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UNIVERSITY OF CALIFORNIA
SANTA CRUZ

**ARCHITECTURES OF SCHOOLING: SCHOOL CONSTRUCTION
SYSTEMS DEVELOPMENT IN CALIFORNIA, 1961-1969**

A dissertation submitted in partial satisfaction
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

VISUAL STUDIES

by

Leslie McShane Lodwick

December 2024

This dissertation of Leslie McShane Lodwick is
approved:

Associate Professor Albert Narath, chair

Associate Professor Kyle Parry

Associate Professor Irene Cheng

Peter Biehl
Vice Provost and Dean of Graduate Studies

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2024

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Abstract

Architectures of Schooling: School Construction Systems Development in
California, 1961-1969

Leslie McShane Lodwick

After the passage of the National Defense Education Act (NDEA) in 1958, American school administrators scrambled to use the allocated funds in service of a rapidly developing public school infrastructure. Administrators were guided by a belief stemming from national discourses and NDEA guidance that science and technology training would ensure the nation remain competitive in the global space and military races. One experimental school program extending from this period was School Construction Systems Development (SCSD)—a school-building program comprised of thirteen prefabricated schools in postwar California. This dissertation project argues that these schools are integral to histories of suburban development in California while leaving an outsized legacy to school buildings nationwide due to the immense and nationwide school-product manufacturing network developed in service of SCSD schools. Long left out of architectural, educational, and urban histories, the architecture of schooling has vital implications for understandings of urbanization, race, and labor in America. Funded in large part by the Ford Foundation through a grant managed by Stanford University's School Planning Laboratory, each of the schools operated uniquely in their respective communities while also functioning as part of the more extensive SCSD project portfolio of schools. The schools

were much lauded in architectural press, national newspapers, and in local and national educational literature as solutions to the national problem of public education, while also being safe, spacious, and part of the growing suburbs.

This dissertation argues that the larger SCSD project was defined by attempts to legitimize public education in the context of national anxiety about desegregation in the years following *Brown v. Board of Education* and to experiment with school buildings as a mechanism by which students could be folded into technocratic national frameworks in the context of the Cold War. Analysis of national media, architectural journals, women's magazines, and educational literature reveals the project's collective experimental potential to serve these national goals. Yet the individual schools comprising the larger project have been virtually unstudied, nor have the larger project goals that defined the individual schools. Thus, this dissertation also argues that these individual schools are integral to understanding shifting on-the-ground dynamics in communities across California with respect to race, class, land management, and the natural world. Through site visits, interviews with teachers and administrators, and visiting community historical and educational archives, this dissertation analyzes the school buildings as sites of learning and as vital components of their respective suburban developments.

The SCSD project also significantly influenced school architecture in the United States. This influence is seen, in part, through the creation of the national network of manufacturers that developed through the SCSD bidding process. Thousands of schools built through the 1990s utilized these prefabricated architectural systems and objects. Education historian David Tyack describes the “grammar of schooling” as the idea that a shared set of accepted temporal and disciplinary conventions by which schools operate ensure their ongoing replication and come to define and organize schooling as an institution.¹ This so-called grammar of schooling prevents the adoption of radical or truly reformatory ideas about what school could be. This project thus argues for the aesthetic, spatial, and architectural functions of these shared schooling systems as also indispensable to cultivating this grammar of schooling. The implications of this are that the network of manufacturers developed out of SCSD in response to project goals further define the look and feel of the institution of schooling itself in the United States. Often presented as the corrective corollary to urban education through the vast public relations campaign and wide imaging of these schools in national media, this new suburban school building was showcased as *the* school

¹ David Tyack and William Tobin, “The ‘Grammar’ of Schooling: Why has it Been so Hard to Change?” *American Educational Research Journal* 31, no. 3 (Autumn 1994), 454.

building that would solve the nation's educational problems and would become a widely built typology as a result.

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Introduction

Fountain Valley High School (FVHS) opened in 1967, five miles from the Pacific Ocean in Huntington Beach, California, on the site of a former asparagus field. It was the first of a series of thirteen experimental school buildings built across the state between 1967 and 1969 as part of the School Construction Systems Development (SCSD) program—a building project driven by experimentation and innovation in systems design, prefabricated construction, school architecture, and American public education. FVHS was completed in fourteen months, four months faster than nearby Marina High School, which had been built three years earlier and often served as a point of comparison for architectural cost analysis. Touted in project literature as a more cost-effective solution to school-building than “traditionally built” non-prefabricated schools, FVHS’s final construction cost was approximately 13% more than Marina High School’s (\$4,524,487, compared with \$4,001,069). Project architects chalked the higher cost up to the higher site-development costs at Fountain Valley than Marina: the asparagus field had needed expensive chemical treatment of the soil to prevent the “tenacious vegetable from disturbing the surfacing of the roads, courtyards, parking areas and the like.”¹

¹ SCSD: *The Project and its Schools, a report from Educational Facilities Laboratories*, (New York: EFL, 1967), 15.

Inside FVHS, the school's environment was regulated by a complex HVAC system housed, along with the lighting system, inside a ceiling truss. The environment was highly regulated and controlled both inside and out, a fact architectural critic Reyner Banham noted in 1984 when he wrote that the so-called tyranny of the SCSD HVAC ceiling system (which housed all the environment-controlling instruments) was to be "absolute" and would thus force all other products utilized in the ceiling to conform to *its* need to control the environment rather than working with any other existing product (Figs. 0.1. and 0.2.).² Both inner and exterior environments were thus highly regulated and controlled so that the school space could operate as a *machine* for education, without outside influence from the natural world—and perhaps, additionally, from more locally rooted ideas about schooling and education. The HVAC system and ceiling-hung fluorescent lighting replaced the need for external airflow through windows, as windows were seen as a potential distraction to students. While the school space was designed to be a highly controlled space that was separate from its physical environment, its capacity as a space for education was also intended to be separate from the messiness and perceived inadequacies of local education. Instead, the space

² Reyner Banham, *The Architecture of the Well-tempered Environment*, (Chicago: University of Chicago Press, 1984), 218.

was intended to be isolated, a vacuum for objective education wrought through architectural systems, itself a new mode of education reform.

There are many implications of an educational building project that sees itself as separate from both the environment *and* the communities in which it operates, including questions about the power dynamics of objectivity in public education, buildings as sites of reform (a concept which, of course, has a long lineage in planning discourses), and the relevance of the human actors who occupy and engage with these spaces. Nonetheless, the great legacy of the SCSD project to date has been the networked forms of industry that emerged as a result; vast manufacturing systems that developed school-based building materials and objects grew out of the project's needs and found their way into school buildings across the United States, informing the very aesthetic of schooling itself.

SCSD has an outsized legacy. At the time of its conception, it was lauded as nothing short of revolutionary. Details of the project were published in newspapers large and small across the United States. This resulted from an intentional campaign, one likely underwritten by Educational Facilities Laboratories (EFL), the educational-funding wing of the Ford Foundation in the mid-twentieth-century and the project's primary funder.³ Articles about the

³ A national press campaign about the school system and its prototype on Stanford's campus resulted in a story about the project being printed in dozens of newspapers nationwide.

planning of the project were also featured in international architectural and building journals. Intimate details of the project, including site-planning meetings and updates on the construction of the schools, were featured in *Architectural Forum*. Educational journals discussed the possible outcomes and implications of SCSD for both the industry of school-building and education in the early 1960s. Despite this, the project's status fell after the thirteen schools were completed. This was due to a constellation of factors, including the higher-than-expected cost of building the structures (they were not, on the whole, cheaper than traditionally built schools), changing public discourse about education in the US, and the less-than-favorable reviews of the spaces by their users: students and teachers. Eventually, the Ford Foundation completely withdrew funding for the project, which effectively ended the SCSD program after thirteen schools had been built in suburban communities across California.

Might the complex legacy of the program—as situated in a changing educational and social context in the US—be read as collateral damage from massive educational, social, and civic change? Is the legacy of the SCSD project simply another failure in the long attempt at American public education reform? Drawing on histories and theories from American education, architectural history, urban planning, and visual studies, this dissertation analyzes the SCSD building program in terms of its complex administrative

origins—from its theoretical bases and concerns to its social and educational outcomes and shortcomings—while acknowledging its contribution to an American aesthetic, or what educational historians David Tyack and Larry Cuban describe as “the grammar of schooling”—the set of mechanisms that both normalize and maintain the institution collectively known as “school.”⁴

Tyack and Cuban write,

The basic grammar of schooling, like the shape of classrooms, has remained remarkably stable over the decades. Little has changed in the ways that schools divide time and space, classify students and allocate them to classrooms, splinter knowledge into “subjects” and award grades and “credits” as evidence of learning. In 1902 John Dewey warned against dismissing the way schools are organized “as something comparatively external and indifferent to educational purposes and ideals.” In fact, he declared the manner in which the machinery of instruction bears upon the child...really controls the whole system.⁵

While Tyack and Cuban note the ongoing persistence of the space of the classroom, they do not attend to the *problem* of space in their history of American education reform. This dissertation research extends from Tyack and Cuban’s discussion of the grammar of schooling, including its lack of attention to the spatial components of the grammar of schooling, and heeds

⁴ David Tyack and Larry Cuban, *Tinkering Toward Utopia: A Century of Public School Reform*, (Cambridge: Harvard University Press, 1997).

⁵ Ibid., 85 and John Dewey, *The Educational Situation*, (Chicago: University of Chicago Press, 1902), 22-23.

Dewey's warning that the organization of schools should not be seen as external and indifferent to the purpose of schooling. I instead hold space and architecture accountable for their roles in maintaining this system of schooling and open a conversation about the role of school buildings--in particular, the architectural typology of California schools--in articulating powerful social and political mid-century discourses. The SCSD schools seem a particularly useful case study in which to anchor this analysis of space and the grammar of schooling because the schools rely on and advocate for a system that pays careful attention to the way that school space is flexibly constructed and changed. Yet, the grammar of schooling persisted in the SCSD schools, and individual classrooms remained unchanged. At the same time, the concentration of administrative power became embedded and replicated in the grammar of American schooling through spatial layout and aesthetics. It is my hope that by unpacking this typology alongside the diverse histories, influences, and discourses that developed the SCSD schools, architects and school districts can break away from this spatial grammar and propose designs and re-designs for schools that embrace new and useful ways of thinking about school space.

Research Questions and Relevance

To date, the SCSD project has been only superficially referenced in architectural histories. The project has been discussed by multiple architects, specifically in reference to its successful use of systems design, but not with any analysis of its educational or social aims. Most notably, Joshua Lee's excellent dissertation and subsequent book project provide a compelling and thorough overview of the use of flexibility and systems architecture in the project and discusses its wide-reaching implications for housing and education.⁶ Lee's well-researched and thorough 2016 dissertation, "Questioning Modern Approaches to Flexibility: 50 Years of Learning from the School Construction Systems Development (SCSD) Project" analyzes the use of flexibility as a design approach toward sustainability as it was conceived in the SCSD project. Lee interviewed project architects, principals, administrators, and school-based facilities personnel while also analyzing plans, photography, and school-based archives to articulate the role that flexibility played in four SCSD case study schools. His project aimed to reveal findings about how flexibility could be employed as a strategy for sustainable building projects, including education and housing. His analysis of the four schools revealed that flexibility in buildings can be significantly affected by

⁶ Joshua Lee, *Flexibility and Design: Learning from the School Construction Systems Development (SCSD) Project*, (New York: Routledge, 2020).

various external conditions, including, as shown in SCSD, unstable market conditions, the need for user input during planning, and what he describes as “long-term social relations to sustain sociotechnical innovations.”⁷ Thus, one major question arising from this study is how can architects and designers better balance these concerns and others with the perceived beneficial properties for individual users afforded by flexibility. In Lee’s study, the amount that buildings can change and do change over time underscores his analysis of SCSD, as does an eye toward these lessons gleaned from embracing change as a necessary component of architecture. My present study of the SCSD schools acknowledges and builds on Lee’s vital research into the individual case study schools, and similarly considers the issue of flexibility in the project at large. My dissertation differs in that I offer a broader historical vantage point from which to approach the SCSD schools. This includes an attention to trends in pedagogy and education, histories of suburban school architecture in the US, as well as the socio-political conditions that frame the development of the project and design of individual schools. While Lee’s dissertation offers findings for the application of flexibility in school and home building, my dissertation argues that these schools cannot be divorced from the socio-political, nor changing educational context,

⁷ Joshua Lee, “Questioning Modern Approaches to Flexibility: 50 Years of Learning from the School Construction Systems Development (SCSD) Project, (dissertation, University of Texas, Austin, 2016), xiii.

in which they are found. Thus I ask how studying the SCSD schools can offer understandings about the role of pedagogy, technology, race, and planning in school buildings that can be more critically brought to the forefront of conversations on historical school architecture today. I also believe that through its role as an integral component of changing attitudes about federal funding within the US educational landscape, the SCSD project functions as a keystone to understanding the relationship between private foundational philanthropy and governmental policy in the mid-twentieth-century. Lastly, my project also argues that the development of SCSD relied on national conversations about cybernetics extending from military operations research. The fact that it attempted to streamline American education via the language of cybernetics through the built environment is missing from histories of education and architecture.

This study looks beyond the immediate framing of the SCSD project in terms of its contributions to systems design and flexible architecture. Instead, it interrogates the many actors involved—institutional, community, and individual—and explores the theoretical and historical contexts of which its schools have become a part. Research on school-building in the United States is scant, possibly because of disciplinary divisions in architectural and educational histories, or the tendency to see educational buildings as less important due to power dynamics inherent to the gendering of teachers or the

lack of importance given to the subjectivities of children. Whatever the reason, school buildings in the US have been given short shrift in histories of modern and contemporary architecture, despite their being fundamental to the dissemination of modernism in the US.⁸ This dissertation identifies some of the key tensions in the articulation of the SCSD project as symptomatic of larger concerns about the lack of attention paid to school-building and school buildings, while advocating for children as trustworthy and valuable users of architectural space and worthy participants in urban planning discourses. In these terms, this research is increasingly valuable to contemporary understandings of school architecture and the current political landscape of school buildings, as well as public education's role in diverse communities across the US. Specifically, the recent conversations on how to approach school buildings from both preservation AND maintenance perspectives are of utmost importance as students increasingly find themselves in schools with asbestos, lead paint, contaminated water, broken bathroom facilities, and inadequate heating and lighting systems.⁹ Many of these problems stem from

⁸ Schools were key sites of dissemination about modern architecture through MoMA's traveling exhibition program and their (albeit limited) inclusion in exhibitions defining the International Style and modernism. See "Museum Presents City Plan Exhibit; Modern Art Traveling Display is Entitled 'Look at Your Neighborhood,'" *New York Times*, March 29, 1944; "Modern Architecture for the Modern School" exhibition, *MoMA*, September 16-30, 1942.

⁹ See Liam Stack and Nate Schweber, "Newark Struggles to Keep Students Cool," *New York Times*, June 20, 2024; Sally Weale, "Almost 600 Schools in England Undergoing Urgent Structural Checks," *The Guardian*, June 28, 2023; Kristen A. Graham, "Seven Philly Schools have closed since March because of damaged asbestos," *Philadelphia Inquirer*, October 7, 2023; Sharon Lurye, "For poor US schools, building repairs soak up COVID relief money,"

a lack of viewing children as credible architectural witnesses, inadequate school funding schemes across the US, and a more general lack of attention paid to school facilities and architecture in municipal planning processes and architectural histories.

I argue that the SCSD project is a key moment in the history of school architecture, one in which there was a nationally oriented pivot away from “traditionally built” schools and toward prefabricated and modular schools, which internalized lessons from modernism and the role of architecture in social reform and production of space. In this dissertation, I focus on several central concerns and key questions: How were messages about the SCSD project articulated visually and textually? How were the project’s goals aligned or not aligned with contemporary educational discourse and theory? How were systems design and cybernetics employed in service of the project? As the size and number of California suburbs grew in the mid-twentieth-century, how were the SCSD schools imaged and imagined as part of this suburban growth? Each of these key concerns has larger implications for their respective histories, all the while being urgently relevant to understanding pressing issues facing American public schools in the contemporary moment.

Los Angeles Times, February 20, 2023. Consistent media coverage of the state of inadequate school facilities in the United States occurs in large urban school districts, suburban districts, and rural schools.

Chapter Outlines

In Chapter One, I first trace the history of school architecture's relationship with modern architecture more generally, and then specifically of California school architecture, in order to situate the SCSD project as part of a larger history of school-building and modern architecture, and to argue for the California school building as typology. Key concerns of this chapter are how school architecture in the US responded to and reflected the nation's evolving pedagogical need, and how the typology of the school building became itself a mode of educational reform and pedagogical innovation. Especially through a functional relationship with modern architecture, school buildings were seen as objects of social reform in California, at least through Richard Neutra's influential school designs in the first half of the twentieth-century. Additionally, this chapter looks to how the simultaneous construction of childhood, as aligned with a growing need for "developmentally appropriate" school spaces and products, functioned as part of the creation of a consumer market which took root in newly developing suburbs in the US, particularly in California. SCSD's legacy has so far comprised the network of school products that developed out of the project's call for flexibility. The large market of school-related products and objects—windows, doors, and drinking fountains, for instance—developed out of this call for flexibility and expanded choices based on systems analysis. That is, school districts had expanded catalogs of

objects to choose from; manufacturers were expected to maintain functional and flexible prototypes of objects while also maintaining the capacity (namely labor and relationships with raw materials companies) to mass-produce said objects for school-building projects quickly, cheaply, and efficiently.¹⁰

While Chapter One contains an overview of the relationship that products for children had with the construction of a developmentally appropriate childhood, particularly in suburban areas of the US, in Chapter Two, I examine the implications and logistics of the network of manufacturers. I also outline the various architects, researchers, funders, and institutions that led to the development of the SCSD project through the case study of the test school. This prototype school was built on Stanford University's campus in 1962 and served as a mechanism by which to test and sell the SCSD system to school district administrators and increase buy-in from manufacturers. Through visual analysis of the promotional material around the project, as well as images associated with its development in architectural journals, this chapter analyzes the role of visuality in selling market-based technology as education reform to consumers. Likewise, I argue that the perceived success of the system rests, in part, on the representation of the school as bound with innovation and the logic of systems architecture. I also trace the history of

¹⁰ See John Boice, *A History and Evaluation of School Construction Systems Development* (Menlo Park, CA: Building Systems Information Clearing House, 1971) for a discussion of the full range of types and amounts of products created for SCSD.

school systems architecture and the histories and theories that led to the development of the SCSD project. Prefabricated schools had long been discussed in architectural circles up through the middle of the twentieth-century, but had not been efficiently experimented with or attempted. Through tracing the discursive origin of the idea of the prefabricated school through its long conceptual and political development, it becomes clear how in the 1960s, the imagined impact that SCSD was anticipated to have was huge. It was believed that through incorporating the objectivity of science and the anticipated endless innovation of scientific advancement, flexible schooling could meet any educational challenge and was poised to become a breakthrough, while at the same time saving money and meeting population demands. Tracing the prefabricated school concept from the UK to the US, and analyzing the dialogue between the two through the figure of architect Ezra Ehrenkrantz and the early days of development of his SCSD school-building program, I position the prefabricated school building as the logical extension of the modern movement in both countries. Through these images, I show how the prefabricated prototype school is linked to technological innovation and modernism.

Chapter Three charts one SCSD school amidst shifting ideas about education reform in the 1950s to the 1970s. While education reform in the early postwar era was characterized by an idealization of science and

technology training, by the mid-1960s, educational discourses had shifted to emphasizing civil rights and race in public schools. The inaction of school administrators nationwide toward school desegregation was supplanted by a new attention to the potential for flexible school architecture to “fix” problems of equity wrought partially through segregation. Specifically, through SCSD’s emphasis on schools and districts at the individual level and their capacity to solve any and all problems (including the problem of desegregation) through flexible school spaces, the emphasis on building as education reform promised the remediation of the losses from progressive education of the previous era while moving toward innovation and technology in the context of Sputnik and the global space race. I show how, at DeLaveaga Elementary School, the failures of these competing theoretical educational concerns resulted in a school space that never quite met the needs of its community architecturally or in terms of education and left individual teachers and administrators scrambling to remediate the inadequacies of systems-based architecture.

In Chapter Four, I look to Los Angeles and Orange County, California, to analyze the aesthetic and functional relationship between numerous SCSD schools built in the late 1960s and the burgeoning technological industry in the region. This chapter is also concerned with the relationship between education, labor, and residential development in Southern California.

Likewise, through examining the schools' relationship to residential developments in the region, I argue that California suburbanites had a distinctly different relationship with public education than their earlier East Coast counterparts. While quality and innovative public schooling was generally not seen as a corollary to suburban growth on the East Coast, in the West the new labor class was part of the growing white-collar technological industry; it demanded high-quality public schools in proximity to or adjacent to new suburban developments, which comparably leveraged a belief in the innovation and technology that their own industry worked to develop and maintain. Here is the fullest realization of the aims of the prefabricated school and the cultivation of a "good" and developmentally appropriate childhood—one that leads to familial economic growth wrought through innovation. At the same time, Chapter Four is concerned with the desegregation of schools in Southern California, the ways that desegregation led to a smaller, concentrated version of white flight and the role that school development in the late 1960s was an integral part of these concerns and inevitable residential shift. This chapter looks to the SCSD schools built in the region to begin to address the provocation posed by Jack Dougherty, namely that "the gap between these different fields of history—on both sides—is remarkable. Whereas educational historians tend to stop at the city line, urban and

suburban historians appear to have stopped at the schoolhouse door.”¹¹ The SCSD case study schools I turn to in Orange County allow us to begin to tease apart this complex disciplinary problem while looking to the ways that local industry affected school architecture and design.

Space and Architecture as School Reform

This dissertation situates the SCSD schools as part of a longer intellectual trajectory that analyzes the impacts of school design on the psychology and educational outcomes for children in the nineteenth and twentieth centuries while advocating for spatial changes to be made as a mode of legitimate education reform.¹² This section looks at some of the goals of proposed spatial reforms for school buildings in the nineteenth and early part of the twentieth-century. Alterations to the built and spatial environment of schooling have been presented as a mechanism of school reform over the past two hundred 150 years. While SCSD was integral to national school reform conversations about the possibilities of open-plan learning and flexible architecture, ideas about how the built environment could fix various social,

¹¹ Jack Dougherty, “Bridging the Gap between Urban, Suburban, and Educational History,” in William J. Reese and John L. Rury (Eds.) *Rethinking the History of American Education*, (London: Palgrave Macmillan, 2007), 254.

¹² Education reform in the United States is the subject of much research and discourse in educational theory and sociology. See Diane Ravitch’s *Left Back: A Century of Battles Over School Reform* (New York: Simon & Schuster, 2001) for a thorough overview of the history of school reform in the US and its relationship to social engineering.

economic, and curricular problems of schooling first developed in the early nineteenth-century. Henry Barnard's 1850 *School Architecture; or Contributions to the Improvement of School-Houses in the United States*, offered early guidance to architects and school administrators on how school buildings could be better designed to affect the "health, manners, morals, and intellectual progress of children."¹³ School Commissioner and architectural advocate, Barnard advocated for more money to be spent on schools and for the use of better quality building materials than those he had found in nineteenth-century schools on the East Coast during research for the book. He advocated for better site locations away from dirt and noise, larger spaces for children, including classrooms, better lighting and ventilation, proper attention paid to heating and cooling, and furniture appropriate for children.¹⁴ He was also concerned with creating aesthetically pleasing environments for children to cultivate "habits of order, and neatness, and...delicacy of manners and refinement of feeling."¹⁵ Barnard was concerned with nurturing students to be productive members of society. Barnard's recommendations became fundamental guidelines for school architects to follow during the years

¹³ Henry Barnard, *School Architecture; or Contributions to the Improvement of School-Houses in the United States* (New York: A.S.Barnes & Co., 1850), 6.

¹⁴ Barnard, *School Architecture*, 39-40.

¹⁵ Ibid.

following the book's publication. This emphasis on modernization offered a critique of the one-room and country schoolhouse that had described most school buildings in the United States until the 1830s. Modernization of school buildings was a key democratic concern for Barnard.

By the turn of the twentieth-century, schools struggled to adapt to the call for modernization and increased curricular demands. Schoolhouses, contending with increased enrollment, had come to resemble factories with limited lighting and nailed-down furniture. They did not meet the demand of progressive reformers for modern, aesthetically pleasing, safe, or wholesome environments. Progressive-era education reformers suggested that the school should be a second home for children. In addition to cultivating American democratic principles, school spaces should nurture children socially and emotionally.¹⁶ Cities responded to this multi-pronged demand and restructured their school systems with particular attention to school buildings: New York and Philadelphia undertook massive administrative and architectural reform campaigns of school buildings in the 1890s through the 1920s.

¹⁶ Adele Marie Shaw, "True Character of New York Public Schools," *Worlds Work* 7 (December 1902): 4205-06, as cited in: Robert A. M. Stern, Gregory Gilmartin, and John Montague Massengale, *New York 1900: Metropolitan Architecture and Urbanism, 1890-1915* (New York: Rizzoli, 1983), 78.

Educational theorists also began to advocate for shifts in school spaces as a mode of reform. In addition to architects, reformers, and school administrators, theorists and educational researchers identified key ways that the architecture of the classroom disrupted educational opportunities.

Educational philosopher John Dewey, in particular, noted that the physical arrangement of school spaces affected curricular possibilities. He described school and classroom spaces as being symmetrical, crowded, and bare, which created the expectation that students be passive and dependent listeners rather than ones who could cultivate knowledge for themselves.

According to planner and historian Amy S. Weisser, Chicago-based Dewey rethought the school building alongside City Beautiful planning principles as centered on a library that would reach out to “home, park, university, museum, public library, and business through its rooms devoted to textiles, shop, kitchen and dining” which would lead to greater experimentation, research, and active participation in the community.¹⁷ Dewey described his principles as “progressive education,” which was characterized by flexibility, project and group learning, natural light, and outdoor education, as well as expansion of the classroom in the greater community.

¹⁷ Amy S. Weisser, “‘Little Red School House, What Now?’ Two Centuries of American Public School Architecture,” *Journal of Planning History* 5, no. 3 (2006): 202.

It wasn't until the 1910s and 20s that Dewey's ideas about progressive education began to effect architectural change. By the 1930s, architects and school administrators became united in their goal of reforming school spaces that were aligned with both modern architecture and Dewey's call. This alignment led to dozens of new school prototypes, including Richard Neutra's Corona Avenue School and Perkins, Wheeler, and Will with Eero, and Eliel Saarinen's Crow Island School, discussed at length in Chapter One. This also led to a renewed emphasis on the school building as a purveyor and shaper of democratic and civic ideals. Educator and writer William G. Carr commented in *Architectural Record* in 1935, "Through this [school] environment...the whole costly process of education may be encouraged or nullified. The school building is the tangible and visible evidence of the public towards education."¹⁸ Carr's comments indicate an increased national responsibility to nurture good school-building as a way of demonstrating democracy. This elevation of the school building as a form of democratic symbolism demonstrated the heightened role that educational spatial planning would take for social engineering as well as its "capacity for reform."¹⁹ While World War II disrupted much school design and building, a

¹⁸ William G. Carr, "Opportunities in School Modernization: A Survey of School Conditions and Prospects in Future School Construction," *Architectural Record*, September 1935: 201.

¹⁹ Amy S. Weisser, "'Little Red School House, What Now?' Two Centuries of American Public School Architecture," *Journal of Planning History* 5, no. 3 (2006): 197.

renewed conversation about school architecture emerged after the war that sought to build on this call for democracy. However, this renewed conversation about national education and reform was also informed by design extending from systems and military research.

Midcentury Research in School Design in the US

In framing this mid-twentieth-century shift in American education and school-building, several architects and designers advocated for innovation in school-building. This call for innovation was partially pedagogically rooted but was also driven by school districts cutting back on capital spending and facilities maintenance after the war. New schools were needed in response to an increased population of school-aged children, but not many could be financed as designed.²⁰ Architect William W. Caudill, a Texas-based architect of the firm Caudill, Rowlett, Scott (CRS), proposed both cost-benefit analysis and designs fueled by research to school administrators. He also wrote extensively on school design, notably his book *Space for Teaching*.²¹ With a degree in education, Caudill displayed an intimacy and expertise in meeting and planning for the needs of children through design. CRS conducted

²⁰ C. William Brubaker, *Planning and Designing Schools* (New York: McGraw Hill, 1998), 242-43.

²¹ W.W. Caudill, *Space for Teaching: An Approach to the Design of Elementary Schools for Texas*, (Texas: Texas Engineering Experiment Station, 1941).

research studies into school design from the perspectives of multiple users of the space—children, administrators, and teachers. In fact, research was a fundamental component of Caudill’s architectural practice, and he featured much of the collected research in his 1954 book *Toward Better School Design*.²² Avigail Sachs argues that presenting architectural design as “research and not only design, created a link between architects as professionals and scientists” that was used to legitimize their architectural firm, as well as, I argue, enable professional consideration of school-building as “serious design” and position school design as a main architectural market in the United States.²³ Caudill describes good architecture as *social*, in that it is informed by the needs of the users and that these needs can be rationally articulated.²⁴ Thus, research became a means through which to gather and analyze what the SCSD architects would later describe, in line with theories of systems architecture, as performance specifications. By gathering data about students’, teachers’, and administrators’ experiences in the schools, SCSD could analyze performance feedback. While CRS quite effectively used this feedback in future school designs, since the SCSD system had been locked into place through its master design and through inflexible contracts with

²² W.W. Caudill, *Toward Better School Design* (New York, F.W. Dodge Corp., 1954).

²³ Avigail Sachs, “Marketing through research: William Caudill and Caudill, Rowlett, Scott (CRS),” *The Journal of Architecture* 21(4), (2016), 525.

²⁴ *Ibid.*, 533.

manufacturers of the system products, the data gathered on the SCSD projects did not go toward improvement or alterations of the school space. Arguably, this rigidity came to define the SCSD schools, while the CRS schools have been (mostly) celebrated for their student- and educator-friendly designs.

Through the rationalization of the school design market, in part through Caudill's research campaign and in part through the advocacy of mass media and architectural and building journals, school design became big business after World War II. Other architects, including John Lyon Reid, analyzed the acoustic environments of buildings, while Ernest Kump emphasized local materials, and Caudill and others advocated for long and low school buildings that contrasted with the multi-story urban school of the early twentieth-century. Firms analyzed designs toward how they met physical needs—lighting and airflow, for instance—as well as emotional needs—was it pleasing to look at? Did it feel friendly?²⁵ It was thought that ensuring that significant attention was paid to these concerns in school designs would create successful school spaces for students and teachers and that addressing these concerns through research would prevent on-the-ground problems once operational.

²⁵ "Modern Schools are Built to Fit Children Emotionally and Physically," *New York Times*, December 23, 1956.

The SCSD project architects did not conduct student or teacher research toward their designs. Instead, they leveraged the existing research performed by Caudill and others to design what they envisioned as a cost-saving system and left local project research to the local project architects. But the tension between an inflexible system that mandated design and a perceived lack of power for local project architects often resulted in buildings that were described as cold and impersonal. While popular among school administrators for the perceived savings, these buildings seemed to refute some trends in school design at the time, such as an emphasis on indoor/outdoor spaces. Their architects instead used the existing language of research, systems architecture, flexibility, and technological innovation extending from the military industry to legitimize their projects within the larger field of school-building projects in the United States. This emphasis on flexibility was, however, certainly in line with midcentury calls stemming from the field of educational psychology for multi-use and flexible spaces, creating stimulating school environments, and open-plan teaching. Educational psychologist J.W. Getzels described this type of learning as “stimulus-seeking learning” and advocated for educational spaces to be built accordingly. Getzels offers the study of the student as seeking equilibrium, but in this case, the equilibrium is achieved by external stimulation as guided by the

teacher in an endlessly malleable space.²⁶ Educational psychology researcher Basil Castaldi wrote in 1968 about the benefits of the changeable classroom and the positive effects this would have on student learning and attention. “This flexibility,” he writes, “also enables the teacher to match the pupil's learning experiences to his readiness for such experiences.”²⁷ The SCSD project leveraged these ideas about flexibility as psychologically and developmentally appropriate, as well as concerns about fluctuating enrollment projects and shifting residential patterns, to advocate for their system of prefabricated school architecture.

Origins of Prefabricated School Architecture

Prefabricated and modular architecture had long been proposed as a solution that would solve the problems of limited building and design budgets and respond to ongoing pedagogical and technological changes that schools are tasked with addressing quickly. The prefabricated school, for instance, could be built out of a kit of modular parts shipped to diverse sites. This would allow

²⁶ J.W. Getzels, “Images of the Classroom and Visions of the Learner,” in Thomas G. David and Benjamin D. Wright, *Learning Environments* (Chicago: University of Chicago Press, 1974), 7. Getzels notes a progression in designing school spaces from the empty or passive learner in the rectangular classroom associated with passive listening to the active learner of Dewey’s description in the square classroom to the stimulus-seeking learner of the open classroom in the 1970s.

²⁷ Basil Castaldi, *Creative Planning of Educational Facilities*, (Chicago: Rand McNally & Company, 1968), 124.

for savings in building, design, and site preparation. However, the aesthetics of prefabricated schools contrasted with Henry Barnard's nineteenth-century call that schools, "should be a temple, consecrated in prayer to the physical intellectual and moral culture of every child in the community, and be associated in every heart with the earliest and strongest impressions of truth, justice, patriotism, and religion."²⁸ Modular schools did not lend themselves to the outsized democratic and impassioned rhetoric associated with earlier eras of school- building. Nor did they correspond to the nineteenth and early twentieth-century tradition of employing Neoclassical or Gothic Revival architecture to school facades to indicate their function as temples to learning. Architect John Donovan wrote in 1921, "One of the most important functions of school architecture is to sell education to the public. This is accomplished by making attractive that side of education which the public [sees] most."²⁹ Prefabricated architecture did not work to sell education through its façade and, as shown in the SCSD system, was more concerned with the ongoing sale of itself and its products. Instead, the buildings are described as, once again, as in the nineteenth- century, looking like a factory. As discussed in Chapter Two, architects of the CLASP prefabricated schools noted that the

²⁸ Barnard, *School Architecture*, 41.

²⁹ John J. Donovan, *School Architecture: Principles and Practices* (New York: The MacMillan Company, 1921), 24.

public would have to learn to accept the new aesthetic of prefabricated schools as a new way of understanding school-building.

Yet despite any critique of its aesthetic values, prefabricated architecture had long had its advocates who argued that prefabricated schools could accomplish multiple goals with limited budgets. In the UK in 1937, Mary Medd (née Crowley) and Erno Goldfinger designed the flexible Expanding Nursery in response to a lack of state funding for preschool care. The model was intended to be mass-produced and designed in a gridded unit system based on six-foot modules.³⁰ The school prototype was built but never mass-produced. These experiments led to the Hertfordshire schools and the CLASP system of over fifty schools built between 1957 and 1970, which are given a thorough overview in Chapter Two. In the 1950s, architect Jean Prouvé began experimenting with prefabricated school construction design in France. Prouvé noted that the new school-building should “display the architecture of the epoch rather than some sort of regressive historical form.”³¹ He designed a few schools in France, and in 1953, in Villejuif, he designed schools with cantilevered frames that were infilled with steel frame

³⁰ Mark Dudek, *Architecture of Schools: The New Learning Environments* (Oxford: Architectural Press, 2000), 79.

³¹ Dudek, *Architecture of Schools*, 79.

windows. These schools were eventually condemned in France and did not catch on as a model for future school design.

In the US, Richard Neutra's Ring Plan School, designed as an integral component to his urban master plan, Rush City, Reformed, was intended to be made of "standardized shop fabricated parts" to reduce cost.³² While prefabricated houses had long been proposed and built in the United States, prefabricated schools were more experimental in the early twentieth-century. Neutra may have suggested that the school be made of prefabricated materials in order to link it to the prefabricated house, which Colin Davies suggests is at the very center of modernist reform.³³ Neutra's prefabricated school plan was, in fact, central to his urban plan. Neutra's model for the Ring Plan School was fabricated in 1925, but a decade prior, between 1913 and 1914, six prefabricated schools were made in Alabama's Black Belt for black communities near Tuskegee. The project was partially funded by Julius Rosenwald, president of Sears, Roebuck, and Co., who suggested that the Sears model for prefabricated catalog houses be applied to schools that would be part of Booker T. Washington's Tuskegee Institute. While Rosenwald funded half of the project, black community members furnished

³² *Modern Architecture: International Exhibition, New Yorke, Feb 10 to March 23, 1932, Museum of Modern Art*, (New York: Museum of Modern Art, 1932), 159.

³³ Colin Davies, *The Prefabricated Home* (London: Reaktion Books, 2005), 9.

the rest to build the schools themselves.³⁴ The collaboration between the Rosenwald Fund and the Tuskegee Institute to build efficient and affordable schools for black communities was the first large-scale use of prefabrication in schools in the US. It wasn't until New York Governor Nelson Rockefeller's plan for "stock plan schools" was introduced and global interest in the Hertfordshire schools in the UK developed that the conversation around prefabricated schools for all children fully began to take shape in the United States.³⁵ Leveraging the international conversation about the science of modular coordination, Ezra Ehrenkrantz's lauded proposal for prefabricated schools seemed to solve the many problems associated with cheap and efficient school-building.

The Possibilities of Systems Design and SCSD

A seemingly global interest in systems design, and systems-thinking more broadly, to which the SCSD program attached itself, was expressed by a number of architects and architectural historians. The SCSD program was often discussed in the pages of *Architectural Forum*, *Architectural Record*,

³⁴ Mabel O. Wilson, "Rosenwald School: Lessons in Progressive Education," in Bary Bergdoll and Jennifer Gray eds., *Frank Lloyd Wright: Unpacking the Archive* (New York: Museum of Modern Art, 2012), 98. Wilson notes that "the fact that black Americans had to pay for even part of their schools was a stark reminder of the unequal distribution of state education monies."

³⁵ See Chapter Two for more about the use of stock plan schools in New York.

and *Progressive Architecture* for its optimistic potential for systems building. In *Age of the Masters: A Personal View of Modern Architecture*, architectural historian Reyner Banham includes the SCSD prototype school as a personal favorite and lauds its success wrought through group planning for human need, “without having to spend hours drawing out details” of the needs of the user.³⁶ The efficiency of systems design, Banham argues, means that the language and logic of modern architecture could now be delivered across the globe more equitably. From the perspective of contributing to modern architecture, systems design—and the SCSD schools, more precisely—had all the potential to be both aesthetically innovative and meet individual school districts' genuine financial needs. Similarly, British architect Cedric Price was influenced by the use of systems design in the SCSD system to bring a model for open, non-state-mandated, and more self-directed learning opportunities through architectural innovation. In Price's Potteries Thinkbelt and Fun Palace projects, as well as the 1968 issue of *Architectural Design* he guest curated, Price states that he was influenced by the concept of education and self-direction, and began thinking of how to employ architecture to meet these needs that he saw emerging through his engagement with SCSD.³⁷ Price

³⁶ Reyner Banham, *Age of the Masters: A Personal View of Modern Architecture*, (New York: Harper & Row: 1975), 154.

³⁷ Cedric Price, ed., “What about Learning” *Architectural Design*, May 1968.

wanted to replace the old manufacturing economy with a new “educational industry” and saw the way that the SCSD schools could be altered on the ground—to be a starting point toward this educational industry that was more fluid and could shift depending on need.³⁸ For both Banham and Price, the system's potential, more so than its actual application, created the infinite potential for and value of the project. From this perceived potential grew an outsized discourse around the school-building project, which failed to manifest through application. This dissertation analyzes the projects’ contributions to modern architectural history on its own terms, with consideration to Banham and Price’s hopeful assertions around the project, as well as its mass imaging in national newspapers and architectural journals. In considering the SCSD schools in the context of, what I argue, is a typology of California school-building, the schools do more toward proliferation of the typology, more so than articulate masterful applications of systems design.

Designing for Children

This dissertation is also situated in scholarship that seeks to place children at the heart of architecture and design discourses.³⁹ Through offering analyses

³⁸ Stanley Matthews, “Cedric Price: From the ‘Brain Drain’ to the ‘Knowledge Economy,’” *Special Issue: Manmade Modular Megastructures* 76(1), (2006), 93.

³⁹ See also, Abigail Van Slyck, *A Manufactured Wilderness* (Minneapolis: University of Minnesota Press: 2006); Abigail Van Slyck, A “Kid Size: The Material World of Childhood: An Exhibition Review,” in *Winterthur Portfolio* 39 no.1 (Spring 2004), 69-78; Molly and Norman

of the ways that children were instrumentalized toward meeting larger national, economic, educational, and social goals, I argue that the overall rhetoric (namely, scientific expertise and systems design) around the SCSD project obfuscates the role that children were being asked to play in these larger concerns. Through looking at the roles that the schools played in desegregation and suburbanization in California, and to meeting changing labor and economic needs in the state, this dissertation argues that the rights of children were time and again made secondary to larger concerns articulated in and through the SCSD buildings.

Through emphasizing the role and rights of children to engage with larger socio-politico-economic issues, while not indoctrinating or stratifying students in racial or class-based hierarchies, this dissertation emphasizes the autonomy and reliability of children to operate within, contribute to, and analyze school architecture. Architectural historian Amy Ogata's *Designing the Creative Child* argues that design for children was used in the mid-century to cultivate imagination in order to position children in the role of ameliorating

McGrath, *Children's Spaces: 50 Architects and Designers Create Environments for the Young* (New York: William Mottow & Company, Inc., 1978); E.P., "The Child at Play in the World of Form: A Catalogue of Architecture Toys," *Progressive Architecture* 47 (April 1966): 191-98; Tamar Zinguer, "The Toy," in Beatriz Colomina, AnnMarie Brennan and Jeannie Kim, eds., *Cold War Hothouses: Inventing Postwar Culture, from Cockpit to Playboy* (New York: Princeton Architectural Press, 2004); Tamar Zinguer, *Architecture in Play: Intimations of Modernism in Architectural Toys* (Charlottesville: University of Virginia Press, 2015); Michael Haber "Designed for Play," *Graphics* 14 (march 1958): 126-30; and Juliet Kinchin and Aidan O'Connor, *Century of the Child: Growing by Design 1900-2000* (New York: Museum of Modern Art, 2012).

myriad national anxieties through their own creative potential.⁴⁰ This study analyzes the SCSD schools in a similar moment and builds on Ogata's work by establishing a connection between housing, education reform, and suburbanization as vital to understanding the anticipated role of children in this era.

Design historian Alexandra Lange's scholarship, including *The Design of Childhood: How the Material World Shapes Independent Kids* and *Meet Me by the Fountain: An Inside History of the Mall*, offers ways of framing children's participation with space and design.⁴¹ She posits that "good child-rearing" has, in the twentieth-century, meant exposing children to objects of "good design."⁴² This dissertation builds on Lange's claims to suggest that good and developmentally appropriate childhoods are also dependent on the belief that "good" schools—the judgment of "good" being at the time contingent on national discourses about scientific rationality and suburban living—would breed an appropriate childhood with positive long-term fiscal

⁴⁰ Amy Ogata, *Designing the Creative Child: Playthings and Places in Midcentury America*, (Minneapolis: University of Minnesota Press, 2013).

⁴¹ Alexandra Lange, *The Design of Childhood: How the Material World Shapes Independent Kids* (London: Bloomsbury, 2018), and Alexandra Lange, *Meet Me by the Fountain: An Inside History of the Mall* (London: Bloomsbury, 2022).

⁴² Van Slyck, "Kid Size," 153. Van Slyck discusses the "good design" standards that influenced toy manufacturer Creative Playthings, which led them to hire artists to design their products, including Isamu Noguchi, Louis Kahn, Robert Winston, and Henry Moore. "Good design" for children was intended to produce creativity as an instrument of social and economic mobility, as Amy Ogata showed in *Designing the Creative Child*.

outcome, and even social mobility, for individual students. Analyzing the SCSD schools through this lens, as aligned with broader national discourses, clarifies the ways in which they were also instrumentalized in suburban planning as vital components of primarily suburban housing developments.

A Gap in Histories of Suburbanization and Planning

This dissertation also serves to identify a clear gap in the literature on suburban history and the role that the development of school architecture played in the racialization of the American suburbs in the mid-twentieth-century. Public schools have long been left out of discourses on suburban planning and development, though they are integral cornerstones to the drive toward suburbanization and markers of home value. While white flight and postwar suburbanization are simply attributed to racial prejudice and aspirations for social mobility, the school is not adequately understood for its role in this process. Schools, as shown through the analysis of the SCSD project, are key interlocutors of national ideas about how anxiety about race in schools, and in this case, school desegregation, affected suburbanization in California. The SCSD schools, and all schools using the system, if needed, could quickly both meet the spatial and educational needs of desegregation through the ability to quickly re-shape school spaces in the event of bussing, shifting neighborhood catchment zones, or forced desegregation. At the same

time, in the event of shifting political tides, flexible schools could also be used toward the creation of racially re-segregated spaces should school politics revert.⁴³ This begs the question of how school buildings were thought to have different spatial needs in the case of white and non-white contexts. While this question is unanswered here, the bifurcation of “urban”—often coded as non-white—and all other education into two distinct academic fields of study suggests that the study of education and schools is racialized.

Interestingly, the SCSD schools in offering themselves as laboratories for education informed by universal design systems, were also positioned as de-racializing individual student users wrought through the school building. That is, the problems associated with desegregation and a pathologized black child, might also be “fixed” by the school building itself. Both cases are unpacked in Chapters Three and Four of this dissertation with respect to case study schools in various then-developing California neighborhoods.

Schools are rarely discussed in histories of suburbanization, though I argue that they played, and continue to play, a vital role in understanding suburban development. Kenneth Jackson’s *Crabgrass Frontier* briefly located the school in his thorough study of suburbanization in the United States, but did not discuss the role of the school beyond its connection to desegregation

⁴³ Ezra Ehrenkrantz, *Architectural Systems: A needs, Resources, and Design Approach*, (New York: McGraw Hill, 1989), 77. Ehrenkrantz discusses how a flexible systems design met the needs for schools that wanted to re-segregate after national civil rights riots in the 1960s.

and white flight. Likewise, educational historians have tended to focus on urban education while focusing less (if at all) on the role of suburban education in the postwar era. David Tyack's *The One Best System*, which Dougherty argues is as definitive for the field as Jackson's *Crabgrass Frontier*, does not address the role of the suburban school in postwar histories of education.⁴⁴ This points to a disciplinary misalignment between histories of architecture and planning with histories of education. This dissertation is anchored in research about the suburbs, which recognizes the pivotal role of education and school buildings. Becky Nicolaides' *My Blue Heaven* analyzes a working-class Los Angeles suburb and fears of rising property taxes alongside concerns about local educational politics in the 1920s through 1960s and Emily Strauss' *Death of a Suburban Dream: Race and Schools in Compton, California*, which examines the role of public schools in suburban expansion in Compton.⁴⁵ Such scholarship offers a more

⁴⁴ For notable discussions of the field of educational sociology in the subject of urban education, see Jean Anyon, *Radical Possibilities: Public Policy, Urban Education, and a New Social Movement* (London: Routledge, 2005); R. Cooper and W.J. Jordan "Cultural issues in comprehensive school reform," *Urban Education* 38 no. 4: 380-397; Jonathan Kozol, *Savage Inequalities: Children in America's Schools* (New York: Harper Perennial, 1991); Jonathan Kozol, *The Shame of the Nation* (New York: Random House, 2005); Monique W. Morris, *Pushout: The Criminalization of Black Girls in Schools* (New York: The New Press, 2018); Charles Payne, *So Much Reform, So Little Change: The Persistence of Failure in Urban Schools* (Cambridge, MA: Harvard Education Press, 2008).

⁴⁵ Becky Nicolaides, *My Blue Heaven: Life and Politics in the Working-Class Suburbs of Los Angeles, 1920-1965* (Chicago, University of Chicago Press, 2002); Emily Strauss, *Death of a Suburban Dream: Race and Schools in Compton, California* (Philadelphia: University of Pennsylvania Press, 2014).

complex narrative than the simple white flight story of suburbanization, and this dissertation offers a narrative that is deeply indebted to histories of suburban planning and urban education while looking more deeply into the role of the school-building and its role in shaping educational narratives and suburban development.

Methods of Understanding School Buildings

A larger takeaway from this dissertation is that individual authorship of school buildings, without smart and intentional collaborations with students, teachers, educators, community members and others, can lead to schools that feel disconnected from their communities, isolated from pressing civic concerns, and instrumentalized for local economies. Schools can be quite isolated and insular places in which community members and the outside world do not engage for a variety of reasons: district policy, carceral architecture, fear of judgment, and safety concerns. In this way, researching school buildings poses difficult, often impossible, challenges in terms of access—to the physical structures, to archives, to students, and to experiencing the building as it is used through the course of the day. This limits conclusions that historians can draw about the biggest questions surrounding school buildings and keeps further inquiry at an arm's distance. In this study, various barriers prevented access to school buildings in the SCSD portfolio, as they are all

fully functional and currently operating school communities. Of the schools I was permitted to visit, incredibly generous administrators, staff, teachers, and students offered valuable insights into the current life and histories of the building. Another challenge is the long-standing perceived lack of importance of school buildings in influencing and affecting educational outcomes—what Dewey described as “external” to the stuff of education. Because of this, there are often scant architectural records or archives of school buildings, either on-site or in district offices. In my experience, the school district facilities department often had the most historical information on plans, maintenance, and changes to the buildings over time. These maps were incredibly useful in analyzing the use and importance of some of the structural features of the flexible system, as well as changing perceptions about open planning in schools through the decades.

While access and lack of an archive presented challenges to this study, many of the project details were retained in archives at Stanford University, the Ford Foundation, and in Ezra Ehrenkrantz’s personal papers. Similarly, the archives of Nottinghamshire’s Consortium of Local Authorities Special Programme, the Hertfordshire County Council, and the University College London Institute of Education each offered insights into the origins and designs of the programs as Ehrenkrantz watched the schools in the UK develop and began to develop the SCSD program. Numerous architectural

archives, including the papers of Richard Neutra, Ernest Kump, Eero Saarinen, and the Environmental Design Archives at UC Berkeley, as well as architectural archives at Syracuse University, Princeton, UC Santa Barbara, Columbia, Temple, and Yale Universities, framed and informed this project. Most significant were my site visits to most of the SCSD schools and corresponding school district offices throughout California and interviews with principals and staff on-site, when possible. Dozens of interviews revealed the challenges and limitations of using the system over time and the small and large interventions carried out on-site to make the buildings more functional.

Implications

The “grammar of schooling,” or the diverse set of mechanisms by which school as a system is maintained, is both long-standing and continually added to.⁴⁶ While historians of education, including those discussed in this dissertation, such as David Tyack, Larry Cuban, Diane Ravitch, and others, tend not to consider issues of space, this dissertation advocates for an interdisciplinary approach that considers architectural and spatial histories—as well as histories of planning, environment, and land use—as being vital to education. The grammar of schooling has an unreckoned-with spatial

⁴⁶ Tyack and Cuban, *Tinkering Toward Utopia*, 85.

component, which is tied to a multivalent set of histories and concerns and needs further attention in educational histories.

Likewise, in arguing for a typology of the California school building, this dissertation points to the ways that histories of suburbanization, desegregation, land use, and pedagogy in California were built into and reckoned with via school designs. Due to the manufacturing network that was developed to build and maintain SCSD, individual SCSD school components were used in thousands of schools across the United States. Likewise, the California school typology has been disseminated via film and television throughout the twentieth-century. This proliferation of both images of California school buildings and their physical components permanently altered the spatial strategy of the grammar of schooling to include discourses around specifically Californian school buildings. The outdoor courtyards and covered breezeways of California schools frequently shown in films have effectively come to stand in for a type of school design. Interrogating the ways that the SCSD schools indicated a shift in the California school typology, away from Richard Neutra's open-air classrooms and Ernest Kump's local materials and natural light, allows a broader understanding of the way that the typology has evolved alongside national discourses around pedagogy, scientific research and expertise, and the application of desegregation in shifting suburban lands.

Chapter One | Modern Architecture and Schooling: Designing Postwar Education and Innovation

During the summer of 1932, the Museum of Modern Art (MoMA) exhibition *Modern Architecture: International Exhibition* came west to Los Angeles from New York. The seminal exhibition offered a survey of then-contemporary architecture since 1922 and launched the application of the 'International Style' to modern architecture. It showcased some of the most influential architectural works of the era while introducing modern architecture to national audiences. It did not land at the Los Angeles County Museum of Art (LACMA), as might be expected of an influential traveling exhibition, but rather at Bullocks Wilshire, an upscale department store on centrally located Wilshire Boulevard. At the same time, the 1932 Summer Olympics were taking place at athletic venues across the city. Despite widespread poverty wrought by the Great Depression, thousands of tourists visited Los Angeles for the athletic events. LACMA, then known as the Los Angeles County Museum of History, Science and the Arts, had been approached by MoMA curators Philip Johnson and Henry Russell-Hitchcock to host the show, but the museum had turned it down due to their previous commitment to host a public exhibition showcasing histories of the Olympic games. The curators then turned to architect Richard Neutra, whose work was part of the exhibition and who was a recently arrived, influential Los Angeles resident. Neutra, surprisingly, urged Bullocks to host the exhibition, with the idea that with both

department-store patrons and those interested in modern art and design coming to see it, the show would get visitors from two publics. The curators described the exhibition as an “assertion that the confusion of the past forty years, or rather of the past century, may shortly come to an end.”¹ This statement encapsulates the curators’ confidence that *modern* architecture was to be the defining architectural style from here forward and that any confusion over what was to be the next architectural style would be eliminated. For Bullocks, the show signaled an alliance with modernity and that perhaps design objects would become synonymous with modern architecture, including the clothing, furniture, and jewelry that the store would feature on their shelves. For Neutra, having the show at Bullocks Wilshire promised future clients and continued success in the region.

Among the work featured in the exhibition at Bullocks was a small model for a school, included as part of Richard Neutra’s master plan, “Rush City Reformed.” While Rush City—a low-density master plan for a series of eighteen skyscrapers and ample roadways for cars—was itself more concerned with the problem of low-income urban housing, MoMA curators were most interested in the model of the school Neutra had included as part of the plan: the Ring Plan School (Fig. 1.1.). It indicated the ways that a

¹ *Modern Architecture: International Exhibition, New York, Feb 10 to March 23, 1932, Museum of Modern Art*, (New York: Museum of Modern Art, 1932), 13.

school-building might become a crucial component of modern planning in the United States. As part of Neutra's overall plan, the school was to be located outside of the housing complex and away from the high rises and business corridors; students would only be able to access the site by bus. They would be dropped off at the main entry of the school, picked up by bus in the afternoon, and return home via the plan's larger roadways.

Noting that Neutra's ideal conditions for the school—in a low-density area surrounded by ample land—might not always be possible with existing housing or even future planned development, Johnson and Russell-Hitchcock urged exhibition viewers to consider the model school as an ideal type to be replicated and reimagined as a vital part of conversations and concerns over housing in the United States. "Neutra has availed himself of the freedom which an ideal project permits to articulate the provision for function very fully and to dispose the parts in an interesting way," they stated. "Even if in actuality, considerable modifications were necessary, this ideal study in terms of shop-fabricated materials with the extensive use of the outdoors possible in California is of great interest."² Here, Johnson and Russell-Hitchcock described the future implications for school-building and planning, as well as for prefabricated building, that Neutra's plan would have.

² *Modern Architecture: International Exhibition, New York, Feb 10 to March 23, 1932, Museum of Modern Art*, (New York: Museum of Modern Art, 1932), 160.

In this chapter, I will locate the Ring Plan School, and Neutra's later Corona Avenue School, as the groundwork for a California school-building typology which would become dominant in the state by the 1960s. The features of the Ring Plan School—including covered walkways, prefabricated parts, a centralized administration wing, an inner courtyard, and attention to a controllable climate—became standard features in California schools built in the twentieth-century. This chapter describes the many physical components of this idealized California school, as conceptualized by first Neutra built on later in the 1940s and 1950s by others including school architect Ernest J. Kump and offers analysis of the diverse range of pedagogical and social influences that contributed to its development. While the later 1960s and 1970s postwar wave of California school-building, namely the School Construction Systems Development program, was arguably the ultimate realization of Neutra's school plan design, earlier California schools developed in the first half of the century contributed to the development of the California school building as a typology. I argue that this typology emerged in California, influenced larger nationwide discussions about what school buildings should be, and then found footing again in California in the years following World War II as a distinct building type often aligned with housing developments.

This chapter also asks how new conceptions of childhood extending from research in the fields of psychology and child development became linked to suburbanization and housing development, and how these discourses operated within the histories of modern architecture and design.³ Additionally relevant is how the site of the experimental school building functioned in this discourse alongside changing ideas about pedagogy on a national scale. By locating this architectural typology in prewar discourses, histories, and influential designs for school buildings, we will be able to see that the concept of the school building that emerges in the postwar period was premised on a style and a set of ideologies in prewar California suburbs. Through arguing for an early California school typology, one which was formed through a distinct set of cultural, architectural, and social negotiations, this chapter establishes the conditions that made this typology possible and led to its ongoing development, which will serve as a vital foundation to concerns of later chapters in the dissertation.

³ As Amy Ogata remarks in *Designing the Creative Child: Playthings and Places in Midcentury America* (Minneapolis: University of Minnesota Press, 2013),³, “Concern for the child’s specific emotional and social development, rather than as a specimen managed according to a scientific process, marked the postwar parenting model.” Childhood, then, was seen as an opportunity to “explore and express him- or herself without fear of strong disciplinary action,” which became equated with the democratic ideals of the nation. This childhood, in turn, needed nourishing and ‘correct’ spaces by which these values could be cultivated, ideally schools and playgrounds.

Selling Houses and Schools of Modern Architecture at Bullocks Wilshire

While the Bullocks Wilshire department store did not frequently host exhibitions, its design-oriented owners, John G. Bullock and P.G. Winnett, prided themselves on conveying trends in luxury living and modern design. The design and architecture of the store itself, which had opened in 1929, were inspired by Winnett's visit to the 1925 Paris Exposition of Decorative and Modern Arts.⁴ The International Style show at Bullocks was densely arranged, with models and photographs placed closely to one another. Shoppers and patrons viewed the architectural models in waist-high glass cases from above, while architectural photographs were situated just at or above eye level. Because of the nature of the venue, the exhibition's viewers would have been shoppers largely familiar with the array of luxury objects offered in the store, but perhaps not intending to look at an exhibition of modern architecture's exemplars. In this context, the architectural objects on display were themselves positioned as luxury objects. Especially in Los Angeles, where recently razed agricultural land permeated the visual landscape, a constant visual reminder of potential land to be built on, it is not a leap to suggest that the wealthy and influential clientele at Bullocks drew inspiration from the exhibition for their own domestic environments.

⁴ "Bullock's Wilshire Building," Southwestern Law School Los Angeles, <https://www.swlaw.edu/bullocks-wilshire-campus/bullocks-wilshire-building/history-bullocks-wilshire#:~:text=It%20was%20conceived%20by%20business,upscale%20Bullocks%20Wilshire%20Department%20Store> Accessed January 2024.

Additionally, this class of client would also have had the means to influence large-scale residential and commercial development—a fact surely not lost on Neutra, who was actively seeking new large-scale architectural projects at the time.

The exhibition, like many others organized by MoMA curators in the first half of the twentieth-century, was arguably pedagogical in nature. That is, its primary aim was to introduce the International Style of architecture and design: to explain and normalize it, to make it accessible and sellable, and to teach viewers and consumers about the value of the new design. It sought to position the International Style as *the* new aesthetic with both functional and utilitarian qualities. While the show had been exclusively displayed at art museums in other cities across the US, that it was now at a department store implied a crossing of boundaries: from objects of design to objects of consumption.

Bullocks Wilshire, which had opened only three years earlier, operated as an exclusive specialty store selling luxury items to affluent patrons who were increasingly mobile through widespread access to personal vehicles. It also boasted a celebrity clientele, and quickly became an institution for upscale Los Angeles living. Designed by architects John and Donald Parkinson, the elaborate Art Deco-style building was “dubbed a ‘cathedral of commerce’ and a ‘temple to the automobile,’ [and] its tower functioned as an

advertisement for drivers, suggestive of the growing car culture and the emergence of a ‘linear downtown’ along Wilshire Boulevard.”⁵ The building itself was embedded in a discourse of suburban development and consumable objects of design—one that the International Style show also evoked, albeit on quite different terms.⁶ Bullocks was a crucial player in the dissemination of modern architectural discourses to California audiences and paved the way for a unique California-specific application of modern architecture to projects. These ranged from large-scale domestic and urban planning projects to socially driven institutions like hospitals and schools.

Neutra had a number of buildings featured in the exhibition. In addition to the Ring Plan School, these included the 1927 Los Angeles Jardinette Apartments and the 1929 Lovell Health House. Neutra had recently emigrated to Los Angeles from Vienna after training with modernist Adolf Loos. Neutra was also heavily influenced by Otto Wagner, who had written the influential

⁵ Megan Kendrick, “Bullocks Wilshire,” *SAH Archipedia*, accessed January 2024. <https://sah-archipedia.org/buildings/CA-01-037-0062>

⁶ The International Style was coined and outlined by Henry Russell Hitchcock and Philip Johnson, who wrote the exhibition catalog, “Modern Architecture: International Exhibition,” and the accompanying book *The International Style: Architecture Since 1922* (New York: W.W. Norton & Co., 1932). In *The International Style: Exhibition 15 and the Museum of Modern Art* (New York: Rizzoli, 1992), Terrence Riley noted that the catalog was more iconic and influential than the exhibition itself. The International Style became the subject of critique in architectural writer and editor Elizabeth Gordon’s essay “The Threat to the Next America” *House Beautiful* (April 1953): 126—130, who criticized the “unlivability [and] stripped-down emptiness” of the style 126. Others, including famously Robert Venturi in *Complexity and Contradiction in Architecture* (New York: Museum of Modern Art Papers on Architecture, 1966), would also go on to critique the International Style and propose that architecture functions as a series of complex and contradictory relationships rather than the oversimplified emphasis on form and material.

1896 book *Modern Architecture*. The exhibition curators thus positioned Neutra in the exhibition catalog as a unique link between European and American architecture; his home and school designs were informed by the same kind of aspirations toward social welfare that guided European modernism but with a distinctly American interpretation that emphasized individual and familial healthfulness. This is most clearly conveyed through Neutra's Lovell Health House; instead of positioning the building's role as shaping health and well-being as part of a *collective* good, as often seen in European modernism, it articulated how a home could shape *individual* health for *individual* gain.⁷ Dr. Lovell, the naturopath for whom the house was designed, "wanted to be a patron of forward-looking experiment. He would be the man who could see 'health and future' in a strange wide-open filigree steel frame."⁸ The relationship between Neutra's designs for schools and

⁷ See Thomas S. Hines, *Architecture of the Sun: Los Angeles Modernism: 1900-1970* (New York: Rizzoli, 2010) and *Richard Neutra and the Search for Modern Architecture* (New York, Rizzoli, 1982). Hines discusses the various ways that health was built into the home: from sleeping porches, to outdoor eating porches, to extra-large cutting, washing and drawing areas for the preparation of vegetarian meals, the home was designed to nurture their lifestyle. Dr. Lovell wrote, "For years, I have periodically written articles telling you how to build your house so that you can derive from it the maximum degree of health and beauty...Always at the end of each article was the thought, 'If I ever built a house for myself...' At last the day has arrived. We have built such a home—a home premised on the fundamental health principles and construction ideas which I have presented in my writings..." quoted in Thomas Hines, *Architecture of the Sun: Los Angeles Modernism 1900-1970*, (New York: Rizzoli, 2010), 314. See also, Sylvia Lavin, "Richard Neutra and the Psychology of the American Spectator" *Grey Room*, no. 1 (Autumn 2000) MIT Press, 42-63 for analysis of the intended psychological function of Neutra's designs.

⁸ Hines, *Richard Neutra and the Search for Modern Architecture*, 100.

homes was articulated in terms of shared stylistic features and shared purpose: both school buildings and homes could shape the well-being of their users through space and modern architecture. This is seen most acutely through both the Lovell Health House and the Ring Plan School, which both promised to harness the climate to the benefit of the users of the space, especially children.⁹

Neutra's master plan, *Rush City Reformed*, of which the Ring Plan School was a part, took cues from European master planning including Le Corbusier's *Plan Voisin* from 1925 and from the Ringstrasse, or Viennese Ring Road, designed and erected in the second half of the nineteenth-century. Neutra surely would have been intimate with the Ringstrasse and its history as a Viennese trained architect, and as architectural historian and critic Reyner Banham suggests in his review of Thomas Hines' monograph on Neutra, that *Rush City Reformed* can be read as Neutra's continuation of the Ringstrasse tradition with the plans' shared prioritization of "regularity, modularity, transportation, and the need for a new start on a clean site" as well as their function as a places where "a street continues but never comes

⁹ See Raymond Richard Neutra, "House and Open-Air School in One," *Southern California Quarterly* 102, no. 2, (Summer 2020), 143-157 where Neutra argues that his father's design for the Health House was also meant to hold school aligned to values of then-contemporary progressive education for Leah Lovell.

to any monumental or functional conclusion.”¹⁰ Designed, but never built, Neutra’s drawings for Rush City Reformed were made between 1923 and 1927 and outlined his vision for an ideal urban plan of his own which was dominated by long streets.¹¹ Neutra’s design foregrounded transportation networks centered on the automobile—perfect for then-sparsely-built Los Angeles—which could be applied horizontally across space, rather than vertically as in the urban plans of Le Corbusier, for instance. Thomas Hines writes that Neutra’s designs for Rush City,

Emphasized traffic and transit systems of rail and motor corridors cutting with a Spartan and geometric rigidity through vast cityscapes of tautly aligned high-rise slabs...The schematic austerity of the general perspectives gave way, however, in detailed close-up studies to a more human and rational specificity...While the overall gestalt of Neutra’s Rush City recalled contemporary European images, the high-rise towers reflected the Chicago School. The drive-in markets and lower buildings, on the other hand, were obviously influenced by the automobile culture and horizontal sprawl of Los Angeles.¹²

¹⁰ Reyner Banham, “Review of Richard Neutra and the Search for Modern Architecture: A Biography and History by Thomas S. Hines,” *Journal of the Society of Architectural Historians*, 42 (no.2) May, 198, 195.

¹¹ Rush City Reformed; 1923-27; Neutra, Richard Joseph." In the digital collection *Art, Architecture and Engineering Library*. https://quod.lib.umich.edu/u/ummu/x-02-07004/02_07004. University of Michigan Library Digital Collections. Accessed September 04, 2024.

¹² Hines, *Richard Neutra and the Search for Modern Architecture*, 81-82.

While designing for a typical American city dominated by cars rather than a European capital city dominated by monumental architecture as in Vienna, at the same time, Rush City showed a gesture toward planning for children and families and included one- and two-story low-rise housing for families with play areas. The plan also included multiple Ring Plan Schools, which would be strategically placed near arterial roads to bring students in by bus. Like a microcosm of the city, the school's design was also concerned with managing flow and movement through the building (Fig. 1.2.). This was accomplished through a covered walkway nestled against a shared interior courtyard, which functioned as a protected playground, surrounded by individual classrooms and a central administration wing (Figures 1 and 6). Each classroom would have its own isolated garden space on the outside of the ring, as well as views of the shared courtyard/garden via floor-to-ceiling windows. Students would be dropped off by bus, filtered in through a main entryway, and funneled into first the covered walkway and then into their own classrooms, complete with their own garden spaces.

In California, school architects began emphasizing outdoor spaces in schools as early as the 1900s. Architect Alfred D. Hamlin wrote in his guide to designing "modern" schoolhouses, "However perfect the heating and ventilating plant, and however faultless its operation, let it be clearly understood and always remembered that no artificial heating and ventilation

can ever take the place of fresh outdoor air and sunshine.”¹³ In John Donovan’s 1921 influential school planning guide, *School Architecture: Principles and Practices*, Donovan suggests that schools could make changes to their existing buildings to allow for increased outdoor spaces by adding adjacent or parallel wings. Notably, Donovan locates most of the innovative work being done in outdoor school design in California in the early twentieth-century.¹⁴ School district officials in Los Angeles promoted this relationship between school buildings and outdoor spaces. MC Bettinger, assistant superintendent of the Los Angeles City School District, told the LA Times in 1911 that time outdoors meant “getting away from the factory system of education” for students.¹⁵ School administrators in California would have looked quite favorably on Neutra’s Ring Plan School for its practical emphasis on modern design, clearly delineated outdoor spaces, and intentional incorporation of indoor and outdoor learning toward greater flexibility (Fig. 1.5.).

¹³ Alfred D.F Hamlin, *Modern School Houses, Being a Series of Authoritative Articles on Planning, Sanitation, Heating and Ventilation*, vol. 1 (New York: The Swetland Publishing Company, 1910), 9. He cited in Lindsay Baker, “A History of School Design and Its Indoor Environmental Standards, 1900 to Today,” PhD Dissertation (Berkeley: Department of Architecture, Center for the Built Environment, University of California, Berkeley, January 2012),”6.

¹⁴ John J. Donovan, *School Architecture: Principles and Practices* (New York: The MacMillan Company, 1921), 48.

¹⁵ “In the Public Schools,” *Los Angeles Times*, 3 December 1911.

The Ring Plan School was shown in Neutra's designs as an indoor/outdoor school at Bullocks Wilshire (Figure 3). It was also positioned as an integral and functional part of the larger Rush City, Reformed Plan. Rush City's lower-rise structures and low-density imprint were fitting for Los Angeles—which was already beginning to be defined by the automobile and low-density sprawl—and thus especially resonant at the exhibition at Bullocks. The Ring Plan School model also, according to exhibition curators Russell and Hitchcock, "must be considered in the terms of a radically reconstructed community and not as a building which could practically be built anywhere by itself at the present time. The project assumes that not one such school should be built but a series. For they are to be built of standardized shop fabricated parts."¹⁶ This is significant as the Ring Plan model is positioned as experimental and hypothetical, as well as a series of schools built of prefabricated parts. Later, this would become a reality for California school buildings and set the standard for school design after the Second World War. Neutra, in ensuring that the exhibition found an appropriate venue, worked to sell this vision of the future of school and home design to Los Angeles audiences, including school administrators in Los Angeles.

¹⁶ *Modern Architecture: International Exhibition*, 159.

Schooling, like housing, was positioned in the exhibition as a necessary and urgent concern for architects and educators alike. Beyond Neutra's model for the Ring Plan School, a number of other schools were presented as prototypes. These included Howe and Lescaze's Oak Plan Day School outside of Philadelphia, and Hessian Hills School in Croton-on-Hudson, New York. While the importance of Oak Lane was described as primarily "turning American attention to new architectural possibilities," Hessian Hills School was described as having a "frankness of construction and simplicity of design" (Fig. 1.4.). In the *Modern Architecture: International Exhibition Catalogue*, they were linked with significant European schools including Hannes Meyer's 1930 ADGB Trade Union School at Bernau bei Berlin and Andre' Lurçat's 1933 Karl Marx School just outside Paris, "representing like them a thorough and sound treatment of a particularly important problem of modern architecture."¹⁷ This highlights the perceived importance of school design, and points to a natural relationship between modern architecture and school design. Through removing ornamentation, using simple shapes, applying clever solutions to allow light and air into the spaces, and emphasizing the harmonious relationship between function and form in school design, curators Hitchcock and Johnson positioned modern

¹⁷ *Ibid.*, 144.

architecture as the ideal solution for the challenges of schooling. As part of the exhibition, they asked Margaret Parkhurst of the Dalton School to review the Ring Plan School model for the catalog. In her assessment, she suggests a number of issues with the practicality of Neutra's design, including the overreliance on overhead lighting and the adjacency of the lockers and running track to the classrooms. Their choices, she suggests, would cause distractions for students; she notes that school designs, in general, need to pay more attention to the needs of those who use the spaces than the desires of the architect.

While assessing spaces of education is mentioned only briefly in the exhibition catalog, Lewis Mumford, in the section titled "Housing," describes how the introduction of the machine fundamentally altered day-to-day life, including the education of children, which would then demand new environments which would meet new approaches to education, as well as living.¹⁸ Mumford's essay proposes the uses of mass production, comprehensive planning and oversight, and standardization as solutions to the problems of housing and education, as well as government intervention, as needed. These proposals would soon inform planning around housing, as well as schooling in the United States, which were very much linked both practically and ideologically.

¹⁸ Ibid., 179.

Families and Childhood in American Modern Planning

The school was to become a crucial component of visualizing and articulating planned communities to new suburban audiences in the US. As scholars have noted, the single-family home became the justification for urban planning and the vehicle through which a new American lifestyle was envisioned in the 1940s, culminating after the Second World War. Andrew Shanken writes that “geography and the city were essential but insufficient elements of [planners’] vision[s], as were land use, resources management, politics, economics, recreation, social factors, regionalism, and local activism.”¹⁹ It was the family unit that guided new, innovative approaches to urban and suburban planning. Likewise, the unique needs of childhood and adolescence were being reflected for the first time in architecture, design, and the built environment, with special attention being paid to elementary and high schools and design for children. The relationship between modern architecture and design for children dovetails with developments in the field of child psychology, including the importance of play in childhood and the development of spaces specifically conducive to child development.²⁰

¹⁹ Andrew Shanken, *194X: Architecture, Planning, and Consumer Culture on the American Home Front* (Minneapolis: University of Minnesota Press, 2009), 1.

²⁰ Amy Ogata argues in *Designing the Creative Child: Playthings and Places in Midcentury America* (Minneapolis, University of Minnesota Press, 2013) that play began to be taken seriously in Midcentury America as a way of nurturing a well-adjusted child and that design and architecture responded to this popular perception by creating toys and spaces devoted to cultivating play.

The relationship between modernism and design is seen not only in schools and playgrounds designed specifically for children but in growing manufacturing industries making toys and school products. As Lizbeth Cohen suggests in *A Consumers' Republic*, buying became synonymous with American civic identity, and the emergence of a “consumer’s republic” defined relationships not only with housing and architecture but with the objects that defined an emerging sense of childhood. Cohen writes that suburbia “became the distinctive residential landscape of the Consumers’ Republic” and “the suburban home itself became the Consumers’ Republic quintessential mass consumer commodity, capable of fueling the fires of the postwar economy while also improving the standard of living of the mass of Americans.”²¹ While the suburban home became the quintessential commodity in the “Consumers’ Republic,” the discourse of the single-family—utilizing the local public school attached to the suburban housing development—meant that new ways of approaching schooling and pedagogy that could meet the needs of this new suburban republican consumer were needed. Thus, by paying attention to school architecture as it developed alongside and as part of suburban America reveals important nuances of the role of childhood and schooling in the development of the suburbs. Particularly in Los Angeles and suburban

²¹ Lizbeth Cohen, *A Consumers' Republic: The Politics of Mass Consumption in Postwar America*, (New York: Alfred A. Knopf, 2003), 195.

California, modern architecture becomes characterized by a distinct style and discourse which is tied to suburban, low-density development, health, the automobile, and climate in ways not necessarily seen in other regional applications of modern architecture.

Richard Neutra and the Corona Avenue Experimental School

In Los Angeles in the 1930s, an influx of new residents combined with outdated school buildings, many of which needed refurbishment after earthquake damage, led to a problem for the Los Angeles Unified School District: How were they going to meet the educational needs of a growing suburban enclave, and do it cheaply, while adjusting to changing national ideas about pedagogy? At the time, John Dewey's theories on education were thought to be cutting-edge, particularly for urban children whose parents had experienced an arguably punitive and rote public education, at least as described by later educational historians and theorists.²² Dewey's progressive ideas foregrounded collaboration and experiential education with a labor-oriented purpose; while working on teacher-guided group projects, students developed job skills grounded in real-life scenarios that they could implement

²² See Dell Upton's "Lancasterian Schools, Republican Citizenship and the Spatial Imagination in Early Nineteenth Century America," *Journal of the Society of Architectural Historians* 55 (3), 238-253. See also "Los Angeles Unified School District: Historic Context Statement, 1870-1969," prepared by Sapphos Environmental Inc. for the LAUSD Office of Environmental Health and Safety, March 2014, 21-22.

immediately after graduating. This method of pedagogy, championed by Dewey at his Laboratory School at the University of Chicago, was in opposition to the teacher-led drills and oration practice that had characterized urban public education for decades.²³ This new so-called “progressive education” was an experimental mode of educating students for social and civic engagement, which leveraged exploration and creative play alongside traditional curriculum. As educational historian Craig Kridel writes, “While progressive education remains a popular conception of schooling from the early-to-mid twentieth-century and is said to be used by educators in contemporary efforts for school reform and renewal, the term continues to arouse confusion and criticism in today’s literature.”²⁴ Yet, progressive education was a critical intervention made by early twentieth-century educators who were inspired by John Dewey’s writings to promote learning-by-doing and rethinking schooling as democratic participation.²⁵

²³ See Lawrence A. Cremin, “John Dewey and the Progressive-Education Movement, 1915-1952,” *The School Review* 67, no. 2, (Summer 1959), pp. 160-173, 162. Cremin writes of Dewey’s *Schools of To-Morrow*, “There is exciting talk of more freedom for children, of greater attention to individual growth and development, of a new unity between education and life, of a more meaningful school curriculum, of a vast democratizing of culture and learning. Nowhere is the faith and optimism of the progressive-education movement more dramatically conveyed.”

²⁴ Craig Kridel, “Towards an Understanding of Progressive Education and “School”: Lee Dick’s 1939 Documentary Film on the Hessian Hills School,” unpublished paper, 2012.

²⁵ John Dewey, *Experience and Education*, (New York, Kappa Delta Pi, 1938). Dewey argues that school and education should be more experiential and that students will learn through engaging in activity and play versus being passive recipients of information. His ideas circulated widely in the 1930s and 40s and provided the framework for the “progressive education” movement in the same period.

Eager to emulate these pedagogical experiments spatially, and with the success of the International Style exhibition and Neutra's indoor/outdoor Ring Plan School design, Los Angeles school board administrators invited Neutra to develop an extension to the existing Corona Avenue School in the southeastern suburban community of Bell, one that would serve as both a testing ground for future school-building projects and as a promotional tool to disseminate ideas about progressive education in Southern California. Los Angeles school principal Nora Sterry had seen Neutra's Ring Plan School design and thought it would be an ideal place to apply John Dewey's educational principle of "learning-by-doing."²⁶ Neutra agreed to the extension and designed a Ring Plan School without the ring, but as an L-shaped building consisting of two kindergarten and five elementary classrooms.²⁷ Once built, Neutra's 1935 Corona Avenue Experimental School, which combined Neutra's Ring Plan School designs with progressive education, was called a "test tube" and a "glass and garden" school by the local press, who also described the school as a science experiment.²⁸ Neutra's consideration of the ideology of progressive education would characterize his future school

²⁶ Hines, *Richard Neutra and the Search for Modern Architecture*, 181.

²⁷ *Ibid.*, 181.

²⁸ Lyra Kilston, "Fresh Air and Outdoor Learning at Corona Avenue School," *The Getty* blog, November 18, 2020. <https://www.getty.edu/news/fresh-air-and-outdoor-learning-at-corona-avenue-school/> Accessed January 2024

designs and influence future school architects, while his spatial application of progressive education to school spaces would become the standard in postwar school architecture nationwide. Corona Avenue was widely covered in the architectural press, which led to its wide dissemination beyond California as an architectural typology of school design to be emulated.

Later, lushly colored photographs of the Corona Avenue Experimental School by noted architectural photographer Julius Shulman capture the essence of its outdoor classrooms in the 1950s: green window frames mimic the color of the grass, and houseplants, illuminated by the bright California sun, are placed around the scene (Fig. 1.3.). In addition to high clerestory windows, classrooms had their own sliding glass walls which, as Hines notes, “truly brought the outside in.”²⁹ The outdoor areas were divided by hedges and the outdoor patios and gardens were covered by shade trees, adjustable awnings, and a roof slab that protected the classrooms. The short-sleeved shirts and dresses the students wear are equally color-saturated, as well as weather-appropriate. The overall impression is of a classroom in an outdoor garden that is full of health, energy, and prosperity, all of which are made possible through a utopic but realizable school space. The students and teacher in the photographs appear to be white and are depicted as behaving orderly and listening attentively to one another. They seem at ease and

²⁹ Hines, *Richard Neutra and the Quest for Modern Architecture*, 180.

comfortable amidst their outdoor surroundings. The school was featured in national and international press, featured in film as part of Hearst's Metronome News and as part of *The March of Time Newsreel*.³⁰ Images of the school, like Shulman's, would likely have been read in a number of ways, including: as distinctly Californian and as decidedly different from the school experiences most viewers would have had in their own childhoods. As they were often presented in architectural and building journals, the photographs might also have been read as engendering a symbiotic relationship between education, children, and the school building. This unusual outdoor school was both a call to a new type of education and a way by which schooling itself began to function as part of a larger narrative of suburbanization and domestic infrastructures. The school also offered a hopeful glimpse into how school buildings might create healthy and well-educated children.

Corona Avenue exemplified a building type stemming from early twentieth-century designs of sanitoriums and hospitals in Europe and the US. Features from sanitoriums had already been applied to existing European schools, including schools mentioned in the MoMA catalog. In the nineteenth and early twentieth centuries, Southern California was seen as a natural location to host sanitoriums, as the healing powers of the climate—with its

³⁰ Ibid., 182. See also "An architect Tries for Informality in the Schoolroom," *St. Louis Post-Dispatch*, September 13, 1936; "Test Tube School Open," *Los Angeles Times*, November 18, 1935; Richard Neutra, "New Elementary Schools for America," *Architectural Forum*, January 1935, 25-32.

mild temperatures, lack of humidity, and ocean breezes—could be harnessed through the building through large windows and sleeping porches, for instance. Dozens of sanatorium buildings and communities were erected in California with the purpose of offering respite from tuberculosis and other diseases. The buildings themselves were seen as curative since the space could be flexibly arranged, was airy and open to the outdoors, and often surrounded by plants.³¹ Since schools were sites of sharing diseases like tuberculosis, it seemed natural to apply the architectural features of sanatorium buildings to schools to keep children healthy and connected to the outdoors.³²

In Los Angeles, a 1933 earthquake had decimated much of the area's school stock. Combined with a growing population and early suburbanization, many schools would need to be retrofitted or built anew. In addition, progressive learning had become a buzzword in educational circles, and administrators nationwide sought to build new schools that met the demand.

³¹ See Lyra Kilson, *Sun Seekers: The Cure of California* (Los Angeles: Atelier Éditions, 2019), 43-50. Writing about Alvar Aalto's 1929-1933 Tuberculosis Sanatorium in Paimio, Finland, architectural historian Sigfried Giedion notes, "In a sanatorium we have been accustomed to conceive room and balcony as a single unit, to allow the patient direct access to open air," *Space, Time and Architecture: The Growth of a New Tradition*, (Cambridge: Harvard University Press, 1941), 629-633.

³² Beyond immediate concerns of disease, architects have cultivated outdoor spaces for children in domestic as well as educational environments in Europe since the very early twentieth-century. Le Corbusier advocated for children to have their own outdoor balconies in his plan for Unité d'Habitation. Le Corbusier, *The Nursery Schools* (New York: The Orion Press, 1968), 51.

This was also in line with a move toward centralized school districts, which would organize schools around central bureaucratic offices. The new experimental wing at Corona Avenue featured floor-to-ceiling glass windows and doors that could be opened to the outside, louvers for controlling airflow, individualized garden pockets attached to each L-shaped classroom, an innovative flat-roofed hallway connecting each classroom, and plenty of open spaces inside for multiple modes and types of individual and group learning activities. In this design, Neutra had effectively spatialized the components of Dewey's pedagogical theories, which called for group play and learning through collaborative projects while also retaining a sensibility about the ameliorative capacity of buildings no doubt drawn from sanitoriums and his own Lovell Health House. Neutra's schools offered ample space for collaborative learning and space for experimentation on child-led projects while creating a space in which children could engage with and receive the positive effects of the climate.

Corona Avenue Experimental School—the first school completed by Neutra in this period—drew heavily from the Ring Plan School but lacked the actual ring.³³ The transition from the Ring Plan School to Corona Avenue represents a shift for Neutra toward designing buildings that could harness

³³ Thomas Hines, *The Architecture of Richard Neutra: from International Style to California Modern*, (New York: Museum of Modern Art, 1984).

the climate and other environmental features to the benefit of children. While the Ring Plan School functioned as a relatively neutral place for children situated outside of neighborhood housing developments, the design of Corona Avenue indicates a shift toward schools being functional, and even supportive environments for children. In a 1959 interview for the *San Diego Union*, Neutra reflected on the period he had spent designing Corona Avenue as part of his desire to flesh out his theories on the school building, specifically, “Biological realism and the purpose of the building is to facilitate a relationship with an environment.”³⁴ This appears true for his California schools, which worked to harness what he indicated were the healing and restorative properties of the California climate while also controlling how the outdoors was let into the buildings via the glass windows, gardens, and louvers. Neutra had an added pedagogical, or instructive, component in that students would be *made* to be healthy and thus participate in their learning more dynamically and robustly while righting the wrongs of nineteenth-century urban public schools that were characterized in popular media as overcrowded and dark spatially, and punitive pedagogically and psychologically.³⁵ Neutra believed that “the educational procedure and the physical school

³⁴ “Biological Realism,” *San Diego Union*, April 5, 1959.

³⁵ See Dell Upton’s “Lancasterian Schools, Republican Citizenship and the Spatial Imagination in Early Nineteenth Century America,” *Journal of the Society of Architectural Historians* 55 (3), 238-253.

plant, the educator and the architect can influence the adult of tomorrow, to see and embrace life in this new, healthy, biologically beautiful way.”³⁶ In this sense, Neutra’s Corona Avenue wing would serve as both a physical embodiment of progressive education and as a space through which students could participate in the natural world while benefiting from the local climate. That is, the building itself functioned as the intermediary between students and the natural world.

Neutra theorized that the local climate could solve many problems associated with urban public education in the late nineteenth and early twentieth centuries, primarily disease and, by proxy, poverty. School buildings also began to function as sites to explore pedagogy, clinical psychology, ideas of child development, and social and economic theories, which was absolutely in line with Neutra’s larger beliefs about the role of architectural space in serving the psychological needs of the users, which were also part of national discourses about school architecture.³⁷ In a 1935 special issue of *Architectural Forum* dedicated to issues of education and school-building,

³⁶ Richard Neutra, “Architect and Educator Joined Hands to Make New Los Angeles Schools Esthetic and Functional,” *School Management and School and College Supply and Equipment News*, March 1941, 196-98.

³⁷ The development of school psychology in the nineteenth-century began with the school-based experiments of Lightner Witmer, who established the first psychological, school-based clinic at the University of Pennsylvania. In 1954, the APA sponsored the Thayer Conference, establishing the need for school-based psychologists. See Jennifer S. Braden, Eleanor DiMarino-Linnen, and Thomas L. Good “Schools, Society, and School Psychologists: History and Future Directions,” *Journal of School Psychology* 39, no 2. (2001):203-219.

Professor of Education Arthur Moehlman said schools of the future would be places where “children who do not learn easily or who show great variations in learning will not be dismissed as in the past...but will be studied by medical, psychological, endocrinological, education and sociological specialists to determine cause and to provide remedies” and architects were expected to respond with clinics and specific spaces for such analysis in school designs.³⁸ This was in line with Neutra’s writings on the responsibility of the architect to design spaces that are both sites of psychological analysis and psychologically secure. Neutra wrote, “to raise children in psychologically satisfactory surroundings and not have them warped by sensorial privation, by confusion and irritation to the eye or the ear or the nose or to inner body sense, all tied together with intimately related organic functions when they sit on the school benches is worthwhile.”³⁹

Neutra, Frank Lloyd Wright, and the Little Dipper School

Richard Neutra drew inspiration from his teacher, Frank Lloyd Wright, and while the relationship between Neutra and Wright has been clearly documented, how they shared an interest in school design, and Wright’s contribution to this distinct architectural typology in California, has not been

³⁸ Arthur B. Moehlman, “Schools of Tomorrow in the United States,” *Architectural Forum*, January 1935, 23.

³⁹ Richard Neutra, *Life and Shape*, (New York: Appleton-Century-Crofts: 1962), 325-26.

significantly traced. Similarly, while Wright's long-standing interest in and influence from the Swiss pedagogue Friedrich Fröbel has been the subject of scholarship—in the book *Inventing Kindergarten*, for example, Norman Brosterman traces the long relationship between Fröbel's "gifts," a series of toys designed for children to be played with in a developmentally appropriate order, and Wright's architectural designs—Wright's interest in Fröbel's theories as applied to a school building, its influence on Neutra, and what it owes to modern California school architecture, has not received significant scholarly attention. Wright's Little Dipper School, as developed in and around the figure of Richard Neutra, also serves as a link between European pedagogical movements and California's modern school architecture. This section articulates the role that King's Road era conversations about pedagogy with Leah Lovell and Pauline Schindler, in addition to Wright, had on Neutra and his early contribution to the California school-building typology.⁴⁰

⁴⁰ Thomas Hines discusses Kings Road era conversations between the Schindlers and the Neutras, as well as Schindler's "sophisticated" group of friends. "In the 1920s and after, the house on King's Road was an important center for advanced social, cultural, and political activity. Leftist political groups frequently used the house as a meeting space." Hines, *Richard Neutra and the Search for Modern Architecture*, 77. Though Neutra was no Leftist, the conversations on radical pedagogy extending from educators Pauline Schindler and Leah Lovell undoubtedly left an impression on Neutra's thinking about school designs. Leah Lovell and Pauline Schindler ran a kindergarten based on Dewey-influenced educator Angelo Patri's "free association, learn-by-doing methods," Hines, *Richard Neutra and the Search for Modern Architecture*, 96.

When Neutra and his family immigrated to the United States, he stayed with fellow Viennese architect R.M. Schindler and his family at their Kings Road home in Los Angeles. Schindler and his wife Pauline welcomed them into their inner circle of artists and leftist politics. Both Schindler and Neutra were devoted disciples of Frank Lloyd Wright, and Neutra hoped to leverage Schindler's professional relationship with Wright into a job for himself. Though Neutra bristled at Schindler's radical lifestyle, he was inspired by Schindler and his left-leaning circle's ideas; they brought more theoretical thinking to his earliest designs, including Corona Avenue.⁴¹ This history is well documented, but the contribution of early conversations about pedagogy with educators who came to Kings Road—which surely inspired Neutra's designs for school buildings in California—is less well known. Schindler and Harriet Press Freeman, an educator and frequent visitor to Kings Road, often discussed schooling and contemporary pedagogy. Freeman and her sister, Leah Lovell, for whom the Lovell Health House was designed, were radical educators and proponents of early childhood education—namely kindergarten and the ideas of Friedrich Fröbel. Architectural historian Marta Gutman writes of early supporters of the kindergarten movement, saying that they “understood children to be malleable and capable of change, and the built environment to

⁴¹ Marco de Michelis, “Rudolf M. Schindler: The Invention of an American Tradition” Canadian Centre for Architecture: A Study Centre: Mellon Lectures, March 1, 2005.

be active, a shaper of consciousness and thus of childhood.”⁴² This suggests that questions around spaces and design of kindergarten was the subject of ongoing discussion in the US.

Like Lovell, Freeman also prescribed to the ameliorative qualities of the California climate.⁴³ She and Schindler’s wife, Pauline, were both progressive educators at a school complex that Wright created a design for in 1923 called the Little Dipper Community Playhouse. The school was to be a part of a larger community arts-and-theater complex for Aline Barnsdall, oil heiress and visionary of an experimental and progressive theater community in Los Angeles.⁴⁴ Barnsdall, Freeman, and Pauline Schindler wanted the school to serve local families involved in the arts, and for it to be an innovative space in which parents, children, art, theater, and the tenets of progressive education comingled as part of the larger arts complex on Olive Hill. Barnsdall had a young daughter and would likely have been familiar with the early childhood education advocated for by Fröbel, in part due to his popularity within arts and leftist political circles like hers in Europe and the US. Barnsdall was moved by anarchist Emma Goldman’s message that larger social change

⁴² Marta Gutman, *A City for Children: Women, Architecture, and the Charitable Landscapes of Oakland, 1850-1950*, (Chicago: University of Chicago Press, 2014), 149.

⁴³ She would ultimately commission Frank Lloyd Wright to design a home for her and her husband in Los Angeles—the Samuel and Harriet Freeman House.

⁴⁴ Alice T. Friedman, *Women and the Making of the Modern House: A Social and Architectural History* (New York: Harry N. Abrams, Inc. 1998), 32–36.

could be wrought through feminism, birth control, and theater.⁴⁵ The rationale for the school was thus guided by a belief that communal education was liberatory for women. This would have resonated with Fröbel's pedagogical principles which also advocated for a community approach to child education for similarly liberatory social goals.

Frank Lloyd Wright, long an advocate for Fröbel and his pedagogical theories of design—color, form, shape, and materials matched with child development—brought many Fröbelian concepts to the design of his Little Dipper School. The school was to be built from Wright's textile block interspersed with stained glass and an elevated terrace.⁴⁶ The school itself featured a south-facing wall of glass, which opened to a circular playground, a hexagonal pool, and a square sand table.⁴⁷ Wright included five different block patterns for this building, and the dominant geometry in the bricks—triangles, hexagons, and circles—was clearly drawn from Fröbelian aesthetic concepts. Light entered the various classrooms via patterned, perforated blocks floating above the main rooms. The circular steps allowed the space to

⁴⁵ Ibid., 38.

⁴⁶ *Architectural drawings for a theater and school building ("Little Dipper Community Playhouse") for Aline Barnsdall, Olive Hill, Hollywood Boulevard and Vermont Avenue, Hollywood, California*, architectural drawing, Library of Congress: *Donald D. Walker Collection*, 1923, <https://www.loc.gov/item/00653270/> Accessed January 2024.

⁴⁷ Kathryn Smith, "Frank Lloyd Wright, Hollyhock House, and Olive Hill, 1914-1924" *Journal of the Society of Architectural Historians*, 38(1), March 1979, 30-33.

function as an outdoor child's theater. This design would have spatially aligned with Fröbel's pedagogical recommendations, which emphasized direct relationships with materials like wood, sand, and water and the kinesthetic use of simple shapes. Though there is scant information available on Little Dipper and school director Lovell's pedagogy, it is a fair assumption that Fröbel's recommendations would have guided the curriculum, and it certainly would have guided Wright, who was highly influenced by Froebelian principles. Conversations between Freeman, Lovell, and Neutra, among other radical educators who visited Kings Road, would likely have, at the very least, familiarized Neutra with these conceptual applications, specifically in Los Angeles schools. The Little Dipper School was never finished, though it was in partial use for a time. It was eventually redesigned by Schindler as a park and finished by Neutra using the concrete blocks left on the site in 1925.⁴⁸

The Little Dipper School is a crucial—and overlooked—building in the history of school architecture. Neutra's experiences working with Schindler and Wright on the school, and ultimately finishing the space, were among his earliest experiments in thinking about school design. Though it went unbuilt, Neutra's later school designs drew on the pedagogical experiment of kindergarten for inspiration and set off a wave of school-building inspired by the kindergarten movement nationwide. The unique way that the kindergarten

⁴⁸ Ibid., 32.

movement was advocated for in Los Angeles, as well as Wright's own personal interest in Fröbelian pedagogy, cannot have been lost on Neutra. To ignore the possible contributions of the radical early childhood educators in Neutra's inner circle would be a misstep. Neutra's designs emphasize play, air, and light; a personal relationship with nature and natural materials; and simple shapes in ways that are arguably tied to the early twentieth-century pedagogical movement for early childhood before his schools became tied to John Dewey's progressive education movement. The Little Dipper School thus articulates the influence that the kindergarten movement had on modern California school architecture, and the role that Fröbel's teachings played in Wright and Neutra's designs for children.

Experimental Modern Schools Influencing California Architects

The 1930s was a period of experimentation in school-building. A number of other proposals for school buildings, two of which were in the International Style show, also sought to integrate Dewey's theories and experiments toward progressive education. These were also concerned with cultivating individual relationships with the natural world and preparing children for the workforce and civic identity. Of the two other schools for young children featured in MoMA's International Style exhibition, the 1932 Hessian Hills School by William Lescaze and George Howe has been discussed more

(Figure 3).⁴⁹ The school, located in upstate New York, featured a curriculum that was oriented around progressive education in a holistic and authentically Dewey-ian sense. Like the Little Dipper School, Hessian Hills was inspired by the kindergarten movement. It was inspired by a number of existing school models including Shady Hill School near Cambridge (1914), the Parker School (1901), and John Dewey's Laboratory School at the University of Chicago, (1896).⁵⁰ All of these schools were early experiments in progressive education which varying emphases emerging from the shared goal of reforming education. Hessian Hills also organized itself around Dewey and William H. Kilpatrick's child-centered project method, which translated and formalized Dewey's ideas into what is at present called "project-based" or "student-directed learning," a mode of instruction in which a student self-selects a project to work on and is guided rather than lectured by the teacher.⁵¹ The school's staff, faculty, and parents were also aligned with leftist

⁴⁹ Amy F. Ogata writes in "Building for Learning in Postwar American Elementary Schools, *Journal of the Society of Architectural Historians* 67, no. 4 (December 2008), 4, that "the Oak Lane County Day School (1929) and the Hessian Hills School (1931-32) by the Philadelphia firm of Howe and Lescaze were both well-publicized single-story buildings with large corner windows to bring light into the classroom area." Research on Oak Lane Day school is limited while the Hessian Hills School is discussed in Katherine Moos Campbell, *An Experiment in Education: The Hessian Hills School, 1925-1952*, unpublished Ph.D. dissertation, Boston University, 1984; Hills School Association, *The Story of a Progressive Educational Enterprise*, (New York: Croton-on-Hudson, 1931); and national publications including "Education: In Hessian Hills," *Time*, December 19, 1932.

⁵⁰ Campbell, *An Experiment in Education*, 18-21.

⁵¹ *Ibid.*, 27.

and radical politics; many families aligned with the school's politics moved their families to the area to form an intentional community centered around the private school. This challenged the apolitical nature of early progressive education which focused primarily on the liberation of children through art, music, dance, and drama, but aligned with the Deweyian concept that schools needed to work toward a more humane, collectivist America.⁵² The school's curriculum focused on world-building and an attempt to humanize the so-called machine age.⁵³ Hessian Hills' workshop and nine small classrooms were set into a clearing in a wooded area of upstate New York where students were expected to engage with the outdoors year-round and contribute to the ongoing building of the school. As was the case with Neutra's schools in Southern California, the students who attended Hessian Hills were by and large white and middle- to upper-middle-class.

Whereas Neutra's schools provided a mechanism by which to leverage the benefits of the climate and natural environment through direct control, Hessian Hills articulated a more diminutive presence within the woods. The school was planned with the idea that the students and faculty would collectively shape the space according to the various projects and built additions they made as part of the progressive curriculum. Filmmaker Lee

⁵² Ibid., 29.

⁵³ Campbell, *An Experiment in Education*, v-vii.

Dick's heavily scripted 1939 documentary about Hessian Hills' students and curriculum shows students running a student store and debating whether to leverage additional taxes on a so-called private, student-run newspaper. These scenes within the film were imaged within the framework of progressive education and touted within education circles and at documentary film festivals as evidence of the success of progressive education; the implication was that such a curriculum applied universally would yield the same results regardless of class boundaries or the individual needs of diverse communities. Yet the students were not actually in charge of the project being documented or their own representation, which calls to mind a critique of progressive education in this period; it was leveraged in name to achieve certain goals, but unevenly applied in actual educational settings. The film, like the MoMA exhibition, was crucial to disseminating the shared aesthetic of modern architecture and progressive education, and positioning the relationship as both experimental and successful. Nonetheless, Hessian Hills alumni, including influential historian of science Thomas Kuhn, have pointed to the education they received at the school as having been influential on innovation in their work.

One year after Lee Dick's film, a unique collaboration in Winnetka, Illinois, led to an experiment in school design that sought to prioritize thinking about the spatial components of progressive education and replacing the old

Horace Mann school, then seen as outdated—a move that Neutra had outlined years earlier. Through collaborating closely with educators, staff, and students, a team consisting of well-established architects Eero and Elie Saarinen; newcomer firm Perkins, Wheeler & Will; and innovative school superintendent Carleton Washburne designed a school which effectively brought together the goals of progressive education and child psychology.⁵⁴ Washburne, along with Frances Pressler, the school's director of activities, had sought to develop a school that would explicitly link the goals of progressive education to architecture and spaces. Perkins, Wheeler, & Will proposed a design that met the experimental curricular needs. While the firm would go on to become very influential school architects, in 1939 they did not have the reputation that Washburne hoped for, so Washburne brought in Elie and Eero Saarinen for their architectural expertise. The resulting pinwheel design (Fig. 1.8.) of the Crow Island School had a central block with an auditorium, basement, and multipurpose/library area that included a fireplace. Classrooms radiated out from the center; each had its own garden area, large

⁵⁴ Elizabeth A. Milnarik, "Crow Island School," [Winnetka Illinois], SAH Archipedia, eds. Gabrielle Esperdy and Karen Kingsley, Charlottesville: UVaP, 2012, <http://sah-archipedia.org/buildings/IL-01-031-0025>
Accessed: September 6, 2024; Betty Williams Carbol, *The Making of a Special Place: A History of Crow Island School, Winnetka, Illinois*, (Evanston, IL: Advanced Reproductions, 1980). Amy F. Ogata, "Building for Learning in Postwar American Schools," *Journal of the Society of Architectural Historians* 67, no. 4 (December 2008): 562-591; "Crow Island School," *Architectural Forum* (August 1941): 79-92. Interestingly, Washburne had been a pupil of the Parker School and sought to bring progressive ideas to Winnetka, Campbell, *An Experiment in Education*, 21.

windows with two different exposures, child-size furniture, individual work rooms with child-size sinks and cabinets, and low ceilings similar to domestic spaces. The designers and architects sought to create a feeling of home-like security in the space, which was decorated with handmade curtains by weaver Loja Saarinen and glazed ceramic reliefs of animals by Lilian Swann Saarinen. Pressler stressed that “there be no illustrative frieze decoration as the means of presenting the place to children who behold it, and lest it designate too definite a form of creation thereby inhibiting instead of encouraging child expression.”⁵⁵ The idea that children were needed to bring the place to life through their imagination and use of the building would inspire British architects David and Mary Medd when they visited Crow Island; they brought these ideas back to their influential Hertfordshire school buildings in postwar England, as discussed in Chapter Two. Like Corona Avenue, the consideration of the unique needs of children within the context of a new attention to childhood informed the spaces of Crow Island. The collaboration produced something that would come to inspire architects and school administrators for a generation to come; hundreds of schools modeled on the experiment in Winnetka would be built throughout the 1940s and 1950s.⁵⁶

⁵⁵ Amy Suzanne Weisser, *Institutional Revisions: Modernism and American Public Schools from the Depression through the Second World War*, PhD Dissertation, Yale University, 1995, 71.

⁵⁶ “Crow Island Revisited,” *Architectural Forum*, October 1955, 130.

Crow Island directly inspired the California school typology, as well as the flexible school typology in the UK.

Objects for Children: Designing with Dewey and Fröbel

In this section, I look to the objects of design for children, namely toys, that were also linked to creating healthy children through progressive education. While Neutra's schools invoked progressive education in order to meet a need articulated by school administrators in Los Angeles, the architects at Crow Island sought to spatialize the tenets of progressive education. Both schools were crucial components of a larger nationwide shift in thinking about schools and education for children, which was aligned with the school building's integral role in urban and neighborhood planning. Architect Lawrence Perkins, in his overview of changing attitudes about school architecture in the 1940s and 1950s *Schools*, writes that now schools need to be "planned, designed, constructed, and used so that it makes possible better living in the community in which it is located," in addition to creating psychologically safe places for children and spaces of "learning by doing."⁵⁷ This shift occurred at the same time that industry in the United States was

⁵⁷ Lawrence B. Perkins and Walter D. Cocking, *Schools* (New York: Reinhold Publishing Corporation, 1949), 38.

becoming more and more streamlined, and innovations in factory systems wrought mass production of consumer objects and goods. Scientific research developing in fields including psychology and sociology legitimized both the kindergarten and progressive education movements as beneficial for children. This would serve to influence parents that part of their responsibility was to stimulate a child in ways that were measurable by scientific means and would provide psychologically safe environments inside and outside of school.⁵⁸

Amy F. Ogata writes of the postwar period, “The heightened focus on children owing to the baby boom stimulated a national debate over child rearing and encouraged both sharp public interest in education and unprecedented spending on children. In addition to buying new parenting guides and magazines advocating techniques for raising a healthy, well-adjusted child, postwar parents spent more on amusements.”⁵⁹ And when these amusements were linked with educational theory, for instance, toy companies were able to sell more toys to parents eager to purchase the correct kind of toy to nurture their children. Kindergarten’s relationship with child psychology and developmentally appropriate play allowed it to be made objectively and

⁵⁸ “Scientists argued that babies learned more and earlier than had been traditionally accepted, and it became a parent’s job to stimulate and guide the growing child even before they entered school. As pediatricians and psychologists created norms and stages against which children were measured and charted, so too were matters of parental guidance increasingly analyzed.” Ogata, *Building the Creative Child*, 1.

⁵⁹ Ogata, *Building the Creative Child*, 35.

scientifically correct.⁶⁰ This proved to be good news for corporations, who could leverage the objectivity of play as developmentally “good” in order to sell products specifically geared toward parents of young children that were linked with the kindergarten movement.

As early as 1864, Milton Bradley began to mass produce “improved” versions of Fröbel’s gifts. They also began designing and producing their own toys which could go along with the gifts; these were marketed as educational or “for kindergarten,” and some even included Fröbel’s name on the box, though he had not designed them. Historian Norman Brosterman, in an especially fitting comparison, writes, “the word kindergarten and Fröbel’s name began to be used to promote ‘educational’ toys like building blocks the way the word ‘natural’ has been used recently to sell everything from mouthwash to frozen food.”⁶¹ Thus, by the early twentieth-century, objects designed specifically for children as morally and educationally “correct” became the standard. As scholars Amy F. Ogata and Alexandra Lange have recently shown, mass-produced objects designed specifically for children were marketed as modes by which to make creative and democratic citizens

⁶⁰ Fröbel’s kindergarten concept was developed in the 1830s. Still, American educational reformers in the nineteenth-century advanced the theory that kindergarten was a model for all children and a functional way to improve society’s social and moral conditions—Ogata, *Building the Creative Child*, 37. Also see Norman Brosterman, *Inventing Kindergarten* (New York: Harry N. Abrams, 1997).

⁶¹ Norman Brosterman, *Inventing Kindergarten* (New York: Harry N. Abrams, 1997), 101.

and consumers.⁶² Fröbel's ideas became essentialized to sell objects and this way of thinking about children. From a psychological and developmental perspective, the potentialities of proper design also became the standard by which buildings were designed for children. Toys of “good” and “developmentally appropriate” design from Milton Bradley, Charles and Ray Eames, and toy and playground equipment producer Creative Playthings also introduced children to modern architecture and design, while connecting these objects to abstract and objective principles of child development stemming from psychology.

In addition to objects of design, this emphasis on creative childhoods built on principles of child development would inform school buildings and outdoor learning environments often included in new suburban developments. At the start of the postwar era, the notion of the “creative child,” which had begun to form in earlier generations through the kindergarten movement and progressive education, found full expression as a commodified part of middle-class culture.⁶³ Ogata outlines the ways that the influence of the baby boom was significant—not only in terms of population growth, but because it was accompanied by a social shift toward understanding and being receptive to

⁶² Amy F. Ogata writes, “The design of specifically educational playthings has...been closely tied to a context of ideas and ideologies about enhancing the physical, intellectual, social, and emotional development of children.” Ogata, *Building the Creative Child*, 37.

⁶³ Amy Ogata, *Designing the Creative Child: Playthings and Places in Midcentury America*, (Minneapolis: University of Minnesota Press, 2013), 1.

the science of childhood development, most specifically an attentiveness that could be framed and altered through good design. Ogata argues that children's creativity was a shared goal among postwar parents. I would add that parents aspired for their children to scale social and economic class as engendered by "good" architecture and design, which was cultivated *through* creativity and innovation while also being developmentally appropriate in the new language of child development. These aspirations included purchasing toys that would facilitate certain kinds of growth and development and raise IQ scores; investing in playground equipment, which would build healthy bodies and minds while encouraging teamwork and innovation needed for future employment; and moving to new suburban developments with technologically equipped school buildings aligned with work environments to build students' job prospects early. In addition to creativity and its inherent value to childhood and life, parents were interested in learning environments that could add anticipated economic value to their children's future lives. It is important to note that while these ideas were national in scale, these were not universally shared values in terms of race and culture. In many communities across the US, the idea of "hard work," rather than cultivating a spirit of innovation, was the way to get ahead. While white suburban families could invest in leisure time and the hope for a creative and fulfilling career, which would be rewarded with financial gains, other communities in the US did not

have the luxury of such aspirations. As will be shown in Chapter Four, the newly developing suburbs of California embraced such cultural values, imbricated with a work ethic skewing toward innovation, and such ideas about childhood proliferated.

The postwar era saw a turn away from theories of behaviorism of the earlier part of the century, which was itself less rigid than attitudes about teaching and child-rearing of eras past, and a move toward thinking about children in terms of stages of development and child-led maturation; these concerns were the subject of national attention in the postwar era.⁶⁴ In the 1930s and 1940s, Yale psychologist Arnold Gesell and researchers Frances Ilg, Janet Learned, and Louise Bates Ames popularized the role of adults as guides for children who would provide correct toys and play in order to meet developmental needs. Later critics, including Robert Paul Smith, pointed out that much of the research by Gesell and influential child development author Benjamin Spock was carried out in the suburbs on middle-class white children and did not reflect the values of other communities in the US.⁶⁵ Likewise, families would have had to have the economic and temporal resources to lavish on toys, experiences, and environments that nurtured this brand of

⁶⁴ Ogata, *Designing the Creative Child*, 3.

⁶⁵ Ibid., and Robert Paul Smith, "Where Did you Go" "Out." "What Did You Do?" "Nothing." 1957

child development (which is to say, that other modes of child-rearing also nourish children creatively and socialization without an attention to buying “correct” toys and experiences). Mothers, especially, were encouraged to learn as much as possible about child development and to be restrained when enacting discipline, which became conflated with a scientific certainty rather than a cultural value.⁶⁶ A report of the Midcentury White House Conference on Children and Youth of 1950 stated, “For healthy personality development it is very important...that much leeway and encouragement be given to the child’s show of expertise and imagination and that punishment...be kept for things that matter.”⁶⁷ That child discipline became a matter of national attention, showcased the ways that the correct ideas behind child-rearing became far-reaching values to aspire to that were then disseminated in schools and in homes as part of a national discourse on child-rearing. These political implications are seen in the contrasting study of Soviet child-rearing carried out by Margaret Mead in 1955, through which she argued that “complete control must be maintained” of children by Soviet

⁶⁶ In research on white flight from the suburbs of Los Angeles, scholars point to differing cultural values of black and white parents in child rearing, and this is an area worthy of future research in urban histories. See Emily E. Straus, *Death of a Suburban Dream: Race and Schools in Compton, California* (Philadelphia: University of Pennsylvania Press, 2014).

⁶⁷ Helen L. Witmer and Ruth Kotinsky (eds), *Personality in the Making: the Fact-Finding Report of the Midcentury White House Conference on Children and Youth* (Washington DC: Harper, 1952), 7.

adults and little attention was paid to child development or individuality. She likewise observed that “creative imagination” in Soviet child-rearing was restrained in favor of rigidity in order to accept the narrow Soviet worldview.⁶⁸ This is important because, within Soviet Russia, the pressure to develop both technological innovations and a national student body prepared to undertake scientific research and future innovation were national concerns. This had direct repercussions for school spaces and implications for the “correctness” of child development in America; childhood had become part of an urgent global debate. Similarly, consumption itself—of toys, food, experiences, play equipment—all leaned toward correct child development.

Suburban Housing Developments and the Addition of Child-Sized

Design

In addition to toys, there was a growing discourse in architecture and planning journals about the benefits of suburban living for children.⁶⁹ This section

⁶⁸ Margaret Mead and Calas, “Child-Training Ideals in a Postrevolutionary Context: Soviet Russia,” in Mary Mead and Martha Wolfenstein (Eds.) *Childhood in Contemporary Culture*, (Chicago: University of Chicago, 1955), 200.

⁶⁹ See Dianne Harris, *Little White Houses: How the Postwar Home Constructed Race in America* (Minneapolis: University of Minnesota Press, 2013). Harris argues that the separation between children and parents came to be seen as good housing design and better for families. “Separating children from their parents increasingly became an ideal, one that was frequently seen in media representations of homes that tended to “render children a polluting presence...”(149). Harris writes, “Experts such as Dr. Benjamin Spock also advised that healthy families resulted when parents were able to maintain privacy from their children” as allowed by the carefully designed suburban home (151) quoted from Benjamin Spock, *The Common Sense Book of Baby and Child Care* (New York: Duell, Sloan & Pearce, 1957), 370.

shows the vital link between schools and new suburban housing developments built after World War II with respect to a growing national discourse about the perceived benefits of such housing developments for children.⁷⁰ Schools, conceived as something between a domestic and work space, have an intimate relationship with the housing developments or neighborhoods of which they are a part. Schools have long been seen as extensions of the home, and considering their relationship to the new suburban housing developments of which they were part is vital to understanding their complex social function. As mentioned previously, following World War II, there was a renewed interest in attention to children and the cultivation of childhood among builders and architects. From Herbert Gans's 1965 book *The Levittowners* to the proliferation of articles and advertisements devoted to children in architecture journals, the concern about how children would operate in and be shaped by the built environment took shape in new ways.⁷¹ Central to these conversations were concerns over how children would engage with the new spaces of suburban housing developments. Lawrence Perkins wrote in *Schools* in 1949 that these new

⁷⁰ See Chapter Four for a thorough discussion on the benefits of suburban spaces for children, especially schools. See also John L. Rury, *Creating the Suburban School Advantage: Race, Localism, and Inequality in an American Metropolis* (New York: Cornell University Press, 2020) for more on suburban advantage for children.

⁷¹ Herbert Gans, *The Levittowners*, (New York: Columbia University Press, 1967).

suburban children would need more space as they were being raised in communities drawn to a larger scale. He positioned this in opposition to urban children who could get along with less space.⁷² While schools were a primary way that children would interact with these new environments in Southern California, the design of shopping malls and homes would be guided by what was seen by educational reformers and in national discourses as a correct or developmentally appropriate conception of childhood. This section looks to the way that a “good” childhood became tied to the spaces of suburban living, and the child-size design of homes and malls would both spur additional markets for consumption of childhood and also inform the logic of “ideal” school spaces, which is addressed in later chapters.

Victor Gruen’s shopping mall complexes, many of which were in postwar Southern California suburbs, were designed to be the “focal point for the life of a community” and built on ideas of cultivating appropriate and safe suburban spaces for children.⁷³ They included venues for “dancing, art

⁷² Perkins, *Schools*, 27. Notably, sociological research on urban school children had long discussed the rising population of non-white students in urban centers and the myriad problems thus brought to urban schools. From scholastic disinvestment to the breakdown of traditional families to cultural differences, urban schooling was much discussed in the twentieth-century as needing reform. See Alvin Toffler, *The Schoolhouse in the City* (New York: Educational Facilities Laboratories, 1968) and James Bryant Conant, *Slums and Suburbs* (New York: McGraw-Hill Book Company, 1961).

⁷³ Alexandra Lange, *Meet Me by the Fountain: An Inside History of the Mall* (New York: Bloomsbury Publishing, 2022), 60, 155. Lange notes that malls were both seen as safe spaces for mothers (white suburban mothers) to drop off their small children in playgroups while they shopped freely as well as being “protected spaces” for older children to “channel their consumerism,” 155, 235.

exhibits, and ice skating, as well as flower shows, fashion shows, and entertainments for children,” and “the shopping center embraced children’s play as commercial logic.”⁷⁴ Playgrounds in and adjacent to malls, as well as stores and activities devoted to children’s rides and games, were designed to entertain children while parents shopped. This introduced and even invited children to participate in American consumerist activities, primarily in shopping centers attached to new suburban developments. Today, we see that these child-centered shopping mall features introduced children to mass consumption through play, which was then externalized to parents as vital for development. It is no small coincidence that the spaces of community gathering in malls and play for children were tied to consumption and that appropriate child development was linked to buyable things and spaces for children.

The belief that suburban living benefited children partially fueled midcentury middle-class white flight from urban centers to outer suburbs; street safety, space to play, and access to the natural world were often cited as reasons why the suburbs aid child development. Educational historian Emily Strauss writes,

Labeling a place as urban or suburban brings with it a set of cultural assumptions: the city is the center of the crisis and the suburb is the

⁷⁴ Victor Gruen and Larry Smith, *Shopping Towns USA: The Planning of Shopping Centers* (Van Nostrand Reinhold, 1960), 257.

embodiment of the American dream. [Midcentury] suburbs and their schools represented a prosperous, white paradise, an escape from minority-populated cities and their failing schools. The flip side of this racialization of space characterizes urban places and urban schools as centers of violence and family breakdown.⁷⁵

Builders and developers, well aware of this belief, placed child-centered components in the centers of new housing tracts. New playgrounds and access to good public schools fueled suburban development, which was funded by the federal government, particularly in the West.⁷⁶ In a press release for an exhibition about neighborhood planning, MoMA stated that “A good neighborhood has an elementary school” and wrote that “the school should be placed in the park so that children may walk there from any house in the neighborhood without crossing traffic streets. It must also be accessible by car.”⁷⁷ Thus, schools became part of the popular imaging of suburbia.

⁷⁵ Emily Strauss, *Death of a Suburban Dream: Race and Schools in Compton, California* (Philadelphia: University of Pennsylvania, 2014), 3-4. Strauss nods to a larger discussion of how these assumptions about racial and class divisions underscored historical narratives between the city and suburbs in works such as Eric Avila, *Popular Culture in the Age of White Flight: Fear and Fantasy in Suburban Los Angeles* (Berkeley: University of California Press, 2004).

⁷⁶ Douglas Massey and Nancy Denton discuss in *American Apartheid* the role of loans from the Federal Housing Administration and the Veterans Administration, which had allowed two-thirds of white people previously living in urban centers to move to the suburbs by the 1970s. This led to the concentration of poverty in Black and Brown urban neighborhoods. Douglas S. Massey and Nancy Denton, *American Apartheid: Segregation and the Making of the Underclass* (Cambridge, MA: Harvard University Press, 2003), 68, 71.

⁷⁷ Museum of Modern Art, “Neighborhood Planning Exhibition Opens at Museum of Modern Art,” press release, March 21, 1944, https://www.moma.org/momaorg/shared/pdfs/docs/press_archives/928/releases/MOMA_1944_0014_1944-03-28_44328-12.pdf Accessed January 2024.

Planned communities throughout California, in particular, showcased in the pages of *Architectural Forum* and other architecture journals, were shown to have proximity to new, modern, high-quality public school buildings. The communities' homes themselves were depicted as in line with a deep belief that suburban living was better for children, while federal housing policy and funding supported massive suburban development.⁷⁸

These new suburbs were imaged in popular media as comfortable and innovative spaces.⁷⁹ Children's spaces were shown in popular children's magazines with child-sized and age-appropriate furniture, as well as ample space to play with new toys.⁸⁰ 1962 Margaret Mead wrote, "Americans show their consciousness that each age has its own distinctive character by all the things that are fitted to the child's size, not only the crib and the cradle gym and the bassinette, but the small chair and table too, and the special bowl and cup and spoon which together make a child-sized world out of a corner of the room."⁸¹ Not only would toys and objects nourish the child-size world of Mead's depiction, but so would furniture and attention to cultivating spaces for

⁷⁸ See Richard Rothstein, *The Color of Law: A Forgotten History of how our Government Segregated America* (New York: W.W. Norton and Co., 2017), 83-85.

⁷⁹ See Dianne Harris, *Little White Houses: How the Postwar Home Constructed Race in America*, (Minneapolis: University of Minnesota Press, 2013), 159-183.

⁸⁰ Molly and Norman McGrath, *Children's Spaces: 50 Architects and Designers Create Environments for the Young* (New York: William Morrow and Co. Inc., 1978).

⁸¹ Margaret Mead, *A Creative Life for Your Children*, (Washington: US Dept. of Health, Education, and Welfare, Social Security Administration, Children's Bureau, 1962), 1.

children within the new suburban home. Amy Ogata notes that even though the design of children's spaces has not received adequate scholarly attention, spaces for children were a key part of domestic planning.⁸² She refers to designer Norman Cherner, who wrote in his 1954 book *How to Build Children's Toys and Furniture*, "A child-conscious home should have a casual atmosphere; yet it should be clean and esthetic [*sic*]. It should be an example for Peter and help him develop positive attitudes and standards for neatness and good taste. Peter can very well serve as an incentive for Parent to plan a more effective home for all those who live in it; a home conducive to well-balanced and creative living."⁸³ Beyond mere toys, even children's bedrooms needed to be well-designed to promote a healthy outlook on life, cleanliness, moral guidance, and psychological security.

In California, the much-publicized Case Study House Program also often included playrooms and areas for children and discussed vantage points from which mothers could supervise children in the houses.⁸⁴ These homes provided a model of what good single-family home design looked like

⁸² Amy Ogata, *Designing the Creative Child*, 72.

⁸³ Norman Cherner, *How to Build Children's Toys and Furniture*, (New York: McGraw Hill, 1954), 78.

⁸⁴ The Case Study Program, published in editor John Entenza's Los Angeles-based *Arts and Architecture* magazine in 1945, was a series of 25 homes (36 were designed), designed by nationally renowned architects and built for specific clients, that could be replicable as single-family homes in various contexts across the nation. The program was incredibly influential and inspired residential architects for years to come.

and were imaged widely in popular national magazines and newspapers.⁸⁵ Esther McCoy writes that the Case Study Houses “opened a new chapter in the design of two-bedroom (with two baths) houses for servantless families with one or two children.”⁸⁶ While the Case Study Houses were designed to appeal to an elite audience of homebuyers, their spatial organization was widely represented in large-scale suburban developments. Outdoor areas in middle-class homes were shown to include playhouses, playsets, and sandpits, and playrooms and activity rooms were often part of suburban home designs. These areas for children were discussed as crucial for and tied to proper child development, and thus characterized these homes as “good,” associating them with positive social and familial outcomes. Annmarie Adams, in her text on builder Joseph Eichler’s homes, argues that the homes were “tied to the child-rearing theories of Dr. Benjamin Spock, who suggested the proximity between mother and child reinforced an ‘instinctual means of learning and mothering.’”⁸⁷ Adams writes, “Spock’s approach to mothering, whereby the mother was a constant and close companion, demanded an architecture in which she could observe every gesture of the child, hear every whimper, and respond instantly.”⁸⁸ These needs would be met by the central

⁸⁵ “Can We Expect Miracles in Postwar Houses?” *Los Angeles Times*, August 5, 1945.

⁸⁶ Esther McCoy, “Arts and Architecture Case Study Houses,” *Perspecta* 15, 1975, 54.

⁸⁷ Annmarie Adams, “Eichler Home” *Perspectives in Vernacular Architecture* 5, 1995, 170.

⁸⁸ *Ibid.*, 170.

placement of the kitchen in the Eichler home plan, which functioned as observation station and “was intended to facilitate this instinctual mode of mothering,” as well as the atrium, where mothers could watch their children, who were constrained by the walls of the outdoor entryway space.⁸⁹ Ogata has also written about the decoration of children’s spaces as intended to “encourage a child’s inner life” through specific spatial and decorative choices, which were proliferated through publications including *Ladies’ Home Journal*, *American Home*, and *Parents*.⁹⁰ Spaces were advertised as “flexible”—this meant that partitions could be placed in children’s bedrooms to create separate play spaces, or corners of the kitchen could be turned into a playpen. This allowed the mother to be in proximity to children in order to nurture their physical and intellectual development while keeping the child engaged and surveilled. Solitary spaces for children were also included in these suburban designs, as it was believed that “self-activity,” written about by psychologists Gesell and Ilg, was also beneficial to psychological and cognitive development. Therefore, playrooms were included in individual home designs—a novelty for middle-class consumers of new suburban homes.

⁸⁹ Ibid., 170.

⁹⁰ Amy Ogata “Building Imagination in Postwar American Children’s Rooms” *Studies in the Decorative Arts* 16 (1) Fall-Winter 2008-2009, 126-7.

An important component of the playroom and children's bedroom that carried over to the school building was furniture. In the 1940s, children's furniture was advertised in national publications as being playful, smaller versions of adult-size furniture. In 1945, designers Charles and Ray Eames constructed a set of children's furniture that consisted of a chair, stool, and table constructed of molded plywood painted red, blue, yellow, black, and magenta. Ogata writes how the Eames' "children's furniture exemplified efficient modern technology and rational production."⁹¹ While this first wave of domestic furniture for children did not gain mass appeal, those moving to suburbs in the 1960s and 1970s increasingly purchased Nordic-designed furniture for children. The massive markets for children's furniture that were developing paralleled the discourse on play and development with thoughtfully designed objects. Parents were concerned with offering their children objects that would not only facilitate proper development, but that would also provide their children leverage for high-level play and cognitive development. This mindset led to the idea that the more parents bought for their children, the better chance they would have of later having well-paying and respectable jobs. These ideas would be spatialized in the new California schools connected to suburban developments, including Palo Alto and the suburbs of Los Angeles. They also pressured schools into convincing parents

⁹¹ Amy Ogata, *Designing the Creative Child*, 90.

that they were in alignment with these ideas of a “good” childhood. The low-density suburban school campus became associated with cultivating healthy children and good education, as opposed to the image of urban schooling, as discussed in Chapter Two.

Ernest Kump: A Transition from Progressive Education to Flexible Schools

Flexibility in architecture had long been touted as a way of meeting these various psychological, spatial, and pedagogical needs of children and communities in school spaces. Architects who began to experiment with flexibility in school spaces were lauded in architectural press. Between 1942 and 1946, years after the Bullocks Wilshire exhibition, MoMA sent another traveling exhibition, *Modern Architecture for the Modern School*, across the United States. It argued that schools could meet the various needs of children psychologically and developmentally, particularly through thinking about flexibility in experimental school spaces. Curator Elizabeth Mock showcased Crow Island in Winnetka, Illinois; Corona Avenue in Bell, California; and Acalenes Union High School in Lafayette, California, as examples. Many experiments in school-building were being undertaken in architectural circles, but they found footing in California, especially due to large amounts of space, new housing developments and the accompanying population boom, climate,

and what some architects later claimed were looser building codes.⁹²

Architects throughout California drew on the experiments at Crow Island and Hessian Hills; they sought to bring these schools' relationships between the natural world and materials, as well as their unique approaches to pedagogy, to new schools in their state. At the same time, residential and school architects were being tasked with meeting the needs of a childhood defined by creativity and play through spaces and materials. School architects turned to natural materials as being developmentally appropriate, inspired by the Fröbelian use of materials in the Little Dipper School. They also incorporated the pedagogical concerns of Crow Island and the lighting innovations of Richard Neutra, all while meeting the new social and educational demands of California suburban families.

Although there were many schools built during the immediate postwar era in California by a handful of architects, arguably none built more schools throughout the state than Ernest Kump, who offered experimental school designs that foregrounded flexibility. I offer his designs here as a full realization of the California school building as informed by Neutra, modernism, child development, and suburban housing developments. Kump's designs sought to balance standardization, flexibility, and modular design with

⁹² At a 1961 meeting with the editors of *Architectural Forum*, SCSD Architect Ezra Ehrenkrantz claimed that California was a good fit for the project because of the flexible building codes in California. "New Proposals to Cut School Costs," *Architectural Forum*, 1961, 111-112.

informal site planning that took local natural features into account. His 1939 Acalenes High School in Lafayette, California, is a “finger-plan”-style school with outdoor student circulation and free-standing classroom buildings that contained three to four classrooms each. The site was remote and surrounded by hills, but accessible by car or bus to a mostly dispersed student body who lived in the hills of the San Francisco Bay Area. Like Crow Island and many other schools by Krump, large windows, which opened to the north, filled the classrooms with natural light, and accompanying clerestories, which opened directly into adjacent outdoor space, provided bilateral lighting. Like Corona Avenue, a roofed arcade over each classroom led to a courtyard for general use and indoor/outdoor activities.⁹³ Kump often used grapewood, redwood, and natural local plywood for fencing and sheathing and sought to bring natural materials to children’s hands.⁹⁴

Kump’s writings on school architecture expressed an attention to the unique condition of childhood, one that was certainly informed by contemporary conversations about child development and child psychology, as well as an underlying humanity and sentiment that schools should feel like domestic environments. Perhaps drawing directly from Crow Island, at one of

⁹³ R. Thomas Hille, *Modern Schools: A Century of Design for Education* (New York: Wiley, 2011).

⁹⁴ Ernest J. Kump Company, *Planned School Environments: Secondary Schools, Part I*, portfolio of school designs, the University of California Berkeley Environmental Design Archives, *Papers of Ernest J. Kump*.

his high schools in the Carmel Unified School District, Kump placed a white-painted brick fireplace framed by a bas-relief plaque in the middle of a shared study space surrounded by natural light. Kump, like Neutra, believed that natural light, fresh air, and California's climatic advantage would make for healthy students. To this, Kump added that spaces of quiet reflection with the comforts of home would allow students to feel safe and nurtured in their schools. Kump's photo portfolios of schools show his attention to the schedule and structure of school—such as where students would put their coats when they arrived, how they could be made to feel warm on inclement days, and where they would learn best at different points of the day. He also attended to the human needs of children, providing drinking fountains with room for children to utilize them and bathrooms and washing-up areas that mimicked homes rather than factories. For Kump, school buildings were a frame for education and should be flexible to ongoing community need as well as shifting pedagogical concerns. He was an early advocate of systems architecture, particularly for educational facilities, and he wrote and lectured extensively about architectural systems.⁹⁵ He was also an inventor who applied for hundreds of patents from the US patent office, many for school-

⁹⁵ Ernest J. Kump, "A New Architecture for Man," *American Institute of Architects Journal* 28 (1957); Ernest J. Kump and Ernest J. Kump, "Prefabricated Building Construction," April 28, 1959, <http://www.google.com/patents/US2883711>.

related objects.⁹⁶ Perhaps school boards and families were inspired by Kump's attention to invention as it appeared in his architecture and design: as solutions to problems and new approaches to learning. Also known for his prefabricated modular homes constructed during wartime, Kump sought to balance innovation with attention to humanity and equity; applied to schools, this made for function and improvement, as well as warm spaces with details evocative of domestic environments. He framed his schools as experimental in order to bring technological innovations to suburban campuses, while also attending to materiality, site, and climate in each design. Kump's designs, and his realization of prefabrication and standardization in schools, would form the Californian rationale for the School Construction Systems Development experiment in the early 1960s.

Implications of Experimental Attitudes About School Buildings

California was a test ground for school-building, with its school architects drawing from pedagogical ideas and experiments in materials and architectural systems. Along with them was Texas-based architect William Caudill, whose 1944 text *Space for Teaching* discussed Crow Island's unique characteristics and predicted future schools would draw on the design. Most

⁹⁶ See "A New Architecture for Man" in *Room 1000*, <https://www.roomonethousand.com/a-new-architecture-for-man>, Accessed September 18, 2024.

important to Caudill was the way Crow Island realized a relationship between design and pedagogy, which he suggested future schools should embrace. This idea informed Ernest Kump and would become a vital component of what comprised effective school architecture. Yet, while Kump, Caudill, and Crow Island leveraged these concerns about pedagogy and learning and situated them locally for students, other architects were interested in the commodification of these ideas and focused on selling innovation and technological advancement to eager parents. Into the late 1950s and early 1960s, the emphasis on progressive education fell away and was even maligned. Education historian Diane Ravitch writes of the period between 1949 and 1953 in which so-called progressivism in American education was referred to as “the great debate” and it was felt that the outcome of the debate would come to define American education.⁹⁷ By the 1950s, progressive education was practiced in almost every school across the nation and the criticisms of it were diverse; critics ranged from extremists who believed it was part of a Communist plot to those who pointed to its moral failings and inability to preach anything but relativism, to the claim that it was anti-intellectual and ultimately undemocratic in its totalism. The emphasis on teaching with the goal of students having meaningful and useful lives left

⁹⁷ Diane Ravitch, *The Troubled Crusade: American Education 1945-1980*, (New York: Basic Books, 1985), 70.

many to claim that the basic subjects of American education—reading, writing, and math—were falling by the wayside.

With the impending baby boom, the concern that American students would be undereducated in math and science dominated educational discourse, and the era of progressive education came to an end. This left a hole in American educational pedagogy that was filled by anxieties over the space race and technological innovation.⁹⁸ Kump and other California school architects thus found themselves in the middle of a pedagogical divide.⁹⁹ On the one hand, these architects believed that architecture should be married to pedagogy in school buildings, but on the other, some school experiments had been less successful than others, and popular ideas about pedagogy seemed to be changing rapidly. In this period, the word “flexibility” begins to be seen more and more frequently in school-planning conferences and school-building literature, likely in response to the great debate about progressive education and as part of debates about using prefabricated architecture in homes and schools. School architects, including Kump, began to rely on flexibility in promotional material in order to continue to persuade school administrators that schools could be built cheaply while meeting the diverse needs of students, near-constant technological innovation, and seemingly rapidly

⁹⁸ Ravitch, *The Troubled Crusade*, 76-80.

⁹⁹ Other California architects including Mario Campi and John Lyon Reid debated the merits of so-called “traditionally-built” schools versus prefabricated ones.

changing ideas about pedagogy. Flexibility became a catchall term for all of the unanticipated challenges associated with school architecture. Leveraging this discourse around flexibility, as written about frequently by Kump, paved the way for the development of an entire industry around flexible school design, which will be seen in the following chapters through the School Construction Systems Development project and architect Ezra Ehrenkrantz.

Conclusion

This chapter has argued for the development and cultivation of a building typology that is the California school building. While the next chapters look to the School Construction Systems Development project, this chapter has considered the various origins that have contributed to the development of the type. Through an early relationship with the functionalism of modern architecture and particular goals related to social welfare and public health, the California school building was rooted in buildings that seek to serve and/or shape the user through spatial interventions. I have also shown how educational and pedagogical theories, including the kindergarten movement and “gifts”—as devised by Friedrich Fröbel and taken up by Frank Lloyd Wright—and John Dewey’s learning-by-doing ideology—spatialized by Richard Neutra—have contributed to school architecture and school spaces. This chapter has looked at the roles of families, planning, and housing

developments in normalizing both spatial approaches to childhood and developmentally appropriate design for children (which is ultimately rooted in consumerism). These factors have unquestionably contributed to not only distinct school (and play) spaces for children but have also created the conditions for a market of products designed specifically for morally good and middle-class childhoods.

In the coming chapters, this typology emerges as the face of the School Construction Systems Development project, and various aspects of the type's production continue to materialize and resonate in the schools that were part of this project. There is also an omnipresent tension between schools designed for children and those designed for power or social or political goals; specifically, how can conversations about the ideal conditions of school spaces for the education of children be leveraged alongside various other factors? How have similar concerns about suburban housing developments affected school designs and how they are used? As seen through the origins and goals of the larger School Construction Systems Development project, the idea that design for children can be articulated purely is not possible. Design for children, like schooling for children, articulates anxieties about contemporary society on behalf of those who are doing the designing and the funding, as well as their goals for the role of education in society. I argue that much like how the organization of time in the

school day is tied to specific objectives, school buildings are also tied to specific objectives, ones often outside official educational discourses. The following chapters look to the ways that particular school buildings in the 1960s reflect the anxieties and goals of their builders, as well as contemporary Californian social, political, and economic goals of the period.

Chapter Two | From Hertfordshire to California: The Origins of the School Construction Development Systems Project

In 1962, a school for elementary students opened on Stanford University's campus in Palo Alto, California. The school was nestled in an idyllic eucalyptus grove near the Escondido Housing Village, a complex for graduate students and their families—a natural fit for a school building (Fig. 2.1.).¹ Despite this, it would never operate as a functional elementary school, nor would children ever set foot in its classrooms. The building, developed and designed by architect Ezra Ehrenkrantz, was a prototype for the School Construction Development Systems (SCSD) building project—a test of what would eventually be thirteen schools built in suburbs across California in the 1960s. In a series of widely distributed promotional photographs and videos, the test school was described as “an elite total system of parts comparable to a modern jet airliner” and was imaged frequently in architectural and building press (Figs. 2.2., 2.3., and 2.4.).² (It was lauded in educational material as a more *efficient* school than those built in so-called traditional ways and was celebrated by architects as the solution to the nation's school-building problems.³ The school featured movable folding partitions, expandable

² “SCSD,” promotional video from July 1965, https://www.youtube.com/watch?v=6B_QETj5hsg Accessed September 2023.

³ C.W. Griffin, Jr., *Systems, An Approach to School Construction* (New York: Educational Facilities Laboratories, 1971), 6-8.

cabinetry, ceiling-trussed HVAC and lighting systems, and exterior walls made of glass and steel. Architects, politicians, engineers, and school administrators from across the United States and the globe traveled to the test site, were given tours of the space, and were shown its various flexible components.

Ehrenkrantz's vision for the school was shared and carried out by a cadre of institutional partners, including Educational Facilities Laboratories (EFL), the educational funding wing of the Ford Foundation, and the Stanford Planning Laboratory, a research group part of the Stanford School of Education. The Planning Lab managed the EFL grant, while Ehrenkrantz and his team of project architects designed both the school-based systems and the manufacturing networks that produced them. This chapter analyzes the various origins, actors, and institutions of the SCSD project—from stock-plan schools and prefabricated housing to Hertfordshire schools, to the EFL—while looking primarily to the test school and its many promotional photographs for orientation. I argue that the test school served to both sell systems-based school architecture and create a multivalent network of school-based industrial manufacturers and products, which would create a replicable way for incorporating technology and industry into American school spaces. These schools would create internationally competitive students in the context of the Cold War and would assert America's market-based

successes in terms of robust industrial markets and technological advancement while signifying qualitative education reform. This test school functioned to sell the system and the network, and to assert American education internationally as bound with technology, which would have significant reverberations in public education in the years following. This chapter points to the ways in which these schools became slated to inspire education and school architecture across the United States as an experiment in quick and efficient building. Through the photographic images and media campaign of the early prototype school built on Stanford's campus, the SCSD project was imaged as a solution to many of the nation's school-building problems. I argue in this chapter that the prototype school was imaged as scientifically rational in order to assuage a range of educational, social, and facilities-related building concerns surrounding American education while also working to build a large market of school-related products.

Origins of Systems-Based School Architecture—Ford Foundation and Educational Facilities Laboratories

In 1960, New York Governor Nelson Rockefeller brought a bill to the New York state legislature that would require the New York State Board of Education to use stock plans of prefabricated schools for future school-

building projects.⁴ These plans were to be first developed by the State Architecture Board and then implemented and managed by local districts across New York. Experiments in prefabricated building had begun in the early twentieth-century and had been applied to housing and defense industries in the US and abroad.⁵ The stock-plan school bill was met with widespread criticism from architects, and it did not pass.⁶ However, the concept of stock-plan schools had staying power; the Ford Foundation revisited it as a solution to the problems of American school-building and a rapidly expanding population in the postwar years. Governor Rockefeller's interest in school standardization was spurred by multiple factors, many of which revolved around race and the anxiety around school desegregation amidst a nationwide discourse about urban renewal. There was a need for objectively designed school buildings that could be applied across all races and cultures, *and* a proposed model of school decentralization that would allow for more local, community control of schools. Functioning together, these ideas meant new schools had to be built rapidly and cheaply while

⁴ The use of stock-school building plans was included as part of the 1960-61 New York State Budget. "New York State Budget Summary," 1960-61, (Albany, NY: Executive Department Division of the Budget, 1960), 10.

⁵ See Colin Davies, *The Prefabricated Home*, London: Reaktion Books, 2005, for a discussion of the history, implications, and limitations of prefabrication in housing.

⁶ See "Open letter to New York State Education Board from AIA architects," courtesy of Ford Foundation Archives, Rockefeller Archive Center.

designed to be user-friendly enough so local communities and neighborhoods could operate the schools.

In New York City, for instance, changing racial dynamics of historically white neighborhoods, combined with unrest about so-called neighborhood renewal and increasing awareness of systemic racism among primarily Black and Puerto Rican communities in the city, led to massive school-based protests. As Marta Gutman highlights in her book chapter “Intermediate School 201: Race, Space, and Modern Architecture in Harlem,” the inadequate facilities and curriculum of Intermediate School 201 in Harlem sparked grassroots, activist-led boycotts and protests in the late 1950s at it and other New York City public schools.⁷ In response to the boycotts, Mayor John Lindsay called for the Ford Foundation to fund a special panel to assess the ways and means of so-called school decentralization. The committee commissioned reports from many, including Dr. Kenneth Clark, an instrumental figure in arguing against school segregation in *Brown v. Board of Education*, who contributed a comprehensive study on emotional achievement in New York City schools; survey researchers Oliver, Quayle, and Company, who to assessed “White Middle Class Attitudes of New York City Public Schools;” and Price Waterhouse & Co., who assessed the fiscal

⁷ Marta Gutman, “Intermediate School 210: Race, Space, and Modern Architecture in Harlem,” in *Educating Harlem: A Century of Schooling and Resistance in a Black Community*, ed. Ansley T. Erickson (New York: Columbia University Press, 2019).

reality of such a move.⁸ The panel ultimately recommended decentralization of the larger school district and a move to a community-school-board model, and advocated for new schools to be built to replace the failing ones. Along with a white population shift to the suburbs away from the city, Governor Rockefeller's call for stock-plan schools would meet the changing urban dynamics as well as the broader call for decentralization. This community-school-board model would put school control in the hands of local parents, teachers, and activists and would bring about a shift away from a central school board. This would allow local authorities to be largely in charge of curriculum, while facilities would still be the purview of the Board of Education. Though neither decentralization nor stock plans were implemented in New York City, the stock-plan model began circulating in the educational and school facilities funding departments of the Ford Foundation, most notably EFL.

In 1958, the Ford Foundation established EFL as part of that year's thematic funding focus on education, which included discussion of the status of national and international educational outcomes. As Inderjeet Parmar chronicles, the major philanthropic organizations in the postwar period were *international* in both scope and conviction and committed to combating anti-

⁸ 'White Middle Class Attitudes of New York City Public Schools' Reports, 1950-1960, Ford Foundation Archives, Rockefeller Archive Center.

Americanism and fighting communism abroad.⁹ The 1958 Ford Foundation annual report notes that

the vigor of a nation and its educational level go hand in hand. Ignorance forestalls or imperils individual freedom and national political independence. But the power of education is evident even in countries where education is rigidly directed and perverted. One great hope is that education, with its power to liberate the mind, will provide not only the tools for scientific advancement but the environment for the fulfillment of man's moral and spiritual nature.¹⁰

That is, if America were to remain a source of global hegemony and order, it would need to train its citizens to pursue scientific advancement and establish educational environments in which shared American values (i.e., anti-communism, American hegemony, and a God-given right to establish and maintain world order) are cultivated and nurtured. EFL was tasked with researching and cultivating school spaces in which a technocratic and morally secure future could be secured for American democracy through funding new school-building, facilities upgrades, and developing a body of educational literature. Through the 1960s and 1970s, EFL also would fund a number of research studies into world-building topics, such as how institutions of higher

⁹ Inderjeet Parmar chronicles in *Foundations of the American Century: The Ford, Carnegie and Rockefeller Foundations in the Rise of American Power* (New York: Columbia University Press, 2012) 75.

¹⁰ 1958 Ford Foundation Annual Report, 12. Courtesy of Ford Foundation Archives, Rockefeller Archive Center.

education could facilitate neighborhood renewal and safer cities, as well as how research from American education buildings and systems could be transmitted and applied globally.¹¹ As such, the Ford Foundation saw the problem of American education as part of a worldwide framework in which “causes such as the exploding birth rate, the mass of new knowledge, and the deep desire for education, and the consequences—the overburdened school facilities, the shortages of teachers, the downward trend in the quality of education—are mirrored or dwarfed by like conditions in almost every other country in the world.”¹² As America was the hopeful steward of global education, the problem of school facilities in the US was an international problem, and experimental solutions were needed on home soil in order to both test and transmit ideas about American education globally.

¹¹ Judy Marks, “A History of Educational Facilities Laboratories (EFL),” National Clearinghouse for Educational Facilities, 2009, <https://files.eric.ed.gov/fulltext/ED508011.pdf>, accessed February 2024. For instance, “Campus and Community,” published by Educational Facilities Laboratories in 1980, looks at the role of the college campus in revitalizing and sustaining urban centers. “The Schools and Urban Renewal,” published by Educational Facilities Laboratories in 1964, advocates for new school construction which would stimulate slum renewal and individual home repair. The Ford Foundation, sometimes through EFL and sometimes through other funding branches, also funded research into international school-building. Inderjeet Parmar in *Foundations of the American Century*, “Ford, Rockefeller, and Carnegie in Nigeria and the African Studies Network,” chronicles the funding relationship between major donors and the development of schools in Nigeria, 149-179, Ford Foundation also donated money for the development of schools and research institutions in Latin America. See “The Ford Foundation on Assistance to Promote Academic Teaching and Research in Disciplines Related to Urban Development,” June 14, 1965, CRS Center Archives at Texas A&M University, College Station, TX.

¹² 1958 Ford Foundation Annual Report, 12. Courtesy of Ford Foundation Archives, Rockefeller Archive Center.

Educational facilities were thus seen by the Ford Foundation and its public-private relationship with the US Department of State as key sites through which important American values could be disseminated globally, the problem of cities could be negotiated, and Americans could be trained to embrace a growing technocracy which advocated for a spirit of educational progressivism and constant expansion. EFL was, therefore, a vital Cold War-era funding body that organized massive grants to school-building projects nationwide and developed literature and academic research to serve these educational and pro-America aims. EFL's 1958 grant was \$4,500,000—the largest grant given to a non-scholarship-oriented body in education that year—and its budget expanded through 1970. The emphasis on EFL within the Ford Foundation indicates a belief in the potential of school facilities that aligns with the foundation's goals and interests. EFL was ultimately given the status of a separate organization housed within the Ford Foundation. It described itself as a laboratory whose “underlying philosophy and operating principle has been to speed, encourage, and guide constructive change in school and college facilities. Undergirding its program have been two basic principles:

- 1) Facilities should be more sensitively designed to the new needs of education in a period of rapid—indeed revolutionary change in instruction and social conditions; and

- 2) Economy is critical in this inflationary period and intelligent economy should be encouraged wherever, whenever, and however it can be.”¹³

EFL worked to articulate these values through its extensive publishing machine and experimental buildings, which served as models for the potential of American public education.¹⁴

Architectural Forum and the School Problem

While the Ford Foundation’s interest in school-building and facilities management was aligned with its larger mission and internationally minded values, in the same postwar period, architectural journals and building magazines also had a robust interest in the problem of school facilities, specifically, how to build many of them efficiently and, most importantly, cheaply. While familiar discourses in the literature attribute the new interest paid to school-building in the postwar period simply to population increase, this section explores the context through an expanded lens; it considers other factors, such as concerns about modern architecture being more fitting for school buildings than the monumental architecture of previous eras, the massive maintenance problems of the existing stock of school buildings, and

¹³ Letter to Milton C. Mumford, July 31, 1969, from Harold B. Gores, Jonathan King, Alan C. Green ‘Subject: Background material looking toward an additional grant from Ford Foundation.’ *Ford Foundation Archives* at Rockefeller Archives Center.

¹⁴ Judy Marks, “A History of Educational Facilities Laboratories (EFL),” National Clearinghouse for Educational Facilities, 2009, <https://files.eric.ed.gov/fulltext/ED508011.pdf>, accessed February 2024.

changing ideas about low-density planning being developmentally better for children in the United States.¹⁵

In November 1961, *Architectural Forum* described the problem of schools as the most pressing architectural problem of the era. According to the editors, there were simply not enough schools for the quickly expanding population of children. *Architectural Forum* had long maintained an interest in school-building.¹⁶ In 1935, a special issue of the journal articulated the role of modern architecture in the new school expression while also advocating for the need for playscapes and spaces devoted to physical health and nature; furthermore, the expansion of child labor laws in this period meant a reconsideration of *the wellbeing of the child* alongside progressive education, and thus more attention to the kinds of spaces that would be appropriate for children. The special issue consisted of four proposed school models for future school planning from noted modern architects Richard Neutra, William Lescaze, Wallace Harrison, and W. Pope Barney. It worked to convey a shift

¹⁵ Amy F. Ogata, "Creative Playthings: Educational Toys and Postwar American Culture" *Winterthur Portfolio* 39, no. 2/3, 129-156. Ogata points to the explosion of births in the postwar years necessitating the need for new school building. As discussed in Chapter One, multiple discourses extending from architecture and planning journals, education, and sociological research, positioned expanded suburban space as safer and more beneficial for child growth and development.

¹⁶ This interest was partially due to European modernism's alignment with social welfare, which included building projects like housing and school buildings, partly because of MoMA's architectural exhibitions in the early twentieth-century which often included schools, and partly because of the perceived opportunity for architects to define American school buildings in innovative ways.

from nineteenth-century-style schools to modern ones, or what Neutra described as a shift from the “massive monumentality” that was “supposedly an ornament to the community” toward modern schools with ample play areas designed for a so-called “return to nature” via technical means.¹⁷ And even in 1935, Neutra alluded to the benefits of prefabricated and modular school planning,

In the future it may well appear feasible and indeed a measure of the true economy to develop certain types of elementary schools fitted to the condition of rural, semi-rural or suburban districts which could be largely shop-fabricated and extensible. Such structures, strictly living up to the program worked out by the state division of schoolhouse planning or by a committee of experts of all pertinent categories, would then in their elements be furnished from the manufacturing plant and speedily erected by crews on the premises.¹⁸

Neutra’s largely prefabricated Ring Plan School served as a model for this type of experimentation in school-building, which he advocated for at the state level. In fact, his larger call in his influential article within the special issue was one toward experimentation in modularity of school-building and in constructing experimental structures in order to pave the way for radical pedagogical and structural changes.

¹⁷ Richard Neutra, “New Elementary Schools for America,” *Architectural Forum*, January 1935, 28.

¹⁸ Ibid.

In October 1949, *Architectural Forum* again devoted an entire issue to school-building. In 1949, the journal noted that more than 11 billion dollars would need to be spent by 1960 in order to replace schools with new ones or bring older schools up to modern code. A seven-million-student increase in enrollment, due to immigration and children being born in higher numbers after the war, meant that schools needed to be built quickly and cheaply; this was described as a challenging and stimulating problem for eager architects. The emphasis was not solely on designing cheaply, but also designing better. The *Architectural Forum* editors wrote,

The builders of these new schools must heed the research which the specialists have been quietly conducting during the past ten years—research on the basic elements required for better schools. It calls for long-range programming, building code revision, integration of architecture and engineering, and most important, modification of the shape, size, and appointments of the basic classroom.¹⁹

Likewise, in 1949, research by the National Education Association showed that urban schools were overcrowded, with, on average, up to 31 percent beyond their capacity.²⁰ Additionally, most school buildings in the Eastern and Midwestern parts of the country were in need of repair or

¹⁹ *Architectural Forum*, October 1949, 81.

²⁰ *Ibid.*

replacement, as many had been built during the Civil War era.²¹ And lastly, as there was a shift in education toward an emphasis on democratic living and away from learning by rote memorization and punitive means, it was thought that students needed more space in order to move around, participate in projects and group work, engage with individual libraries, and work with materials, machines, and technology.²² Whereas nineteenth-century schools had been essentially large factories with exterior colonial or gothic design features, by the 1950s, there was a return to the design of large schools, but with entirely reworked spaces for student learning.

This diverse set of factors pointed to a massive facilities problem.

Architectural Forum highlighted these changing needs throughout the postwar moment and also, importantly, began highlighting the large industry and ever-growing availability of objects designed specifically for school buildings. The journal's issues in the 1950s and 60s devoted to school architecture were filled to the brim with advertisements for school products designed to regulate internal temperatures, create quiet hallways, silence closing doors, maximize airflow, and foster ideal lighting, among countless other needs. While in

²¹ Allan C. Ornstein, "School Finance and the Condition of Schools" *Theory Into Practice* 22, no. 2: Financing Education (Spring 1994), 122.

²² This shift was due, in part, to the outsized influence of John Dewey and his concept of progressive education, which called for holistic and developmentally appropriate learning. See Introduction and Chapter One.

architectural and popular media, there was a sense of nostalgia about the demise of the little red school house, the general consensus was one of embracing technology and modernity as solutions to the problem of school-building. “Today’s average school is an extravagant monument to a dead past,” wrote editors of *Architectural Forum* in 1949.²³ They criticized the elaborate trimmings and style of neocolonial and collegiate gothic-style schools as wasting space that could go to classrooms. They pushed for smaller, plainer schools that would be pleasing to children and could be built efficiently without stretching taxpayer dollars. In the years that followed, the magazine turned to flexible and prefabricated school-building models from the United Kingdom as potential solutions for the problem of American school architecture.

Hertfordshire Schools and Prefabricated Educational Spaces

As in postwar America, school-building in the United Kingdom was also seen as a vital architectural challenge and urgent necessity. The need to build as much public infrastructure as cheaply and quickly as possible, despite shortages of bricks and other building materials and massive labor shortages, resulted in local conversations about prefabricated structures.²⁴ This section

²³ *Architectural Forum*, October 1949, 92.

²⁴ British Pre-Fabricated School Construction, School Construction Systems Development, (New York: Educational Facilities Laboratories, 1962).

looks at the various influences of the Hertfordshire school-building program in order to draw connections between both how the need for the project was premised and designed, and how the flexible school-building project functioned socially and pedagogically in the UK. Detailing this history illustrates how Ezra Ehrenkrantz, with his on-the-ground perspective, was positioning SCSD in relation to the perceived failures and successes of the program, and how he pitched the project to the Ford Foundation, *Architectural Forum*, and various school districts when he returned to the United States. As Ehrenkrantz sought out a Fulbright working with the county architects in Hertfordshire in order to eventually pitch a similar program in the US, it is vital to identify how the UK project came to be, and how it functioned alongside goals of modern architecture and child development, in order to compare it with the development of its US-based counterpart.

In Hertfordshire, county architects began experimenting with steel frames for school building (Fig. 2.5.) Steel frames had the advantage of being able to be built in areas where strip mining had compromised foundations, causing buildings to sink.²⁵ Additionally, the recently passed Education Act of 1944 had increased the length of time students would be in school and eliminated many fees that families had to pay to send their children to state

²⁵ "System Building" by Elain Harwood, March 2020, *e-flux*, <https://www.e-flux.com/architecture/education/322668/system-building/>, accessed September 2023.

schools, both of which resulted in an influx of students. Combined with an increase in the birth rate after World War II, which, as in the US, caused considerable anxiety for local school boards, the discourse around building educational infrastructure was urgent at the Ministry of Education.

At the same time, the young British architects working for the Ministry of Education in the 1940s were fresh out of the Architectural Association (AA); they were concerned with collaboration and child development in exciting ways that garnered attention in architectural and educational circles.

Architectural historian Andrew Saint, in his seminal history of postwar schooling in England, *Toward a Social History of Architecture: The Role of School-Building in Postwar England*, points to the ways in which the architectural collaboration of the architects, educators, and researchers of the period is an early example of dispelling the hero–architect myth of the modern movement. The context of architectural education in Britain in the 1930s and 1940s was evocative of a spirit that “went well beyond dabbling in socially or politically alluring projects”—it aimed to meet the call for the new European architecture through improving technical knowledge, which included prefabrication, plastic, and new materials.²⁶ During this time, the AA produced a generation of architects who, having witnessed the devastation of the Great

²⁶ Andrew Saint, *Toward a Social History of Architecture: The Role of School-Building in Postwar England* (New Haven: Yale University Press, 1987), ix.

War during their many educational travels through Europe—and who also were themselves often products of Garden City utopian experiments in living—embraced social reform via the built environment and the new materials and techniques that might bring better homes, schools, playgrounds, and hospitals to more people.²⁷ Bauhaus experiments in total social design and European architects such as Alvar Aalto influenced many of the young architects who found themselves working in educational architecture throughout the UK in the 1940s to 1960s. Saint also argues that the modern movement itself heavily influenced the ways in which the school-building program was messaged and developed and that the role of social welfare in public institutions could not be understated:

It was the fullest expression of the movement for a social architecture in Britain which gathered pace in the 1930s and found its outlet in the service of the post-war welfare state. No more ambitious, disciplined, self-conscious or far-reaching application of the concept of architecture as social service can be found in any western country. More than any other modern programme of building, the English schools fulfilled Walter Gropius's ideals about an architecture which should be simple, practical, universal and imaginative.²⁸

The potential impact that the new school architecture was to have on society in the UK, and later the US, was believed to be monumental.

²⁷ Ibid., ix.

²⁸ Ibid.

One young architect, Mary Beaumont Medd, after graduating from the AA and becoming the first female architect licensed by the Royal Institute of British Architects, took a position designing public housing before working as a school architect. She, like other young London architects, was influenced by utopian experimentation happening at places like the Peckham Health Centre, designed in 1935 by Owen Williams. According to Catherine Burke,

the building was designed to have an impact on the activities within it. Freedom of movement and visibility in an open-plan structure were considered important in promoting social cohesion, spontaneity of behaviour, and awareness of opportunities for action...At the Peckham Health Centre, health was defined not as a state but as a process of interaction with the environment.²⁹

Like other European buildings of this period designed toward health, the structure itself provided the framework to facilitate healthy living and thus bring about social change—connections that Medd would bring to her designs for schools. Her 1932 senior thesis project at AA, “An Educational Centre for Arts and Sciences,” was a school which articulated pedagogy as a process of movement *within* and interactions *with* the surrounding natural environment.³⁰ She was taken by the idea that intergenerational relationships could be

²⁹ Catherine Burke, *A Life in Education and Architecture: Mary Beaumont Medd* (London: Routledge, 2013), 66.

³⁰ Medd’s later designs were deeply influenced by Peckham Health Centre.

facilitated through these types of social facilities and enhanced through an interplay of light, water, and sunshine—an idea which would also find expression in her later schools. Her thesis project also drew from educational progressivism and Dewey’s concept of learning by doing. Her design articulated the idea that “education and welfare might be mutually supported in a progressive educational environment characterized by functionality.”³¹ Medd’s educational-center design fits within a larger pattern of school and community planning in Europe and the UK, one built upon a moral compass toward social welfare as a shared value that could be engendered through consciously designed and built infrastructure and structures. For Medd, these ideas were also foregrounded in a specific relationship with the natural environment through both the design of spaces and the materials used.

Medd had worked designing houses and housing complexes for a number of years with Ernő Goldfinger. Their mutual interest in childhood is evident; Goldfinger designed the children’s section of the British Pavilion as

³¹ Ibid., 39. The *Architectural Association Journal* described the school in 1932 as having “...folding French doors [which] opened out onto a terrace and a court. It contained a small public library to be open all day to the public for lending and reference near to the students’ entrance and divided into bays with glass partitions. There was to be a special children’s room within the library with clear-storey lighting over covered ways. The plans contained handicraft rooms; workshops equipped for carpentry, metal work, art work as required; gymnasium and changing rooms for both sexes with shower baths; lecture rooms and staff rooms; first aid and music rooms; and classrooms for housewifery were to be adjacent to an infant welfare centre ‘so that the rooms can be used for afternoon classes for mothers as well as for evening class. The welfare centre was to have a cross ventilated waiting room with a South West aspect and French doors out to gardens.” *Architectural Association Journal*, October 1932, p. 102.

part of the Exposition Internationale des Arts et Techniques dans la Vie Moderne in 1937, and in the late 1930s, Medd began to work on flexible spaces for families and children in housing complexes, which resulted in some of the earliest uses of prefabrication for school design. Medd designed one such flexible nursery school on a unit system that was completely prefabricated.³² These experiments were part of the 1934 commission from the Nursery School Association, which asked Goldfinger to design a standardized nursery classroom made from wood, later known as the “expanding nursery.” The goal was for the “parts to be multiplied and used to extend to the desired number of units” in order to accommodate shifting student populations via mass production. The prototype was built but never mass-produced.³³ For Medd and Goldfinger, the aims of social architecture and progressive education were perfectly in line with standardization and prefabrication.

As a result of this work, Medd was invited to join the Hertfordshire County Council as a school architect. There, she worked with an innovative and radical group of young architects who were experimenting with systems design and prefabricated parts for schools. Medd was eager to bring the

³² Lynne Walker, “Golden Age or False Dawn: Women Architects in the Early 20th Century,” *English-Heritage.org.uk*, 1997, 24, Accessed September 2023.

³³ Catherine Burke, *A Life in Education and Architecture: Mary Beaumont Medd* (London: Routledge, 2013) 70.

ideas of intergenerational spaces and integration of the school within the natural environment—as well as locally made fine-art pieces and school spaces that mirrored domestic spaces—to her designs. Arguably, the Hertfordshire schools that were built in the 1940s and 1950s display Medd’s hand alongside the more well-known narrative of prefabrication. Indeed, the schools in which Medd was involved, including Cheshunt and Burleigh Primary schools, were singular in their emphasis on prefabricated pieces nestled into the existing geography and designed with special attention to the feel and the aesthetics of the space with children in mind. Mary Medd and her husband, David Medd, were passionate about ensuring that these types of spaces were cultivated in their designs despite the competing attention paid to standardization and prefabrication by critics, architects, and historians alike. Mary Medd insisted on bringing the tenets of progressive education to her designs. When she left Hertfordshire and became a school architect for the Ministry of Education in London, the Hertfordshire schools continued to be described in national media as inspired by progressive education, though, without the Medds’ direct influence, the pedagogical component aligned with standardization of UK schools mostly fell away.³⁴ Medd is an important figure in this narrative, as her work articulates a link between pedagogical theory and architecture that feels similar to those of the school spaces designed by

³⁴ Saint, *Toward a Social History of Architecture*, 72-73.

Richard Neutra in California and those of Crow Island in Winnetka, Illinois. Yet, these ideas were viewed first in Hertfordshire and later in the SCSD project as inefficient and not aligned with the total goals of the project. This disjunction points to some of the ways that the schools were critiqued by teachers and students on the ground in both US and UK projects.

In the same period, Cheshunt Infants School served as a prototype for prefabricated school architecture; the systems that followed it relied on Cheshunt's material and spatial considerations as a model. As Saint describes, the Hertfordshire architects wanted to create a shared language and grammar for school-building that employed prefabrication—not by individual unit or structure, but by components. The young Hertfordshire school architects hoped to build schools that would be flexible and could be constructed quickly by a few men. Hertfordshire architect Bruce Martin said, “We must build lightly for a life of free and changing activity, for families with the space in which to grow as needs and ideas change.”³⁵ This emphasis on flexibility guided the schools' program architects across the country, as did a quest for technological innovation.

This innovation took on the form of various updated system names and increasingly more specific building ratios that the Hertfordshire project

³⁵ Ibid., 68.

architects used over the years. These changes reflect the experimental nature of the prefabricated schools. Each subsequent refinement of the system resulted in more streamlined school buildings. According to David Medd, moving toward a grid system of prefabricated planning allowed for the construction of a “whole school, not just the classroom bits.”³⁶ Planning with a grid system thus articulated an important shift in prefabricated systems planning. Instead of being seen as a hasty solution to an urgent problem, the schools began to be seen as, according to Saint, “offering better changes for education, better value for money and therefore a tool specially applicable to a national programme of public building.”³⁷ As in the US-based architectural press, architecture journals in the UK, namely the *Architectural Review* and *Architects’ Journal*, widely reported on the Hertfordshire schools.³⁸ These images, which proliferated widely across the globe, showed children in bright, colorful spaces: working independently at desks or playing outside amidst trees and gardens, as well as in light-filled classrooms and hallways, with murals, mosaics, and sculpture throughout the schools. Leading up to the 1950s, the Hertfordshire schools also institutionalized processes and procedures for collaboration between students, teachers, industry,

³⁶ Ibid., 70.

³⁷ Ibid., 71.

³⁸ Ibid., 75-76

technologists, and clients, which, arguably, was one of the most innovative contributions of the schools to British and international architecture of education and beyond. Andrew Saint describes the campaign to showcase the schools as vital to the ongoing proliferation of the project.³⁹

One such system extending from the Hertfordshire schools, Nottinghamshire's CLASP (Consortium of Local Authorities Special Programme) schools, took lessons from the Hertfordshire experiments and, with material research from the Building Research Station, continued to develop the building of school systems through the 1950s. The CLASP schools drew increasing international attention and proved to be incredibly influential on the editors of *Architectural Forum* as well as on Ezra Ehrenkrantz, who eventually became the lead architect on the SCSD project. Ehrenkrantz was a young architect from New Jersey who had become acquainted with the idea of whole-systems planning for schools when he worked on a Fulbright Fellowship from 1954 to 1956 at the Building Research Centre (BRC) in Hertfordshire toward the planning of the prefabricated Hertfordshire schools. Ehrenkrantz had ambitiously developed a theory of modular number patterns, which he sought to put into practice professionally as soon as possible.⁴⁰ Ehrenkrantz's modular number pattern might have

³⁹ Ibid.

²⁹ Ehrenkrantz unsuccessfully petitioned multiple universities in the US and the UK to allow him to earn his master's in architecture degree in one year instead of the standard two, as he

been inspired, in part, by the 1956 report from the Organization for European Economic Cooperation called “Modular Co-ordination in Building.”⁴¹ The report called for the “adoption of a modular system as a basis for standardization of building components.”⁴² Ehrenkrantz wrote about his modular number pattern in *Architectural Forum* and *Arts and Architecture* magazine. In 1967, Ehrenkrantz described his modular number pattern as the ratio that composes the idea of the module, the “dimensional framework” for a building’s construction but not its appearance.⁴³ Ehrenkrantz goes on to describe the modular system as a series of standardized parts which share a ratio of size. This would enable, for instance, a wall to be altered so that a standardized partition could be added and would fit the size of the wall so long as it was extended within the parameters of the shared ratio. For instance, in the SCSD system, four partition panel sizes were proposed, 24”, 32”, 36”, or 40”, which would work with any door or wall panel also designed as part of the system.

saw a crucial and time-sensitive opportunity in the building industry to standardize building operations via his modular number pattern. Eventually, he was awarded a Fulbright to study systems-building in the UK and completed his MArch at the University of Liverpool. He hoped to figure out a way to apply his modular number pattern to the Hertfordshire schools.

⁴¹ Colin Davies, *The Prefabricated Home* (London: Reaktion Books, 2005), 139.

⁴² Barry Russell, *Building Systems, Industrialisation and Architecture* (London: Wiley, 1981), 306, cited in Davies, *The Prefabricated Home*, 139.

⁴³ Ezra D. Ehrenkrantz, “Modular Materials and Design Flexibility,” *Arts and Architecture* (April 1967.)

Photographs and text about the Hertfordshire schools were widely published in architectural journals, building magazines, and books, including Nicholas Pevsner's seminal *Buildings of England* series. Pevsner wrote of the schools,

In spite of all this research and technical ingenuity, these schools would be merely an achievement of engineering and organization if the composition and finishes were not the work of a team of exceptionally sensitive and modern-minded designers. From the balancing of block against block down to the colours of the walls, the curtain patterns, and the door handles, everything is carefully considered and elegantly done. It is a delightful experience to walk around and through some of these schools.⁴⁴

The schools were lauded in the international architectural press for their balance of prefabrication, systems architecture, and humanistic design for children, and Ehrenkrantz saw the way that the schools were being positioned in the UK architectural press as the answer to various problems of school-building.⁴⁵

At the BRC, Ehrenkrantz worked with local architects toward perfecting the Hertfordshire prefabricated steel frame by making it more streamlined and

⁴⁴ Nicholas Pevsner, *The Buildings of England: Hertfordshire* (London: Penguin Books, 1977), 37-38. The Buildings of England series offer a town by town analysis of vernacular and notable buildings of England across forty six volumes. They are celebrated as key components of English heritage.

⁴⁵ Saint, *Toward a Social History of Architecture*, 75-76. Ehrenkrantz would also have seen the wide imaging of the CLASP school type in the Milan Triennial in 1960.

cheaper. The architects, by this point, admittedly were not looking toward educational needs but instead prioritized in order from most important to last: “cost, speed of erection, site labor, maintenance, flexibility, stability faced with mining subsidence, mechanical properties, and appearance.”⁴⁶ In this effort, Ehrenkrantz worked with county architect Donald Gibson. Though he inherited a building program that was behind schedule due to shortages in materials, plasterers, and bricklayers in the 1950s, Gibson brought a fresh perspective to the project.⁴⁷ He promised a solution to the labor and material shortages, as well as mining subsidence, in two years. This two-year period was thus a period of great technological innovation and heavily prioritized cost-cutting over educational goals.

The Building Research Centre was the space where Gibson and other architects experimented with these cost-saving ideas. Sharing information and ideas across the country, they would have interacted with Ehrenkrantz. The BRC began in the 1930s at a secret compound in Garston, Hertfordshire, where government scientists studied the effect of explosions on scale models. It was reorganized in 1939, when the director became the minister of home security, and tensions in Europe heightened. The organization, its architects

⁴⁶ Report, 13 September 1955, CC/AR/4/1, Nottinghamshire Archives.

In “System Building” by Elain Harwood, March 2020, e-flux, <https://www.e-flux.com/architecture/education/322668/system-building/>, Accessed September 2023.

⁴⁷ This was due to an increasing demand for power stations to be built nationally during this period of nation rebuilding after the war.

note, was influenced by the recently published book by JD Bernal, *The Social Function of Science*, which argued that science and scientific progress could not be separated from society, including material, social, and economic concerns. At the BRC, this mode of framing scientific research became bound with a social aim rather than simply objective function and knowledge seeking. Bernal spoke to the Royal Institute of British Architects about the BRC in 1946:

In the early days of the war, the whole emphasis of science in war was science in relation to scientific gadgets...But as the war progressed, it became noticed that it was not so much the scientific gadgeteering side which was important; problems raised in the factor, production problems, planning problems in the general preparation of war weapons, and finally, towards the middle and end of the way, the problems of actual operations. While this was going on, organization was drawing the scientists more and more closely in with the practical people. It was an experience which was common, I think, to all branches of science and led to an entirely new and wider view of the relations of science and practical things.⁴⁸

Here, architecture, manufacturing networks, and scientific research as a social good came together and would greatly influence Ehrenkrantz's approach to school-building in California. While building research would take the shape of a social good at the BRC, in the United States, it would come to

⁴⁸ Andrew Saint, *Toward a Social History of Architecture: The Role of School-Building in Postwar England*, (New Haven: Yale University Press, 1987), 21.

define a postwar pedagogy. Ehrenkrantz's project would pay a considerable amount of attention to administration, project-planning, and addressing the problems of production—concerns no doubt gleaned from his time at the BRC.

The effect of the BRC on architecture in the UK should not be underestimated. Architects working in various fields intersected there, and Ehrenkrantz would have been exposed to architectural thinking in cross-disciplinary ways, all fueled by the idea that architects could use technology for the betterment of the public. Yet, Ehrenkrantz ultimately criticized the CLASP and Hertfordshire schools for their closed system; it necessitated products be designed and made at the school level, as opposed to an open system, which would allow for products to be designed to fit into any school.⁴⁹ Ehrenkrantz pointed to this as an example of ways that the UK school-building systems could be made even more efficient.

The head of Mechanical Engineering at the Building Research Station showed that 'modular co-ordination' bore no relation to real-world production and assembly issues. Economist Duccio Turin showed that consortium costs rose in the same way as conventional new construction when escalation and the funding cycle were considered; the benefits of bulk-purchase did not materialize—discounts offered related to length of commitment rather than volume; annual funding cycles mitigated against reducing construction time because of

⁴⁹ See critique of open systems building in Chapter Three.

‘peaking’ of start and finish dates related to the school year and the funding cycle.⁵⁰

Ehrenkrantz would have been privy to such critiques of CLASP at the BRC. In 1960, he wrote the article “How to Make Things Fit Together” for *Architectural Forum*, in which he outlined a more flexible and, thus, he thought, successful formula for modular coordination, one designed to sidestep some of these pitfalls. The concern over production and the creation of a sustainable market took precedence in the design of SCSD at its inception, while pedagogy and education took a back seat.

In retrospect, however, the critique of the CLASP schools and their less-than-favorable uptake with the British population was because the schools were aligned with “disagreeable urban phenomena,” including highways, land clearance, and careless redevelopment.⁵¹ It is not clear whether Ehrenkrantz was aware of such critiques, but they ended up being relevant to the strategies of planning and land management ultimately taken up in his own SCSD project in California just a few years later. After Ehrenkrantz’s time in Hertfordshire, he persuaded the Cupertino School

⁵⁰ Andrew Rabeneck, “Building for the future—schools fit for our children,” *Construction History* 26, 2011, 63.

⁵¹ Ibid.

District to test his systems-building ideas on the design and construction of two schools.

The [Cupertino] experiment achieved two things: Ehrenkratz built relationships with the EFL staff, and some basic conditions emerged that would have to be satisfied by future school-building system(s): Significant orders would be needed to interest manufacturers in meeting new criteria; a market would have to be aggregated; a single authority controlling a sufficient volume of work would be needed to make cooperation among manufacturers advantageous to them; only large companies could be expected to invest in development work in support of the programme; Research would be needed to establish the size of programme necessary.⁵²

EFL was thus persuaded that Ehrenkrantz would be the person to lead the next steps of this experiment, and they began investing dollars in building research and spatial design as pedagogical intervention. Instead of looking to existing educational theory, Ehrenkrantz and EFL would partially design their own through their vast publishing campaign of educational material.

EFL and *Architectural Forum*: “New Proposals to Cut School Costs”

In 1960, one of the CLASP schools was erected and displayed as Britain’s submission to the Milan Triennale in Italy. The school was much lauded and well-photographed and thus garnered international interest. In fact, the school won the top prize at the exhibition due to its advocacy of social architecture.

⁵² Saint, *Toward a Social History of Architecture*, 65

Inspired, in 1961, the editors of *Architectural Forum* and administrators at EFL were compelled by Ehrenkrantz to put together a symposium to discuss the problem of US school-building and to see what lessons could be learned from the Hertfordshire and CLASP schools. Stimulated by Governor Rockefeller's recent proposal for stock-plan ideas, the editors at *Architectural Forum* were convinced that his proposal was not innovative enough but offered some promising directions for the problem of school-building. The American Institute of Architects had soundly criticized the plan, declaring that stock-plan schools would cost more and lessen quality. Buoyed by the "pent-up capital" of EFL and the Ford Foundation, the editors felt that they could bring together a team of professionals and experts to evaluate the implementation of stock-plan schools and to study the Hertfordshire schools.⁵³ The group, which named itself "The School Economy Inquiry," consisted of representatives from state educational bodies in California, New York, and the UK: architects William Peña, Ezra Ehrenkrantz, and J. Stanley Sharp; manufacturers from Northrop Corp. and Kawneer Co.; Harold Gores and Jonathan King from EFL; and two editors from *Architectural Forum*, Douglas Haskell and Walter McQuade.

⁵³ Inderjeet Parmar chronicles in *Foundations of the American Century: The Ford, Carnegie and Rockefeller Foundations in the Rise of American Power*, 6.

From Hertfordshire and CLASP, the committee found that working directly with manufacturers yielded massive savings, and assembling interested architects and designers was key in coming up with flexible, economical, and fast solutions. The recommendation made by the committee was to continue research into the British prefabricated schools and to contract for development research on the precedent of defense development contracts, with the idea of leveraging existing military industry into school-systems production. Lastly, the group recommended what they called a “universal Erector-set system,” in which a development architect would pick components out of a parts catalog that would fit into the existing dimensioning system. The choice of product types would be limited, which would “yield a greater spread of possible bidders with consequent economy.”⁵⁴ EFL management would develop a series of educational pamphlets and other material that would be distributed widely to various school districts across the US. The pamphlets and books would not only highlight the potential impact of systems-building by showcasing the work of SCSD but would also show the pedagogical implications of flexible school designs. From fully controllable interior environments to moving walls that would facilitate open-plan learning to advise on how to facilitate innovative and flexible learning, the literature they published was concerned with linking architectural design and research

⁵⁴ *Architectural Forum*, November 1961, 128

with education and schools. Arguably, this literature showcased the work being done through the SCSD schools, but also positioned this mode of school-building as the logical and inevitable face of sound and rational educational thinking.

Developing School Construction Systems Development and Building the Prototype

Gore and King at EFL allocated \$50,000 to the Stanford Planning Laboratory, which had been named Western Regional Center for EFL during the Cupertino project with Ehrenkrantz. The idea was to study the notion of market aggregation and move forward with planning for a design for school systems in California. Ehrenkrantz and Stanford Planning Lab project coordinator James D. Laurits were aware early in the planning for this project that the various institutions and partners needed to carry it out would be challenging to assemble. For instance, as Andrew Rabeneck points out,

a new legal entity would be needed to take bids and award contracts; contractors would have to accept components from nominated suppliers; user requirements would have to be agreed and performance levels established before going into the market; powerful construction unions would have to back the system...Ehrenkrantz designed a process to bring a building system into being, in contrast to the Hertfordshire architects who wanted to design the system themselves.⁵⁵

⁵⁵ Rabeneck, "Building for the future—schools fit for our children," 66.

This would eliminate any urge toward individual authorship, and instead ensure that the schools would be beholden to the system and the market.

For the SCSD project staff, managing the relationships of various participants was a crucial and since overlooked part of the project. The sheer organizational complexity of the project—including management strategies needed to ensure buy-in from manufacturers, educators, architects, engineers, unions, and district administrators—was enormous. But in 1960s California, the buzz around “systems thinking” had also been circulating at research universities and in the military; both were seeking to branch out and maintain existing public-private governmental relations.⁵⁶ In addition to the assurance offered by funding underwritten by state education boards, the backing of the Ford Foundation and EFL surely interested manufacturers, who saw an international audience for their products and the school-building infrastructure that was being proposed. Only after the project was well

⁵⁶ Ehrenkrantz and project architects and administrators often comment on the use of cybernetics and systems thinking in their design. John Boice, the project architect, refers to cybernetics as being a major influence on the SCSD project: John Boice, *A History and Evaluation of School Construction Systems Development* (Menlo Park, CA: Building Systems Information Clearing House, 1971). In EFL’s pamphlet “Transformation of the School House,” it’s noted that the SCSD project is the first time that performance specifications (extending from systems research) “had been used extensively in architectural products. While performance requirements were common in military systems design, architectural products were normally described in hardware specifications” 14. Cybernetics, as an area of applied and theoretical study, while cited in project literature, is underdeveloped in its application in SCSD. Chapter Three offers an overview of the use of performance specifications and cybernetics.

underway and the many industrial and institutional partners were identified, and as he became familiar with the technocratic California systems culture, would Ehrenkrantz describe SCSD as “a systems approach to design.”⁵⁷

The project team began developing the organizational framework of the system and analyzing user needs and behaviors within school environments. They created a “general educational specification” to distribute to the various participating school districts in order to put together a composite of user needs that could be transferred into performance requirements. A few findings emerged: 1) districts wanted a variety of spaces and plans, 2) a building had to be flexible enough to meet changing needs throughout its the life, and 3) systems had to be economical in order to meet demand for both variety and ongoing flexibility. According to Andrew Rabeneck, “converting these requirements to measurable physical attributes led to the use of performance specifications, then very much a part of ‘systems’ thinking developed for military procurements where expert clients expressed their needs to industry in quantifiable ways.”⁵⁸ Ehrenkrantz believed that these performance specifications could be met by the ingenuity of American industry in ever-expanding ways, so long as they could be articulated and quantified. In this way, Ehrenkrantz and the project team

⁵⁷ Ezra Ehrenkrantz, *Architectural Systems: A Needs, Resources, and Design Approach*, New York: McGraw Hill, 1989, 4.

⁵⁸ Rabeneck, “Building for the future—schools fit for our children,” 67.

anticipated a national, even international, network of manufacturers and global markets to serve school architecture and beyond.⁵⁹ This research was guided by the existing goals of the project and designed to take educational thinking in new directions.

The construction of a mock-up building was crucial to the development phase of the project; in a draft of the contract between SCSD/Stanford and the various school districts, the function of the mock-up was described as operating

to develop the building components in detail so that School District architects may complete the design of project schools with full knowledge of the nature, performance and unit cost of the various components. The development work is to be completed by September 30, 1964, by which time each component contractor shall have produced components which meet the performance specifications as demonstrated by the mock-up building and testing program. After the documents comprising the building system have been accepted and approved by the commission, no change shall be made in the design of building components except up on the written approval of such change by the commission.⁶⁰

The development of the prototype school would lock in the system and no further changes would be made to the system itself by architects or administrators after September 30, 1964. This meant that some assurance

⁵⁹ Ibid., 68.

⁶⁰ First California Commission on School Construction Systems, "Contract Documents and Performance Specifications: School Construction Systems Development," July 1963.

could be provided to manufacturers that their products would not undergo periods of constant revision after this date and instead could begin manufacture and distribution to schools throughout the state.

The prototype school was built on Stanford University's campus in 1962. The school was, in many ways, designed to test the functionality of the bidding process and relationships with manufacturers as much as to showcase systems architecture more broadly. The six-part purpose of the mock-up was described as follows:

- 1) To check the component system in detail at a prototype level in a well-designed and well-finished building
- 2) To test components in relation to one another
- 3) To test the lighting, acoustic and mechanical environment
- 4) To present a visual check on the results of the system for participating school districts, manufacturers, district architects, and any other interested parties.
- 5) To exhibit the system
- 6) To provide an example to general contractors prior to their bidding on individual schools.⁶¹

From this, we can see that the mock-up was about testing and optics and not about showing pedagogy or accessibility or operating in specific communities; it was to be a universalizing system of education reform that would work for all students and teachers regardless of class, race, nation, or culture.

⁶¹ Ibid 4-3, 4-4.

Photographing the System

The prototype school, with its thin steel columns and glass, was sleek. The exterior was evocative of Mies van der Rohe's elegant offices and high-rises; it looked incredibly modern among Stanford's groves of eucalyptus trees and not unlike the much-publicized Eames house in Pacific Palisades down the coast. Promotional images and films of the school were widely published in construction and building publications, as well as architecture journals.⁶²

Working alongside newspaper campaigns and EFL's publishing empire, these visual references functioned with intention and operated in multivalent ways. Not only did they serve to sell the functional components of the system, but they also situated the test school in an ongoing technocratic conversation about modernity and architecture. Images of the prototype did much of the heavy lifting in discourses around systems architecture, as well as an expanded industry around public education, in the 1960s, without ever addressing the "stuff" of education or pedagogy. Instead, these images are selling the system (Figure 9).

⁶² See *Architectural Forum*, February 1964, 112-117; "Prospect Heights School to Utilize Component Parts Construction Concept," *Santa Cruz Sentinel*, September 9, 1964; "Gates-Chili Oks Expandable School," *Rochester Democrat and Chronicle*, August 17, 1966; "New Concept in Partitions," *Janesville Daily Gazette*, December 31, 1964. In addition to hundreds of various news reports and articles, Ehrenkrantz was named "Construction's Man of the Year" in 1969 for his work on prefabricated systems. Paul F. Colebrook, Jr., "A Man of A Year" *The Plain Dealer*, February 23, 1969.

The promotional photographs taken of the prototype school on Stanford's campus that were most widely disseminated are a helicopter lowering an HVAC system on the roof of the in-construction school (Figs. 2.2. and 2.3), the construction of the steel frame in the Eucalyptus grove (Fig. 2.4), and the final built school with its slim steel columns and glazed windows reflecting the nearby campus (Fig. 2.1 and 2.8.). Each of these photos reveals important ways that the SCSD project was messaged and would work to sell the system through the construction of the prototype school. The images of the helicopter show an in-motion aircraft carefully and slowly lowering the HVAC system on the roof. In the color image, the blue California sky provides a backdrop while the Eucalyptus trees frame the helicopter. It is a delicate procedure, but the viewer is assured that the militaristic-looking helicopter will successfully install the system. The whole scene seems to suggest a carving away of the natural world through the clearing of the trees and the imposition of the system on the landscape. The next image shows a series of men wearing hardhats and utility belts with tools perched on ladders and guiding the system's steel frame into place as it is lowered from above, presumably by helicopter. We even see the photographer who is taking the photo of the helicopter, aiming his photographic lens upward. Rather than being built from the ground up as in a traditional brick-and-mortar school, the power over the landscape and the sky itself is shown, and expertise and technical mastery

are projected. The steel frame of the school bisects the frame of the image and forms an “x” shape, while also being framed by the cleared-out Eucalyptus grove. These men are not laborers but rather skilled experts or even technocrats, or maybe represent the architects themselves. This somehow does not humanize the image but rather shows the power of the men associated with the school-building industry to get this (and future!) job done efficiently.

The last image shows a steel rectangular ribbon roof elevated by thin, steel columns set on a concrete and brick base. White panels under the roof hide the inner steel skeletal system of lighting, heating, and cooling. The glass box below is made of rectangular glazed floor-to-ceiling windows and reflects the red tile roofs of Stanford’s buildings across the street. Also surrounded by Eucalyptus trees and a neatly trimmed lawn, the glass and steel juxtapose with the unruliness of the gangly tree limbs, which seem to reflect the local environment, though the Eucalyptus trees were imported to Stanford’s campus. The image works to show the SCSD prototype in fluid and seamless conversation with local architecture and environment, and thus flexible, adaptable, and able to be mapped endlessly onto. Taken together, these promotional images highlight both the inherent expertise and adaptability of the system while intimating the steel frame and the entire system’s ability to control what’s around it.

While the photographs may appear unscripted, images like these that appeared in popular magazines, builder magazines, and architectural journals were carefully chosen to speak to their intended audiences. As Dianne Harris articulates in *Little White Houses*, postwar magazines had massive nationwide readerships and were often read as guides for living and buying. While the images project gender stereotypes, the reality was, of course, more complex. Consumers who read these magazines looked to buildings and objects to justify their own alliance with the stereotypes of “good” and “efficient” homeowners depicted in the magazine’s pages. Schools, as part of the domestic landscape of postwar America in terms of their function and physical placement proximal to suburban developments, were arguably very much a part of a larger discourse about housing and an appropriate childhood, as I indicate in Chapter One. Yet these images for the SCSD prototype function in nuanced ways as they were published widely in local newspapers, women’s magazines, building magazines, and architectural journals. They portray a confidence aligned with a white male technical expert and highlight the dominance of the steel frame over the eucalyptus trees. They do not evoke a school in delicate alignment with its environment and siting, but rather, show how the physical elements of the school building dwarf and constrict the trees. They work to articulate a system that is infallible and

based on scientific precision and expertise. As Dianne Harris, quoting Valerie Babb on domestic advertisements, reminds us,

because 'whites are the only personifications of privilege, social mobility, economic security, and cultural refinement, experiences and products that appear race- neutral are implicitly racialized.' The very fact that nearly every image about the home that appeared in a magazine or on a television show included whites alone meant that the possessive investment in whiteness was continually reinforced.⁶³

This is apparent in these images, in which all of the workers and architects are white, and their intended suburban audience (often in communities with restrictive housing covenants) was also white. Thus, these images and promotional materials align whiteness with technological expertise and the rationality of architectural systems. The white male technical expert is depicted as certainly knowing what is best for children and families; those in line with national ideas about education in this moment could either join the wave of support for systems-built schools or be left behind with the now-out-of-touch progressive educators and architects. These images also, arguably, functioned quite differently than images of urban schools from the same period. Images of urban schools in the 1960s are predominantly of Black children and broken windows and accompanied by a discourse on cultural

⁶³ Dianne Harris, *Little White Houses: How the Postwar Home Constructed Race in America*, Minneapolis: University of Minnesota Press, 2012, 62.

deprivation that was common in the era of nationwide school desegregation.⁶⁴ While Black families were pathologized through images like these, as well as through government reports such as the Moynihan Report, white families were instead encouraged to dream of innovation and creative futures for their children as wrought through new homes in new suburbs with new, state-of-the-art schools, as imagined and built by white men just for them.⁶⁵ These photographic images were used to encourage buy-in from influential home-builders and school administrators who would contract with SCSD and bring the school system to their growing communities.

The 1965 promotional video for the SCSD project begins with a list of all of the schools that have already committed to the project and a car's moving reflection in the glass of the prototype on the Stanford campus.⁶⁶ The narrator's voiceover explains the purpose behind SCSD while a group of

⁶⁴ James Bryant Conant writes in "City Slums and Negro Education" in *Slums and Suburbs* about the status of education for Black Americans and seeks to redress what he describes as a common misconception that Black students are of a lower educational aptitude than white students, 12. He points to the widespread messaging about the intellectual ability of Black Americans as one of the problems. Referring to visualizing the 1960s civil rights movement in urban contexts, activist and writer Bayard Rustin, in "The Mind of the Black Militant" in Alvin Toffler's edited volume *The Schoolhouse and the City*, notes that "newspaper and television commentators" drew comparisons between so-called "ghetto uprisings" and "French, Russian, Algerian, Irish and Black African independence revolutions," 27. These comparisons were widely televised and reproduced in news media.

⁶⁵ See larger conversation in Chapters Three and Four of this dissertation. Daniel Patrick Moynihan, "The Negro Family: The Case for National Action," (Washington DC: Office of Policy Planning and Research, US Dept. of Labor, 1965).

⁶⁶ "SCSD," promotional video from July 1965, https://www.youtube.com/watch?v=6B_QETj5hsg Accessed September 2023.

white men in white-collared shirts looks at the work done so far and, quite literally, pat each other on the back. A flowchart is used to signify the narrative of rational and progressive development that the project relies on and names the prestigious partners on the project. The narrator then details the performance specifications that guided the development of the project, relying mainly on movable walls and partitions to facilitate different-sized group instruction. Technical jargon inundates the viewer as the narrator describes the ceiling's sandwich panel system, HVAC system, cabinets, and flexible partitions—the main components of the system. A series of time-lapse photos show workers with diggers, pavers, and steamrollers preparing the site in the eucalyptus grove for the foundation of the prototype. White-collar workers wearing hard hats and carrying clipboards frequently appear along the perimeter of the foundation as it develops, while the voiceover describes the prototype as a testing laboratory for product development and the enhancement of the performance specifications. A lighting test in which lightbulbs represented student bodies was run to test the HVAC system. In each of the various tests, white male scientists in white coats and hard hats are shown, ensuring the optimal function of each system; no students or educators are shown in the video. There are also many shots of large Mack trucks, helicopters, heavy-duty cables, construction equipment, and steel. The footage continues with a comparison of the school to a jet airliner, which

suggests that these schools are not only hyperefficient, they are like machines aligned with a military industrial complex. While magazines disseminated images of the prototype to popular audiences, this video is very much for an audience of white men who view themselves through the lens of expertise as either manufacturers or school administrators. The narrator's omniscient voice projects expertise at every step of the project and explains why each choice is the best possible choice for the construction of the building.

The prototype's promotional material and the larger system seek to align educational theories with a logic of technological development and the production of a rational and efficient education through the building itself. Problematically, the prototype thus becomes aligned with a dominant racial and gender stereotype and implies that students can be made logically educated through both the building and through the expertise of the white male builders, scientists, and architects involved in the project. These images function in direct opposition to the images of "failing" urban schools proliferating widely on television and in national media in the 1950s and early 1960s. Thus, they serve to assure or convince new suburban homeowners that these schools will not produce the same types of educational outcomes aligned with urban public schools; they will instead facilitate good jobs, innovation, and the upward class momentum aligned with new suburban

living. The prototype school thus sold the system, and also the rationale by which school buildings could align with the goals of new suburbanites.

Ehrenkrantz would have been very familiar with the conversation around images and school promotion through Alison and Peter Smithson's 1954 Hunstanton School, which was widely imaged in the British press. As Claire Zimmerman argues in *Photographic Architecture in the Twentieth Century*, the photographs of the school and their resemblance to the architecture of Mies van der Rohe "tell the viewer that the building looks like another building and that this resemblance is intentionally visible; second, the volume of published photographs indicates the architects' embrace of photography as the primary system of information exchange for international modernism."⁶⁷ Like Hunstanton, the prototype school resembles the steel and glass structures of Mies, and was built, according to SCSD Staff Architect Bert Ray, "to be an elegant little Miesian jewel to sell the system" by the architects upon its completion.⁶⁸ This resemblance thus links the prototype building not only to international modernism but also to the wide successes of Hunstanton School. Ehrenkrantz certainly sought to employ the same campaign of photographic images in service of legitimizing the system itself

⁶⁷ Claire Zimmerman, *Photographic Architecture in the Twentieth Century*, (Minneapolis: University of Minnesota Press, 2014), 252-253.

⁶⁸ Joshua Lee, "Questioning modern approaches to flexibility: 50 years of learning from the School Construction Systems Development (SCSD) project", PhD dissertation, University of Texas, 2016, 179.

as part of a discourse on appropriate architecture for schools and as logically part of an internationally reputable architecture.

Conclusion

The rush to build schools in the United States in the middle of the twentieth-century is often attributed simply to an expanding postwar population. While this is undoubtedly part of the story, there were other factors that went into the push for school-building in the period, including concerns over architectural style and the previous era of monumental school design, questions of appropriate school types for new lower-density suburban developments, an interest in a model for cheap and flexible school-building which could be both mass-produced and exported, and new proposed pedagogies taking shape. The Hertfordshire schools in the UK were seen as models for what could happen in the US, both in terms of their efficiency and cost, as well as their reliance on scientific discourses leveraged on behalf of social welfare. These various concerns led to the development and funding of the School Construction Systems Development program, which promised an efficient, flexible, and cost-effective mode of building that would solve the many problems of school-building affecting school districts in the United States. The system was sold through its early prototype on Stanford's campus, as well as through a campaign of promotional images and videos

that linked it to modern architecture and scientific rationality. And yet, while the schools were imaged as rational and technocratic, they lacked an attention to warmth and child development. They were far from the nurturing environments outlined by Mary and David Medd in their early prefabricated designs for Hertfordshire. As in Hertfordshire, the SCSD schools functioned as an experiment in building, with the hope that they could be replicated quickly and cheaply throughout the United States and beyond. And yet, the critique of both sets of schools is that they appear cold, sterile, and lacking the warmth of a space designed for children. How might we read this analysis of schools designed in service of a market and efficiency versus ones designed for children? What is the role of pedagogy in school design, and how do changing ideas about pedagogy, even when attended to as in the flexible schools here, inform a school space over time? A lingering question is whether it is possible for buildings to serve as pedagogy, as suggested by Educational Facilities Laboratories. The next chapter looks to the national conversations around desegregation and a backlash against John Dewey's progressive education to explore the links between pedagogy and design and how this relationship has been revealed spatially in one SCSD school over time.

Chapter Three | Education Reform in the 1960s: From Sputnik to Civil Rights and the Limitations of SCSD Architecture

An early photograph of DeLaveaga Elementary School in Santa Cruz, California that was featured in an Educational Facilities Laboratories book about the School Construction Systems Development (SCSD) shows a lone male figure walking the entry path toward the school's main building (Fig. 3.1.).¹ The building façade has an American flag on one side and a coastal oak tree on the other. As the landscaping was not yet completed when the photo was taken, there is only dirt in front of the school. The single-story school building is positioned in the background of the photograph, with the entry path and dirt comprising the foreground, and the viewer can see only the administration wing and the unfinished portion of the building—which was still unfinished when the school opened in 1966. The school, devoid of ornamentation, looks stark, as does the male figure in the image, who wears a white-collared shirt and black trousers and walks away from the viewer. The accompanying photographs in the publication show a group of students in the school's stepped Little Theatre and smaller groups of students working in open-plan classrooms, likely illustrating the limitless possibilities of flexible planning in the SCSD schools (Figs. 3.2. and 3.3.). They all work under

¹ *SCSD: The Project and the Schools, a report from Educational Facilities Laboratories* (New York: Educational Facilities Laboratories, 1967), 82.

checkerboard ceiling lights in spaces organized by flexible walls that are mostly devoid of student work or decoration.

The image presents the school as a *tabula rasa*, a blank slate meant to be filled with student life, artwork, and greenery, as needed by the students and faculty over time—a crucial component of the imaging strategy around the school. Instead of showing the spaces as finished, project photographs show the school as “in progress” to align with the newly completed housing developments nearby, as if to suggest they both were just ready to be lived in (Fig. 3.4.). The photos show the classrooms brightened by fluorescent lights and work to depict the space as new, and full of potential. Reading these images of the school this way, they serve as an implicit comparison with so-called “traditionally built schools,” which are the point of comparison of the entire SCSD project. Throughout project literature, SCSD schools are discussed as cheaper and more efficient than schools of the past, and this comparison marks a new mode of education reform—the systems-built school building as a new mode by which students can learn better and more efficiently. The building as a mode of education reform answers the call from education reformers in the early twentieth-century who decried the limitations and socialist impulses of progressive education while meeting a growing need for educational markets and the language of cybernetics, which were experimentally being applied to public institutions after World War II.

DeLaveaga Elementary School (1966), the only elementary school in the SCSD system, was also the only school in the portfolio designed by Ezra Ehrenkrantz. It was an opportunity for Ehrenkrantz and project architects to showcase how the system could be suited for early childhood. DeLaveaga thus also allows us to analyze the changing ideas of childhood pedagogy during the time that the school was built. Doing so, we may see how the school was presented as an experimental machine for education for a brand-new community—a community positioned to be part of the emerging Silicon Valley and adjacent to the newly constructed University of California campus in Santa Cruz. DeLaveaga was built during a moment of change in the formerly rural region. Ehrenkrantz showcased the potential of the newly developed manufacturing networks and architectural innovation to what he hoped would be international audiences in nearby Silicon Valley.

DeLaveaga offers an intimate view of how the SCSD system operated at the intersection of changing educational theories and the limitations of cybernetics as applied to social experiments. This chapter traces how competing ideas about education reform stemming from diverse fields contributed to the development of the SCSD project. It also considers the prioritization of cybernetic and systems design in school architecture over national conversations around school desegregation and offers a critique of the potential ways in which cybernetics, as applied to schools, was both an

insufficient model and sought to assuage racial concerns through cybernetics and systems architecture.² While other schools in the SCSD program have been changed and altered over the last sixty years, DeLaveaga remains relatively unchanged architecturally. The school thus offers a perspective on this in school building and proposes architecture as a mechanism of education reform.³ As part of a larger national conversation about education reform—spurred by school desegregation and anxieties about technology, the space race, and the future of American global education—DeLaveaga offers a unique case study through which to parse national educational concerns. This chapter argues that DeLaveaga was intended as a prototype for elementary education within the larger SCSD system, which accounts for its unique emphasis on performance specifications and selling the potential of the system as a tabula rasa versus anchoring the school within a community.

² In John R. Boice, *A history and evaluation of the School Construction Systems Development Project, 1961-1967*, (Menlo Park, California: Building Systems Information Clearinghouse, Educational Facilities Laboratories, 1971), 491-492. Project administrator Boice offers a reading list on cybernetics and systems design to apply to the SCSD project in order to better understand its origins and implications.

³ “New Schools for New Education: A Report from Ann Arbor” conference proceedings (New York: Educational Facilities Laboratories, 1960). This conference sought to examine the “architectural implications of *Images of the Future* by J. Lloyd Trump” and evaluate the spatial dimension of his educational report. This research inspired other conferences on school architecture and building research in the 1960s. See also Amy Ogata, “Educational Facilities Laboratories: Debating and Designing the postwar American schoolhouse,” in Kate Darian Smith and Julie Willis (eds.), *Designing Schools: Space Place, and Pedagogy*, (London: Routledge, 2016).

At DeLaveaga, we see the ways that the individual components outlined in the early performance specifications of the project were intended to set a new standard for elementary school education. The accordion and movable walls, the expanding cabinetry, the eleven loosely organized teaching stations (instead of classrooms), and the emphasis on open-plan teaching were all individual elements meant to encourage innovation for the youngest learners in a new suburban neighborhood proximal to the technologists of Silicon Valley and the new University of California campus. While project architects hoped that DeLaveaga's aesthetic would eventually be accepted in its commitment to functionalism, this is at odds with the perceived cheap quality of the materials themselves. Its architecture was frequently deemed insufficient to handle the needs of children and to accommodate learning. The school was instead linked with discourses around science and technology that increasingly felt irrelevant and at odds with the inexpensive material components used in construction. While Santa Cruz was initially lauded as the perfect place to develop and display the manufacturing networks possible for elementary schools, changing national, pedagogical, and cultural needs led to widespread dissatisfaction with DeLaveaga's architecture, and this discontent reverberated throughout the system.

DeLaveaga Elementary School and Santa Cruz

Construction on DeLaveaga started in January 1966 in Santa Cruz, and the school opened seven months later. Santa Cruz was a suburb well positioned to leverage the technocratic discourse in California and, as Ehrenkrantz hoped, could bring more attention to the manufacturing network potential of the project on a national scale. DeLaveaga served as a further prototype of the system and the potential for systems architecture that had yet to be explored in elementary schooling. Ehrenkrantz noted that an elementary school could be included in the project to show the implications for future elementary school developments. Initially, the mock-up SCSD prototype building on Stanford's campus was intended to work closely with Stanford's School of Education and operate as a teaching and observing nursery school. It was decided that the need for a real-world school to be attached to the mock-up would limit the capacity of the school to showcase all of its potential to educators and manufacturers. Likewise, the demand for the school to conform to Stanford's existing architecture would limit and stress the building too greatly. However, showing the implications of the system as it pertained to younger school students was still a target goal for Ehrenkrantz. The other possible reason for including an elementary school in the SCSD portfolio was that the project had already contracted with Santa Cruz Unified School District to build a new high school, and due to increased projected enrollment, the

district officials were able to propose an elementary school as well. This last-minute increase in the amount of square footage the entire SCSD project would then take up was, with the inclusion of DeLaveaga, just ahead of the state requirements in order to maintain state-aided funding to cover construction costs.⁴

Designed to show the range of the SCSD products, DeLaveaga—the “expandable” elementary school, as it was described locally by school district administrators—was constructed with “eleven teaching stations.” These were to be areas functioning like classrooms but adhering to the open-plan model of school design; they would be defined and bounded less by walls than by areas of activity.⁵ SCSD architects explained they approached the educational specifications of the district by arranging space so that clusters of three classrooms could be added in the future, as enrollment projections predicted would be needed. Ehrenkrantz and Leefe collaborated on this school directly, and Ehrenkrantz used the opportunity to show the system's potential. It is unclear why James Leefe was selected as the collaborating

⁴ The total square footage required for all schools in the project, statewide, was 1,400,00 square feet in order to qualify for state funding. John R. Boice, *A history and evaluation of the School Construction Systems Development Project, 1961-1967*, (Menlo Park, California: Building Systems Information Clearinghouse, Educational Facilities Laboratories, 1971), 327. There was a push in California in 1964-5 to unify and thus streamline elementary and secondary districts. Santa Cruz was part of this shift, which ultimately led to DeLaveaga being included. *Ibid.*, 320.

⁵ SCSD: The Project and the Schools—a report from Educational Facilities Laboratories, (New York: Educational Facilities Laboratories, 1967), 24.

architect, but his practice in the Bay Area in the 1960s was defined by a naturalistic approach to working with local materials and shapes.⁶ He wrote about his underlying belief that architecture should be integrated with the natural environment rather than seeking to overpower or dominate it. Leefe's inclusion on the project likely was to serve as local architect who leveraged local landscapes and building materials in the design. All of the SCSD schools featured a local architect who executed the systems design that had been established and designed by Ehrenkrantz and SCSD project architects. Leefe and Ehrenkrantz's partnership lasted from 1964 to 1968, with their primary collaboration being DeLaveaga School.

The DeLaveaga building is laid out simply (Fig. 3.5). Its classrooms are grouped in threes with a central corridor that runs through the school. Like all of the SCSD buildings, there is a large central administration wing which concentrates leadership at the front of the school. The administration wing is the first visual visitors have upon approaching each school. Also, like almost all of the SCSD schools, the central administration wing at DeLaveaga has been virtually untouched since it was first built. This could indicate that the very makeup of schooling itself, the organization of school-based leadership,

⁶ Leefe is perhaps best known for the Chapel of the Cross at Pacific Lutheran Theological Seminary in Berkeley, which is modeled after Le Corbusier's famed *Nôtre Dame du Haut* in Ronchamp from 1955, and for his Sausalito hillside homes overlooking houseboats in San Francisco Bay. James Morrison Leefe, "Two Small Houses," *Arts and Architecture* 73, no. 2, 30-31.

has not changed since the 1960s. This rings true with literature from educational and organizational leadership in which the basic administrative structure of school boards and leadership has remained much the same since the nineteenth- century, albeit with more specialized positions added.⁷ At DeLaveaga, the administrative wing houses the front desk receptionist, the principal and vice principal's offices, and the various school counselors.

The school also features a "little theatre," which was envisioned in the 1960s as a space where community members could hold meetings and school students could have assemblies (Figure 5).⁸ The addition of the little theatre is a phenomenon in American school-building that came with the wave of planned suburban communities. Suburbs were not envisioned as isolated places separate from urban centers but rather as integral to the urban core in providing domestic space (both in terms of individual/private space and space from the pollution of cities) that would continue to utilize, serve, and work in the city.⁹ In this way, the little theatre functioned as a

⁷ Kate Rousmaniere, "Presidential Address: Go to the Principal's Office: Toward a Social History of the School Principal in North America," *History of Education Quarterly* 47, no. 1 (2007), 1-2.

⁸ Little Theatres were often included in school plans in the first half of the twentieth-century, including here at DeLaveaga. They function as multivalent spaces in schools that can meet community and school day needs as outlined by Lawrence B. Perkins and Walter D. Cocking in *Schools* (New York: Reinhold Publishing Company, 1949), and EFL publications including: Ronald Gross and Judith Murphy, *Educational Change and Architectural Consequences* (New York: Educational Facilities Laboratories, 1968), 42.

⁹ See "The New School System" in Herbert Gans, *Levittowners: Ways of Life and Politics in a New Suburban Community*, (New York: Columbia University Press, 1967).

community center that would serve the core of the community members, primarily students and families, where they lived. It was meant to facilitate the kinds of communal investments and relationships that a city offered and meant to bring the school squarely into the realm of the functional domestic landscape. Ehrenkrantz would have been thrilled to think of DeLaveaga as serving the needs of a growing Silicon Valley in innovative ways. He positioned himself as part of this technological shift via these buildings in Santa Cruz and later in Southern California via this connection with aerospace and defense industries in both places. However, in Santa Cruz, the building's limitations became clear very quickly to faculty and students, who found DeLaveaga unsuitable for their needs.

Santa Cruz, like many communities where other schools in the SCSD portfolio were built, was at a crossroads in the mid-century. It was rapidly urbanizing in the postwar moment and was projected to harbor aerospace and other technological industries, providing jobs for its residents. The university brought growth to the town, and the 1960s was a transitional period for the rural, conservative, mostly Republican, working-class population.¹⁰ Clark Kerr, former University of California Santa Cruz (UCSC) president who was responsible for developing the vision of UCSC, noted that “town and

¹⁰ Irene H. Reti, Cameron Vanderscoff, Sarah Rabkin, *Seeds of Something Different: An Oral History of the University of California, Santa Cruz—Volume 1*, University of California: e-Scholarship, 34, <https://escholarship.org/uc/item/68v4q9sf> Accessed September 19, 2024.

gown” problems existed in Santa Cruz immediately.¹¹ Many in Santa Cruz saw the university as an external force meant to bring in outsiders alongside a growing Silicon Valley, while the regents thought UCSC was a natural outcrop of the tech community. DeLaveaga arrived in the middle of vast, community-wide modernization efforts, including the expansion of the public library system, pipe installation under the San Lorenzo River, construction of new water treatment plants and improvement of existing ones, the rebuilding of the Santa Cruz mission, and the construction of dams. DeLaveaga, along with two other schools built in the mid- to late 1960s, was seen as a necessity.

Santa Cruz has a rich architectural legacy that is defined by Victorian houses and log cabins. William H. Weeks designed Branciforte Elementary School, Santa Cruz High School, Watsonville High School, and a Mission Revival-style private home on West Cliff Drive for William Seward Iliff, all of which still stand today (Figure 6). Weeks’s buildings often conjure “Mission Revival, Queen Anne, and Colonial Revival styles” and remain much beloved in the city.¹² Thus, DeLaveaga Elementary School was seen by local

¹¹ Irene H. Reti, Cameron Vanderscoff, Sarah Rabkin, *Seeds of Something Different: An Oral History of the University of California, Santa Cruz—Volume 2*, University of California: e-Scholarship, 438, <https://escholarship.org/uc/item/4wn6f291> Accessed September 19, 2024.

¹² In fact, in 1989 the Loma Prieta earthquake decimated the nineteenth-century structures in downtown Santa Cruz, and of those that were razed after the damage, many were rebuilt in their original styles, deriving from various late nineteenth and early twentieth-century styles including Streamline Moderne, Mission Revival, and others. John Chase, *The Sidewalk Companion to Santa Cruz Architecture*, (Santa Cruz: Santa Cruz Historical Society, 1975), 5.

community members not as the innovative, architecturally significant structure of education reform, but unimpressive and solely meant to house a quickly growing school-age student population. John Chase, in his 1975 book *The Sidewalk Companion to Santa Cruz Architecture*, bemoans the “ugly modern construction” of buildings like DeLaveaga.¹³ While Ehrenkrantz and project architects might have pointed to the flexibility and simplicity of the SCSD buildings, they were so aesthetically different from the monumental schools built in the region, residents expressed their distaste with the new building.

Another marker of change, Santa Cruz, like many California cities, expanded rapidly with immigrants from across the nation and globe who were moving to the region in the late nineteenth and early twentieth centuries. The city had received large numbers of immigrants from China, which peaked in population numbers in the 1890s, as well as Black Americans, first during the 19th century and again during the Great Migration.¹⁴ In addition, it had endured longstanding and ongoing racism toward Indigenous Americans, Mexicans, and Californios.¹⁵ The *Santa Cruz Sentinel* detailed various

¹³ Ibid., x.

¹⁴ Marla Novo, “To Know my Name: A History of African Americans in Santa Cruz County,” October 31, 2018, <https://www.santacruzmah.org/blog/to-know-my-name-a-history-of-african-americans-in-santa-cruz-county> Accessed September 2024. See also Sue Bailey Thurman, *Pioneers of Negro Origin in California* (San Francisco: Acme Publishing Company, 1952) and Rudolph Lapp, *Afro-Americans in California* (Danvers, MA: Boyd & Fraser Publishing Co., 1987).

¹⁵ An editorial published in 1879 in local newspaper the *Santa Cruz Sentinel* used dehumanizing and racist language to describe its Chinese community. *GoodTimes Santa*

instances of racially based arson, exclusion, and unrest in which racism drove exclusionist practices.¹⁶ In 1975, local Santa Cruz newspaper *The Peoples Press* columnist CF Gray noted the ways in which racism in Santa Cruz drove ongoing exploitation since the nineteenth-century through both Ku Klux Klan activities, housing discrimination, and labor exploitation.¹⁷ Desegregation in Santa Cruz was approached slowly even in the 1960s, as de facto residential segregation led to a largely white population in the developing suburban neighborhoods in Santa Cruz city, including the suburb where DeLaveaga was built in 1966. Local historian Sandy Lyon describes the presence of intimidating presence of KKK members and meeting places in Santa Cruz and nearby Live Oak and Watsonville.¹⁸ According to Lyon, this presence, which built on anti-foreign sentiment in the region, also led to racial covenants written by developers and realtors starting in the 1920s in the county, which

Cruz said that the “anti-Chinese movement in Santa Cruz was as racist and vicious as it was anywhere in the West...while the Chinese played an absolutely critical role in the economic development of Santa Cruz County (and the rest of California for that matter), their roles’ in the region’s expansive mythology have often been relegated to faceless stereotypes as railroad workers and laundrymen.” Geoffery Dunn, “The Hidden Legacy of Santa Cruz’s Chinatown,” *GoodTimes Santa Cruz*, July 9, 2019, <https://www.goodtimes.sc/hidden-legacy-santa-cruzs-chinatown/> Accessed September 2024. See also, Sandy Lyon, *Chinese Gold: The Chinese in the Monterey Bay Region* (Capitola, CA: Capitola Book Co., 1985).

¹⁶ Santa Cruz newspaper *The Daily Sentinel*/ Publisher/editor Duncan McPherson wrote strongly worded anti-Chinese editorials, Joan Raymond, “Chinese never found a niche in Santa Cruz,” *Santa Cruz Sentinel*, April 23, 1984.

¹⁷ C.F. Gray, *Letters to the Peoples Press*, September 19, 1975, 2.

¹⁸ Sandy Lyon, “The History of Racism and the KKK in Santa Cruz County,” <https://www.sandylydon.com/new-page-3> Accessed September 2024.

prevented non-white people from renting, leasing, or owning homes as well as multiple accounts of racially fueled intimidation in the region through the early twentieth-century and following the Second World War.¹⁹ Promotional photographs taken inside the school show only students who appear white. While larger urban centers in California, including nearby San Francisco, experimented with busing and other systems designed to desegregate schools, the Santa Cruz school district did not.²⁰ Even in the widely discussed context of desegregation in the US, in Santa Cruz, the school was mostly left alone as it was assumed that the expertise of the architects would create spaces suitable for all students, without discussing the segregationist practices occurring in the suburbs of the region.

¹⁹ The Santa Cruz County General Master Plan relates as told by historian Phil Reader, “in the decades following the Second world war, many of the new African American families moving into the area found housing difficult to obtain and, on several occasions, white residents attempted to block the integration of their neighborhoods, sometimes resorting to arson. One local example occurred in 1951 where a Black pastor named Rev. William Brant made a down payment on a house in Live Oak. The night before he was set to move in, it was burned down by arsonists.” Santa Cruz County General Plan, Chapter 4, 2023, 153-154.

²⁰ Santa Cruz, because of its relatively homogenous population in the 1970s, would not have been a candidate for busing. Larger cities in California, including Los Angeles, Berkeley, and San Francisco, did participate in bussing because of their segregation rank, which established busing candidacy for primarily urban areas, “using the conventional index of dissimilarity, a measure showing the proportion of local residents who would have to move if every census tract were to have a racial balance equal to the overall index for the metropolitan areas.” M. Stephen Weatherford, “The Politics of School Busing: Contextual Effects and Community Polarization,” *The Journal of Politics* 42, no. 3 (August 1980), 750.

Issues with Instruction at DeLaveaga and Problems at SCSD

Former teachers at DeLaveaga Elementary note that the school felt both experimental and incomplete. Neither the landscaping nor the classrooms were fully finished when the school opened in 1966. While teachers were excited to teach in a brand-new school, they remarked on its lack of color and the general sterility of the rooms. Cindy Morely, a retired DeLaveaga teacher who was present when the school opened, noted that the school is basically unchanged today from when it was built.²¹ Morely reflected on a school she visited in Switzerland that was likely based on Crow Island School in Winnetka, the unique early twentieth-century progressive collaboration between Lawrence, Perkins, Wheeler, and Will and Eero Eliel Saarinen. The Swiss school, she said, felt more like a home, with self-contained classrooms that had their own bathrooms and storage rooms, as well as large, tall windows. She contrasted this with DeLaveaga, which was designed to be impermanent, flexible, and communal.²² She described the storage as communally oriented and insufficient for teacher needs. Indeed, this is a well-documented problem across all of the SCSD schools, with staff and teachers

²¹ Cindy Morely (retired teacher), in discussion with author, March 2022.

²² The lack of windows at DeLaveaga is described by John Boice as a “fad at the time” so kids wouldn’t be distracted looking out the windows. Instead, the HVAC system could completely regulate the environment. Joshua Lee, “Questioning modern approaches to flexibility: 50 years of learning from the School Construction Systems Development (SCSD) project,” PhD dissertation, University of Texas, 2016, 206.

describing the open-plan style as severely limiting storage space. Morely recalled that teachers and students loved that the Little Theater was turned into a music room. Interestingly, this also removed the flexible community-oriented intent of the space, but its carpeted steps and Greek-theater-like design made it a perfect place for music classes. Many former and recent teachers noted that the partition walls, in their recollection, had not frequently been used to alter classroom spaces as intended.²³ In fact, the thin walls created sound issues. The teachers were left to deal with the shortcomings of the space, including noise levels and a general feeling of the spaces being unfinished, such as the partition edges not lining up flush with the wall and cabinets not closing all the way. Many teachers nailed the partitions together permanently or stacked up learning materials against the temporary walls to prevent them from being opened by students.²⁴ Another common complaint of DeLaveaga teachers was that there was not enough wall space to hang student artwork. The partitions were metal (though some were painted with an experimental chalkboard paint that did not seem to work well over time) and could not hold adhesive to showcase student work or teacher-designed

²³ Cindy Morely (retired teacher), in discussion with author, March 2022.

²⁴ Partitions were a key part of the SCSD system. There were three basic types: standard fixed, relocatable, and operable *and* relocatable. All the partitions were designed to be opened easily by a 95-pound, presumably female, teacher. While the project architects intended the partitions to allow for the creation of flexible spaces, the partitions proved difficult to use and acoustically problematic. *Systems* (New York: Educational Facilities Laboratories, 1971), 62.

materials on the walls. Teachers pointed to these basic shortcomings as reasons why DeLaveaga felt challenging on a daily basis, and said that they had to constantly invent solutions for problems about which they had not been consulted during the design process. These spatial shortcomings were an ongoing concern for teachers, even in the years directly following the opening of the school in the 1960s and 1970s.

For its part, SCSD blamed the negative feedback received at the time of opening on inadequate “teacher interest” in learning about the systems. Architect and historian Joshua Lee, in his 2016 dissertation about SCSD and flexibility, offers the theory that teachers at DeLaveaga and others across the system were simply not trained in how to think with flexible materials in the creation of spaces.²⁵ This critique is correct, and yet, there were a number of other problems with the system that prevented it from being taken up as intended. As mentioned in Chapter Two, the misaligned goals between pedagogy and the creation of a market caused tension that was felt most acutely by the teachers who used the spaces. The products were simply insufficient for their needs, cheaply made, and cheaply installed. There was also the matter of the schools being built to accommodate a very straightforward version of national education in which the idea of technocracy

²⁵ Joshua Lee, “Questioning modern approaches to flexibility: 50 years of learning from the School Construction Systems Development (SCSD) project,” PhD dissertation, University of Texas, 2016, 213.

and national goals around defense would guide curriculum. By the time the schools were built in the mid-1960s, educators, and the national educational discourse more broadly, had shifted to a more nuanced understanding of the roles that race and community play in the classroom and in the construction of a school community.²⁶ With their reliance on building experimentation as pedagogy, the schools already felt outdated even as they were being built.

There were other problems with the project. Local architects, some employed by local school districts, were used to developing a vision for individual schools in their districts and had methods by which to gauge community and educational needs. The SCSD system was ultimately foisted on professional architects who spent much time going back and forth between SCSD project architects and their plans in order to deliver a school that aligned with the project vision. Many architects and general contractors found these limitations very frustrating and were not able to work with local suppliers or local community members to deliver institutions to education. This points to the larger problem of the ways in which educational funding and curriculum in the United States are generally tied to local property tax and local curricular

²⁶ Diane Ravitch notes in *The Troubled Crusade* that the color-blindness that had characterized approaches to instruction and curriculum in the early 1960s changed as the “nature of the civil rights movement changed” 145. Instead of public policy that treated persons as “individuals without regard to race, color, creed, or national origin,” the idea that people of color needed more assertion in society and active representation changed to achieve equity also affected attitudes toward schooling, 146. This rendered the color-blind approach that SCSD offered as woefully outdated in the context of these curricular changes toward increased cultural representation.

needs, while a state-wide building system simply couldn't meet the local needs of education as designed. SCSD project administrator and historian John Boice writes that the "modular nature of the system forced the designer to adjust his thinking to these relationships." That is, instead of relying on local relationships and knowledges, the designer instead was focusing on modularity and aligning with system design ratios. This proved both frustrating for local architects but also at odds with models of educational design and funding.²⁷

A major problem with the system was around the Office of Architecture and Construction (OAC) in California, which approved new building in the state in the 1960s. SCSD worked out a deal with the state OAC board, which would allow all of the individual school building plans to be approved based on approval of the prototype school on Stanford's campus. SCSD architects and administrators saw that since the system was whole and complete, there would be little opportunity for individual deviance in the local school sites. However, the local OAC boards (Northern California, Los Angeles, Sacramento) disagreed and understandably demanded that the individual site plans be proffered to their offices for approval. They found various issues at each office, including with a number of components in the Inland Steel

²⁷ John Boice, *A History and Evaluation of School Construction Systems Development* (Menlo Park, CA: Building Systems Information Clearing House, 1971), 334.

structural steel system, and rejected some of the already standardized components. SCSD blamed a lack of administrative flexibility and faulty organizational systems at the local OAC offices for this demand for oversight, but the local OAC boards felt that the individual schools were varied enough to warrant holistic examination. Boice writes, “This caused problems for the architects and component contractors who could not be sure what would be acceptable...For the component contractors who were relying on standardization of details for mass production, the lack of uniform requirements was critical, for the contractors could not afford to keep changing details for each project.”²⁸ This back-and-forth with the product manufacturers meant that slight alterations of what was actually produced for each school limited the true standardization of the entire project. While the full market of standardized components was available for purchase for future projects, it meant that the SCSD project cost more money than intended, often much more than what a traditional school would have cost. Disrupting the arguably useful and safe precedent for school construction outlined by the OAC would have made the SCSD project cheaper, but combined with the shifting discourses around education and the diverse, at times mutually exclusive, goals of the project interlocutors, the SCSD project, on the whole, was unable to streamline school systems architecture. Aside from project cost

²⁸ Boice, *A History and Evaluation of SCSD*, 350-351.

and insufficient use for educational purposes, the SCSD functioned at the intersection of competing ideas about education reform and found itself quickly outdated with its reliance on cybernetics and systems architecture in favor of a shift toward civil rights in educational reform discourses in the late 1960s.

Educational Change in the 1960s: Buildings as Reform and School

Desegregation

Education reform was the subject of widespread discussion in the United States in the 1950s and 1960s. Nationally, stakeholders were concerned with the application of John Dewey's progressive education, as well as desegregation and Cold War anxiety about technology and education.

University of Illinois education professor J. Lloyd Trump was a household name in educational circles in the 1960s and a leading education reformer. His recommendations for high school learning changed secondary education in the United States in radical ways. His 1959 text *Images of the Future: A New Approach to the Secondary School* altered the way that education was carried out across the US, both in terms of the application of pedagogy and in the built environment. Trump advocated for school days to be comprised of a mixture of large-group learning carried out by highly trained specialist teachers, small peer-group learning facilitated by general teachers, and

student-directed individual learning time. Such a level of student autonomy had not yet been seen in American schooling, but Trump argued that it could be done with increased numbers of teaching and administrative staff providing direct oversight.

Likewise, as science and technology training became central to pedagogical discourse and federal educational policy, greater emphasis on group and individual problem-solving began to reflect the real-world situations students would find themselves in amidst rapid technological change and a globalized world. Significantly, Trump wrote, “Further experimentation is needed to develop flexible, functional, pleasant, and utilitarian facilities. The school building should contribute to, rather than inhibit, reorganization of classes and methods of instruction.”²⁹ Trump issued a call to architects and engineers to meet the pedagogical needs of flexible instruction, and he proposed the reorganization of future secondary schools on the ground through further research and experimentation. As Avigail Sachs has shown, well-known school architect William Wayne Caudill was directly inspired by Trump to rethink a school building, as he outlines in his text *Toward Better School Design*.³⁰ Likewise, Educational Facilities Laboratories (EFL), the

²⁹ J. Lloyd Trump, *Images of the Future: a new approach to the secondary school*, (Washington DC: National Education Association, 1959), 41.

³⁰ Avigail Sachs, *Environmental Design: Architecture, Politics and Science in Postwar America*, (Charlottesville, University of Virginia Press, 2018) 57. William Wayne Caudill, *Toward Better School Design*, (New York: FW Dodge Corp., 1954).

school-building research wing of the Ford Foundation in the 1960s, saw their organization in Trump's call and set to work funding experimental high school research. SCSD, EFL's flagship experimental project, leveraged Trump's recommendations as now universally recognized pedagogical interventions in order to meet a range of needs on behalf of the various actors and institutions involved in the project.

At the same time, school desegregation wrought through the US Supreme Court case *Brown v. Board of Education*, itself the result of a tireless and ongoing battle waged by the NAACP, shaped conversations about education and, thus, education reform in the 1950s and 1960s. In addition to debates about the federal responsibility to fund secular education and a backlash against the progressive style of education popular in the early twentieth-century, desegregation characterized the educational landscape of the postwar era. As Diane Ravitch notes, in *The Troubled Crusade: American Education 1945–1980*, critics of progressive education and the way it had been misappropriated (including by John Dewey himself) warned that a lack of structure engendered by progressive education was to blame for problems with American education.³¹ Reading both EFL and, more specifically, SCSD as direct products of these contemporary critical discourses sheds light on the

³¹ Diane Ravitch, *The Troubled Crusade: American Education 1945-1980*, (New York: Basic Books, 1983), 58-59.

ways in which this experimental project was designed to be responsive to diverse political, racial, and urban planning needs beyond simply their educational rationale as outlined by Trump and the aims of EFL.

In 1954, the problem of racial inequality in America's public schools came to a head in *Brown v. Board of Education of Topeka*, the landmark court case which ruled that "separate educational facilities are inherently unequal."³² However, without offering any methods by which to carry out the physical act of school desegregation, local educational administrators were left without any structure or guidance by which to equalize educational facilities as quickly as possible. This ensured that desegregation of schools would drag on for years while individual school leaders debated the best ways to fund restructuring facilities and even building new schools.³³ This decision had far-reaching implications for urban schools, which were, like schools in the South, deeply segregated. A 1975 study by sociologist James Coleman concluded that school desegregation had contributed to white flight in American cities, hastening a movement of whites away from cities toward newly developing suburbs.³⁴ Urban schools, also largely reliant on local

³² *Brown vs. Board of Education*, 1954.

³³ Diane Ravitch, *The Troubled Crusade*, 129.

³⁴ James Coleman, "Equality of Educational Opportunity," Washington DC: National Center for Educational Statistics, 1966.

property taxes for funding, became publicly imaged as sites of conflict and representative of the supposed dangers of the city, largely inhabited by Black and Brown people living in poverty. Public education, as well as cities more generally, was imaged in the media as unsafe, most especially in comparison to more recently designed suburbs, which were depicted as secure and very white. The idea of the school had long been linked with ideas about planned communities, and the relationship between cities and unsafe schools became embedded in many white suburbanites' minds.

James Conant's influential and widely read report, *Slums and Suburbs*, argued for inherent differences between so-called "slum" schools, populated by mostly children of color, and suburban schools, which at the time educated mostly white children.³⁵ The report relied primarily on testing data and graduation rates, and while designed to point to problems in the ways in which desegregation had been unevenly applied, it also served to identify Black students as "culturally deprived" and in need of compensatory education to rectify failings. While schools were doing the complicated work of desegregating, three influential reports released in the early 1960s worked to

³⁵ James Conant, *Slums and Suburbs: A commentary on schools in metropolitan areas*, (New York: McGraw Hill, 1961).

pathologize Blackness and call into question the ability of Black students to learn in the same ways that white students did.³⁶

These reports, though widely contested, affirmed white suspicions and no doubt deepened chasms in beliefs about the potential of achieving true equality in schools and communities. Naturally, Black communities and civil rights leaders protested against these racist, but supposedly scientifically sound, theories while taking concerns about unequal school facilities to public forums. Nationwide, protests about subpar school facilities among communities of color grew in the mid-1960s after the tensions of slow desegregation and white flight came to a head. This racially charged conversation created both a framework for conversations about experiments in public education and facilities which would better meet community need, opening a door for the experimental proposal of SCSD to find footing. The tension between school-building and desegregation was not a settled matter, even by the 1970s. Discussing a Pittsburgh school-building project planned for the 1970s, Ehrenkrantz writes of the challenges in approaching desegregation and integration amidst what he describes as changing public opinion.

³⁶ See reports: James S. Coleman, "Equality of Educational Opportunity" (Washington DC: National Center for Educational Statistics, 1966); Arthur R. Jensen, "How Much Can we Boost IQ and Scholastic Achievement?," *Harvard Educational Review* 39, no. 1, (1969); Daniel Patrick Moynihan, "The Negro Family: The Case for National Action," (Washington DC: Office of Policy Planning and Research, US Dept. of Labor, 1965).

During the course of the project that we did for the Pittsburgh high school system, we learned that programs must be designed and managed for a moving target. When the educational parks program was originally developed to replace old and outmoded high schools, the mood of the country was in favor of integration and the development of the educational parks for that purpose. By the time the plans were completed, riots in Newark, Detroit, and Watts had occurred, and by the time we were ready to go out to bid for integrated schools, both the Black and white populations of Pittsburgh wanted segregated facilities.³⁷

School desegregation was just as much of a concern in California as on the East Coast.³⁸ Chapter Four outlines the discourse around school desegregation in Southern California, while this chapter looks to link these concerns around desegregation with the flexible systems architecture and school buildings informed by cybernetic research.

Another consideration in the debates around education reform was the national public outcry over early twentieth-century progressive education ideas espoused by John Dewey and seen in Richard Neutra's California school projects of the 1930s, as well as Crow Island School. Those who had

³⁷ Ezra Ehrenkrantz, *Architectural Systems: A needs, Resources, and Design Approach*, (New York: McGraw Hill, 1989), 77.

³⁸ In sizeable West Coast cities like San Francisco, in the early 1960s, school boards worried about developing plans for civil unrest in the context of desegregation and prepared widely distributed reports for teachers and administrators intended to disrupt, calm, and disperse racially motivated protests through blocking off spaces in the school and redirecting human traffic. See, "Student Unrest," pamphlet, (Burlingame, California: California Association of Secondary School Administrators, 1967).

argued against progressive education since the late 1940s further decried the state of American education after the Soviet launch of the world's first artificial satellite, Sputnik, in 1957. One historian wrote, "A shocked and humbled nation embarked on a bitter orgy of pedagogical soul searching," while national magazines declared a new crisis in education. Admiral Hyman Rickover, inventor of the nuclear submarine, loudly blamed the nation's schools for endangering national security by allowing students to fall behind Russians in science, mathematics, and engineering.³⁹ This conversation around American schools falling behind in global education was rooted in the critique of progressive education, with its emphasis on skills for employment and community engagement. Although President Eisenhower was reticent to support federal funding for public schooling, the broad public demand for a federal response after the Russian launch of Sputnik led Congress to pass the National Defense Education Act (NDEA) in 1958. It provided fellowships, grants, and loans to encourage the K-12 study of science, mathematics, and foreign languages and funded school construction and equipment in the name of national security.⁴⁰ This national attention to pedagogy led to a renewed interest in both *what* was being taught, and *how* it was approached; curriculum reformers created new curriculum packages which prioritized

³⁹ Diane Ravitch, *Troubled Crusade*, 228.

⁴⁰ *Ibid.*, 229.

“innovation,” “discovery,” and inductive reasoning through hands-on activities. A climate of experimentation spread throughout school systems, supported by funding from governments and foundations.

By extension, building research became an area of governmental and foundational interest, and academic research centers devoted to school-building experimentation were set up in university education departments nationwide. Broadly, recommendations were made in line with Trump’s call for flexible walls, language labs, television systems providing instruction, and other spaces which would mirror the types of technological environments students might find themselves in as future workers, and in order to employ these tools toward technological advancement in the classroom. Educational Facilities Laboratories would go on to publish pamphlets designed to increase support for these spatial interventions in education reform.

At the same time, a concurrent debate about how to educate those who were problematically labeled “culturally disadvantaged” dominated education reform. As a result, social scientists examined the connections between race, social class, and learning. From the mid-1950s to the mid-1960s, “a vast literature was produced which sought to account for the low achievement of poor and minority children in urban schools. Books, articles, symposia, seminars, and conferences proliferated around the theme of how to educate the ‘culturally deprived’ and the ‘culturally disadvantaged,’ the

‘underprivileged’ and the ‘lower-class child.’ Often, though not always, the terms were used as euphemisms for the black child.”⁴¹ Notably, the application of the 1958 NDEA was not discussed necessarily in the same conversations about how to educate the “culturally deprived.” The act aligned with the emergence of neo-liberalism in American society and arguably contributed to the creation of a worker who was aligned with the socio-political goals of the state.⁴² The issue of racial inequality in schools, especially urban schools, was curiously absent from the NDEA language despite pervasive nationwide conversations around school desegregation. Instead, it focused on creating the soft skills that students would need to be globally competitive, as well as to be self-reliant consumers and hard workers. This kind of colorblind politics assigned personal responsibility to individual students and families to acclimate to technology as facilitated through public education, but this assumed an objective and equal application of this new training. In 1965, the Elementary and Secondary Act (ESEA), which discussed education reform in the context of President Johnson’s “war on poverty” initiatives, was passed. Johnson spoke of his dislike of NDEA and the advantages it afforded white

⁴¹ Ibid., 150.

⁴² Henry Giroux, *Youth in a Suspect Society: Democracy or Disposability?* (London: Palgrave Macmillan, 2009).

students.⁴³ The ESEA instead sought to improve public education, most especially for minority students, as well as the larger communities within which schools operated.

It was in this spirit—of both building research and early NDEA funding—that the Ford Foundation developed the Educational Facilities Laboratories program discussed in Chapter Two. The SCSD program was developed in the same breath as NDEA funding, though most of its schools were actually built after the passage of the ESEA and amidst these changing attitudes about race and public education in the later 1960s. SCSD sought to leverage both the specific funding allotted in the act, but also the very specific framing of school buildings as spaces in which self-reliant students could be educated toward larger socio-political goals aligned with technocracy and the creation of a neo-liberal student subject. In this way, the experimental SCSD program of schools worked within these larger structures and ideas about the purpose of schooling. While the later ESEA defined education as part of the campaign against poverty and key to a healthy economy through a holistic approach, the architects behind both EFL and SCSD instead framed schools as technological solutions for a universalized student aligned with whiteness and individual or familial choice.

⁴³ Erica Frankenberg and Kendra Taylor, “ESEA and the Civil Rights Act: An Interbranch Approach to Furthering Desegregation” *RSF: The Russell Sage Foundation Journal of the Social Sciences* 1, no. 3 (2015), 35.

Ehrenkrantz and the SCSD project architects did not refer to the problem of desegregation in their writings on the building program, despite its widespread discussion in educational circles across the United States and relevant conversations around busing in nearby San Francisco and Berkeley. Instead, the administrators of the program chose to focus on making education objective and rational through the school building itself and employing systems architecture informed by cybernetics and the broader push for innovation.

Mid-century Architecture, Technology, and Cybernetic Systems

The idea that flexible architecture could create an environment through which state goals could be made legible and performed is a distinct feature of the time period in which the field of environmental design developed. Considering the context of the emerging field of environmental design as a vital factor in the development of Ehrenkrantz's total system of school-building allows for a reading of the SCSD schools as situated within a larger mid-century conversation about the most efficient and rational way of designing for life, specifically the lives of children. Considering SCSD schools through this lens links them with larger discourses about the philosophy of scientific expertise in everyday life. And in considering DeLaveaga as a system prototype for specifically elementary school building, considered alongside his interest in

research and cybernetics, Ehrenkrantz was able to experiment with the design of the total environment of a school system as a form of environmental design.

Architectural historian Avigail Sachs writes about the development of environmental design as bound with conversations planning for experimental housing as environments for human life, as well as the role of technology and scientific expertise in creating and messaging these conversations. Drawing on Catherine Bauer, who argued that “all humans who were in a relationship with an environment should participate in shaping it and work together toward common goals,” Sachs states that environmental design was aligned with democratic goals of the period and thus it articulated a political agenda that found footing in the design schools at Harvard, MIT, University of Pennsylvania, and Berkeley.⁴⁴ At Berkeley, these particular ideas were embraced by a number of faculty in the department and coalesced around Ehrenkrantz, who was a faculty member in the early 1960s. At Berkeley’s School of Architecture, the focus on research distinguished “architecture as environmental design from the competitive, commercial reality of practice, as it connected architecture with science, in a time when scientists were accorded elevated status and endowed in public opinion with moral virtues.”⁴⁵

⁴⁴ Avigail Sachs, *Environnemental Design*, 114.

⁴⁵ *Ibid.*, 36.

Importantly, research, as taken up in the context of architectural design at Berkeley and elsewhere, was to be productive of objective knowledge and thus universally applicable and at the front of technological advancement.⁴⁶ In fact, Ehrenkrantz was hired toward this emphasis on research as “Assistant Research Architect” and was the first to hold this position. Ehrenkrantz had advocated for research in his 1960 essay “The Need for Basic Architectural Research,” in which he argued for the need for a branch of architecture focusing just on research.⁴⁷ In the context of rapidly changing technology, this research would allow architects to turn their primary focus to design rather than constantly reading about new technological solutions and innovation. He defined the varied research agendas within architecture, which range from perception and theory to program analysis, and from to urban studies to emerging structural concepts.

Through considering architecture a discipline of research, Ehrenkrantz argues, practitioners would be guided in accessible and efficient ways toward the integration of more theoretical concerns from other disciplines (including education) into architectural practice. Through embarking on new ways of approaching architectural research, architecture could become less siloed and more interdisciplinary. Research and design were thought of as mutually

⁴⁶ Ibid., 37.

⁴⁷ Ezra Ehrenkrantz, “Need for Architectural Research,” *Progressive Architecture* 41 no.1, (1960), 9.

reifying and crucial to the concept of environmental design at Berkeley, as well as to the formation of Ehrenkrantz's architectural systems experiments.

In assembling the research for SCSD, Ehrenkrantz turned not only to his experiences with systems in Hertfordshire but also to the expanding field of cybernetics to explore the possibilities of school architecture as cybernetic system. In both Ehrenkrantz's own writings and project literature, project architects frequently point to the influence of cybernetic theory and systems thinking in the development of the SCSD project. Studying biological systems and looking for their individual factors, feedback, and output was considered part of the spirit of architectural research in Berkeley's mid-century curriculum. Ehrenkrantz and other project architects readily adopted the language of cybernetics and discussed the need for a self-regulating system of modular architecture with SCSD project architects. Cybernetics and systems design were regularly conflated in project literature. Project administrator Boice describes the systems approach they undertook quite simply as "a strategy of problem definition and solution which emphasizes the interaction between problem elements and between the immediate problem and its larger context, and which specifically avoids traditional methods of independent or ad hoc treatment of the various elements."⁴⁸ Boice refers to

⁴⁸ Boice, *A History and Evaluation of SCSD*, 17.

the systems approach being undertaken in the project as one through which to solve problems of school building through a rational and big-picture perspective. In project literature, cybernetics was synonymous with this systems approach. Geoffrey Bowker has described “legitimacy exchange,” the notion that cybernetics as a rational and objective concept was legitimized across disciplines and employed in the service of objectivity but was often little understood by those who used it. In actuality, cybernetics extended from research into making military operations more efficient and in examining biological and social systems in order to assign universalized input and output loops to a multitude of future systems. Norbert Wiener defined “cybernetics” in his text of the same name in 1948. He explained cybernetics as the study of the way that messages are articulated and argued that the study of “messages between man and machines, between machines and man, and between machine and machine, are destined to play an ever-increasing part.”⁴⁹ In an era when anxieties about both rapid technological progression and globalization were coming to a head, cybernetics offered a way of making sense, or making universal, of what seemed to be increasingly unknown and difficult to decipher. That is, by making biological and social systems universal

⁴⁹ Norbert Wiener, *On the Human Use of Human Beings: Cybernetics and Society*, (New York: Da Capo, 1988), 16. Wiener argued that all systems could be adjusted and self-maintained through constant feedback. In essence, the system would “learn” through feedback and make the system adapt to this feedback and perform better.

and objective, these findings could be applied to disciplines from sociology to architecture, across the globe despite language differences.

In this case, applying cybernetic systems research to school architecture has notable implications. It makes sense in the context of environmental design, as cybernetic thinking asserts that if a designed environment contains the relationships and processes of human life, it can be assumed that the systems through which humans communicate messages can also be universally approached. And yet, when it comes to education, especially amidst dominant conversations about a lack of equity, the processes of communication cannot be assumed to be universally true or equally applied. Attempting to understand education as a series of naturally occurring processes is erroneous and ignores the history and theory of education. It may account for why systems architecture could not be adequately applied to schools and sites of education, namely because the inputs and outputs are not objective, and knowledge is made through varied processes for different students and groups of students. This would explain some of the survey data taken from students and teachers in the late 1960s in which students and teachers were asked about their perception of school spaces and whether or not they were pleasing, usable, and conducive to learning. Despite the intention of the planning team to link school spaces with measurable data and growth, it was not possible to link student educational

objectives to the school spaces, and thus, could not prove that the schools were more effective for learning. Cybernetics is thus not an appropriate way to understand environments of education and learning, and its application to the SCSD schools in general, and specifically to DeLaveaga, accounts for the spatial failings and critiques of the architecture of the school.

Measuring Systems Output and Performance Specifications

Cybernetics and systems thinking demand a measurable output—a way of understanding the feedback that is produced in any system and drives the information loop forward. An important feature of the SCSD system was the ability of the building’s output to be measurable and self-sustaining. SCSD project architects prioritized the performance specifications of the entire building system rather than of individual schools. This was to encourage manufacturers to be increasingly experimental and to ensure the ongoing expansion of the market they had created.⁵⁰ It was anticipated that technological advances would allow for more sophisticated ways of reading SCSD building performance in the future. The National Council on Schoolhouse Construction wrote in 1966,

⁵⁰ David Hill, “Sheltering Education: Open System Prototyping in the School Construction Systems Development (SCSD)”, *Association of Collegiate Schools of Architecture Proceedings Book 2*, <https://www.acsa-arch.org> › ACSA.AM.96.69.pdf Accessed September 19, 2024.

Clearly if the American school system is to benefit from the advances in educational technology now evolving, new design solutions in school architecture are required. In addition, an important problem area now beginning to receive more attention pertains to the realization that architecture can and does influence human behavior. Much research is needed before this concept can be specifically employed in school design. In studying what may be accomplished in school planning, computers and other technological advances will be invaluable in aiding researchers to determine how architecture may be used to encourage certain desired behavior patterns by building occupants.⁵¹

This thinking was leveraged by Ehrenkrantz in the development of the SCSD project and was employed in the service of its experimental nature. That is, SCSD was touted as the research experiment that would allow further inquiry into the way that school architecture could change human behavior and, by proxy, render national conversations about the logistical problems of desegregation moot. Among a number of theories that were proposed, some architects working with systems wondered if architecture could be made into something akin to a computer, with students functioning as the messages or the data. Project architects saw school-building as a naturalized extension of systems research extending from military research. School design was thus made measurable through the project specifications, but the problem came with how to measure those specifications.⁵² Ehrenkrantz and project

⁵¹ "Schools-Planned for the Community" report, National Council on Schoolhouse Construction Report, (43rd Annual Meeting, Palto, California 1966) 19.

⁵² Boice wrote in a History and Evaluation of SCSD, "As the defense establishment of World War II became increasingly technically oriented, science and scientists became an established part of government. During this period the technological and scientific base from

architects thus realized the importance of survey data for capturing the feedback that was proposed as part of the cybernetic feedback loop. Project administrator and historian John Boice, in his report on SCSD, offered snapshots of the feedback captured in survey data:

The results of a study of student and faculty opinions on a number of environmental and aesthetic issues will form the basis for the conclusions and recommendations presented One of the primary objectives of the SCSD Project was the creation of a system which would enable designers to provide the users—students and faculty—with functional, aesthetically pleasant places in which to work.⁵³

Yet, at the same time, Boice describes how a systems approach requires quick and meaningful feedback in order to respond to the demands placed on the system. Boice describes building performance as being captured before the construction of the individual schools. It can be predictably prescribed via the use of a shared system, and he distinguishes this from user feedback, which he describes as mostly effective.⁵⁴

which the systems revolution received its impetus was firmly established and the sage was set for the post war development of the systems approach into many fields, both civilian and military. Systems and systems methodology spread rapidly, crossing disciplinary lines and permeating almost every aspect of our lives. It has even begun to make itself felt in two of the most tradition dominated fields, education and building. While most segments of American business and industry moved rapidly to embrace advances in science and technology as they became available, the building industry has been extremely slow to respond,” 20-21.

⁵³ Ibid., 437.

⁵⁴ Ibid., 438.

Surveys were distributed to each of the eleven SCSD schools in the fall of 1969. They asked twenty-one yes/no questions and one open-ended question (“I wish designers of schools would...”) around the environments created in the schools. Additionally, faculty were asked about their knowledge of administrative procedures for using certain features of the building system. Boice describes the rationale of these surveys as twofold: “1) determine the extent to which the users were aware of and made use of certain features of the system and 2) assess the users’ reactions to the quality and appropriateness of the environment in which they worked.”⁵⁵ This indicates some confusion on understandings of cybernetic systems and the ways in which feedback loops operate, as well as of places of education and the supposed role that a pleasantly perceived space informs work ethic and learning. Knowledge production differs from labor in a factory or office, and arguably cannot be measured in the same way.

The student response rate to the survey at the various schools was between 6.3 and 21.9 percent of the total student body, and 517 faculty members participated. The results indicated that, just a few years after the project schools were built, a majority of the staff were unaware that 1) the system had any capacity to be changed, 2) the schools had been designed with flexible systems in mind, and 3) there existed administrative channels

⁵⁵ Ibid., 438.

through which to request spatial changes be made. However, across sites, twenty-three percent of respondents indicated they had been involved in some change to their teaching space, and eighteen percent of respondents said they had made change requests that were not granted even when going through official administrative channels to request those changes. While the facilities and design of the school were deemed adequate or even good by nearly all of the faculty members, students were more critical of the exterior and interior appearance. The lack of color was cited as a reason for dislike, as were the poor acoustics of the halls and classrooms, which a majority of respondents described as “poor.” The noise isolation is of particular significance since noisy classrooms are a common complaint of those engaged in team teaching or open-plan teaching, which the flexible walls were designed to facilitate. Boice writes that this was the fault of the individual architects, who did not utilize acoustical wall treatment and instead relied on carpets to absorb noise. He noted that both the walls and ceiling were metal, which, in addition to the large spaces and the use of accordion partitions, contributed to very noisy classroom spaces. SCSD offers the following conclusions about noise isolation:

The unfavorable comments about acoustics in the SCSD schools is a result of a combination of all of these factors: teaching styles not properly matched to their spaces, lack of proper acoustical treatment of certain parts of the spaces, and a plenum space which was combined

with a ceiling which lacked the necessary acoustical absorption to prevent sound transfer.⁵⁶

Regarding feedback on the SCSD system in general, SCSD explained that the teachers had a lack of knowledge about the flexibility of procedures for initiating change and suggested that schools write instructional manuals to share with teachers.⁵⁷ While perhaps a wise recommendation, it could be argued that it is the responsibility of the project administrators to ensure pathways for knowledge of the system make its way to students and faculty.

Despite concern over environmental design, ultimately, the SCSD project was less concerned with education or pedagogy, but rather developing a bidding system based on performance specifications, which Ehrenkrantz believed would lead to the development of a massive market of school products.⁵⁸ Ehrenkrantz also believed that a massive untapped talent existed in American industry, one whose skills could be better leveraged

⁵⁶ Boice, *A History and Evaluation of SCSD*, 457.

⁵⁷ *Systems*, 68. Describing the unused potential of the system, superintendent of San Jose East Side Union High School District Frank Fiscalini, notes “[Teachers] are competent in their mastery of their subject matter, but generally unresourceful in adapting new audio-visual techniques to instruction. As a result, the SCSD schools are still not used to their full potential.” Teachers, in this description and in project literature, thus bear the brunt of the perceived failures of the system. EFL did produce a pamphlet intended for teachers called *Learning about the Built Environment* in 1974.

⁵⁸ Boice, *A History and Evaluation of SCSD*, 461.

toward research and development of products, in this case for schools, but ultimately, this type of bidding system based on performance specifications could be applied unilaterally to various industries and types of buildings. The success of performance specifications, according to Boice, would be contingent upon significant experimentation and the creation of multiple prototypes, which could then be measured and evaluated for success. That is, do the projects both do the work that is intended of them and do it cheaply?⁵⁹ This emphasis explains the lack of concern on behalf of the architects around measuring around student performance or learning goals, for instance, and shifts the project focus away from what educators and government officials might hope the schools would promote in terms of basic training and types of education, toward a test project for the development of industry and manufacturing in America. Though Ehrenkrantz did not believe these were mutually conflicting, this bifurcation of interests in the project reveals why the project did not live up to the goals and desires of those working in education, to the Ford Foundation, or to those students and

⁵⁹ Boice, *A History and Evaluation of SCSD*, 269. This emphasis on performance specifications and research led multiple companies to invest hundreds of thousands of dollars into designing the products for SCSD, believing they would be the approved contractor for the project. However, due to various factors, including delays to the project timeline and delays in production, at least two companies were ultimately asked not to participate in the project, though they had carried out considerable research into the performance specifications at their own expense. This led to two lawsuits and a reputation as a money-losing project to manufacturers, complicating and endangering the project's longevity outside of SCSD. It was clear that manufacturers expected to reap their development costs back when the national market took off. See Boice, *A History and Evaluation of SCSD*.

teachers on the ground who used these schools daily. EFL at the Ford Foundation described their interest in the project as the exploration of the relationship between educational theory, as outlined in Trump's call, and building research. Ultimately, Ford pulled out of the project because it did not meet their educational specifications, and the school projects cost just as much as non-systems-built schools. Tension was felt directly within the schools, and those who used them in their early days quickly remediated their spatial limitations. By the mid-1960s, ideas about education had changed rapidly, prioritizing racial equity and civic engagement over scientific and technological training.⁶⁰

The Problem with Open Systems and Prefabrication

In addition to the changing educational context and inapplicability of applying cybernetic feedback loops to students, the whole concept of systems coordination of architectural components fell flat. As Paul Barker pointed out in 2002 in *New Statesman* about London's housing problems, "[Prefabrication only saves money if the units manufactured are identical, and if the factory can always run flat out. Change the specifications, or pay assembly workers

⁶⁰ In Ehrenkrantz's later book *Architectural Systems*, he describes how building for educational requirements would have been impossible since educational trends and organization are more locally oriented and established. However, the emphasis on team teaching and open-plan teaching defined the created spaces. Ezra Ehrenkrantz, *Architectural Systems: A Needs, Resources, and Design Approach*, (New York: McGraw Hill, 1989) 134.

for down time, while the line doesn't run at full speed, and the equations collapse."⁶¹ The SCSD project architects had imagined the whole open system of manufacturing as an abstract concept that did not function practically. While Boice describes the SCSD system as "somewhere between the extremes of a one-at-a-time design and construction and the 'stock plan' approach [as proposed by Gov. Rockefeller in New York] is a middle ground: not stock plans, but stock components; not entire schools, but major component parts designed to fit simply and easily with minimum alterations required on the job."⁶² However, the manufacturers themselves manufactured the parts not continually as in a factory system, as perhaps preferred by SCSD architects and administrators, but rather per job. Therefore, individual manufacturers produced the various components individually for each job, and each component had to be redesigned, re-priced, and manufactured anew for each new school design, all while needing to schedule and staff the actual production. This explains the legal battles in 1966 between Inland Steel and SCSD. SCSD accused Inland Steel of prioritizing Lockheed's steel manufacturing needs over their own and violating their contracted schedule agreement. SCSD filed a temporary restraining order preventing Inland from

⁶¹ Paul Barker, "Sorry, but we don't want to live in flats," *New Statesman* (September 30, 2022), 46-7 cited in Colin Davies, *The Prefabricated Home* (London: Reaktion Books, 2005), 143.

⁶² Boice, *An Evaluation of SCSD*, 6.

shipping steel to Lockheed. Inland responded by filing a suit against SCSD, the various school districts involved, and the general contractor.⁶³ Inland later explained that the US Department of Defense had mandated the steel be sent to Lockheed. Regardless, the case points to the first of a number of manufacturing concerns in which the collaboration of manufacturers proved too unwieldy to reliably resource, staff, and produce the so-called “open” system of coordinated parts.

Moreover, the most damning critique of prefabricated systems coordination comes from architectural historian Colin Davies who writes, “The truth was, however, that far from being a fundamental condition for industrialized building, modular coordination was a deeply flawed conception based on a misunderstanding of the nature of manufacturing industry and an over-optimistic assessment of the achievable accuracy of building construction.”⁶⁴ That is, modular coordination of school parts assumed an interchangeability of parts that was not possible from a manufacturing perspective. Whereas Henry Ford’s system of manufacturing had been reliant on identical parts, this model for standardized school parts: doors, windows, wall panels, partitions, etc., were all different and therefore not easily replicable in a factory setting or actually interchangeable. While Ehrenkrantz

⁶³ Ibid., 372-386.

⁶⁴ Colin Davies, *The Prefabricated Home* (London: Reaktion Books, 2005), 139.

hoped that the shared ratio of production would lead to the parts being easily manufactured with slight numeric variations, tuned to a shared ratio, in fabricating machines, the actuality was that the parts were different enough to cause each order of school parts to be treated as unique and separate, rather than interchangeable and mass-produced. That is, while Ehrenkrantz had hoped that the modular system would avoid what he described as the “inefficient basis of batch production,” which resulted in an increase in product cost, in reality, the manufacturers did not have the sheer volume of demand to maintain this level of coordinated production.⁶⁵ This so-called open system, as pointed out by Chris Abel in 1969, implied that “no component could be seriously modified unless like changes were performed on all other related components in the entire industry.”⁶⁶ That is, the degree of collaboration among various manufacturers that would be required to make any kind of small changes needed--based on schedule, resource availability, accuracy problems during production, and on-site, for instance, would be nearly impossible to manage logistically. This meant that discrepancies and lack of continuity between manufacturers meant that the idea of a universal module was not actually possible. This limitation, or what Davies describes as the

⁶⁵ Ezra D. Ehrenkrantz, “Modular Materials and Design Flexibility,” *Arts and Architecture* (April 1967).

⁶⁶ Chris Abel, “Ditching the Dinosaur Sanctuary,” in *Architecture and Identity*, (London: Architectural Press, 1997), 7 cited in Colin Davies, *The Prefabricated Home*, 139.

“modular fallacy,” proved one of the major downfalls of the SCSD school system. And as SCSD architect William Blurock cautioned, “System is a bit of a misnomer. It’s still a series of parts to assemble.”⁶⁷

Learning from the Limitations of Cybernetics and Systems Architecture for Schools

The belief that technological innovation, modularity, and cybernetic systems could organize and manage student bodies in schools lingered despite the changing national priorities for schooling. As education, media, and critical race professor Ezekiel Dixon-Román reminds us, “...cybernetic systems do have sociopolitical implications. Although these automated systems of technology are purported to be more efficient, precise, and objective than the human, it has become now widely known that the technologies are masking the reproduction of inequalities and social histories of sociopolitical violence.”⁶⁸ Dixon-Román notes that through cybernetic processes, technologists sought to develop self-regulating and self-generating systems of what we now describe as artificial intelligence. This system was not only about creating objective observations and feedback loops but also about

⁶⁷ “School Construction Systems Development Program,” *Arts and Architecture* (April 1967).

⁶⁸ Ezekiel Dixon-Román, “Surrogate Pedagogy, AI Robots, and Racial Hauntings” (SACHS Lecture, Edmund W. Gordon Institute for Urban and Minority Education, Teachers College Columbia University, 2023)

instrumentalizing this so-called efficiency toward maximizing capital accumulation. We can then see the way that this cybernetics was applied to students through SCSD schools—not only was it about creating efficient, logical, and self-regulating systems, but it was also about decentering differences in the national and quite visible conversation about the logistical and managerial problem of carrying out school desegregation. If students could be made into rational subjects through the school building itself, debates about urban vs. suburban education, centralized vs. decentralized schools, and school boards vs. community schools were no longer needed. Instead, the building would do this work, and any sociopolitical, cultural, or racial difference could simply be masked through the system.

While cybernetics was discussed widely in the postwar period as the solution for many postwar concerns, its application toward school systems architecture was not a success. The logic of cybernetics employed in the SCSD project, which assumed that the complex social system of a school could be reduced to its simplest objective—learning—and made to function rationally through feedback loops facilitated by architecture and design, proved to be flawed. The design of performance specifications used to measure the success of DeLaveaga and other SCSD schools did not match the expected outcomes with the parts of the building. That is, there was a fundamental flaw in the design and analysis of the performance specifications

that equated “a pleasant environment” with the ability to perform educationally. While contemporary scholars of education describe the broader social, racial, and class-based considerations of learning, there remains a persistent tendency to attribute educational inequity to something that can be addressed quickly and efficiently, like a school building. In this way, the SCSD program, with its promise of efficient and objective education wrought through cybernetics and systems architecture, can be seen as a panacea for issues of race and class, which were and remain the cause of educational inequity. In ignoring the larger conversation about equity in the United States, the buildings were seen as increasingly out of touch and reminiscent of a time in which technological innovation could solve even complex social issues. At DeLaveaga, histories of racial tension in the region could simply be erased through the system itself.

Other schools in the SCSD program, built in the years after DeLaveaga Elementary, employed architects who had greater knowledge of previously built schools in their respective areas and who articulated a vision for the schools outside of SCSD. They were able to leverage existing styles and meet local architectural expectations. In assuming a tabula rasa for DeLaveaga’s school and local community, Ehrenkrantz’s prototype elementary school proved to be a misstep for the larger project and for the community it served. In Southern California, architects were better able to

design schools that matched the landscape of existing school architecture and better anticipate spatial needs informed by local industry. Ehrenkrantz's reliance on the logic of universal systems building was unable to meet the local need, which still has vibrational effects in the school today as teachers and administrators have worked tirelessly to meet neighborhood need, create warmth, and display student art throughout the structure, and fundraise for future needs, including remediation for climate change and insufficient building materials.⁶⁹

⁶⁹ "DeLaveaga new Classroom Building Project," https://www.sccs.net/bonds_homepage/bond_projects/delaveaga_elementary Accessed: September 2024. Thien Hua (DeLaveaga school principal), in discussion with the author, March 2022.

Chapter Four | Education for High Technology in Southern California

Sonora High School is located in northern Orange County, California (Figs. 4.1. and 4.2.). Even today, with its rows of industrial warehouses punctuated by farm plots, it feels more remote than the rest of the urbanized, densely organized county. It harkens back to an earlier, transitional era of Orange County's history, when the burgeoning aerospace industry butted up against outgoing industrial agriculture. With the peaks of the Angeles National Forest visible in the near distance, La Habra retains an intimacy that other parts of the county have since lost to smog and a clogged landscape of industrialized buildings that prevents such a majestic view. Sonora High would be just another industrial building if it were not for the school marquee out front and the brand-new athletic facilities visible from the road. Inside, Sonora High has one of the most unique architectural designs and layouts of any school in Southern California: its shared central courtyard is intentionally like that of a shopping mall, and its layout concretizes disciplinary relationships by putting like subjects together in hallways that radiate from it. Each hallway has a series of skylights over built-in concrete planters, each of which was full of tropical houseplants when the school first opened in 1966.

Sonora High was to be one of the last schools built as part of the School Construction Systems Development (SCSD) portfolio of schools. It

was designed by William E. Blurock and Associates, who had employed the “open planning of clustered classrooms around an interior math commons” at the celebrated Estancia High School in Costa Mesa in 1965.¹ Sonora was one of the more architecturally significant schools featured in the SCSD program due to Blurock’s unique and innovative school-building vision—one he used across Southern California and, ultimately, around the world. Blurock employed the concept of shopping centers in Southern California: “The central mall is the structural center, where offices can be located and where various other functions can take place. It may be used as a lobby or an entrance to the instructional areas that form around it.”² This central area would function as a sort of entrance, as well as a place for students to congregate and take breaks, and he envisioned classrooms, including auto shops, opening up directly into it. Blurock’s vision for school buildings was characterized by open spaces containing open learning processes; this is made explicit at Sonora, where the interior central courtyard and interior corridors (unusual for a Southern California school of this era) were themselves intended to be areas of learning and congregation. His vision

¹ Brittany Woolsey, “Newport Beach architect dies at 90,” *Los Angeles Times*, June 20, 2012, <https://www.latimes.com/socal/daily-pilot/news/tn-dpt-0621-blurock-20120620-story.html>, Accessed January 2024.

² William Blurock, “Architectural Features of the Southern Nevada Vocational-Technical Center,” Nevada University Reno Department of School Administration, June 1967. Speech given at the National Vocational-Technical Facility Planning Conference, 43.

does not appear to have been hampered by the design limitations due to being part of the SCSD program; his designs for Sonora High and El Dorado High School in Placentia—the schools described as the most notable of all the SCSD schools by project architects and administrators—mimicked a growing number of corporate military-industrial complexes in their interiors and nearby industrial warehouses on their exteriors.³ Blurock appeared interested in the challenge of meeting industrial and vocational needs through space and architectural design, as evidenced by his writings on the subject and the fact that he designed many such spaces for industry. His entire body of work emphasized the intersection of work and education, especially in Southern California.⁴ He was particularly interested in filling the niche of school architecture in the region when housing developments dominated local architectural resources. Unlike many architects designing SCSD schools, Blurock's interest in the relationship between industry, education, and design was supported, not hindered, by the vision of SCSD architects.

In Southern California, specifically the Los Angeles–Orange County metropolitan area, a new concept of suburbia, fueled by postwar growth and a

³ David Hill, "Sheltering Education: Open Systems Prototyping in the School Construction Systems Development" *Seeking the City, Sheltering Education. Systems* (New York: Educational Facilities Laboratories, 1971), 65-67.

⁴ William E. Blurock, "Goals and Options. Spaces for Career Preparation: Document 1" Council of Educational Facility Planners, International, 1973.

high-technology military-industrial manufacturing complex, was developing. This brought legions of upper-middle-class workers to the region for jobs in science and engineering. While Herbert Gans described the East Coast Levittowner suburbanites as not being particularly motivated to move to the suburbs because of public schools, those moving to the suburbs in Southern California cited good schools as a crucial factor when deciding on which newly built housing development or community to move to.⁵ This was a class of suburban worker that valued innovation in education, science training, and national defense, especially in the earlier half of the 1960s, when the federal government issued the Elementary and Secondary Education Act that specified millions of dollars in federal funding to go toward school buildings and programs in service of science and technology training. Gans's *Levittowners* devotes a chapter to the backlash from parents when a rural superintendent was brought in to head a new suburban school in New Jersey.⁶ Indeed, this later wave of would-be suburbanites had a new range of concerns about public education fueled more by anxiety about replacing the perception of so-called failing urban schools with those that would provide

⁵ Annmarie Adams, "The Eichler Home: Intention and Experience in Postwar Suburbia," *Perspectives in Vernacular Architecture* 5, (1995), 165. See also Jack Dougherty, "Shopping for Schools: How public Education and Private Housing Shaped Suburban Connecticut," *Journal of Urban History* 38, no. 2 (2012), 206.

⁶ Herbert Gans, *Levittowners: Ways of Life and Politics in a New Suburban Community*, (New York: Columbia University Press, 1967).

elevated educational opportunities and access to upper-middle-class job training while also maintaining white classrooms and neighborhoods.

This chapter looks at four SCSD schools in the Southern California area—Sonora High School, El Dorado High School, Fountain Valley High School, and William Workman High School—in order to explore the unique ways that these schools operated as a part of, or obfuscated, the intersections between school desegregation in Los Angeles, a new wave of suburban development, and a new type of suburbia. It also looks at shifting ideas in national pedagogical discourse around the move away from science and technology training to one spearheaded by concerns about civil rights during the latter half of the 1960s. Central to these concerns is how race operated in each of these threads and the ways in which this affected the day-to-day operations of the design of each school. Often left out of urban and suburban histories, these case studies show the prime role of schools in the study of urban and suburban development more broadly, and especially in Southern California. This chapter argues that suburban development in the region was accelerated by fears of failing public schools—part of a national discourse, which was ultimately used as a strawman by both industry and developers to rationalize constant expansion and the building of new schools. SCSD architects, at the same time, were less concerned with social or community issues, or what project architect Christopher Arnold recalled as

“local environmental concerns,” than they were thinking about the spaces of “English or shop class.”⁷ It was instead the purview of the so-called local architects to deal with some of these so-called “community concerns,” as, from the perspective of the SCSD project, classroom spaces could be altered in order to deal with any social issues that might occur, but there did not need to be any specific community planning that went into the school building’s design. That such concerns were not considered indicates a lack of attention to *certain* pedagogical trends—planning for equity and community, for instance—in favor of ones entrenched in questions of science, technology, and industry; this comes through in the aesthetic choices made by the architects for the schools, the communities chosen for schools, as well as which architects the project employed locally.

School Desegregation in Southern California

As mentioned in previous chapters, during the late 1950s and 1960s, the 1954 *Brown v. Board of Education* federal court decision had tremendous nationwide reverberations. California had its own complex history with segregated schools; the 1947 *Mendez v. Westminster* ruling declared that state schools were engaging in discriminatory practices against pupils of

⁷ George Rand and Christopher Arnold, “Evaluation: A Look Back at the School’s Sexiest System,” *AIA Journal* (1979): 86.

Mexican descent in California and mandated that schools must offer equal “technical facilities, textbooks, and courses of instruction” to all students.⁸ This case was used as a precedent for the later *Brown v. Board of Education*. While much scholarship has focused on the ways in which desegregation affected major metropolitans on the East Coast and in the rural South, less has been written about the complex but no less significant ways that desegregation was carried out in California in the 1950s to 1970s.

Before World War II, schools throughout the southland were largely segregated due to restrictive housing covenants and unofficial residential patterns. Educational historian Jack Schneider writes that “like the city itself, Los Angeles’s schools had long been highly segregated, but the threat of desegregation—credible in the aftermath of the *Brown* decision and terrifying after the Watts riots [in 1966]—weighed heavy with white parents. Threats to the schools caused parents to reevaluate the quality of life in Los Angeles, and their subsequent flight brought about the schools they feared and forever changed the face of the city they left.”⁹ The California State Board of Education began to address the issue of desegregation directly in 1962 by issuing a directive to school districts to “exert all effort to avoid and eliminate

⁸ Mendez, et al v. Westminster [sic] School District of Orange County, et al, 64 F.Supp. 544, aff’d, 161 F.2d 774 (1947).

⁹ Jack Schneider, “Escape from Los Angeles: White Flight from Los Angeles and its schools 1960-80,” *Journal of Urban History* 34 no. 6, (2008), 996.

segregation.”¹⁰ Yet the order was met with inaction by the school districts, and as a result, schools in California were “more segregated from those in Louisiana, Alabama, North Carolina, Virginia, and South Carolina.”¹¹ Despite inaction from the local districts, a California state court held in 1970 that residential segregation was to blame for racial imbalances and that despite this, school boards must take concrete steps toward rectifying the problem.¹² In that same year, the anti-integrationist South Gate Education Committee in Los Angeles created a petition that opposed integrating schools and gathered 17,500 signatures in only two weeks. The group pushed for secession from the Los Angeles Unified School District (LAUSD) but was unsuccessful. Four years prior, a 1966 opinion survey in Berkeley of how families were responding to desegregation found that the opposition to integration “was expressed primarily by white residents, homeowners, registered voters, persons educated in the community’s schools, and those who resided in the community for over six years.”¹³

¹⁰ Ibid., 998.

¹¹ Schneider, “Escape from Los Angeles,” 998.

¹² *Crawford v. Los Angeles Board of Education.*, 458 US 527 (1982).

¹³ Leonard A. Marascuilo and Kathleen Penfield, “A Northern Urban Community’s Attitudes toward Racial Imbalances in Schools and Classrooms,” *The School Review* 74(4) (1966): 359-79, 372.

As in Berkeley, integration was widely denounced by those in Southern California, and when petitions and secession failed, homeowners began to move from Los Angeles proper to the surrounding cities. The population of Orange County exploded in the 1960s when “panic or prejudice moved large numbers of longtime residents there from Los Angeles, further solidifying the county’s identity as a haven for whites concerned about states’ rights, property rights, and so-called traditional values.”¹⁴ At the same time, developers in Orange County were constructing endless housing tracts on former agricultural land, creating new neighborhoods with brand new schools. Schneider writes that “many whites, facing the threat of losing their shot at social mobility in a school system presented as being under siege, left LAUSD....[for] an alternative waiting for them just outside the city, where homes were each day replacing fruit trees.”¹⁵ School integration in the LA region, an already decentralized and sprawling area, led to massive disinvestment in urban schools and the ghettoization of previously white neighborhoods as black and brown inhabitants moved in. New schools were thus built fresh, in the next outer ring of suburbs, making good on the promise of the suburban dream for the few. These schools became understandably linked to the growing industry in the region through their architecture and

¹⁴ Schneider, “Escape from Los Angeles,” 1005.

¹⁵ Ibid., 1007.

through the types of workers that they were expected to be producing—a vision strictly in line with the idea of the white technological worker. Thus, schools and industry worked together to facilitate a vision for suburban America, one that drew thousands of residents outside of SoCal to high-technology and defense-contract-dependent Orange County and the corresponding industrial and more working-class suburbs outside of Los Angeles.

Many scholars in the field of educational sociology have written about the specific tactics used to isolate indigenous Californians, Californios, and Mexicans into separate schools and residential neighborhoods throughout Southern California in the early twentieth-century. Drawing on George Lipitz, who notes that “because of practices that racialize space and spatialize race, whiteness is learned and legitimated, perceived as natural, necessary, and inevitable,” a number of educational scholars bridge the chasm between school and urban histories through inquiry into how whiteness is normalized and replicated through school buildings. Tara Yosso, in her analysis of the links between residential and school segregation before and immediately after World War II, introduces the concept of “mundane racism,” or “the process of racism becoming an everyday taken for granted part of schooling that helped reproduce a stratified workplace,” which she says appeared as an ordinary and normalized way of subordinating Mexicans within and beyond schools in

Oxnard (Ventura County), California.¹⁶ Yosso found that residential space became racialized and segregated Mexican students, though, on the surface, the phenomenon appeared to be the product of “natural” patterns of residential development and communities. She argues that because white privilege led to concerns about Mexican students diluting the earning potential of white students, Mexican families were concentrated, through racial covenants, into certain neighborhoods and thus into certain schools.¹⁷ Similarly, educational historian Emily Strauss, in *Death of a Suburban Dream: Race and Schools in Compton, California*, argues that defining the postwar American school crisis as “urban” has “limited the scope of inquiry into school failure and ignore[s] the connection between schooling and geography.”¹⁸ In her study of schooling and residential patterns in Compton, California, Strauss anchors the educational crisis in the city not in schooling but rather in processes of suburban development over time. She details the factors that contributed to how the perception of school failure as an *urban problem* is tied to both whiteness and development. She writes that

¹⁶ David Garcia and Tara Yosso, “‘Strictly in the Capacity of Servant’: The interconnection between residential and school segregation in Oxnard, California, 1934-54,” *History of Education Quarterly* 53 no. 1 (February 2013): 87.

¹⁷ Ibid.

¹⁸ Emily Strauss, *Death of a Suburban Dream: Race and Schools in Compton, California*, (Philadelphia: University of Pennsylvania Press, 2014), 3.

labeling a place as urban or suburban brings with it a set of cultural assumptions; the city is the center of the crisis and the suburb is the embodiment of the American dream. Suburbs and their schools represented a prosperous white paradise, an escape from minority populated cities and their failing schools. The flip side of this racialization of space characterizes urban places and urban schools as centers of violence and family breakdown. Disentangling how these basic assumptions about the character of cities and suburbs reveals how demographic changes, political conflict and lack of economic development combined to put this suburb and its school district in crisis.¹⁹

In the 1950s and 1960s, the popular idea of “compensatory education”—which described students from nonwhite backgrounds as being culturally deprived and thus doomed to fail scholastically and professionally—was backed by numerous federally funded studies. It contributed to the pathologizing of nonwhite families and led many whites to rationalize a desire for segregated schools and neighborhoods.

This leads to a question about the role of schools in urban and suburban history. Why have schools and their related concerns been left out of many histories of urbanism, planning and development, and the suburbs? Jack Dougherty writes that “the gap between these different fields of history—on both sides—is remarkable. Whereas educational historians tend to stop at the city line, urban and suburban historians appear to have stopped at the

¹⁹ Emily Straus, *Death of a Suburban Dream*, 3-4.

schoolhouse door.”²⁰ This chapter asks how the specific SCSD schools in the Southern California metropolitan region—certainly part of the period’s wave of postwar development and flight from Los Angeles—operated in these larger issues of schooling, desegregation, and suburban development. I pay particular attention to the ways in which these schools function in complicated local and regional labor and economic histories. I also consider the ways that the vision for SCSD schools at large could have been propelled through both a racialized attention to suburban development and the development of accompanying technological industries, as well as the ways in which architecture might have been employed to these ends. This chapter argues that the SCSD schools at times premised, and were always part of, a larger regional vision for school-building that aligned with the research and production components of the military defense industry in order to supplement the needs of labor and local economies, while maintaining distinct class divisions rooted in divergent approaches to housing developments. This chapter builds on architectural researcher Torin Monahan’s concept of “built pedagogy,” which suggests that the design of built school spaces affects the behaviors and actions of students in those spaces and that these spaces, thus, to a certain extent, embody the pedagogical beliefs and philosophies of

²⁰ Jack Dougherty, “Bridging the Gap between Urban, Suburban, and Educational History,” in William J. Reese and John L. Rury (Eds.) *Rethinking the History of American Education*, (London: Palgrave Macmillan, 2007), 251.

their architects and designers.²¹ Moreover, as educational historians Jean and Robert McClintock note, “Designs for classrooms not only tell us much about the didactic means that were used in them; they also reveal the essence of the pedagogy that directed the educative efforts of past times.”²²

Suburban Land Development

The story that American cities in the postwar era lost their middle class to surrounding suburbs has been long characterized as having been due to a collective desire for space, cleanliness, and community in the face of cities’ high-density urban environments and rapid industrialization. Numerous scholars have shed light on the ways that racial covenants, unequal lending practices, and redlining denied some Americans access to home ownership and the ways that these practices were racially motivated.²³ It is not as clear, however, how schooling functioned as an integral component of suburban development and the reorganization of capital that was occurring in the

²¹ Torin Monahan, “Flexible Space & Built Pedagogy: Emerging IT Embodiments,” *Inventio* 4, no. 1(2002): 5.

²² Jean and Robert McClintock, “Architecture and Pedagogy” in *Henry Barnard’s School Architecture* (New York: Teachers College Press, Columbia University, 1970), 2.

²³ See Richard Rothstein, *The Color of Law: A Forgotten History of How our Government Segregated America* (New York: Liveright, 2017), Gene Slater, *Freedom to Discriminate: How Realtors Conspired to Segregate Housing and Divide America* (Berkeley, CA: Heyday, 2021), Paige Glotzer, *How the Suburbs Were Segregated: Developers and the Business of Exclusionary Housing, 1890-1960*, (New York: Columbia University Press, 2020), Keeanga-Yamahatta Taylor, *Race for Profit: How Banks and the Real Estate Industry Undermined Black Homeownership* (Chapel Hill, NC: The University of North Carolina Press, 2020).

postwar era. While families in the first wave of the development of East Coast suburbs may have been less interested in the role of schooling, by the early 1960s, “the superiority of suburban schools lay not only in the strength of educational experiences but also in the possibility that the schools could remain racially segregated.”²⁴ In his influential and highly regarded text *The One Best System*, educational historian David Tyack writes about the ways that “the ‘village’ and ‘urban’ [function] as shorthand labels for the highly complex changes in ways of thinking and behaving that accompanied revolutions in technology, increasing concentration of people in [American] cities, and restructuring of economic and political institutions into large bureaucracies.”²⁵ Tyack’s history of American public education is succinctly tied to the history of urbanism: through the move away from local education, as symbolized by the “village;” into the streamlining of “urban” education, characterized by educational science, professional expertise, and mass media; and away from tradition and local knowledge through urbanization.

How might this spatial understanding of the concentration of knowledge and expertise in cities help explain the shift *away* from urban education in the period of massive suburban development in the 1960s? How

²⁴ Emily Strauss, *Death of a Suburban Dream*, 6.

²⁵ David Tyack, *The One Best System; A History of American Urban Education* (Cambridge: Harvard University Press, 1974), 5.

does this shore up with how Lisa McGirr characterizes the rise of right-wing, anti-intellectual conservatism grown in newer Southern California suburbs during the postwar era in *Suburban Warriors: The Origins of the New American Right*?²⁶ How might government funding and organizational methods have contributed to suburbanization in Southern California and a distinct form of de jure segregation from what was outlined in Arnold Hirsch's second ghetto theory?²⁷ Hirsch, for instance, argues that the expansion of the postwar South Side ghetto in Chicago was the product of direct cooperative efforts of government intervention, local business practices, and major institutions. In Southern California, by comparison, a distinct combination of anti-intellectualism and anti-urbanism coalesced with real estate as well as housing development practices to produce a different type of segregation. Schooling was a critical component in the new organizational processes driving suburban development in the region, and this role can be explored by studying the school buildings that operate at the intersection of these disciplines. Another way of thinking about this is to consider how "urban schools," long discussed as failing, have been a strawman for the problems of urbanism, which have led to, in this case, the development of organized

²⁶ Lisa McGirr, *Suburban Warriors: The Origins of the New American Right* (Princeton: Princeton University Press, 2015).

²⁷ Arnold R. Hirsch, *Making the Second Ghetto: Race and Housing in Chicago 1940-1960*, (Chicago, University of Chicago Press, 1983).

networks of school products and architectural components whose accompanying discourse has been to ameliorate the ills of urban schools themselves. The answer to this perhaps lies in the relationship between new ways of spatially organizing capital through residential development and architecture's role in normalizing and linking schooling to ongoing development and developing industry.

On an expanded level, we can view the entire SCSD project through the lens of David Harvey's spatial fix and the expanded needs of capital in the region.²⁸ As described by Edward Soja in *My Los Angeles*, Harvey argues that "the social processes of capital development shaped urban geography and the built environment to fit its needs at a particular moment. But as the needs of capitalist development change over time, becoming especially challenged during periods of crisis, the existing geography and built environment become, to an increasing extent, outdated and dysfunctional, a straitjacket of sorts. A new and different geography is required to meet the changed needs of capital."²⁹ Soja argues that even before the Watts riots reshaped the social landscape of Los Angeles, the seeds of white flight were planted through massive demographic changes to the state. Nonwhite

²⁸ See David Harvey, "The Spatial Fix—Hegel, von Thunen, and Marx," *Antipode* 13 no. 3 (1981): 1-46.

²⁹ Edward Soja, *My Los Angeles: From Urban Restructuring to Regional Urbanization*, (University of California Press, 2014), 51.

workers moved into formerly white communities and, through desegregation policies, were increasingly able to enroll in public schools. According to Harvey's logic, there is a perceived need for new schools beyond the reach of official desegregation policies. This would facilitate the reorganization of workers to benefit capital in socially acceptable ways, allowing white individuals to continue living, working, and schooling with other whites by expanding into new suburban areas. It also leveraged the existing markets of residential production and created new markets for educational products; these worked in a self-affirming cycle, deeming themselves necessary because of demand for new suburbs and new schools. At the same time, the larger SCSD project brought forth a bold vision of the creation of a networked market of manufacturers of school products and architectural components which leveraged these ideas amid existing wartime industry. This reorganization of spatial capital was thus presented as a logical way of streamlining architectural production at the same time that suburban development necessitated new school buildings be built quickly and cheaply. Here, racial fears, extending from narratives about failing urban schools and cultural deprivation, led to a perceived need for more schools in new areas that can be bound into whiteness. Thus the needs of an ever-expanding market are met through stoking these racial fears. As Stuart Leslie writes in "Cold War Suburbs,"

to accommodate the families of all those workers, local real estate developers built out entirely new subdivisions in the early 1960s with the kind of amenities ‘executive category’ buyers expected: single-family homes, mostly variations of mid-century modern with open floor plans, outdoor patios, the latest appliances, and restrictive covenants. What seemed to matter most to prospective Hughes employees was top-notch public schools.³⁰

Manufacturing the Suburban School Advantage

In the 1960s and 1970s, the suburbs and suburban education were discussed in national contexts as having very serious advantages for children. James Conant’s 1961 book *Slums and Suburbs* described, on the one hand, urban schools as embodying most of the “vexing problems in American education and were associated with poverty, indiscipline, and low achievement.”³¹ Conversely, the suburbs are portrayed in Conant’s book as places where families are more typically concerned with where to send their children to college. Education historian John L. Rury notes that this is exemplary of a shift in thinking about urban education—before the 1950s, urban school systems were often better resourced than smaller or rural schools and held up as examples in national conversations about the future of schooling.³²

³⁰ Stuart W. Leslie, “Cold War Suburbs,” *Southern California Quarterly* 102, no. 1, (2020): 29.

³¹ John L. Rury, *Creating the Suburban School Advantage* (New York: Cornell University Press, 2020), 18.

³² Urban schools had “age grading, uniform textbooks, specialized classes, and summer school,” as well as a “wide range of courses and specialized programs such as college prep

When wealth shifted away from urban centers to the suburbs due in part to the rise of personal vehicles and the construction of the highway system, suburban communities, and their schools emerged as sites of power and status.

At the same time, education was increasingly seen as a driver of social mobility and economic opportunity. While urban school systems were increasingly segregated due to increased residential segregation, suburban schools seemed to be spared from many of the problems facing urban schools. In 1976, the *New York Times* published the *Guide to Suburban Public Schools* which allowed families to peruse schools before buying a home in a suburban neighborhood outside the city. While limited to suburbs around New York, the guide suggested a belief that purchasing a house which would allow enrollment in top suburban schools would increase economic opportunity and social mobility, moreso than what an urban school could offer.³³ The suburbs were now nationally situated as sites of educational advantage in all parts of the country, at least, as Rury argues, for many whites.³⁴ And while the suburbs were unilaterally positioned as better

and vocational training,” and better paid, experienced teachers. Rury, *Creating the Suburban School Advantage*, 19.

³³ *Guide to Suburban Public Schools* (New York: *New York Times*, 1976).

³⁴ Rury, *Creating the Suburban School Advantage*, 31.

than their urban counterparts, the idea of “urban education” became increasingly maligned.³⁵ Many of these suburbanites were not interested in paying for goods or services that did not benefit their immediate neighbors or families and were especially not interested in the type of large urban centralized school board that ran large urban districts, nor the government oversight associated with it.³⁶

Instead, new suburbanites sought individual freedom and freedom of school curriculum while also organizing campaigns against court-ordered busing and increased property taxes in California. Educational scholars describe this as “opportunity hoarding,” in which communities employ various practices to consolidate and hoard resources.³⁷ Sociologist Charles Tilly describes opportunity hoarding as a mechanism of social inequality that “operates when members of a categorically bounded network acquire access to a resource that is valuable, renewable, subject to monopoly, supportive of network activities, and enhanced by the network’s *modus operandi*.”³⁸ Advocating for school boundary re-zoning, for instance, or organizing against

³⁵ On anti-urbanism see Steven Conn, *Americans against the City: Anti-urbanism in the Twentieth-century* (New York: Oxford University Press, 2014), chaps. 6 and 7.

³⁶ Campbell F. Scribner, *The Fight for Local Control: Schools, Suburbs, and American Democracy*, (New York: Cornell University Press, 2016), 25-27.

³⁷ John L. Rury and Aaron Tyler Rife, “Race, Schools, and Opportunity Hoarding: Evidence from a Post-war American Metropolis,” *History of Education* 47, no. 1 (2018): 87-107.

³⁸ Charles Tilly, *Durable Inequality*, Berkeley: University of California Press, 1998, 10.

busing, functions to limit the boundaries for some, while others continue to access that resource, in this case high functioning public schools. The schools in the SCSD portfolio in Southern California discussed here were tied to securing the economic fruits of the high technology industry that the schools were aligned with. Suburban schools, especially in California, as shown in this chapter, were thus seen as sutured to the right to economic mobility, which was decidedly not the case in urban schools. As we will see, by tying suburban public schools with the rationality of systems architecture and endowing them with the aesthetic of innovative technological research, the schools were further positioned as attractive to a new class of engineer and white-collar worker arriving in southern California's suburbs in the 1960s while implicated and employed in service of in the region's uneven development.³⁹

Growing an Information Industry in Southern California

In the 1960s, Southern California also became a primary site of industrialization and rapid technological change in the US. Shifting away from the manufacturing belt in the Northeast, the industry's expanded role in the region showcases the larger pattern of economic transformation. To that end,

³⁹ See Kevin Fox Gotham, *Race, Real Estate, Uneven Development: The Kansas City Experience, 1900, 2010* (New York: State University of New York Press, 2014), for conversation on suburban uneven development and consumer demand.

numerous manufacturers pivoted from military production to participating in information technology and what geographer Allen J. Scott calls “technopolis.” Scott writes that “after World War II, the aircraft industry blossomed into a great aerospace-electronics manufacturing complex whose growth was fueled by large-scale federal defense spending over the postwar decades. By the early 1960s, the complex had become *the* dominant element of the entire local production system.”⁴⁰ This industry was to be nearly entirely dependent on defense contracts and sought to produce the most technologically advanced electronics by attracting the best scientists and engineers in the US. Architectural historian Stuart W. Leslie analyzes the architecture of such a high-technology regional industry through what he describes as “aerospace modernism,” a style/type of building and work environment that is distinguished from architectural modernism and predates the contemporary Silicon Valley tech campus. While considering the work of Peter Hales—which reconfigured the Manhattan Project through interpreting the communities of Los Alamos, Oak Ridge, and Hanford as urbanized domestic environments that included laboratories, factories, homes, and schools—Leslie argues that the built environment of aerospace modernism offers a reframing of the Cold War by viewing it through the lens of architecture and

⁴⁰ Allen J. Scott, *Technopolis: High technology Industry and Regional Development in Southern California*, (Berkeley: University of California Press, 1994), 3.

design.⁴¹ Leslie describes the way that only the correct kind of buildings—“scientific, industrial, and residential—could attract the kind of creative talent and inspire the kind of thinking required for state-of-the-art aerospace engineering.”⁴² Similarly, this style would be distanced from the kind of buttoned-down, organization man of the East Coast and sought to define the industry architecturally: “a pastoral capitalism of aluminum and glass, open-air corridors, broad courtyards, shallow reflecting pools, green space, and gardens” which were private and isolated from the outside world while mimicking public spaces.⁴³ Architect Albert C. Martin’s corporate campuses built in the 1950s and early 1960s integrated responses to company surveys completed by scientists and engineers. “From the founding partners on down, [employees said they] preferred a campus-like setting, with a number of separate, smaller buildings rather than a single large structure. Multiple buildings offered the further advantage of providing some spatially derived autonomy for different directions within the company, without losing economies of scale, and also made future expansion less expensive...In essence the architecture should clearly and self-consciously reinforce the

⁴¹ Peter Hales, *Atomic Spaces: Living on the Manhattan Project* (Champaign, IL: University of Illinois Press, 1997) in Stuart W. Leslie, “Aerospaces: Southern California Architecture in a Cold War World,” *History and Technology: An International Journal*, 29, no. 4 (2013), 331.

⁴² *Ibid.*, 331.

⁴³ *Ibid.*, 332.

philosophy of systems engineering.”⁴⁴ Martin’s designs reflect his belief that the “best conditions for the advancement of knowledge are those in which they are free to roam intellectually and physically within only those limitations set by their own self-discipline” while balancing this openness with the secrecy around highly classified scientific research.

Many of these complexes included residential areas directly adjacent to them, which aimed to appeal both spatially and stylistically to the employees the companies sought to attract. These new developments, sometimes featuring homes by Joseph Eichler or others, showcased features of California living that would attract people fleeing urban metropolitan areas outside the state. The mostly single-family homes were modern in design with open floor plans, outdoor patios, updated appliances, and restrictive purchasing covenants.⁴⁵ Sunny Hills High School, built on land next to the Hughes Aircraft Company corporate campus in Fullerton, offered a school-based version of the concept of idealized California living seen in local housing while mirroring the campus-like setting of the industrial architecture. This directly illustrates not only the importance of public schools to prospective employees but also the ways that architecture and spatial design were to unite education and industry. In George Rand and project architect

⁴⁴ Ibid., 336-337.

⁴⁵ Stuart Leslie, “California Dreamin’,” *Physics Today* 74 no. 2, (2021): 42-43.

Christopher Arnold's 1979 look back at the SCSD system, Rand describes the technological euphoria that surrounded the project—one that could only capture the nation's imagination in the manner it did because of the ways in which California was imaged in the media: as the next great frontier. That the SCSD system should be part of the same impulse drawing the nation's top engineers and scientists westward was not lost on anyone, least of all the project architects. Rand states that "the approach was ahead of its time in understanding the piecemeal way in which technological innovations are adopted." It thus signified the capacity of Californian industry made available to students via the SCSD buildings and leveraged by families looking to maintain or move to upper-middle-class status.

Rand writes,

American high schools of this vintage were substantial corporate enterprises. They tended not to be very innovative environments. Colors and materials were typically selected to resist wear rather than to express or induce pleasure...The facades of the schools are indistinguishable from electronics plants, commercial offices and warehouses on adjacent lots. The technician style is carried over to the stark interiors of buildings in which illumination by commercial office standards is a far cry from chandeliers hanging from vaulted ceilings and wooden library tables outfitted with individual reading lamps typical of older British university...SCSD was the final crystallization of the school influenced by the postwar corporations, the electronics industry, and the IBM computer.⁴⁶

⁴⁶ George Rand and Christopher Arnold, "Evaluation: A Look Back at the School's Sexiest System," *AIA Journal* (1979): 57.

These schools share exterior and interior features with the aerospace technopolis of Orange County, including central courts, concrete slabs, large open spaces, and exposed materials. Sometimes, the most creative architects included natural features like skylights or interior planters, reminiscent of the gazing gardens of the industrial campuses. Through replicating postwar industrial architecture, the schools link the language of production and suburban development with the SCSD vision, thus functioning in more nuanced ways than even the architects could have imagined. The stories on the ground at the individual SCSD schools reflect these themes in myriad complex ways. As summarized by Rand and Arnold,

There's an irony...in the sense that [they] were trying to do something fairly revolutionary with the school system...to think of schools as more malleable than they had previously. Yet, ironically, when they really want to modify the system to make it work more effectively, they bring out the old technologies, wood or aluminum frame doors, and the old craft skills to close off areas. It seems that you were looking for a perfect set of solutions that would be universal, and not a system that really be adapted through a little hard labor and some jerry-rigged solutions, that were already available and present within the community, or could easily be created among the students or among the teachers. In fact, shop teachers are still enjoined from using their craft skills to do the work that has to be done to tune the schools up. It

is a way of saying that you didn't design a mixed system that could accommodate local adaptations.⁴⁷

Huntington Beach and Fountain Valley High School

The first high school built in the SCSD system was Fountain Valley High School (FVHS) in the Huntington Beach Union High School District (Figs. 4.3. and 4.4.). Built by architects Neptune and Thomas, FVHS was built on top of an asparagus field. Prior to building, the field had to be chemically treated to proactively prevent the perennial vegetables from regrowing and destroying the school's foundation, sidewalks, and parking lots.⁴⁸ Because of the school's proximity to the potentially damaging salt air of the ocean, the exteriors were constructed of red brick. Allegedly, between 1966 and 1968, the first two years the school was open, FVHS had the largest population of any high school west of the Mississippi.⁴⁹

FVHS was built in close proximity to Hughes Aircraft, Huntington Beach Space Systems Center, and Douglas Space and Missile Systems (later McDonnell Douglas and more recently Boeing), which provided jobs for

⁴⁷ George Rand and Christopher Arnold, "Evaluation: A Look Back at the School's Sexiest System," *AIA Journal* (1979): 86.

⁴⁸ SCSD: The Project and the Schools-a report from Educational Facilities Laboratories, (New York: Educational Facilities Laboratories, 1967), 14.

⁴⁹ Greg Mellen, "Fountain Valley High School Graduation, 2017," *Orange County Register*, June 14, 2017, <https://www.ocregister.com/2017/06/14/crowd-hails-the-barons/> Accessed January 2024.

many families newly arriving to the fledgling city. The Space Systems Center was well known for developing multiple advancements for the US space program in the 1960s, including the Saturn IV-B which took the Apollo 11 astronauts to the moon.⁵⁰ The Space Systems Center, designed by architects Daniel, Mann, Johnson, and Mendenhall (who later went on to design an SCSD school in Simi Valley), was designed to “create a campus atmosphere conducive to the complex human acts of thinking and design, while at the same time providing for the manufacture, assembly, and testing of great space vehicles.”⁵¹ “By 1960, the tipping point, California already employed more physicists than New York, Pennsylvania, and New Jersey combined,” particularly in Southern California, where aerospace, over aircraft production, had become dominant.⁵² Companies that had been originally built for war-time manufacturing increasingly needed to rely on scientific expertise and research to build rocket engines and guidance systems for intercontinental ballistic missiles, aircraft and antiaircraft radar systems, ground-to-air and air-to-air missiles, and other high-tech instruments.⁵³ This shift meant a shift in

⁵⁰ Huntington Beach Waves Goodbye after Stellar History,” Defense Contract Management Agency, US government, March 7, 2018. <https://www.dcma.mil/News/Article-View/Article/1454759/huntington-beach-waves-goodbye-after-stellar-history/>, Accessed January 2024.

⁵¹ Tom Cameron, “New Douglas Space Center Aims at Atmosphere for Thinking,” *Los Angeles Times*, November 24, 1963, S1.

⁵² Stuart Leslie, “California Dreamin’,” *Physics Today* 74(2), (2021), 36.

⁵³ *Ibid.*, 36.

the type of workforce that local companies needed. In the decade prior to this shift, the Huntington Beach Company, Chevron's land development branch, owned most of the land in the rural city, and they pivoted quickly to transform the region's land into housing developments.

Realizing that the Space Systems Center would need thousands of scientists and engineers, the company bankrolled half a dozen new housing developments that were quickly erected in order to "transform Huntington beach from a 'gritty neighborhood built by big oil to a seaside community surrounding a country club.'"⁵⁴ These "aerospace suburbs" had housing developments featuring "three-, four-, and five-bedroom 'pads' with two full baths, open floor plans, massive stone fireplaces, master bedroom suites, marble foyers, and sliding glass doors opening to a patio. The model homes featured the same kind of mid-century modernist aesthetic as the Space Systems Center lobby."⁵⁵ The homes were a mixture of mid-century modern design and traditional picket fences and gables, the latter intended to appeal to those transplants looking for homes more reminiscent of traditional Americana. Thus, a juxtaposition between traditional American values and architecture and space-age technology came to be perfectly normalized

⁵⁴ Stuart Leslie, "Cold War Suburbs," 36.

⁵⁵ Ibid., 36

through architecture and infrastructure in Huntington Beach and the surrounding areas.

This contrast was also evident in the schools in Huntington Beach. SCSD 's Huntington Beach School, Fountain Valley High School, is composed of brick buildings that form a rectangular arrangement around a central courtyard with a tree-rimmed amphitheater at its center. The entrance of the school, like all SCSD schools, is anchored by a weighty-looking central administration building. Wings, arranged by discipline, flank either side of the central courtyard, and there is a large outdoor swimming pool toward the back of the campus. While the street-facing façade of the building is predominantly brick, the interior-facing administration wing has steel and glass windows that face the shared courtyard. Classrooms are formed from exposed red brick walls, floor-to-ceiling chalkboards, and flexible accordion partitions to accommodate open-plan teaching and learning. There is a fully controllable interior environment with an advanced air conditioning system and few classroom windows. The courtyard is bordered by windows, covered breezeways, and lockers on some walls. Amphitheater seating takes the place of cafeteria seating and provides places for students to gather and eat lunch. Athletics seem to have been a fairly large emphasis at the time of construction, with space devoted to a larger-than-usual gymnasium, ample lockers, and a large athletic field.

The exterior of the campus and interior historic and contemporary photographs show aesthetic choices similar to some of the nearby technology companies. The school's large courtyard rivals the contemplative and landscape-like interior spaces of the technology campuses of Daniel, Mann, Johnson, & Mendenhall and AC Martin—meant to be gazed upon, but not interacted with.⁵⁶ The relationship with outdoor space is one of pure utility: while the classrooms have few, if any, windows, the trees surrounding the courtyard are for shade, the natural landscape has been resurfaced entirely with concrete, and the open-air setting of the auditorium is more for economy of space and noise reduction than nurturing any specific interaction with the natural world. Additionally, the HVAC, lighting, and electric systems are to do the work of regulating the internal environment instead of relying on classroom windows. This is a space meant for movement between clearly demarcated and intentional spaces, with little room for deviation from the schedule of the day.

Schools for Industry: Open-Planning for Innovation

Open-plan schools were optimistically described in EFL literature in the 1960s and 70s.

⁵⁶ Daniel, Mann, Johnson and Mendenhall designed an SCSD school, Royal High School, in Simi Valley, California, which will hopefully be part of future projects, but was not included here.

While open-plan schooling may seem an innovation, it carries on the tradition of the one-room schoolhouse, expanded to accommodate 1000 students. The concept also attempts to instill in students the quality of independence that we admire in our forefathers and believe their successors were weaned away from by making teachers the directors of what, when, and how to study.⁵⁷

The belief that schools could, once again, produce innovation and independence was ascribed to open-plan classrooms. This section looks to the ways that open-plan classrooms, as discussed in EFL literature, were positioned to nurture mathematics and science instruction toward greater innovation and research. This language of innovation and research is consistent with the emulation of the scientific research campus associated with technological innovation that we find in the SCSD schools of southern California discussed in this chapter.

Open-plan schools were described throughout EFL project literature as uniquely “innovative.” In an attempt to differentiate open-plan schools from classroom designs of the past, advocates dissuaded open-plan schools from being labeled as progressive. Instead, messaging these newly built schools to their respective communities as “innovative” allowed for a shift away from early twentieth-century “progressive” pedagogy to something new, which aligned with both changes in pedagogy and changes in the workforce.

⁵⁷ “Five Open Plan High Schools,” (New York: Educational Facilities Laboratories, 1973), 6.

Notably, EFL literature highlighted the need for spaces designed for the teaching of physics and mathematics as especially important in meeting the growing demand for scientists, researchers, and technologists.⁵⁸ Especially important, as highlighted in two key reports on the design of math and physics classrooms in secondary schools, respectively, was the need for flexible spaces to accommodate open-plan learning as well as team teaching. The reports identified key ways that the classroom could support industry-level research, including group collaboration and individual research. Specific high schools successfully utilizing this method of spatial instruction were the subject of analysis in EFL literature: Hillsdale High School in California and Newton South High School in Massachusetts, were both highlighted as embracing “flexible subdivision” to allow for greater interdisciplinary collaboration, which would mimic real-world research scenarios.⁵⁹ As noted in the EFL pamphlet “Planning for Change,” the emphasis on what subjects are emphasized and the role of technology in the classroom was a direct result of World War II-inspired changes in the industry, new knowledge, and postwar changes in social patterns. These changes led to the need for flexible

⁵⁸ “Buildings and Facilities for the Mathematical Sciences,” (New York: Educational Facilities Laboratories, 1963), 114; R. Ronald Palmer and William Maxwell Rice, “Laboratories and Classrooms for High School Physics: A Report of the American Institute of Physics’ Project on Design of Physics Buildings,” (New York: Educational Facilities Laboratories, 1961), 5.

⁵⁹ “Laboratories and Classrooms for High School Physics,” 6-7.

classroom design in order to keep meeting those technological and pedagogical shifts, as well as the goals of industry.⁶⁰ Open-plan and flexible schools were the logical spatial convention derived from the recommendations made by J. Lloyd Trump and others at the 1959 conference held at the University of Michigan.⁶¹ The conference brought together architects and educators to re-evaluate the design of schools in line with postwar changes. Architects working with these new ideas emerging from the conference, including local SCSD project architects like William Blurock and Kistner, Wright, and Wright, sought to include these recommendations in their design of the SCSD schools while also attending to changing residential patterns and local industrial needs.

El Dorado and Sonora High Schools

El Dorado High School is in Placentia, California, and Sonora High School is in La Habra. Both of these schools are also in Orange County but much further from the coastline. The coastal breeziness found on Fountain Valley High School's campus is absent at these two schools, both of which were built on former citrus and walnut groves close to the nearby mountain ranges.

⁶⁰ Peter Tarapata "Spaces for Career Preparation: Planning for Change," (New York: Educational Facilities Laboratories, 1972,)1.

⁶¹ "New Schools for New Education: A report from Ann Arbor," (Educational Facilities Laboratories, 1958).

The development of both cities began through Mexican land grants, which were managed by wealthy families aligned with elite Mexican families in the nineteenth-century.⁶² La Habra was plagued by drought, but when irrigation systems were constructed to bring water from the San Gabriel River in the early nineteenth-century, the area was converted to industrial agriculture with groves of citrus, walnuts, and avocados. The city of Placentia was part of the same Mexican land grant—which also included Anaheim, Brea, and Fullerton—and was eventually converted to farmland for citrus, grapes, walnuts, and avocados.⁶³ Both La Habra and Placentia were quickly converted to low-density suburban developments in the late 1950s and were part of the same wave of transformation that brought the electronics and aerospace industries to the area, as well as Disneyland in adjacent Anaheim.

Documentary footage of Disneyland under construction shows the clearing away of orange groves for the creation of futuristic, utopian landscapes with rows of identical flowers and recreations of South American jungles. The language and imagery of Disneyland were not lost on developers, as shown by Barbara Miller Lane in *Houses for a New World*:

⁶² City of La Habra, government website, “History,” <https://www.lahabraca.gov/531/History>, Accessed January 2024. The Milhous family, some of La Habra’s earliest settlers, were grandparents to Richard Nixon.

⁶³ “History of Placentia,” municipal website, <https://www.placentia.org/178/History-of-Placentia>, Accessed January 2024.

Builders and Buyers in American Suburbs 1945–65.⁶⁴ Homebuyers were lured by specific stylistic features that mirrored Disneyland’s Fantasyland (which itself was evocative of old-world French and German fairytale architecture). Developer Ross Cortese was well known for creating the walled community of Rossmoor, near Seal Beach, and the Leisure World older-adult communities. In a nod to Disney’s “imagineers,” he advertised his contemporary, upper-middle-class home developments as being “imagineered” for buyers while making apparent their connection to the aerospace engineers and scientists who would live in many of them. Stuart Leslie notes that Cortese’s buyers, mostly aerospace engineers, knew that the real so-called “imagineers” worked in places like Autonetics, Nortronics, and Hughes.⁶⁵ Developers, eager to sell the whole community to new workers, often advertised the shopping center as a desirable amenity to those in the “high paying electronics and space-age industries.”⁶⁶ These housing developments, and Disneyland itself, were decidedly anti-urban and sought to redefine suburban living and leisure through a fantastic, and often

⁶⁴ Barbara Lane Miller, *Houses for a New World: Builders and Buyers in American Suburbs 1945-1965*, (Princeton: University of Princeton Press, 2016).

⁶⁵ Stuart Leslie, “Suburban Warriors,” 16.

⁶⁶ “Anaheim Plaza—What’s Next,” Anaheim Heritage Center featuring “Anaheim Plaza”; “Town Houses Claim Top Location in Anaheim,” *Los Angeles Times*, May 17, 1964.

exclusionary, lens—one which negotiates and rationalizes the memory of a fantastical rural past as a vital to the image of Californian suburbia.

The allure and fantasy of Disneyland as a lifestyle framework allowed for common critiques of Orange Countians' perceived nostalgia for its agricultural past as well as being a place on the cusp of innovation and the defense industry.⁶⁷ This kind of outsider status left Orange Countians in a unique position to critique liberal elites and urban environments while distinguishing their own neighborhoods from national realities, including the burgeoning civil rights movement. In 1960, Huntington Beach and La Habra were each close to 95% white and still semi-rural.⁶⁸ George Rand and Christopher Arnold write of visiting Sonora and El Dorado in the early 1970s:

At the time those buildings were under design, the free speech movement was getting underway in Berkeley; but I think down in Orange County nobody perceived for a moment that there was something going on that would shake the social context of the whole country. At the same time, I would say that Orange County, to the greatest extent possible has perhaps insulated itself from these social movements. One of the schools we saw seemed to me just about totally insulated from the whole ethnic and racial question. In the

⁶⁷ Elaine Lewinnek, Gustavo Arellano, and Thuy Vo Dang, "A People's Guide to Orange County," *Boom California*, January 27, 2022 Accessed: September 21, 2024. Authors note, "first advertised on orange crate labels as a golden space of labor-free abundance, then promoted through the reassuring leisure of the Happiest Place on Earth, and most recently showcased in television portraits of the area's hypercapitalism, Orange County also contains a surprisingly diverse and discordant past that has consequences for the present. Alongside its paved-over orange groves, amusement parks, and malls, it is a place where people have resisted segregation, struggled for public spaces, created vibrant youth cultures, and launched long-lasting movements for environmental justice and against police brutality."

⁶⁸ US Census Data, "General Population Statistics, California, 1960."

other school, the [Hispanic] influence was fairly strong and from some of the things that were unsaid rather than those that were said, they were experiencing some stress.⁶⁹

Because of these unofficial and official policies and collective ideologies, these schools were quite racially homogenous initially; as communities changed, racial tensions erupted in the schools. One administrator I spoke with recalled the tensions being so heightened that Mexican American and “white” students used separate entrances to the high school, ones that students from each community fiercely monitored.

This perhaps points to a desire to look the other direction on behalf of school administrators working with SCSD—to turn away from conversations about rights, conversations that deepened post-Watts, and instead toward the kind of insularity that SCSD schools often ended up aligned with. Their technocratic vision, which was harnessed by architect William Blurock and employed in service of El Dorado and Sonora High School, came to align more with industrial production settings, especially in their grandest gestures, while retaining some of this controlled sense of nature found in FVHS. Like FVHS, both El Dorado and Sonora are anchored by a central administration building facing the street. The primary interior architectural distinction between the three schools is the differences in their central courtyards. At El

⁶⁹ George Rand and Christopher Arnold, “Sexiest System,” 57.

Dorado, the central space consisted of concrete rows of lockers, a covered seating area with a cafeteria just off the central administration office, and one uncovered seating area (Fig. 4.5.).⁷⁰ Rustic stepped planters made of brick were in the elevated courtyard but were empty when the school opened. Older-growth trees lined the gymnasium just off the central court; today, their roots have broken up the sidewalks near the gym, which is now flanked by a dozen portable classrooms. Like FVHS, El Dorado has larger sports facilities than others in the SCSD portfolio and few windows. None of the partitions are operational, having been nailed shut shortly after the school opened; they are mostly a nuisance. Christopher Arnold and George Rand noted in their evaluation that while the walls were advertised as being flexible and quickly movable, administrators and teachers found that the process of moving the walls actually took about a week, which prevented them from changing the classroom spaces. Interior floor-to-ceiling glass windows lined classrooms, which looked much like office spaces; they were originally designed to feel more open and collaborative, but they became distracting. Each of the separate academic buildings at El Dorado has large interior courts, which architects intended as a space for collaborative learning, play rehearsals, and working at individual carrels. Unfortunately, the partitions did not function well

⁷⁰ One seating area, because it was so dark, was eventually caged off to prevent students from hiding there (or other unscrupulous activities) after school hours or between classes. Joey Davis (El Dorado High School principal) in discussion with the author, October 2022.

acoustically, and all of the noise of the classroom activity filtered into the common space through the ten-foot wide openings on each classroom.⁷¹ El Dorado High School is much like FVHS: a low-density, one-floor campus complex evocative of nearby industrial buildings and mid-level management offices. Some administrators with whom I spoke described the area as having been agricultural at the time of the school's construction and corresponding development. With its near-universal white plaster, exterior slender columns, and elevated breezeways, the school resembles a mix of DeLaveaga Elementary in Santa Cruz and Fountain Valley High School, perhaps owing to their similar climate and population.

Sonora High School's central courtyard, and its architecture in general, is the most exciting. Contemporarily, it is a bustling campus full of activity in the common spaces. This energy derives from the innovative use of space in the common area, the use of lighting, and an emphasis on student collaboration across disciplines and activities through common spaces. On the exterior, the original building was made from lighter brick and featured painted columns, creating an entryway into the main administrative building. A separate entry into the covered courtyard is evocative of an airplane hangar, a production facility, or a shopping mall. There are skylights over the corridors that extend from the central elevated courtyard to classrooms affiliated with

⁷¹ EFL, *Systems*, 71.

different academic disciplines. There are two concrete planters in each hallway filled with houseplants. Being architecturally reminiscent of both a shopping mall and a factory or production facility perhaps offers a much different purpose than the contemplative electronics campus and instead suggests production and consumership. The reason for this may lie in several factors: La Habra remained relatively rural and was also closer in proximity to Los Angeles; its developers may have envisioned a different family than those in wealthy Placentia (El Dorado High) or Huntington Beach (FVHS); and while Placentia and Huntington Beach sought to attract engineers, scientists, and managers, La Habra had more factories and spaces of production that might have attracted a different class of white worker. Like the other cities, La Habra was very segregated, and Sonora High School was intended for white populations of new housing developments, as opposed to the Mexican schools built for existing communities. Between 1950 and 1960, La Habra's population grew 400% and then doubled again by 1970, with an influx of largely new, white, suburban dwellers.⁷² In addition to English, foreign languages, math, and social sciences, larger areas inside the school at the time of its opening in 1967 were designated for commerce, art, home economics, shop, and a kitchen. The vocational nature of these spaces

⁷² US Census Bureau, "Decennial Census by Decade" 1960 and 1970, <https://www.census.gov/programs-surveys/decennial-census/decade.1970.html#list-tab-693908974> Accessed: December 2023.

seems to imply a working-class population serviced by vocational training rather than collegiate preparation or higher-level management jobs. At FVHS, a smaller connected area devoted to drafting and shops might indicate a more professional attention to scientific drafting based on the population of students in attendance and the desired jobs and professional expectations of families.

William Workman and La Puente

William Workman High School—now in the City of Industry, California, and originally in La Puente—was designed by Kistner, Wright, and Wright and opened in 1967 (Fig. 4.7.). The City of Industry is deeply tied to the histories of Lakewood and other cities in the San Gabriel Valley—including El Monte and La Puente—and its school demographic reflects this nuanced history.⁷³ According to Victor Valle’s thorough history of the City of Industry, it maintained a mutual entanglement with municipal governments, housing developers, and industrial development. “Real estate retailers promised their

⁷³ Victor Valle explains how the charter that was used to keep Lakewood racially exclusive was employed in the founding of the City of Industry. As in Lakewood, the architects and developers convinced the city to hand over full design authority for the project. This meant that “like those nineteenth-century capitalists who built company housing for their workers, the...team built a town.” Victor Valle, *City of Industry: Genealogies of Power in Southern California* (New Brunswick: Rutgers University Press, 2009), 61. The same logic was used in Lakewood, where architects, planners, and attorneys were involved in slum clearance and redesign of the land of La Puente for industry and to develop the whole City of Industry: Valle, *City of Industry*, 94.

customers the wholesale virtues of hobby farming, a small-town lifestyle defined by personal relationships, responsive local government, and the racial and class exclusivity needed for the invention of a respectable middle class. Federal housing policies condoning the creation of racially exclusive housing developments and restrictive housing covenants underlay these ‘vanilla suburbs.’”⁷⁴ At the same time, the valley was slated for industrial development as part of a strategy to decentralize arms production. Weapons factories began to relocate outside Los Angeles city limits because the media convinced military planners that the region was susceptible to aerial bombing, and thus the production facilities needed to be scattered around the region and camouflaged.⁷⁵ As in Huntington Beach, this worked to dually encourage suburban development and the defense industry. In developing suburbs in La Puente, multiple factors went into rationalizing the land-grab that created the City of Industry. Among these were attorneys working to deem remaining pastures and orchards “blighted” in order to open up the areas for redevelopment and municipalities that were given the authority, financial

⁷⁴ Victor Valle, *City of Industry: Genealogies of Power in Southern California*, (New Brunswick: Rutgers University Press, 2009), 54.

⁷⁵ Valle, *City of Industry*, 54. Near Fountain Valley High School and the accompanying former Huntington Space Systems Center (most recently Boeing), there are vast fields of grass-colored bunkers, camouflaged from aerial view, containing military material. See David Ferrell, “Old Bunkers a Reminder of Earlier Fears,” *Los Angeles Times*, October 18, 2001, <https://www.latimes.com/archives/la-xpm-2001-oct-18-me-58589-story.html>, Accessed January 2024, for instance.

resources, and political rhetoric to allow for the “massive transfer of public wealth into the hands of private developers, all in the name of urban renewal.”⁷⁶ Here, we see the transfer of capital to create new frontiers that include some and exclude others and the unique application of Hirsch’s second ghetto theory. The interpretation of charters that allowed nearby Lakewood housing development to be developed as a racially exclusive suburb with its own schools was also employed to incorporate the City of Industry as a low-tax industrial town and to starve La Puente economically.⁷⁷ At the same time, La Puente’s population was continually cut off by the construction of the Pomona freeway.

From the beginning, William Workman High School was zoned to serve white students moving into the new suburbs—what is now zoned as City of Industry. La Puente had long been segregated from El Monte, where white students lived, and this was enforced through well-known violence, housing covenants, public campaigns, the media, and school-based Americanization programs.⁷⁸ When the school board forced the closure of Central Avenue School in the 1950s, Central—the school serving Mexican

⁷⁶ Valle, *City of Industry*, 98-99.

⁷⁷ *Ibid.*, 94.

⁷⁸ Gilda L. Ochoa, *Becoming Neighbors in a Mexican American Community: Power, Conflict, and Solidarity*, (Austin: University of Texas Press, 2004), 33, 50.

and Japanese students in La Puente—students were forced to join the white La Puente High School, where they experienced racial discrimination. This did not last for long—the City of Industry was incorporated in 1957, and it was able to eventually bring new suburbs and a new school for white students: William Workman High School. Plans for the school began in the early 1960s, and it opened in 1967. Historian and independent scholar Mike Davis notes that the City of Industry became an “economic superpredator” and worked to monopolize tax assets in the whole of the San Gabriel Valley, including 2,100 factories and warehouses.⁷⁹ However, as the City of Industry was first designed as a non-residential city, it relied on neighboring cities to provide a labor force for its factories and warehouses, subsequently eliminating jobs in La Puente. The result was that the City of Industry had well-funded schools (through property tax and other funding), and La Puente schools were underfunded. As Layne Karafantis and Stuart Leslie write in “Suburban Warriors,” the “blue-sky” suburbs—white, white-collar, and with predominantly male workforces—reinterpreted the California dream for an upper-middle class who believed they had little in common with their blue-collar counterparts left behind in older working-class communities.”⁸⁰ While the City of Industry was designed to house the components of industrial innovation,

⁷⁹ Mike Davis, *City of Quartz: Excavating the Future in Los Angeles* (New York: Verso, 1990), 181-82.

⁸⁰ Karafantis and Leslie, “Suburban Warriors,” 3.

the working-class community of La Puente was to be distanced and segregated, in part, through school redistricting and rezoning.

While Workman reflects this complicated relationship with industry (and segregation)—in ways similar to the other campuses discussed in the region—the school is also very tied to the land of the San Gabriel Valley. Kistner, Wright, and Wright, known for their other school and college campuses, were skillful in working with the existing landscape, including vistas of the nearby mountains. The school's exterior is a lighter, thinner, and more delicate-looking brick than nearby FVHS and does not seek to overwhelm the often snow-capped mountains in the near distance. Large athletic fields were situated below the school, while a basketball court and large walkway are just below and adjacent to the elevated school, which somehow seems both elevated and perfectly reverential to the landscape. The central courtyard is smaller than those of other SCSD schools and seems more intimate. The architects were tender in handling the SCSD system by employing the system inside and creating a unique vision, with subtle and intentional gathering spaces on the outside. La Puente was largely rural when Workman was built and remains more rural than other urbanized areas in Southern California. Despite the hold of industry over the region, the school's architecture also seems to reflect a desire to be incorporated into the landscape versus consuming it. Perhaps due to the various zoning and

rezoning, as well as tensions around intentionally segregating the Valley—certainly more visibly and more resisted than other attempts in Orange County—the architects developed a structure that would be in harmony with the natural world rather than reflective of expanding industry.

Conclusion

This chapter argues that suburban development in Southern California was accelerated and naturalized through a normalization of collective anxiety about failing urban public schools that was tied to racialization and collective fears about maintaining upward economic mobility in nonwhite and failing schools. At the same time, the developing military-industrial complex and high technology industries used the promise of new public schools, which looked and felt like the types of research campuses that families with children could feel confident about, to connect their own necessities to educational opportunities. The SCSD schools in the region resembled aerospace buildings and research campuses architecturally and spatially, while also normalizing the expansion of white suburbs and industry itself into these formerly rural areas. While the schools' designs themselves were not complicit in this gesture toward racialization nor in the development of new endless suburbs in Southern California, their programs' constant alignment with new and rapid low-density growth positioned the SCSD schools in a

unique role of shaping and defining the landscape of education in the region. On the one hand, the design of the schools was complicit with local industry in the service of preparing students for work in military research and the burgeoning information technology industry. On the other, the schools worked in tandem with housing to define formerly rural or agricultural space as suburban, often at the exclusion of others. These unique spatial dynamics were reflected in the design and spaces of the schools in various ways and normalized as part of the existing landscape through aspects of their design. More so than DeLaveaga Elementary School, the Southern California schools work to reflect relationships with local environments and geographies, and they take more time to create vistas, pathways, and spaces of engagement. While the spaces are, at times, austere, they reflect the California school typology in ways often in spite of the imposition of the SCSD framework. The local architects, if given more freedom of expression, might have been able to construct schools that were even more responsive to local needs, but indeed, each is a shining example of SCSD at its best.

Conclusion

This dissertation has analyzed the School Construction Systems Development building program with respect to its contribution to what I argue is a typology of school building. This type of school building was linked in the United States in the 1960s-1980s to suburban education. This building type set a precedent for school design that was applied broadly to suburban and urban schools throughout the second half of the twentieth-century. As shown, the SCSD schools were intended to prepare students for careers in research and technology, as well as careers devoted to national defense in the context of the Cold War. School buildings need a community-driven architectural response--that is, buildings should reflect the diverse needs of communities and local educational contexts and needs. A school building type designed for a specific suburban environment might not be unilaterally applied elsewhere with positive educational outcomes. This can be seen in urban experiments in school-building where large suburban-style campuses were placed in dense, urban areas including New York, Pittsburgh, and Philadelphia. While at the same time, further research is needed into the sometimes sprawling experimental urban campuses built in the 1970s and 1980s, the implication of this current study is that this particular typology of school building, which extends in part from the SCSD schools, is not an appropriate model for contemporary public education. I argue that schools built on this model are in

need of retrofitting and reorganization and that public funding needs to be applied to these schools, including the SCSD schools in operation today. Multiple factors, including climate change, fluctuating student enrollment, changing career patterns, and ongoing facilities maintenance issues, require new solutions to the built environment of public education.

The End of SCSD

While the Ford Foundation offered continual support to Educational Facilities Laboratories programming, publishing, and school building programs through the 1960s, by 1975, the foundation's interest in domestic education and EFL began to wane. While funding for EFL had previously been renewed in five year increments, by 1975, Ford began to slow down the payout of the grant for the program in order to gradually wind down operations. In letters between and Ford Foundation representatives and Harold Gores, EFL president, the conditions of the project's reduced funding were discussed and debated at length.¹ As early as 1970, Ford suggested that leadership at EFL should begin seeking outside funding to continue the project, and EFL responded with a memorandum outlining their ongoing effect on education in the US as a

¹ Letters written between Harold Gores and Ford Foundation representatives between 1975-1979 Educational Facilities Laboratories, Inc. (05800096); 1958 February 19-1979 December 31; Ford Foundation records; Ford Foundation records, Central Index; Ford Foundation records, Grants; Ford Foundation records, Grants E-G; Ford Foundation Grants - E to G; Rockefeller Archive Center; <https://dimes.rockarch.org/objects/RZdDsYViwa23awnAM8dCaL>

laboratory of change, which is by nature troublesome and difficult to quantify. The memorandum also indicates that while the SCSD schools were not continued in California, they did influence technology for other schools in Florida and Toronto and had implications for future international school-building projects. This points to an issue found frequently in the project literature including in the archival grant documents of the Ford Foundation: the SCSD project had not delivered on its large-scale systemic change of educational buildings and education systems, thus EFL was put in jeopardy because of its lack of ongoing success. These letters between the Ford Foundation Board members and EFL staff also reveal that even through the 1960s while the SCSD schools were being built, Ford Foundation saw school building research as already outdated as a method of pedagogy and socio-economic change. This correspondence over a twenty-year period shows how EFL and SCSD were immediately under threat from Ford and paints a picture of a project continuously in economic peril. From Ford's perspective, they were eager to leave domestic school-building research behind and focus on global educational research (possibly using systems architecture) and new projects supporting inner-city and urban school development.

While the SCSD and EFL experiment in suburban school architecture was almost over before it began, it had reverberations for school architecture across the United States. How might suburban schools have still functioned

as sites of experimentation after SCSD? How was a suburban school typology developed as a result of SCSD research that was exported and transplanted in urban and suburban communities nationwide? While the SCSD schools were conceived as relatively ahistorical in a long line of school buildings, how might this new suburban school typology that was developing as a result of SCSD conversations articulate lessons from the long history of school architecture in the US? This question of what emerged after the dissolution of SCSD is the subject of further research and ongoing questions of twentieth and twenty-first century questions of school design to be tackled. While the SCSD schools are in need of modernization, how might their contemporary conditions offer new ways of understanding the contribution of systems architecture to a suburban school typology even alongside more contemporary concerns? Through an analysis of some of the present-day facilities conditions and ongoing concerns of the SCSD schools, we can start to plan for the remediation of systems architecture as it was applied to schools across the nation in order to come up with a more appropriate way to approach preservation and remediation of mid-century school buildings that were part of, and informed by, the SCSD system.

Climate Change and Santa Cruz SCSD Schools

By 2016, the facilities at DeLaveaga Elementary School in Santa Cruz were in need of modernization. Many of the products built as part of SCSD's flexible system were obsolete, and the lack of appropriate irrigation and landscape hampered the school's ability to adapt to climate change. Additionally, the classrooms were all in need of modernization. From windows, to doors, to flexible partitions, many of the features in the building had been installed in 1969 when the school opened and not been replaced since. A 2016 report outlined the major remediations that would be needed to modernize the school. All of the SCSD-era parts would be removed and replaced, and second stories would be added to some of the original single-story classrooms. Like many California schools, fluctuating enrollment numbers required the use of portable classroom facilities in the 1990s. The 2016 report advised removing these and replacing them with permanent structures. Additionally, the lack of shade canopies and a functional HVAC system made the school's functional temperature inconsistent. By February 2024, almost all of the schools had been at least partially modernized. Portable classrooms were eliminated, and new energy-efficient classrooms with upgraded insulation were built. The entire HVAC system, the main feature of the SCSD project, was finally completely replaced. Rain permeable walkways replaced blacktop and concrete, and landscaping was updated to be drought resistant.

A green bio-swale retention pond was built in new parking areas. At the top of the list of concerns for administrators were finding solutions for climate change and creating outdoor spaces that were more habitable, with attention to outdoor learning built into the school at various parts of the site plan. Firm 19six Architecture developed the facilities plan for DeLaveaga that included input from teachers, students, staff, parents, and neighbors who “prioritized new technology infrastructure, new classrooms, shaded play areas, a new stage/performance space and an expanded, resurfaced parking and drop-off area.”² Additionally, the SCSD-era cabinetry and storage were replaced, and new interactive presentation screens and sliding whiteboards were added. Environmentally conscious flooring was also added to new and existing classrooms. DeLaveaga is an exemplar of the modernization of SCSD schools and could be repeated through state funding for other SCSD schools. The community engagement process, which included meetings and ample opportunities for feedback from a diverse and large number of community stakeholders and students, could also be a model for design. Ample school funding should be allocated for such attention to remediation for climate concerns in schools across the nation.

² “Bond Projects, February 2024 update, for the DeLaveaga Elementary School site committee by 196 Architects,” Meeting agenda and presentation.

At nearby Harbor High School, a majority of buildings on campus also required modernization. Additionally, the plan addresses the ongoing flooding of the campus, which regularly occurs because of the unique siting of the school, according to Santa Cruz City Schools.³ Much of the SCSD system is also being replaced at Harbor High with a new high-efficiency HVAC system which offers “increased outside air intake and CO2 detection.”⁴ Also notably, an attention to responsible roofing, the use of locally sourced and recycled materials, as well as added solar structures are also significant components of the master facilities plan at Harbor. Notably, security concerns play a large role in modernization efforts at both DeLaveaga and Harbor High. Shifting the campus entries, as well as greater attention to security fencing, overall site visibility, and door hardware operable by remote and smart locking systems, are all interventions to address safety and violence concerns on school campuses.⁵

³ “Harbor High,” Santa Cruz City Schools, <https://fmp.sccs.net/all-schools/harbor-hs/> Accessed July 2024.

⁴ “Harbor High,” Santa Cruz City Schools, <https://fmp.sccs.net/all-schools/harbor-hs/> Accessed July 2024.

⁵ Nicholas Ibarra, “We just want change,” Santa Cruz Sentinel, March 14, 2018, <https://www.santacruzsentinel.com/2018/03/14/we-just-want-change-thousands-of-students-walk-out-of-classes-across-santa-cruz-county/> Accessed July, 2024.

Shifting goals for High School Education

While the SCSD schools emphasized media centers and language learning labs, new schools must be cognizant of career trends and consider how to spatially accommodate new modes of education and training for students. Specialized spaces would increase professionalization for high school students and offer spaces for creative exploration as well as specific sites of vocational education. Additionally, athletics and performing arts are increasingly spaces that bring in audiences and community members to school spaces, as well as give students a sense of empowerment. At Sonora High School, gym facilities were expanded dramatically from the original SCSD plan. Bond Measure funding was used to design and build a brand new gymnasium and athletic facility for basketball and football. This was in response to a lauded athletic program and student and community request for better athletic facilities.

At El Dorado High School, the Bond Measure funding was spent on the design and construction of a Performing Arts Center with a multi-use concert hall and theatre and capacity for over 600 audience members.⁶ Swinerton Architects designed a glass lobby with a structural steel roof that was completed in 2013. Known for its theatre program, El Dorado administrators

⁶ "Performing Arts Center" Placentia Unified School District, https://www.pylusd.org/apps/pages/index.jsp?uREC_ID=184765&type=d&pREC_ID=471678 Accessed July 2024.

advocated for the construction of a new performing arts hub that would offer a space for community gatherings and the elevation of the performing arts at the school. While the SCSD school is arguably in need of modernization, the strategic construction of the performing arts center elevates the school's profile and offers a space in which families and neighbors can connect with the larger school community, a major goal of the school's leaders.

Learning from SCSD Schools

Modernization efforts are taking place in midcentury schools across the United States. Questions of how to mitigate the effects of climate change, while addressing safety concerns, and addressing aging and out of date school stock is made more challenging by insufficient school budgets and current school funding structures. In California, school funding is largely allocated through bond measures and property taxes. Yet the question of how to balance competing needs of modernization among aging school buildings is increasingly tasked to school administrators and local school boards. Often with very little funding or training, administrators must work closely with community members, students, teachers, and contracted architectural firms to establish priorities for existing school facilities. School administrators need guidance on modernization and retrofitting. While advisory committees are being developed in California to address the ongoing concerns of school

facilities, there needs to be significant attention paid to issues of climate change and responsible building practices, safety, and professionalization for students in addition to infrastructural modernization.

Context of this Research and Looking Forward

This research began in 2019, one year before the start of a global pandemic that shuttered archives, schools, and lives. The schools featured in this dissertation, as well as all of the archives affiliated with the SCSD project, were closed. The context of the pandemic, as well as the increased attention to issues of school safety brought on by ongoing nationwide gun violence, impeded the ability to access school buildings, students, and faculty. Many schools simply shut down to outsiders and due to the outsized concerns over safety and health, administrators did not have the capacity to address research and facilities concerns. This dramatically affected this current research project and stopped site visits and interviews during the research process.

The scope of a multi-site study was also a learning opportunity and challenge. Each site, while originating from a common site plan, had unique interpretations as defined by local needs and materials, as well as its relationship to housing complexes. Each school had a unique history, community, and set of archival materials. Thus, the singular throughline of the

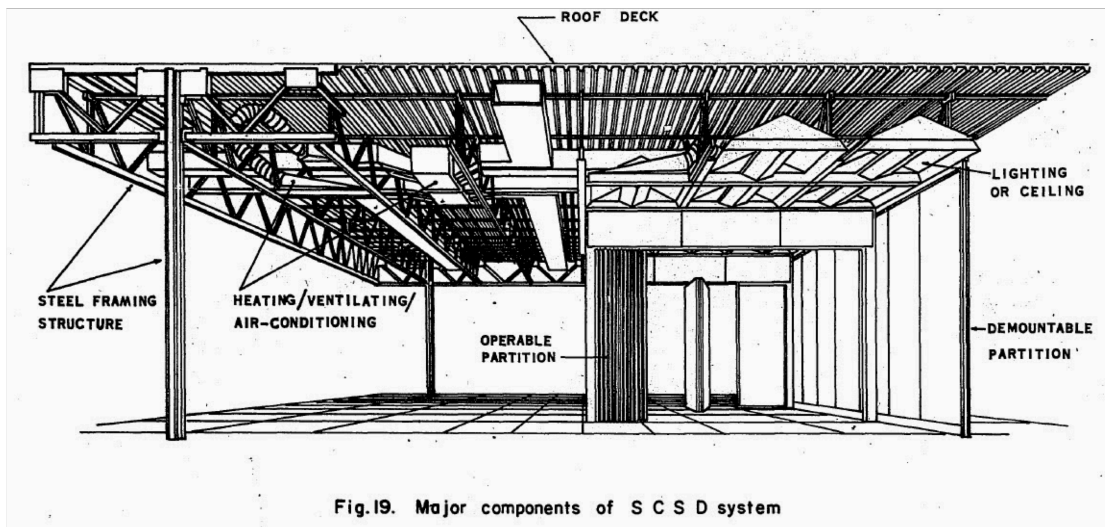
project was the origin, design, and funding of the original SCSD model. The interpretations of each school on the ground belonged to the 13 neighborhoods the schools found themselves in. There is not a broader theory of the schools outside of their shared origin and their resonance to school architecture of the California suburbs, which is perhaps a more interesting story to tell.

Moving forward, this research will play a role in future research devoted to architectural and spatial histories of suburban education in the United States and their role in responding to concerns about urbanism and race, as well as their relationship to national and local pedagogy. These schools function as microcosms of these broader national concerns, and future research will look more closely at the origins and role of SCSD in this national trajectory and set of ideologies around the spatiality and siting of late twentieth-century public education. Additionally, this research will lead to larger future studies about the idea of safety in public education and conversations about climate and the environment in campus and school planning, as well as how to remediate historic school architecture for the future.

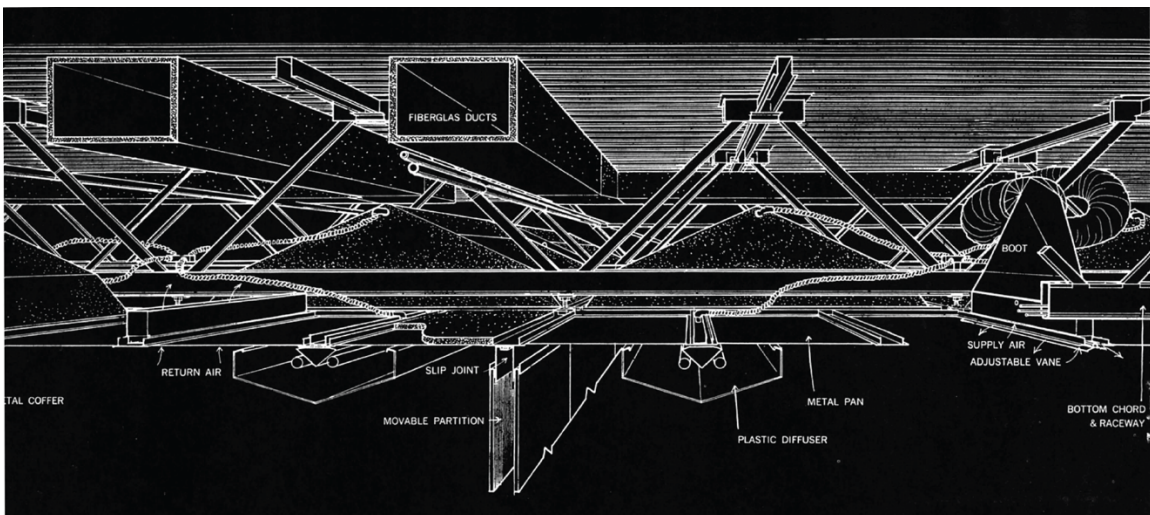
Conclusion

While not a definitive or comprehensive study of every community or school in the SCSD project, as a researcher, I tried to approach each school through a local lens with respect to local designs and materials, as well as local histories. At the same time, this project had a much-publicized national identity and very little information or research about the individual schools. This played a role in shaping and establishing a typology of school building associated with the California suburbs that was very much linked to diverse socio-political national discourses, outside of education. The challenge, thus, became how to balance the local histories of each school with the ideological role they played on a national scale and their important contribution to the development of a much-imitated school building type. Through these efforts, this project has hopefully opened the door to further research on the ideological and discursive function of school buildings in local and national histories and the role that the school building takes in terms of its imagined capacity to bring hope and change at multiple scales. School buildings are still doing this heavy lifting, but they are now also encumbered with the ongoing spatial challenge of modernization and reform for immediate concerns such as safety and visibility and climate change. It is with this hope that in analyzing and developing the histories of these buildings, their ongoing importance can be fully grasped.

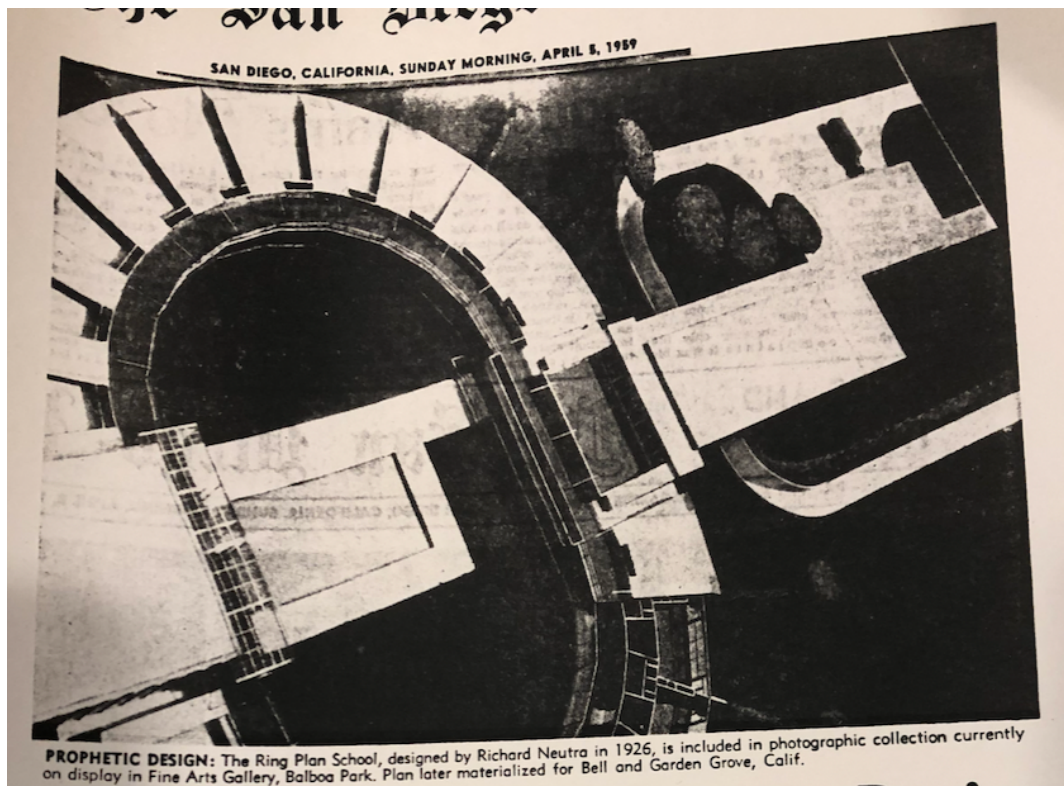
Illustrations



0.1. SCSD Ceiling Sandwich.



0.2. SCSD Ceiling Sandwich. Taken from "School Construction Systems Development Program," *Arts and Architecture*, April 1967



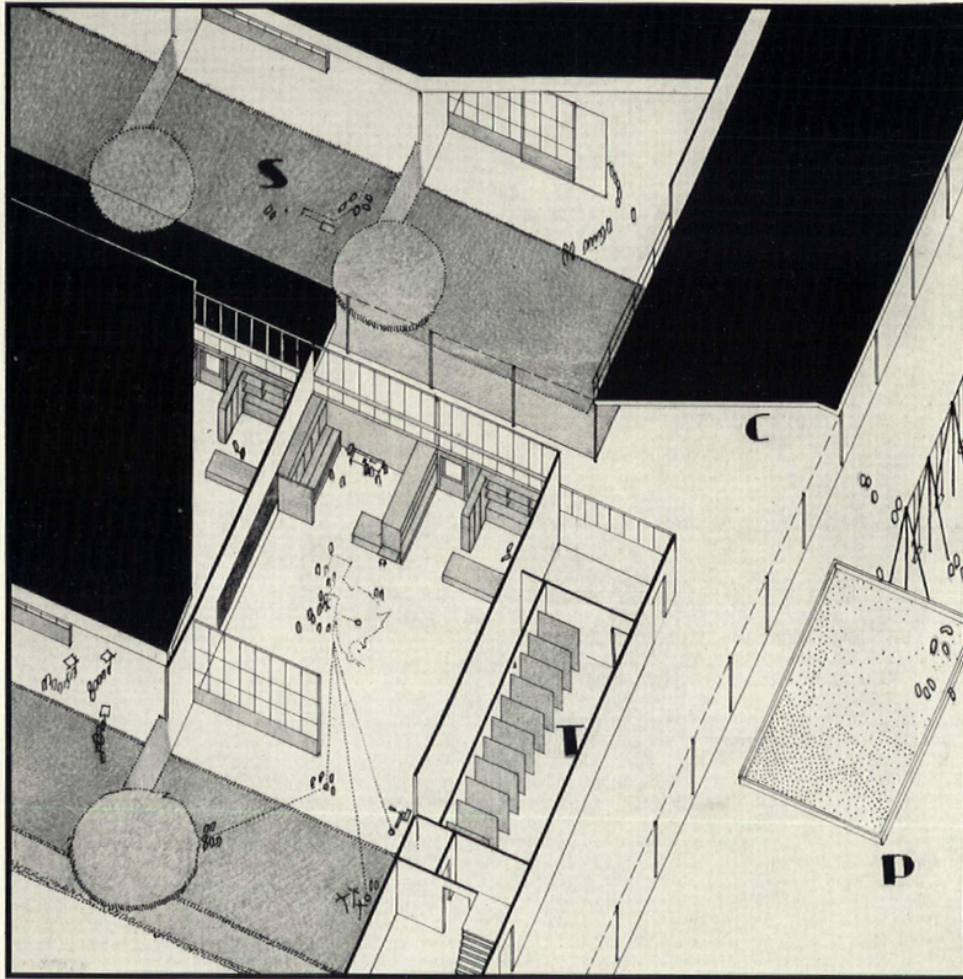
- 1.1. Image of Ring Plan School, taken from Rush City Reformed, *San Diego Union*, April 5, 1959.



1.3 Julius Shulman, (photographer). Corona Avenue School (Bell, Calif.), 1953, Richard Neutra (architect). Getty Research Institute, 2004.R.10. © J. Paul Getty Trust.



1.4 Hessian Hills School, William Lescaze and George Howe (architects), 1932, Hessian Hills, New York.



THE IN-DOOR OUT-DOOR CLASSROOM

S. OUT-DOOR CLASSROOM

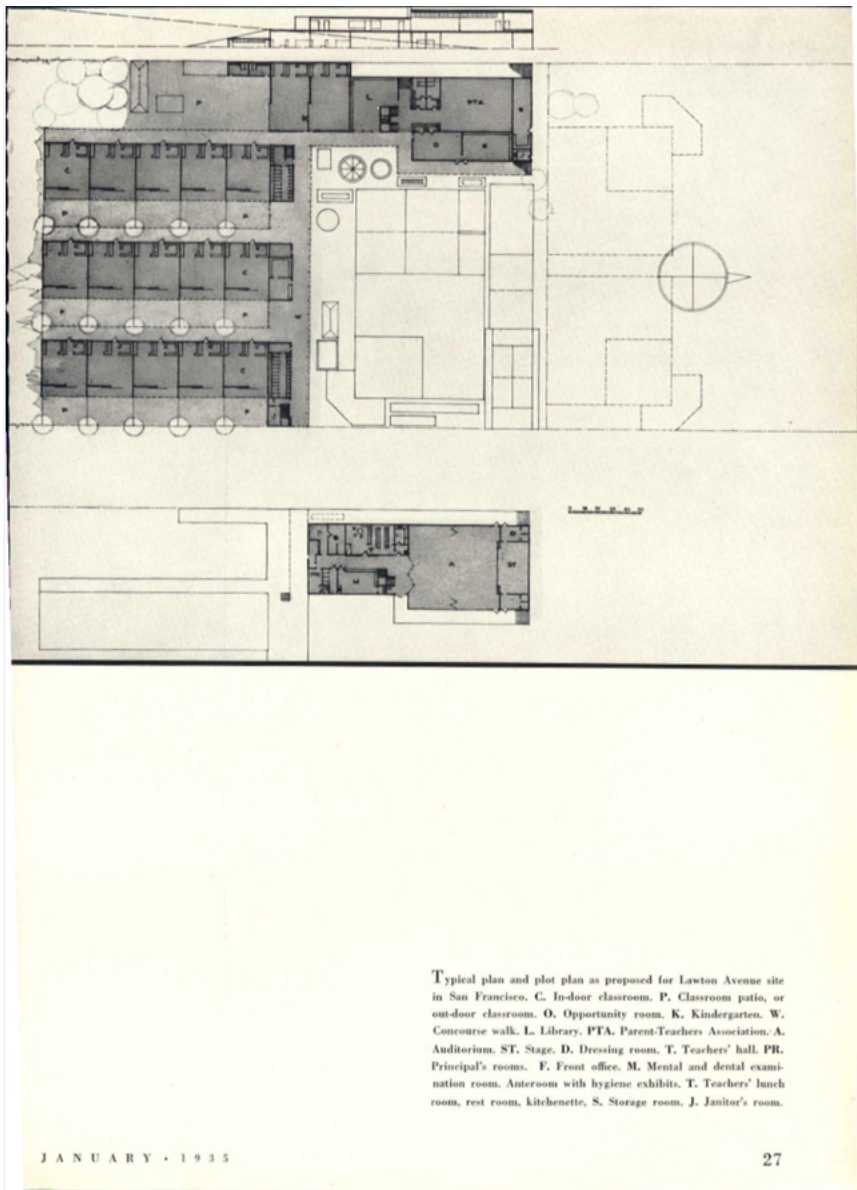
C. CONCOURSE WALK

T. TOILET GROUP

P. PLAY YARD

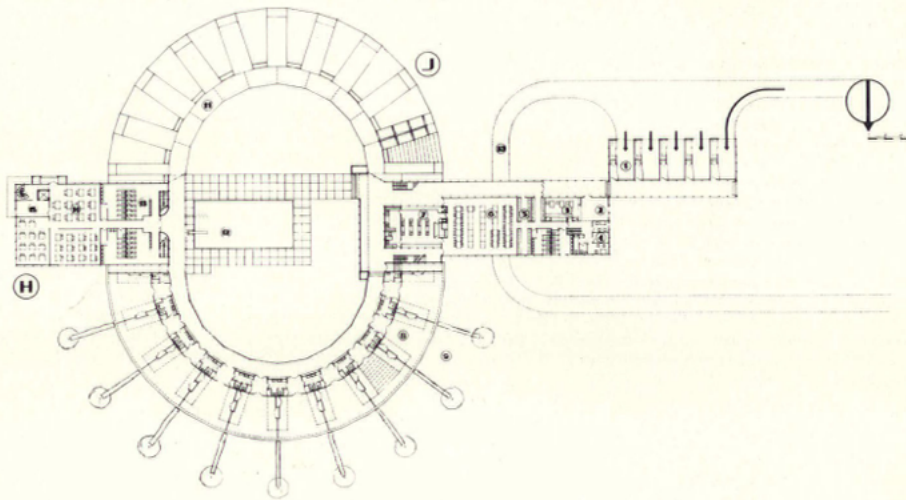
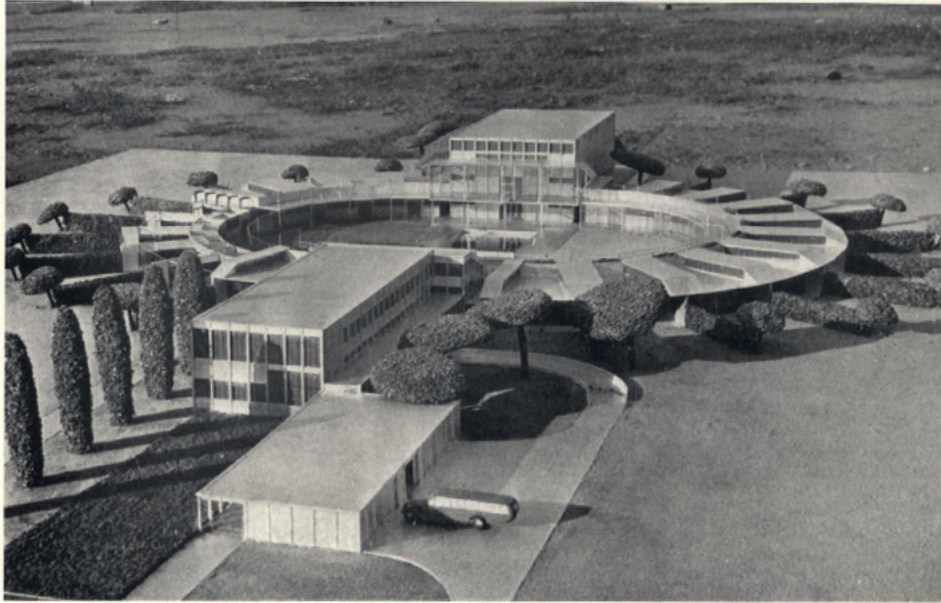
RICHARD J. NEUTRA, ARCHITECT

- 1.5 "The In-Door Out-Door Classroom" design by Richard Neutra for *Architectural Forum*, January 1935, p. 24.



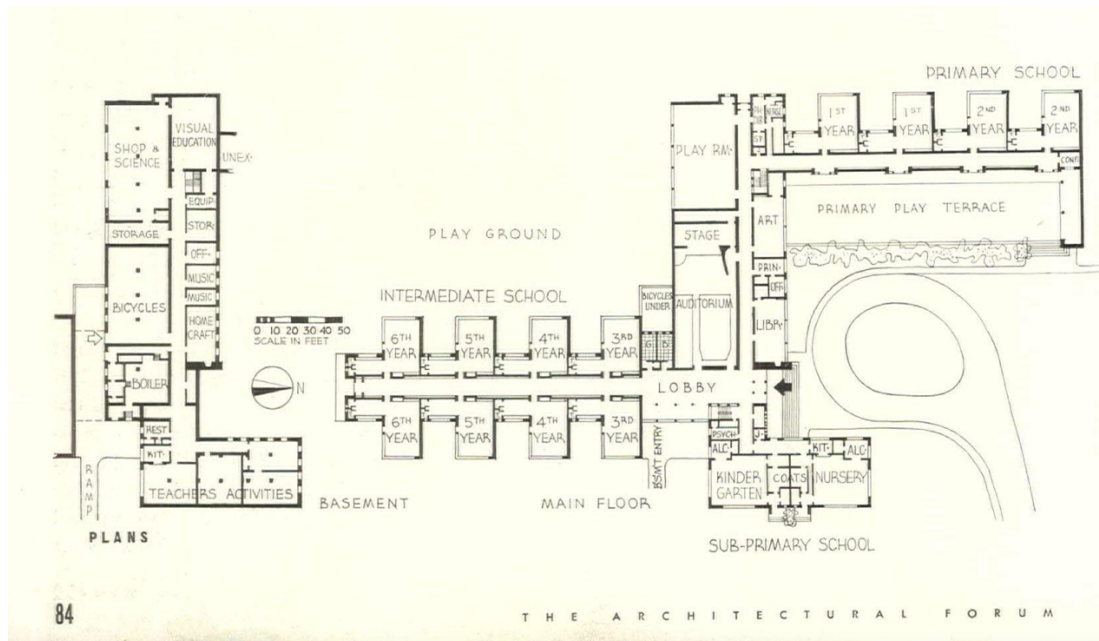
- 1.6 Typical plan and plot proposed for Lawton Ave site in San Francisco, Richard Neutra, *Architectural Forum*, January 1935, 27.

NEUTRA'S PROPOSED RING PLAN SCHOOL

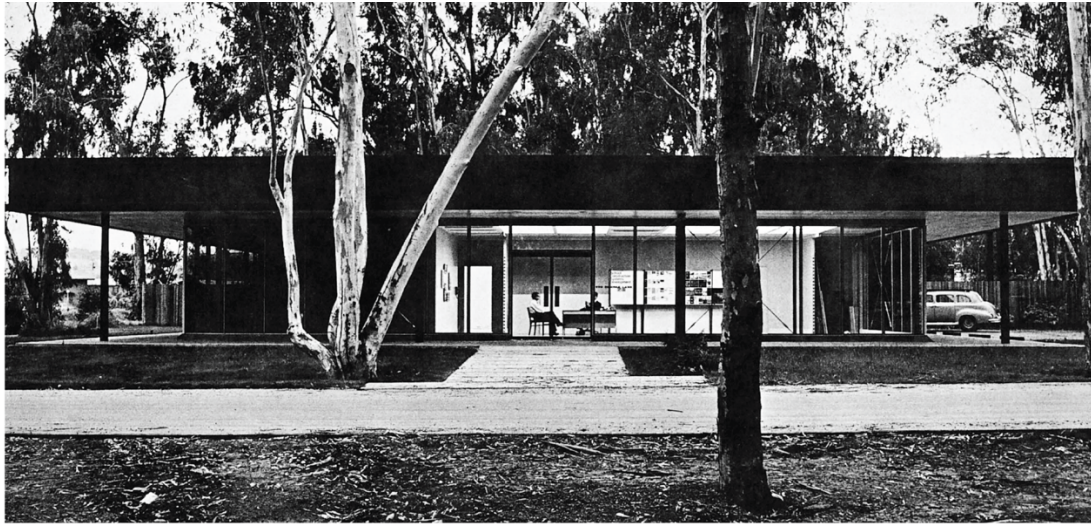


RING PLAN SCHOOL by Richard J. Neutra. This school is intended to be built largely of prefabricated sections and to serve, by bus lines, a widely distributed population.

- 1.7 Neutra's proposed Ring Plan School, *Architectural Forum*, January 1935, 35.



1.8. Plan of Crow Island School, Winnetka, IL., Eliel and Eero Saarinen, Perkins, Wheeler and Will (Architects).



2.1. Prototype School on Stanford's Campus. Taken from "School Construction Systems Development Program," *Arts and Architecture*, April 1967.



2.2. SCSD Promotional Photograph, 1964.



2.3. SCSD Promotional Photography, 1964. Courtesy of CRS Center, Texas A&M University, College Station, Texas.



2.4. SCSD Promotional Photograph, 1964.

New proposals to cut school costs

A joint inquiry of FORUM and the Ford Foundation's Educational Facilities Laboratories, Inc., into the best ideas here and abroad for construction savings.

GOVERNMENT

CHARLES D. GIBSON, *Chief, Bureau of School Planning, State Department of Education, Sacramento, Calif.*

ANTONY PART, *Deputy Secretary, Ministry of Education, United Kingdom.*
(Mr. Part acted as a consultant to the Inquiry, not as a member.)

WARREN SCHMIDT, *Assistant Commissioner, New York State Education Department.*
RUFUS PUTNAM, *Superintendent of Schools, Minneapolis, Minn.*

ARCHITECTS

WILLIAM PENA, *Partner, Caudill, Rowlett & Scott, Houston.*

KEBA EHRENKRANTZ, *engaged in research on development programs for manufacturers and on modular coordination studies; San Francisco.*

J. STANLEY SHARP, *Partner, Ketchum & Sharp, New York City.*

MANUFACTURERS

JOHN HINCHLIFFE, *Director, Commercial Products, Northrop Corp.*

W. W. DEDON, *Project Engineer, Northrop Corp.*

GEORGE E. MARTIN, *Director, Marketing Research and Distribution, Kawneer Co.*

EDUCATIONAL FACILITIES LABORATORIES, INC.

HAROLD GORES, *President*

JONATHAN KING, *Secretary Treasurer*

ARCHITECTURAL FORUM

DOUGLAS HASKELL, *Editor*

WALTER MCQUADE, *Senior Editor*

With all the science, skill, and organizational ability available in the world's most advanced free-enterprise industrial community, should it not be possible to lift the whole discussion of schoolhouse economy to a new plateau? Should there not be a technical break-through?

These thoughts were stimulated when New York State's progressive Governor Rockefeller recently pushed through the legislature an appropriation of \$1 million to promote school economy through the familiar old "stock" plan idea. His action set off a flurry in other states, and stirred the American Institute of Architects to reiterate its undeviating opposition. Quite frankly, FORUM's editors, battle-scarred from fights for better value out of the school dollar, were bored, not stimulated. Here was "the same old new stuff," dusted off for a predictable stalemate.

Should Governor Rockefeller's best legitimate hopes be met, FORUM believed that the results would still be tiny in proportion to the effort. On the other hand, it was felt that the reply by AIA, declaring that stock plans would actually cost more and would result in lessening quality rather increasing it, was less than blood-stirring to the American people, however sound it might be.

What might be done? Underlying the Governor's approach was a great fund of good will and a hunch that was sound in its direction if not in its program. Was not the real purpose to make available to all school boards the skill of the best professionals? Was not the real purpose to get industrial efficiency applied to operations that were routine, so that the big effort could be made at the creative, educational level?

Looking at other recent developments, the editors were struck by the phenomenal progress made in schools in Great Britain. Facing a school crisis after the war, certain "counties" (the equivalent of U.S. states) had begun what looked like a stop-gap prefabrication effort. Yet, instead of tapering off during the last decade, this effort had blossomed, grown more comprehensive, solid, and permanent. It had not only created economies of its own that are specific and provable, but it had stimulated the nonprefab school architects to compete with it on the basis of its own advances. It had dominated international competition, as at the Triennale in Milan last year where a British CLASP school ran off with the highest honors. Might the U.S. get from this effort at least a direction?

At this point the editors found an enthusiastic ally: the Ford Foundation's Educational Facilities Laboratories, Inc. Dismayed by the repeated failure of stock plans to deliver on their promise, this organization concluded that a very different approach was needed. E.F.L. too had felt challenged by the British success and already had begun one experimental project of a parallel kind.

Proposed E.F.L.: "Let us set up an 'Inquiry' among some of the best minds on the subject both here and abroad: school men, government officials, progressive manufacturers, imaginative architects."

FORUM happily agreed. Those who accepted and gathered in New York for a two-day session are listed at the left. On the following 18 pages are some of their most constructive ideas, and a statement of their recommendations.

PHOTOS: (LEFT) GEORGE ZIMMEL; (BELOW) WALTER DARAN



2.5. "New Proposals to Cut School Costs" *Architectural Forum*, November 1961.

Testimony:



DRAWING BY GRAHAM HOYT

First answer: "stock plans," as proposed in New York State—patterns for complete schools, available to all school districts, to save cost and time in planning.

The Governor's hope: the community can choose to pick up complete a set of plans by expert architects, then adapt cheaply. The Inquiry's conclusion: There will be no savings worth noting, because of unexpected costs of adaptation to particular sites and programs. Educational costs may even rise, and educational progress will be inhibited. Might there be a better way to spend New York's million dollars?

WARREN SCHMIDT: We have nine sets of stock plans under way. Three for elementary, one for junior high school, two for senior high schools, and three for junior-senior high schools. They vary in size. Also each plan is supposed to be designed so that it can be expanded to increase its capacity. We expect the final plans to be available early next year—that is, shortly after January.

The architects who were selected are familiar with the state standards and requirements, and I think that everyone who has reviewed the list has agreed that it was an excellent choice. The state architect also invited an advisory committee of school people, an architect, and a builder primarily to help in the programming and reviewing the preliminary plans. Obviously, the plans cannot be complete, because sites vary,

so that the standard plan will begin about a foot below the first-floor level. Any school district wanting to use the stock plans will need to employ engineering or architectural consultants to prepare the necessary foundation plans and to make any alterations in the plans that the local school district may feel are needed to meet their own particular local situation.

It is hoped that the time lag between the need for a school building and its completion can be shortened substantially by the use of standard plans. In other words, the study time that it takes in developing the efficient plans will already have been contributed. So from that point on, it is only a matter of adaptation to local conditions.

I would say that these are not going to be cheap buildings in the usual sense of the word "cheap." They will be eco-

nomical, but they will be good buildings. We have an appropriation of about a million dollars to develop these plans, and we may need more if we are going to expand the program.

ANTONY PART: I was wondering if we could get closer to the scale of the expected saving.

SCHMIDT: Well, I would say it would be on the order of 4 per cent of the cost of the building, roughly.

PART: Then you are hoping to get this building at 2 per cent in architectural fee?

SCHMIDT: I am just guessing at that. We have no experience whatsoever as to what an architect will charge to adapt a stock plan to its site, but we assume he would charge roughly 2 per cent and perhaps 1 per cent, or a half per cent, depending on the amount of adaptation that is necessary to prepare

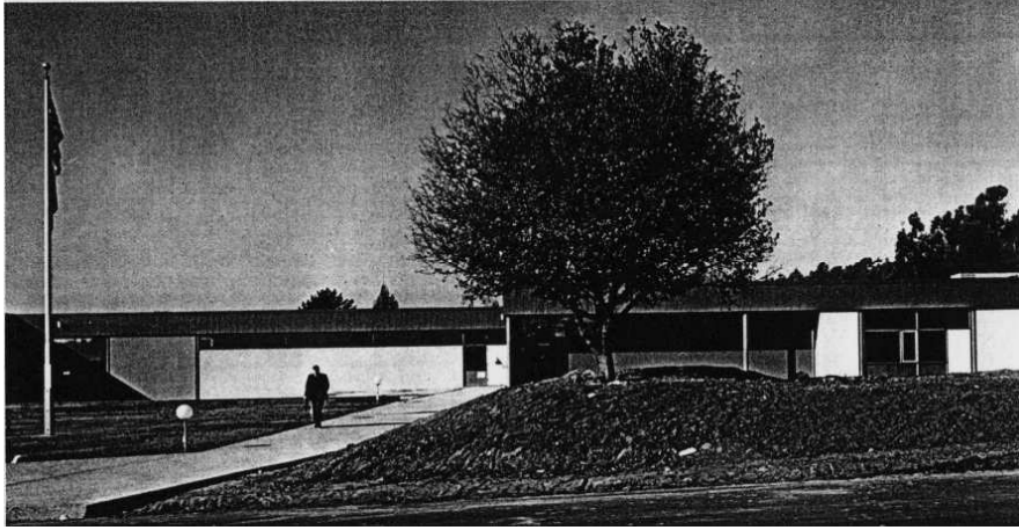
2.6. "New Proposals to Cut School Costs" *Architectural Forum*, November 1961.



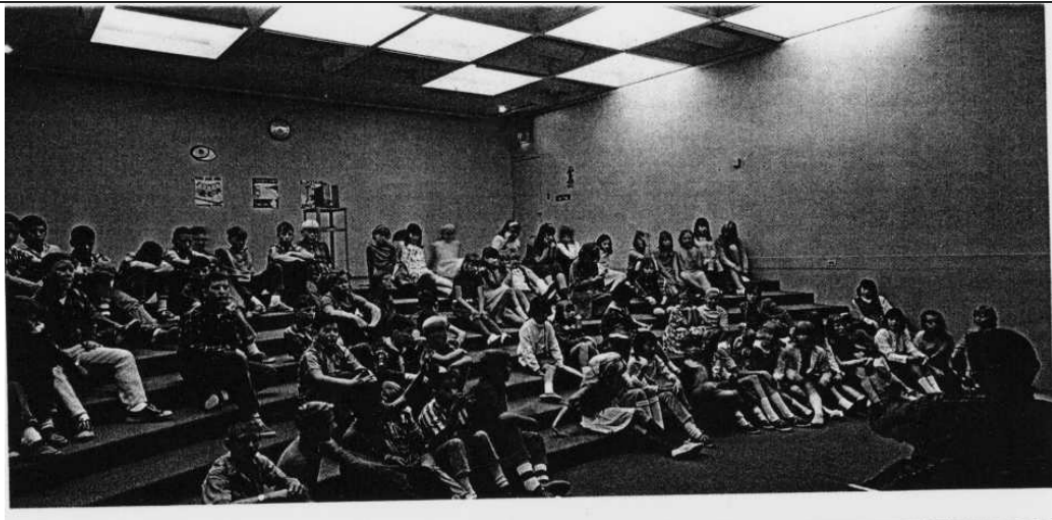
2.7. Prototype school on Stanford's Campus. Taken from *SCSD: The Project and the Schools: a report from Educational Facilities Laboratories*, 25. Courtesy of CRS Center, Texas A&M University, College Station, Texas.



- 2.8. Workers building SCSD system. Taken from *SCSD: The Project and the Schools: a report from Educational Facilities Laboratories*, 76. Courtesy of CRS Center, Texas A&M University, College Station, Texas.



3.1. DeLaveaga Elementary School. Taken from *SCSD: The Project and the Schools: a report from Educational Facilities Laboratories*, 25, 82.



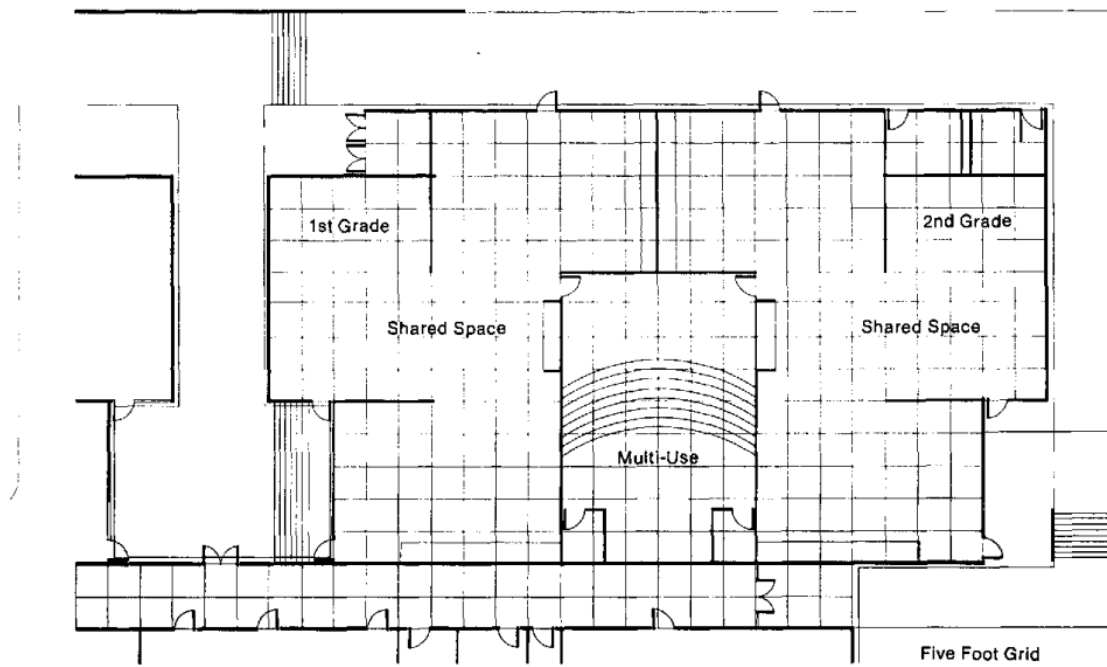
3.2. Little Theater, DeLaveaga Elementary School. Taken from *SCSD: The Project and the Schools: a report from Educational Facilities Laboratories*, 25, 83.



3.3. Open Plan Classroom, DeLaveaga Elementary School. Taken from *SCSD: The Project and the Schools: a report from Educational Facilities Laboratories*, 25, 83.



3.4. DeLaveaga School. Taken from "School Construction Systems Development Program," *Arts and Architecture*, April 1967.



- 3.5. School Plan, DeLaveaga Elementary School. Taken from *SCSD: The Project and the Schools: a report from Educational Facilities Laboratories*, 25, 82.



4.1. Sonora High School Atrium. Taken from *SCSD: The Project and the Schools: a report from Educational Facilities Laboratories*, 81.



4.2. Sonora High School, 2022.



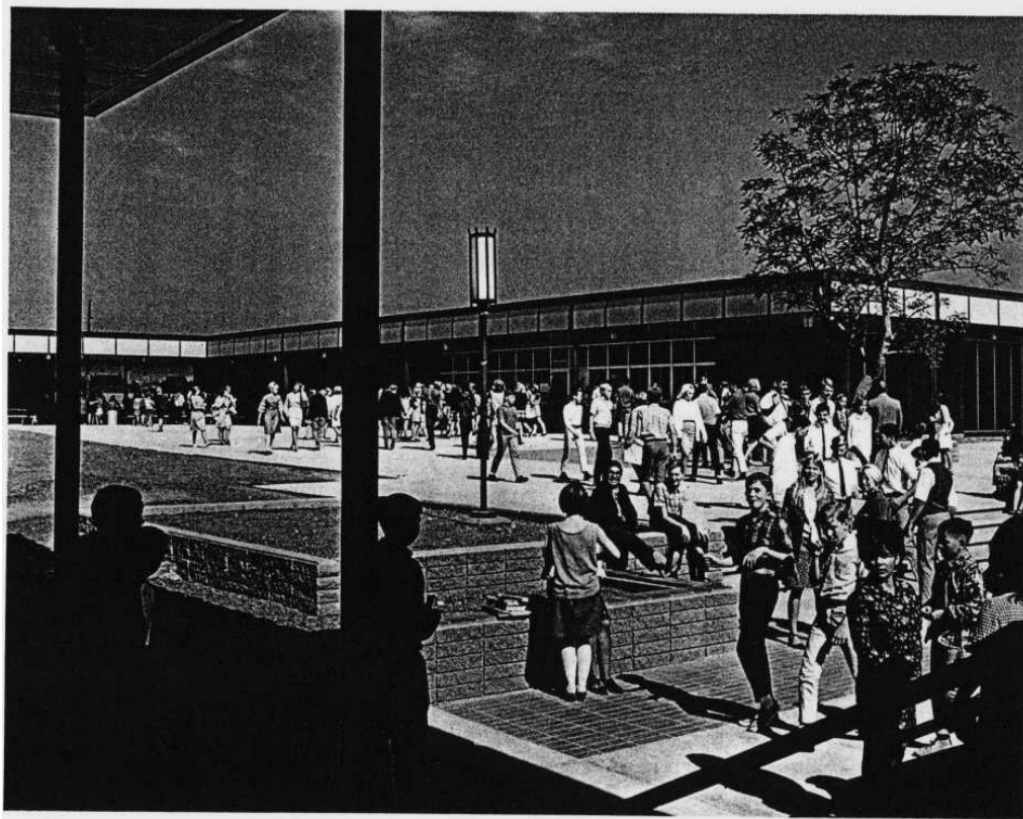
4.3. Fountain Valley High School, 2022.



4.4. Fountain Valley High School Pool.



4.5. Fountain Valley High School. Taken from *SCSD: The Project and the Schools: a report from Educational Facilities Laboratories*, 87.



4.6. El Dorado High School. Taken from *SCSD: The Project and the Schools: a report from Educational Facilities Laboratories*, 85.

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