectural Record* 164, no. 2 (Aug. 1978): 117; PhotoCrd: Nathaniel Lieberman.; Harlem School of the Arts [1979] Ulrich Franzen, architect; Harlem, New York City, NY in "Harlem School of the Arts," *Architectural Record* 165, no. 5 (May 1979): 96; PhotoCrd: Norman McGrath.; Barnstable Middle School [1979] Caudill, Rowlett, Scott, architects; Hyannis, MA in "Schools," *Architectural Record* 165, no. 7 (Jun. 1979): 133; PhotoCrd.: Nick Wheeler.; **1980** Cambridge Rindge and Latin High School [1980] Eduardo Catalano, architect; Cambridge, MA in "Four Schools with Thought," *Architectural Record* 168, no. 2 (Aug. 1980): 116; PhotoCrd.: Eduardo Catalano photos.; Arlington Elementary School [1988] Earl R. Flansburgh Associates, Inc., architects; Lawrence, MA in "Varied Textures and Subtle Color Enrich a Conservative Pattern," *Architectural Record* 176, no. 10 (Sep. 1988): 112; PhotoCrd.: Sam Sweezy Photos.; **1990** Warsaw Community High School [1991] Perkins & Will, architect; Warsaw, IN in "Prairie Tech," *Architectural Record* 179, no. 1 (Jan. 1991): 97; PhotoCrd.: Gregory Murphey Photos.; Warsaw Community High School [1991] Perkins & Will, architect; Warsaw, IN in "Prairie Tech," *Architectural Record* 179, no. 1 (Jan. 1991): 97; PhotoCrd.: Gregory Murphey Photos.; Troy High School [1993] Perkins & Will, architects; Troy, MI in "School Sprit," *Architectural Record* 181, no. 8 (Aug. 1993): 102; PhotoCrd.: Balthazar Korab Photography.; Far Hills Country Day School [1999] Ford Farewell Mills and Gatsch, architects; Far Hills, NJ in "Open Door Policies," *Architectural Record* 188, no. 11 (Nov. 1999): 128; PhotoCrd: Chuck Choi.; **2000** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.; The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.; P.S. 156, I.S. 392 [2003] Mitchell/Giurgola Architects, architect; Brooklyn, NY in "Building Types Study: K-12 Schools," *Architectural Record* 191, no. 3 (Mar. 2003): 142; PhotoCrd.: Kevin Chu/KCJP.; P.S. 156, I.S. 392 [2003]

Mitchell/Giurgola Architects, architect; Brooklyn, NY in “Building Types Study: K-12 Schools,” *Architectural Record* 191, no. 3 (Mar. 2003): 142; PhotoCrd.: Kevin Chu/KCJP.; Lycée Français [2004] Polshek Partnership Architects, architects; New York City in “Environment Counts,” *Architectural Record* 192, no. 3 (Mar. 2004): 134; PhotoCrd.: Richard Barnes.; **2010** Jeremiah E. Burke High School [2010] Schwartz/Silver, architects; Boston, MA in “Schools of the 21st Century,” *Architectural Record* 198, no. 1 (Jan. 2010): 93; PhotoCrd: Alan Karchmer. Phoenix Union Bioscience High School [2010] Orcutt | Winslow, architects; Phoenix, AZ in “Schools of the 21st Century,” *Architectural Record* 198, no. 1 (Jan. 2010): 107; PhotoCrd.: A.F. Payne.

**Chapter 6**
Sun Spine



## Definition

Sun Spine is a circulation path bordered on at least one side by a glass curtain wall or large windows that extends along the entire length of the hall.

## Application Definition

In schools, Sun Spine is found in major corridors typically with classrooms on the opposite side. School designs favor mullioned windows that create Marching Order.

## Cluster

Sun Spine + Marching Order

## Description

Sun Spine[1] introduces light and views of a natural environment into corridor spaces, creating a well-lit, restorative space for students to pass through on their way to class. The openness of these spaces provides sight-lines that allow teachers to monitor student behavior. Secondary schools, particularly those with large courtyards or those with several buildings, are more likely to utilize Sun Spine to connect classrooms and facilities. In some instances, Sun Spine is paired with Showcase Stair.[2]

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[1] The Intype Sun Spine was originally identified and named by graduate student Rachel Barry and her committee in 2009 as part of her unpublished thesis research about the Healthcare practice type.

[2] *Showcase Stair* is an extravagantly designed architectural feature in which the stair itself becomes a prominent display element. Its functionality is often secondary to the spatial drama created by the stair's structure, form, materials and lighting. It has been established as an archetypical practice in apartments, hotels, houses, and retail design. The Interior Archetypes Research and Teaching Project, Cornell University, http://www.intypes.cornell.edu/intypesub.cfm?inTypeID=95 (accessed May 29, 2012).

Additionally, the patterns created by the mullions of the windows create Marching Order[3], a rhythm of consecutively spaced forms used to create spatial order. In some instances, windows are on both sides of the path, and sometimes glass ceilings make the hall into an atrium.

**History**

To understand the origin of Sun Spine, one must understand something about the history of glass walls. A curtain wall is defined as an exterior wall "loaded only by [its] own weight," not the weight of the roof or the rest of the building. As architects began to experiment with the exterior wall plane and as building style and structural technology evolved, the glass curtain wall came into existence. "In the early decades of the 20th century, one of the envisioned promises of modern architecture was a future in which the idea of transparency, in both its literal and phenomenal manifestations, would have a liberating effect, leading to new and improved modes of cultural expression."[4]

Even as glass walls were heralded as a symbol of modernity in the 20th century, their evolution started as early as the decade of 1850. Built to celebrate international

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[3] *Marching Order* is a sequence of repeating forms organized consecutively, one after another, that establish a measured spatial order. It has been established as an archetypical practice in retail, showroom and workplace design. The Interior Archetypes Research and Teaching Project, Cornell University, http://www.intypes.cornell.edu/intypesub.cfm?inTypeID=95 (accessed May 29, 2012).

[4] Donald Friedman, *Historical Building Construction* (New York: W. W. Norton and Company, 1995), 114.; Scott Charles Murray, *Contemporary Curtain Wall Structure* (Princeton: Princeton Architectural Press, 2009), 25.

exhibitions, both the Crystal Palace of London (1850) and of New York (1853) "contained large wall and roof areas of iron framing and glass panels."[5] These influential buildings, despite being harbingers of the coming modernism, initially had little effect on architects' understanding of building structure. Effective measures for lighting these cavernous spaces also did not yet exist yet, so there was little impetus to continue to explore iron frames with glass panels.

Coupled with the lack of understanding of structure, code regulations in New York prevented architects from experimenting with the capabilities of the curtain wall for the next few decades. However, architects' fascination with the glass wall continued. Experimentation with cast iron and glass facades resulted in the Thomas Gantt Building (1877) in St. Louis, Missouri (see Figure 6.1) by an unknown architect. The building had a "cast iron facade with [clearly articulated] large metal-framed windows and modular units prefabricated and bolted together on site."[6] The period following the American Civil War was marked by improvements in engineers' understanding of the curtain wall's structure and potential application.

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[5] Friedman, *Historic Building Construction*, 121.

[6] Murray, *Contemporary Curtain Wall Structure*, 18.

**Figure 6.1.** Thomas Gantt Building [1877] Anonymous architect ; St. Louis, Missouri in Scott Charles Murray, *Contemporary Curtain Wall Structure* (Princeton: Princeton Architectural Press, 2009), 17; PhotoCrd: Historic Landscape and Architecture Image Collection, Ryerson and Burnham Archives, The Art Institute of Chicago.

Although technological exploration stalled in the United States, Europe continued experimenting with glass panels and steel frames. “The obvious benefits of increased daylight, views, and opportunities for ventilation” called for the creation of buildings with ever larger windows. Among the first buildings to truly open up the wall plane and apply new methods of construction was the Fagus Shoe-Last Factory (1911) which was designed by Walter Gropius and Adolf Meyer (Figure 6.2). This building, seated in Alsfeld an der Leine, Germany contained a “wall with [an] organizing grid of slender steel mullions… divided into clear glass panels and metal spandrels.”[7]

[7] Murray, *Contemporary Curtain Wall Structure*, 18, 19.

**Figure 6.2.** Fagus Shoe-Last Factory [1911] Walter Gropius and Adolf Meyer, architects; Alsfeld an der Leine, Germany in in Scott Charles Murray, *Contemporary Curtain Wall Structure* (Princeton: Princeton Architectural Press, 2009), 17; PhotoCrd: Botond Bognar.

Slowly, the use of all-glass curtain walls spread. In 1918, the Hallidie Building in San Francisco by the architect Willis Polk was among the first urban structures to feature a curtain wall made entirely of glass (Figure 6.3). Shortly thereafter, the trend-setting Gropius and Meyer utilized the technology to create the Bauhaus Building in 1926 (Figure 6.4). This school, located in Dessau, Germany, contained classrooms, dormitories and workshops.[8] This building and others like it were enormously influential, announcing a new age of architecture, one that was even further removed from the

[8] Murray, *Contemporary Curtain Wall Structure*, 20-21.

thick, heavy masonry structures of the previous century. This new architecture featured light and air and a new architecture of space, not volume.

**Figure 6.3. (left)** Halide Building [1918] Willis Polk, architect; San Francisco, CA in Library of Congress Prints and Photographs Online Catalog; PhotoCrd: Library of Congress.

**Figure 6.4. (right)** Bauhaus Building [1926] Walter Groepius and Adolf Meyer, architects; Dessau, Germany in *Contemporary Curtain Wall Structure,* Scott Charles Murray, 22; PhotoCrd: Botond Bognar.

As all-glass curtain walls became increasingly popular, technology slowly caught up to the demand for glass. Early in the decade of 1950, Sir Alistair Pilkington of England "invented a new method of architectural glass production-called the float process-that still dominates the industry and that fed the rapid growth of glass architecture during the second half of the twentieth century."[9] Following this development, the lowered cost of glass contributed to its use in glass curtain walls in schools throughout the United States.

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[9] Murray, *Contemporary Curtain Wall Structure*, 28.

## Effect

"For Frank Lloyd Wright, glass represented the liberation of interior space, the reintegration of the interior with its exterior setting." Only a few years later, Caudill Rowlett Scott (CRS) reiterated Wright's concept. William Caudill, in *Toward Better School Design*, observed that a "school should not be divorced from nature. It should harmonize with and take advantage of all that nature has to offer in the way of beautiful surroundings. That is why sometimes glass walls are better than brick ones."[10] This principle is reflected in many of the schools that CRS designed. However, the benefits to creating glass-walled corridors were more than just aesthetic.

From Caudill's programmatic analysis of schools came to the conclusion that "high school students [spend] as much time in halls (over an hour a day) as they do in any one classroom or laboratory: therefore halls and other circulation areas should be designed to help achieve the aims of the educational program." This revolutionary idea transformed corridors from "dark tunnels" to "well lighted attractive spaces" that could become a secondary classroom or socializing space, rather than "just places to walk."[11]

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[10] Murray, *Contemporary Curtain Wall Structure*, 25; William W. Caudill, *Toward Better School Design* (Ann Arbor, Mich.: FW Dodge Corp, 1954), 54.

[11] Caudill, *Toward Better School Design*, 38, 160.

Not only did hallways fulfill educational requirements, they were also important to the function of the building itself. Because few schools in the decade of 1950 had air conditioning, Caudill and his partners were left to find their own ways to cool down buildings in the Midwest and Texas. As a result, corridors were “designed as an air flow duct [and were] made large enough to scoop up the prevailing breeze and dam up the air as a reservoir; then with a system of grills and baffles, the air is evenly distributed from the corridor into the classrooms.”[12]

Numerous studies that have taken place since 1950 confirmed the need for adequate amounts of daylight in schools, be it in the hallway or the classroom. “[Student] performance improves in the presence of daylight and its positive effect is manifested in better social behavior.” While a variety of lighting should be available in schools to aid students in various activities, there should also be enough daylight in classrooms and school spaces such that building inhabitants can perceive the change in lighting throughout the course of the day. Overall, it should be noted that “natural daylight has a positive impact on [the] bodily and mental well-being of all humans.”[13]

The mullioned windows of schools also have a secondary effect that wherein their frames convey both a sense of solidarity and of motion. Lying across or at the top of a

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[12] Caudill, *Toward Better School Design*, 70.

[13] Rotraut Walden, *Schools for the Future: Design Proposals from Architectural Psychology* (Germany: Hogrefe and Huber Publishers, 2009), 83, 83.

series of vertical mullions in Marching Order, “a straight beam will accent a horizontal motion… a motion paralleling the construction is indicated.” This effect of Marching Order with a Sun Spine provides instruction to students, directing them down the corridor; it also lends a feeling of weight and permanence to the glass wall, which otherwise would “carry no weight and in character [be] ‘non-existent.’” Additionally, by ordering the Sun Spine with Marching Order and creating architectural rhythm through mullions, “varied but not chaotic schools” can be achieved, arriving at an ideal architectural state for children.[14]

**Chronological Sequence**

William Caudill noted that “American architecture in general drifted backward after the first advances of the Chicago School, and failed to get under way again until 1933, but in school architecture the retrogression lasted even longer . . . from 1915 to 1945 progress in school planning slowed up.”[15] Additionally, the development of steel frame structures and the glass curtain wall were just becoming accessible to the general public in the decade of 1950. For these reasons, it is appropriate for the purpose of this study to begin exploring Sun Spine’s chronological sequence beginning in 1950.

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[14] Thomas Thiis-Evensen, *Archteypes in Architecture* (Oxford: Norwegian University Press, 1987), 325, 189.; Walden, *Schools for the Future: Design Proposals from Architectural Psychology,* 82.

[15] Caudill, *Toward Better School Design*, 13-14.

Due to their collaboration with elementary and secondary school educators about 1950, CRS was among the first to utilize the knowledge gained from these collaborations in planning school buildings. As a result, “double wide” corridors like the one in Norman High School of Norman, Oklahoma in 1951 were brought into existence as a place for students to not only pass through, but to stay and mingle within; the main hallways become student centers, exhibit spaces, lounges, auditorium lobbies, library reading rooms, locker rooms, and waiting rooms for administrative offices (Figure 6.5).[16] The school was designed to allow for easy expansion and the maximization of “natural illumination.” Classes were built off of one side of the corridors, while the opposite side utilized glass curtain to create a Sun Spine, looking inward toward a courtyard. These windows were framed by regularly placed metal frames that created a rhythm moving down the corridor. Fluorescent fixtures augmented the natural light and were placed at regular intervals going down the corridor. Classrooms attached to the corridor, have clerestory windows that allow natural light from the corridor to flow through into the space.

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[16] Jonathan King and Philip Langdon, *The CRS Team and the Business of Architecture* (College Station: Texas A&M University Press, 2002), 66-68; Norman High School [1951] Caudill Rowlett Scott, architect; Norman, OK in ”Designed for High School Youth,” *Architectural Record* 116, no. 2 (Aug. 1954): 141-49.

**Figure 6.5.** Norman High School [1951] Caudill Rowlett Scott, architect; Norman, OK in "Designed for High School Youth," *Architectural Record* 116, no. 2 (Aug. 1954): 143; PhotoCrd: Hedrich-Blessing Studio.

Another school built with the anticipation of expansion was the Langley-Bath-Clearwater High School of Bath, South Carolina featured in *Architectural Record* in 1955. In this school, "classrooms face outward from single-loaded glass-walled corridors which surround a quiet court next to the library for outdoor reading . . . corridor ceilings [had overhangs] on one side and trees on the other [to] protect classrooms from sun and glare."[17] In this Sun Spine, lockers line the classroom side, while natural light floods the space via operable windows that line the opposite wall from floor to ceiling down the length of the corridor (Figure 6.6). Pendant light fixtures are placed at intervals down the hall and exposed joists ran parallel to the length of the

[17] Langley-Bath-Clearwater High School [1955] Lyles, Bissett, Carlisle & Wolff, architect; Bath, SC in "Six Year High School For a Southern Mill Town Area," *Architectural Record* 117, no. 2 (Feb. 1955): 186-89; PhotoCrd: Hedrich-Blessing Studio.

corridor. Notches in the classroom wall allow openings for doors and create rhythm throughout the length of the corridor.

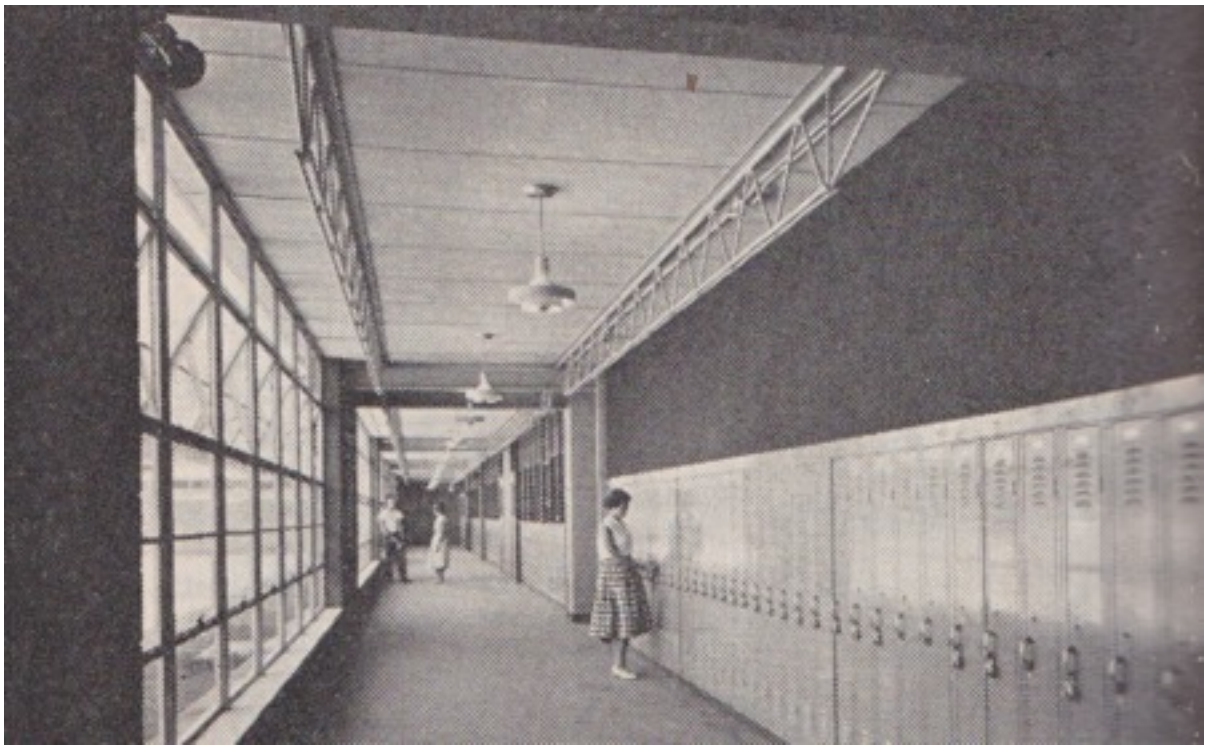

**Figure 6.6.** Langley-Bath-Clearwater High School [1955] Lyles, Bissett, Carlisle & Wolff, architects; Bath, SC in "Six Year High School For a Southern Mill Town Area," *Architectural Record* 117, no. 2 (Feb. 1955): 186; PhotoCrd: Joseph W. Molitor.

In 1955, the Pocantico Hills Central School in Pocantico Hills, New York created a Sun Spine in a similar manner to the Langley-Bath Clearwater High School. In Pocantico Hills, Perkins + Will created classrooms that branched off of a Sun Spine corridor, with floor to ceiling windows lining the opposite side (Figure 6.7). Because this school serves a younger population, cubbies and coat hooks lined the classroom side rather than the metal lockers found in secondary schools. As opposed to other depictions of Sun Spine from this decade, the corridor pictured here is one level off of the ground floor, although this building also makes use of a Sun Spine corridor on the ground floor.

The use of windows here are also meant to highlight the lake the school surrounds “a community institution dredged out of a spring-fed bottom.”[18]

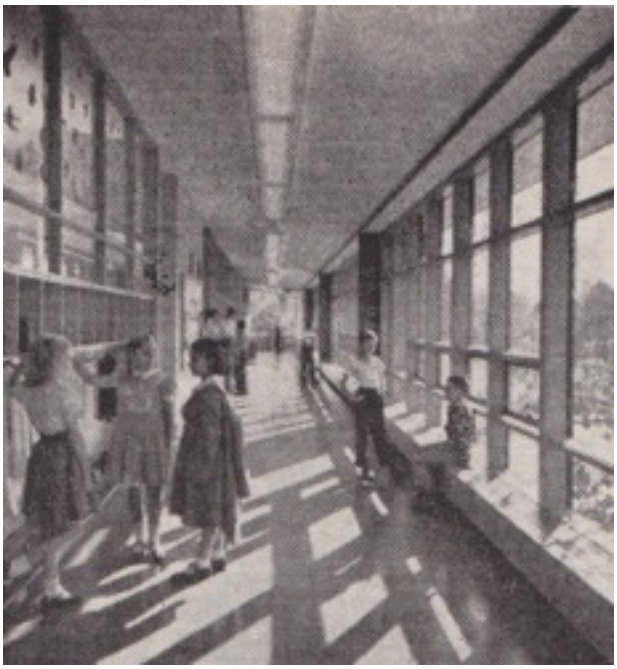

**Figure 6.7.** Pocantico Hills Central School [1956] Perkins + Will, architect; Pocantico, NY in ”Schools,” *Architectural Record* 119, no. 4 (Apr. 1956): 242; PhotoCrd: Hedrich-Blessing Studio.

Greenfield Elementary School, built in 1960 in Birmingham, Michigan was designed to accommodate 650 pupils from kindergarten through sixth grade. The plan of the school allows a “classroom [to] face inner semi-enclosed and enclosed garden courts which also separate grade groups.” An image from the school depicts a Sun Spine with a glass curtain wall on one side, looking out towards one of the “garden courts” with classrooms with clerestory windows on the opposite side (Figure 6.8). From the

[18] Pocantico Hills Central School [1956] Perkins + Will, architect; Pocantico, NY in ”Schools,” *Architectural Record* 119, no. 4 (Apr. 1956): 238-42; PhotoCrd: Joseph Molitor.

window, a perpendicular glass-walled Sun Spine can also be seen, connecting the wing on the other side.[19]

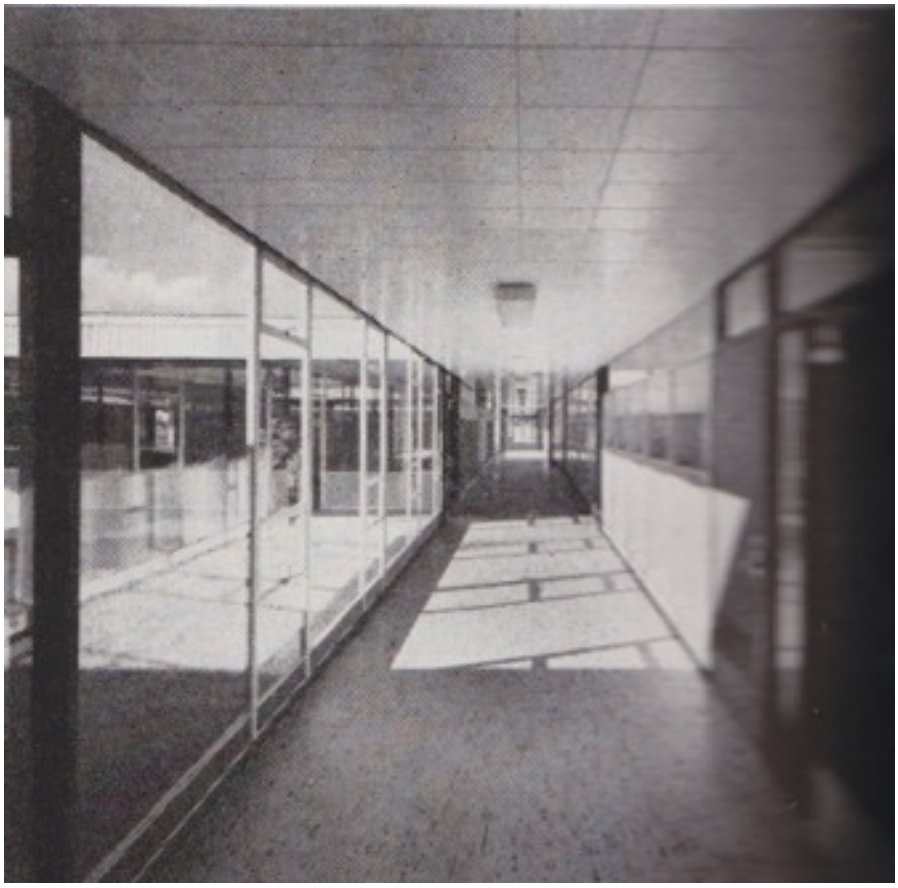

**Figure 6.8.** Greenfield Elementary School [1960] Eberle M. Smith Associates, Inc., architect; Birmingham, MI in "Eight Schools Compared," *Progressive Architecture* vol. 41, no. 3 (Mar. 1960): 134; PhotoCrd: Lens-Art Photo.

In 1960 H.F. Hunt Junior High School in Tacoma, Washington is used both by students and the surrounding community. The building contains "two open and planted courts, which double as outdoor corridors;" these courts also introduce natural light into the interior corridors through the use of floor-to-ceiling glass walls that line the space on

[19] Greenfield Elementary School [1960] Eberle M. Smith Associates, Inc., architect; Birmingham, MI in "Eight Schools Compared," *Progressive Architecture* vol. 41, no. 3 (Mar. 1960): 134; PhotoCrd: Lens-Art Photo.

one side, creating a Sun Spine (Figure 6.9). An image of this shows a student walking down the corridor, the windows of which look out onto a courtyard where another corridor can be seen. The second corridor is also a Sun Spine with windows on both wall planes.[20]

**Figure 6.9.** H.F. Hunt Junior High School [1960] Robert Billsborough Price, architect; Tacoma, WA in "Schools: H.F. Hunt Junior High School," *Architectural Record* 128, no. 2 (Aug. 1960): 191; PhotoCrd: Dearborn-Massar.

Built in Andover, Massachusetts in 1961, the South Elementary School feature glass walls around an interior courtyard (Figure 6.10), which "admittws daylight to the interior library… [thereby relieving] the regularity of the [school plan's] in-line arrangement."[21] The courtyard sits in the middle between two long hallways that extend the length of

[20] H.F. Hunt Junior High School [1960] Robert Billsborough Price, architect; Tacoma, WA in "Schools: H.F. Hunt Junior High School," *Architectural Record* 128, no. 2 (Aug. 1960): 191-92; PhotoCrd: Dearborn-Massar.

[21] South Elementary School [1961] Hugh Stubbins & Associates, architect; Andover, MA in "Courts Enhance Environment of Low Cost School," *Architectural Record* 130, no. 1 (Jul. 1961): 166-67; PhotoCrd: Hedrich-Blessing Studio.

the school, with classrooms off of the far sides. Like the article suggests, the courtyard and Sun Spine corridors provide light to an otherwise dark, unbroken and monotonous corridor. In this Sun Spine, joists are also exposed in the ceiling, running perpendicular to the length of the hall, with a series of metal cans extending from the ceiling at intervals parallel to the windows. Glazed brick lines the non-window walls and ceramic tiles are used in the floor plane.

**Figure 6.10.** South Elementary School [1961] Hugh Stubbins & Associates, architect; Andover, MA in "Courts Enhance Environment of Low Cost School," *Architectural Record* 130, no. 1 (Jul. 1961): 167; PhotoCrd: Joseph W. Molitor.

Similar to Caudill Rowlett Scott's multi-building schools, East Hills High School, built in 1964, was intended to create a campus-like facility, despite the severe winter conditions of Bloomfield Hills, Michigan. "The four main elements of the school [are] grouped around a central court" connected by several Sun Spine corridors surrounding

a large, central courtyard (Figure 6.11).[22] The overhang on this corridor is larger than previous examples of Sun Spine, with the roof extended a few feet beyond the glass curtain wall, into the courtyard where several evenly spaced brick columns provide support. The corridor itself is plain; the wall opposite the glass curtain wall contains a clerestory, allowing light from the courtyard to filter into the interior rooms. Wall panels aligning with the clerestory windows give some additional rhythm to this side of the corridor.

**Figure 6.11.** East Hills Junior High School [1964] Traumata-McMahon Associates Inc, architect; Bloomfield Hills, Michigan in "Suburban Campus-Plan school Designed for Future Team Teaching," *Architectural Record* 136, no. 3 (Sep. 1964): 240; PhotoCrd: Balthazar photos.

In this Sun Spine in Greenwich, Connecticut, "window walls open [the school] to visual and spatial relationships with other parts of the campus" (Figure 6.12).[23] In 1971,

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[22] East Hills Junior High School [1964] Traumata-McMahon Associates Inc, architect; Bloomfield Hills, Michigan in "Suburban Campus-Plan school Designed for Future Team Teaching," *Architectural Record* 136, no. 3 (Sep. 1964): 240; PhotoCrd: Balthazar photos.

[23] Greenwich High School [1971] Reid & Tarics Associates, architect; Greenwich, CT in "Greenwich High School," *Architectural Record* 150, no. 5 (Nov. 1971): 133-38; PhotoCrd: Balthazar photos.

Greenwich High School was built on a site containing “fine old trees, rock outcroppings, and [a] natural pond.” A goal of the architects was to save these natural features and to create a building that was one with the landscape. In addition to creating a school that felt open to the surrounding environment, Sun Spines are used to link the school’s academic “house” wings with those of the fine arts and the gymnasium and natatorium. Like the Sun Spine corridor in Norman High School (Figure 6.5), the corridor in East Hills (Figure 6.11) is wider than most, with plenty of space for both circulation and socialization. Windows are not operable, though doors did open out onto a courtyard space. Artificial lighting is provided in the form of cans, which proceed down the corridor in two parallel lines. Regularly spaced columns articulate the horizontal planes of the hall, as do the window’s mullions, providing a cadence to the passage.

**Figure 6.12.** Greenwich High School [1971] Reid & Tarics Associates, architect**;** Greenwich, CT in ”Greenwich High School,” *Architectural Record* 150, no. 5 (Nov. 1971): 135; PhotoCrd: Roger Sturtevant photos.

“The Cambridge Rindge and Latin School, in Cambridge, Massachusetts, designed by Eduardo Catalano, used architectural interventions to work for positive social and environmental effects.” An amalgam of two formerly separate public high schools, Rindge Tech and Cambridge High and Latin, the new building joined these separate facilities and eliminated redundant spaces. An “elevated two-story skywalk wrapped in transparent glass” connects the two halves of the building and becomes the Sun Spine space for the school (Figure 6.13). Conceived as an airwalk, this Sun Spine features windows on both wall planes that run from three feet above floor level up to the roofline. One wall slopes gently toward the ceiling while the other plane runs perpendicular, which creates a more dynamic space. Regularity is given to the space by the thick mullions of the windows and in the large lighting cans that descend from the ceiling. The flooring for this space is tile and brick, brought to life by the natural light that flood the space. [24]

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[24] Cambridge Rindge and Latin High School [1980] Eduardo Catalano, architect; Cambridge, MA in ”Four Schools with Thought,” *Architectural Record* 168, no. 2 (Aug. 1980): 114-18; PhotoCrd: Roger Sturtevant photos.

**Figure 6.13.** Cambridge Rindge and Latin High School [1980] Eduardo Catalano, architect; Cambridge, MA in "Four Schools with Thought," *Architectural Record* 168, no. 2 (Aug. 1980): 118; PhotoCrd: Eduardo Catalano photos.

Designed by Perkins + Will, the Desert View Elementary school in Sunland Park, New Mexico made use of "simple concrete block and bar joists" to create a low-cost school. "Varied fenestration… helps give the building a much larger, grander sense of scale than its relatively modest size would ordinarily evoke."[25] Two different corridors in the school utilize Sun Spine in hallway spaces. In one wing of the school, a large hallway with two-story high ceilings contains turquoise-painted trusses and beams spaced at regular intervals down the corridor's ceiling plane (Figure 6.14). Short, long windows near the ceiling echo the even spacing of larger windows below and allow more natural

[25] Desert View Elementary School [1988] Perkins & Will, architect; Sunland Park, New Mexico in "Inventive Regionalism Sparks a Prototype for the Desert," *Architectural Record* 176, no. 10 (Sep. 1988): 106-10; PhotoCrd: Eduardo Catalano photos.

light to enter the space. The lower set of windows run from the floor up to a mid-wall horizontal datum.

A second Sun Spine space in a different part of the school connects administrative spaces to a classroom corridor  (Figure 6.15). Turquoise trusses are repeated here, lying perpendicular to the roofline, evenly spaced down the corridor. Large glass windows with white mullions run from a foot off the ground up to the ceiling plane to create a Sun Spine.

**Figure 6.14. (left)** Desert View Elementary School [1988] Perkins & Will, architect; Sunland Park, New Mexico in "Inventive Regionalism Sparks a Prototype for the Desert," *Architectural Record* 176, no. 10 (Sep. 1988): 109; PhotoCrd: Robert Reck photos.

**Figure 6.15.  (right)** Desert View Elementary School [1988] Perkins & Will, architect; Sunland Park, New Mexico in "Inventive Regionalism Sparks a Prototype for the Desert," *Architectural Record* 176, no. 10 (Sep. 1988): 108; PhotoCrd: Robert Reck photos.

The Perry Community Education Village of Perry, Ohio was built in 1995 and contains "three distinct schools and a sports complex- the town's entire school system" in one large plot of land near a nuclear power plant facility. By locating the schools in the same complex, the town was able to "starting doubling up on functions so there is some economy." An image from the school's music building shows a short Sun Spine wherein "windows on the left look out into a courtyard" and the corridor leads toward the band room (Figure 6.16). The windows of what starts out as a two-story space have long, horizontal panes of glass, separated by large, white mullions. As the corridor curves on the right, the left side bends to create a square corner, then continues down the hall as a one-story space.[26]

**Figure 6.16.** Perry Community Education Village [1995] Perkins & Will, architect; Perry, OH; "All in One," *Architectural Record* 187, no. 7 (Jul. 1995): 85; PhotoCrd: Perkins & Will.

[26] Perry Community Education Village [1995] Perkins & Will, architect; Perry, OH; "All in One," *Architectural Record* 187, no. 7 (Jul. 1995): 78-85; PhotoCrd: Perkins & Will.

"When it was built in 1954, the Wilbert Snow Elementary School in Middletown, Connecticut embodied the era's progressive thinking regarding modern architecture's role in public education… five free-standing classroom buildings stood in a horseshoe formation behind three administration buildings."[27] While sound in theory (the architects were striving to connect students to nature), this practice ultimately failed as young students struggled to pass between buildings in bad weather. A goal of this 1999 renovation was to connect these disjointed facilities into one larger building, while still maintaining the connection to nature. The solution utilized Sun Spine, creating window-walled corridors that connect classrooms to administrative spaces.

An image of the Sun Spine shows the connection to a wing of classrooms; the ceiling drops from an atrium space to a lower ceiling height in the corridor (Figure 6.17). Parallel, horizontal mullions and glass stretch from the floor up to the ceiling and have thin, green metal mullions. The opposite side of the corridor also has a window wall, but instead of looking to the exterior, this window looks into a music classroom.

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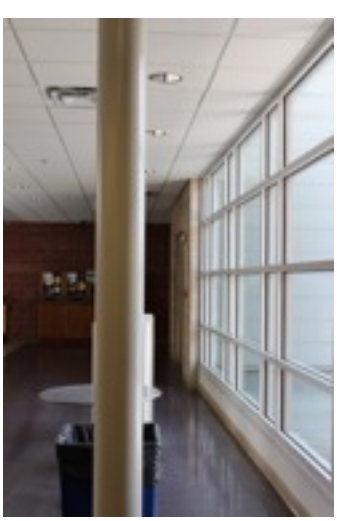
[27] Wilbert Snow Elementary School [1999] Jeter, Cook & Jepson, Architect; Middletown, CT; "Open Door Policies: Wilbert Snow School, Middletown, Connecticut," *Architectural Record* 187, no. 9 (Sep. 1999): 118-21; PhotoCrd: Robert Reck photos.

**Figure 6.17.** Wilbert Snow Elementary School [1999] Jeter, Cook & Jepson, Architect; Middletown, CT; "Open Door Policies: Wilbert Snow School, Middletown, Connecticut," *Architectural Record* 187, no. 9 (Sep. 1999): 121; PhotoCrd: Woodruff/Brown Photography.

The Flint Hill school in Oakton, Virginia boasts two Sun Spines in different places in its complex. Built in 2001 by Chatelain Architects, one Sun Spine can be found on the second floor, running over the school's main entrance and leading to the science classrooms (Figure 6.18). Another can be found near one of the school's main staircases and along the southern side of the building (Figure 6.19). Both corridors allow a great deal of light into the school, which was designed for optimum light flow.



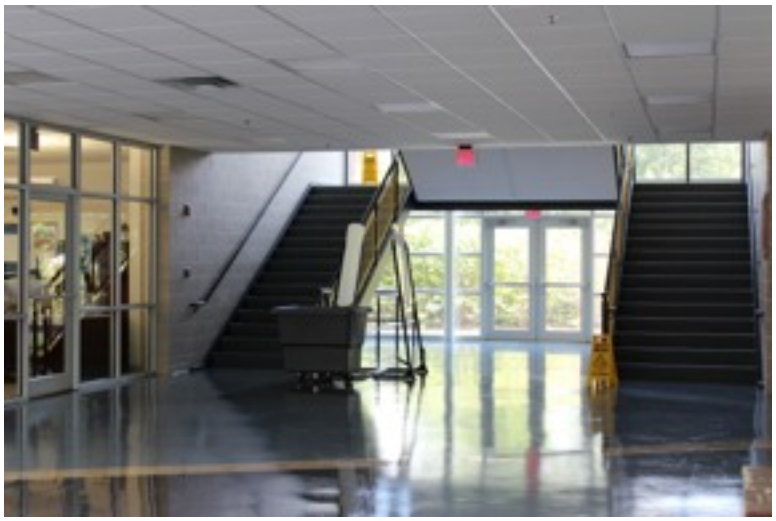


**Figure 6.18. (left)** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.
**Figure 6.18. (right)** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.

In 2005, Skidmore, Owings & Merrill were contracted to design Burr Elementary School in Fairfield, Connecticut. This unique public school worked with existing wildlife on site to create a series of "Amoeba-shaped courtyards" that "function as auxiliary teaching spaces protected within the building footprint."[28] These courtyards are lined with "standard aluminum-framed glazing lets in views and daylight while keeping sight lines open" (Figure 6.20, Figure 6.21). These windows extend two stories, up through both floors of the school, allowing light in through floor to ceiling windows with thin white mullions. Located near multi-use spaces in the building, these Sun Spines experience a great deal of student traffic.

[28] Burr Elementary School [2005] Skidmore, Owings & Merrill, architect; Fairfield, CT; "Back to the Future," *Architectural Record* 193, no. 12 (Dec. 2005): 142-47; PhotoCrd: Woodruff/Brown Photography.

**Figure 6.20. (left)** Burr Elementary School [2005] Skidmore, Owings & Merrill, architect; Fairfield, CT; "Back to the Future," *Architectural Record* 193, no. 12 (Dec. 2005): 147; PhotoCrd: Robert Polidori.
**Figure 6.21. (right)** Burr Elementary School [2005] Skidmore, Owings & Merrill, architect; Fairfield, CT; "Back to the Future," *Architectural Record* 193, no. 12 (Dec. 2005): 145; PhotoCrd: Robert Polidori.

Located in Greenwich, Connecticut, the Brunswick Upper School has been around since the early 20th century, and as such has undergone several additions and renovations, resulting in a campus with a lack of unity. Skidmore, Owings & Merrill sought to remedy this by "linking the disjunctive buildings with a two-story glass walkway, creating a continuous means of circulation between the campus buildings" (Figure 6.22). The new Sun Spine features large glass panels that run from floor to ceiling without break. Between each panel are large steel frames. The curving corridor shows small light fixtures around the edge of the ceiling, allowing for a great deal of nature lighting.[29]

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[29] Brunswick Upper School [2008] Skidmore, Owings & Merrill, architect; Greenwich, CT; "Schools K-12: Brunswick Upper School," *Architectural Record* 196, no. 9 (Sep. 2008): http://archrecord.construction.com/projects/bts/archives/k-12/09_Brunswick/default.asp?bts=K12 (accessed Jul. 7, 2012); PhotoCrd: Robert Polidori.

**Figure 6.22.** Brunswick Upper School [2008] Skidmore, Owings & Merrill, architect; Greenwich, CT; "Schools K-12: Brunswick Upper School," *Architectural Record* 196, no. 9 (Sep. 2008): http://archrecord.construction.com/projects/bts/archives/k-12/09_Brunswick/default.asp?bts=K12 (accessed Jul. 7, 2012); PhotoCrd: Robert Polidori.

When work began on Nathan Hale High School in Seattle, Washington in 2011, "the school was essentially a closed concrete box, full long, windowless corridors that isolated students in mazelike paths and concealed the layout of the program." To help with wayfinding, the architect, Mahlum, created "students commons around two existing interior courtyards- one north of the main corridor, one south… architects removed concrete infill panels from the courtyard-facing walls, leaving the structural columns and fitted the openings with windows" (Figure 6.23).[30] The result is a Sun Spine, with views to the open courtyard. Fluorescent lights hang in Marching Order,

[30] Nathan Hale High School [2011] Mahlum, architect; Seattle, WA; "Schools of the 21st Century," *Architectural Record* 200, no. 1 (Jan. 2012): http://archrecord.construction.com/projects/Building_types_study/K-12/2012/Nathan-Hale-High-School.asp?bts=K12 (accessed Jul. 7, 2012); PhotoCrd: Benjamin Benschneider.

perpendicular to the path of circulation. Glossy white flooring reflects light from the courtyard space into the interior.

**Figure 6.23.** Nathan Hale High School [2011] Mahlum, architect; Seattle, WA; "Schools of the 21st Century," *Architectural Record* 200, no. 1 (Jan. 2012): http://archrecord.construction.com/projects/Building_types_study/K-12/2012/Nathan-Hale-High-School.asp?bts=K12 (accessed Jul. 7, 2012)**;** PhotoCrd: Benjamin Benschneider.

Sun Spine is consistently represented in every decade since it first appeared in 1951. The benefits schools receive from the natural light it allows into the interior will not change in the coming years, and continue to outweigh the negatives, lack of insulation, heat, and glare, especially with developments in window and glass technology. It can be expected that Sun Spine will continue to appear in schools for decades to come. [31]

[31] Evidence for the archetypical use and the chronological sequence of Sun Spine in 1-12 schools was developed from the following sources: **1950** Norman High School [1951] Caudill Rowlett Scott, architect; Norman, OK in "Designed for High School Youth," *Architectural Record* 116, no. 2 (Aug. 1954): 143; PhotoCrd: Hedrich-Blessing Studio.; Langley-Bath-Clearwater High School [1955] Lyles, Bissett, Carlisle & Wolff, architects; Bath, SC in "Six Year High School For a Southern Mill Town Area," *Architectural Record* 117, no. 2 (Feb. 1955): 186; PhotoCrd: Joseph W. Molitor.; Pocantico Hills Central School [1956] Perkins + Will, architect; Pocantico, NY in "Schools," *Architectural Record* 119, no. 4 (Apr. 1956): 242; PhotoCrd: Hedrich-Blessing Studio.; **1960** Greenfield Elementary School [1960] Eberle M. Smith Associates, Inc., architect; Birmingham, MI in "Eight Schools Compared," *Progressive Architecture* vol.

41, no. 3 (Mar. 1960): 134; PhotoCrd: Lens-Art Photo.; H.F. Hunt Junior High School [1960] Robert Billsborough Price, architect; Tacoma, WA in "Schools: H.F. Hunt Junior High School," *Architectural Record* 128, no. 2 (Aug. 1960): 191; PhotoCrd: Dearborn-Massar.; South Elementary School [1961] Hugh Stubbins & Associates, architect; Andover, MA in "Courts Enhance Environment of Low Cost School," *Architectural Record* 130, no. 1 (Jul. 1961): 167; PhotoCrd: Joseph W. Molitor.; East Hills Junior High School [1964] Traumata-McMahon Associates Inc, architect; Bloomfield Hills, Michigan in "Suburban Campus-Plan school Designed for Future Team Teaching," *Architectural Record* 136, no. 3 (Sep. 1964): 240; PhotoCrd: Balthazar photos.; **1970** Greenwich High School [1971] Reid & Tarics Associates, architect**;** Greenwich, CT in "Greenwich High School," *Architectural Record* 150, no. 5 (Nov. 1971): 135; PhotoCrd: Roger Sturtevant photos.; **1980** Cambridge Rindge and Latin High School [1980] Eduardo Catalano, architect; Cambridge, MA in "Four Schools with Thought," *Architectural Record* 168, no. 2 (Aug. 1980): 118; PhotoCrd: Eduardo Catalano photos.; Desert View Elementary School [1988] Perkins & Will, architect; Sunland Park, New Mexico in "Inventive Regionalism Sparks a Prototype for the Desert," *Architectural Record* 176, no. 10 (Sep. 1988): 109; PhotoCrd: Robert Reck photos.; Desert View Elementary School [1988] Perkins & Will, architect; Sunland Park, New Mexico in "Inventive Regionalism Sparks a Prototype for the Desert," *Architectural Record* 176, no. 10 (Sep. 1988): 108; PhotoCrd: Robert Reck photos.; **1990** Perry Community Education Village [1995] Perkins & Will, architect; Perry, OH; "All in One," *Architectural Record* 187, no. 7 (Jul. 1995): 85; PhotoCrd: Perkins & WIll.; Wilbert Snow Elementary School [1999] Jeter, Cook & Jepson, Architect; Middletown, CT; "Open Door Policies: Wilbert Snow School, Middletown, Connecticut," *Architectural Record* 187, no. 9 (Sep. 1999): 121; PhotoCrd: Woodruff/Brown Photography.; **2000** The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.; The Flint Hill School [2001] Chatelain Architects; Oakton, VA; SIte Visit, Katherine Mooney, 13 August, 2012; PhotoCrd: Katherine Mooney, Intypes Project, 13 August, 2012.; Burr Elementary School [2005] Skidmore, Owings & Merrill, architect; Fairfield, CT; "Back to the Future," *Architectural Record* 193, no. 12 (Dec. 2005): 147; PhotoCrd: Robert Polidori.; Burr Elementary School [2005] Skidmore, Owings & Merrill, architect; Fairfield, CT; "Back to the Future," *Architectural Record* 193, no. 12 (Dec. 2005): 145; PhotoCrd: Robert Polidori.; Brunswick Upper School [2008] Skidmore, Owings & Merrill, architect; Greenwich, CT; "Schools K-12: Brunswick Upper School," *Architectural Record* 196, no. 9 (Sep. 2008): http://archrecord.construction.com/projects/bts/archives/k-12/09_Brunswick/default.asp?bts=K12 (accessed Jul. 7, 2012); PhotoCrd: Robert Polidori.; **2010** Nathan Hale High School [2011] Mahlum, architect; Seattle, WA; "Schools of the 21st Century," *Architectural Record* 200, no. 1 (Jan. 2012): http://archrecord.construction.com/projects/Building_types_study/K-12/2012/Nathan-Hale-High-School.asp?bts=K12 (accessed Jul. 7, 2012)**;** PhotoCrd: Benjamin Benschneider.

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