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Building Paradigms: Major Transformations in School Architecture (1798-2009)

This article provides an historical overview of significant trends in school architecture from 1798 to the present. I divide the history of school architecture into two major phases. The first period falls between 1798 and 1921: the modern graded classroom emerged as a standard architectural feature during this period. The second period, which extends from 1921 to the present, has been defined primarily by the growing influence of progressive educational ideas and practice on school design. It is argued that school architecture has changed gradually over the last 200 years by building on existing design trends rather than breaking from them. The article concludes with some speculations about current trends in school architecture.

Cet article présente un aperçu historique de tendances significatives dans l'architecture scolaire de 1798 au présent. L'auteur divise l'histoire de l'architecture scolaire en deux phases majeures. La première période s'étale de 1798 à 1921; c'est pendant cette époque qu'apparaît la salle de classe moderne comme caractéristique architecturale standard. La deuxième période, qui débute en 1921 et se prolonge jusqu'au présent, est surtout caractérisée par l'influence grandissante d'idées et de pratiques pédagogiques progressives portant sur la conception des écoles. L'auteur maintient que l'architecture scolaire a changé peu à peu au cours des 200 dernières années en s'appuyant sur des tendances déjà établies plutôt que de s'en éloigner. L'article conclut avec quelques conjectures relatives aux tendances actuelles en architecture scolaire.

The historical research on school architecture is fragmentary. The most significant writing on the subject focuses on the 19th century and does not follow the development of school design into later periods. For example, Seaborne's (1971) *The English School* offers a wealth of information about individual schools, but its analysis ends abruptly at 1870. Remmel's (2006) dissertation on Boston public schools is similarly confined to the 19th century. The sparse literature on 20th-century school design—represented mainly by Volume II of *The English School* (Seaborne & Lowe, 1977) and Weisser's (2006) article "Little Red Schoolhouse, What Now?"—touches on how modern educational trends have informed school design, but does not properly account for the influence of 19th-century architecture on contemporary school plans.

In this article I survey school architecture from 1798 to the present to define a number of pivotal developments and link them coherently. The history of school architecture is segmented here into two distinct but related phases. The first period falls between 1798 and 1921, during which time the modern classroom emerged and evolved as a structural unit. I examine how the classroom improved on earlier school layouts. The second period (1921-2009) is charac-

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terized by the growing influence of progressive educational theory and prac-tice on school design. I explore how progressive educational ideas have driven critiques of traditional school design and trace how progressivism has trans-lated into architectural practice. I argue that many of the architectural innova-tions inspired by progressive principles are based on plans originally developed during the first phase of school design.

In all, I posit that (a) school design has evolved gradually over the last 200 years and has built on existing innovations rather than revolting against them, and (b) the architecture and organization of schools have shifted significantly over time and continue to change. I close with some speculations about the future trajectory of school design.

1798-1921: The Emergence and Evolution of the Classroom
The Grammar School and the Monitorial School

During the first four decades of the 19th century, British and North American school boards debated the relative advantages of the traditional *grammar school* model on the one hand and the newer *monitorial school* plan on the other. The grammar school model enjoyed a considerable head start in this contest, as it had dominated formal schooling at least since the 16th century (Spring, 2005). I note here that I use the term *grammar school* as a catch-all for the gamut of schools that taught reading, writing, arithmetic, and occasionally a few other subjects and am not referring only to the more prestigious grammar schools, which also offered courses in classical languages and literature (Houston & Prentice, 1991; Phillips, 1957; Reese, 2005; Seaborne, 1971; Spring).

Grammar school students were not graded by age as students usually are today, but were instead classed according to their knowledge of subject matter (Remmel, 2006). Some of the larger schools provided separate floors or school-rooms for individual classes of students, but most schools accommodated multiple classes in one schoolroom. The Academy (Figure 1), which opened in 1848, offers a standard example of a well-appointed Victorian grammar school (Barnard, 2005).

In this plan, 124 boys are paired at desks that are bolted to the floor. Two recitation rooms are provided so that students can perform recitations without causing a disturbance in the main area. A "closet for apparatus" is also in-cluded, providing storage space for items such as globes, maps, three-dimen-sional geometric models, and textbooks.

A significant drawback to the grammar school model was that the school-master could offer only so much simultaneous instruction to the whole school given the overall differences in student ability. As a result, most of the students were left to work independently or went unsupervised at any given time (Remmel, 2006). Remmel notes that this meant that groups of students were regularly "left idle or assigned self-study, which often led to disciplinary problems, the increased use of corporal punishment, boredom, and a lack of progress, particularly among the lower classes" (p. 48). Another outcome of this arrangement was a heavy reliance on textbook work, which the school-master or an assistant monitored by having students perform a brief oral recitation (Phillips, 1957). Educational content was consequently short on con-text and long on bare fact. Some of the best grammar schools such as Eton in England compensated for the inherent weaknesses of the schoolroom by
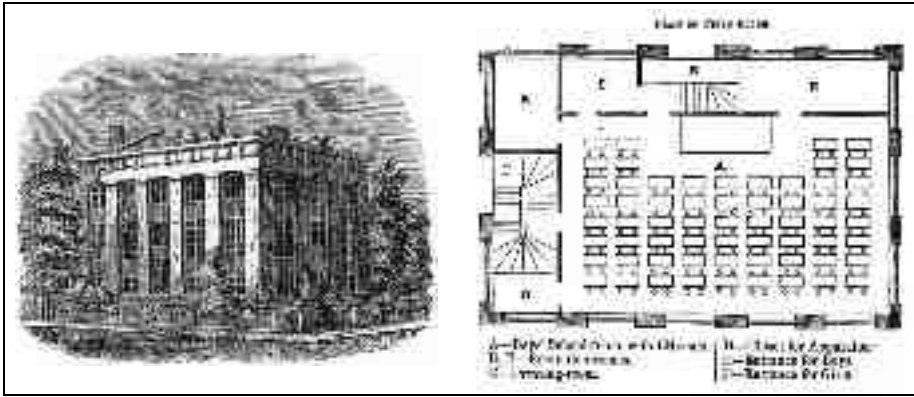
Figure 1. The Academy at Rome, New York, Barnard (2005).

employing tutors who worked intensively with students (Seaborne, 1971). Other superior grammar schools, including Bishop Strachan in York (now Toronto), made use of a rigorous question-and-answer method (Phillips). For the most part, though, grammar schools provided a highly pedantic kind of education of highly variable quality.

The monitorial system assumed another approach to the question of how to engage a wide range of students simultaneously (Gislason, 2007; Markus, 1993; Rabinowitz, 1974; Seaborne, 1971; Upton, 1996). Initially developed by English charity school proponents Andrew Bell and Joseph Lancaster—Lancaster's seminal Borough Road school opened in 1798—the monitorial model aimed to maximize the number of students that could be taught effectively under a single master. As in the grammar schools, students were classed by ability rather than by age and were seated by form. There were eight forms in Lancaster's standard design, with the eighth being the most advanced. A floor plan (Figure 2) from 1839 illustrates the standard Lancasterian arrangement (Barnard, 2005).

The semicircles along the periphery mark the lines where individual forms stood to perform recitations or follow a lesson on reading, writing, or reckoning numbers (recitation rooms were therefore unnecessary). These group lessons were led by monitors drawn at little or no expense from among the best students, making the system relatively inexpensive to operate. Although the savings may have not been great for a school of 56 pupils as in the plan given here, the same layout was regularly used to accommodate 300-400 pupils. This kind of radical extension of student numbers in a single schoolroom would have been impossible in a grammar school setting: monitors offered the level of surveillance and engagement needed to manage such a large student body.
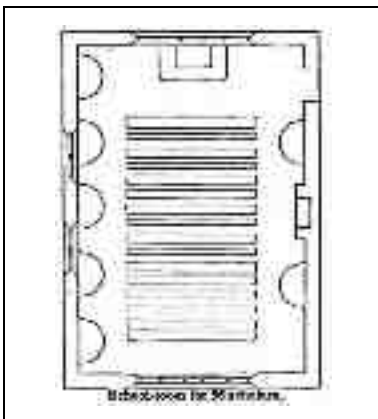

Figure 2. Lancasterian school.

The monitorial system relied on rigid sequencing alongside surveillance. An excerpt

from a Lancasterian manual gives some insight into how spelling and writing were typically taught:

> When the children are seated the monitor of each class takes a small lesson board in his hand … and at the command of the general monitor, the eighth class monitor stands on the form at the head of his class, and spells a word aloud, adding a simple definition. He is followed by the seventh, sixth, fifth, and fourth class monitors to the lowest. The words thus dictated, are written by the boys. As soon as the monitor has given out his word, he and his inspectors pass down the class, and inspect the writing.… They continue to do so, until the general monitor says, "Dictate another word." (cited in Phillips, 1957, p. 117)

This sort of teaching by drill was pedagogically limited. Reading and writing could be taught only in their crudest form and were not given a meaningful application. Nor was there significant discussion of the material, and critical thinking was not invited: it was learning by rote in the most basic sense.

One imagines that students would have rebelled against such a regimented system had Lancaster not reinforced it through the use of close supervision. Lancaster's (1973) focus on surveillance is plain in his *Improvements in Education*, which emphasizes that a monitor must keep his "business … before his eyes," so that students' behavior would not turn "idle or deranged" (p. 61). The principle that "many crimes are committed in privacy" (p. 61) was fundamental to the Lancasterian scheme, which curtailed deviant behavior by exposing and reprimanding it; or alternately by encouraging desired behavior in its place through prizes and other conspicuous signs of merit.

The final aim of Lancaster's (1973) framework of reward and punishment was to engender a "public spirit" that would tacitly guide behavior through group norms. Lancaster thus envisaged a type of school that encouraged what one modern sociologist has called a *closed community*: a self-sustaining social system built on a collective set of sanctions, rewards, and expectations (Coleman, 1988). Foucault's (1995) notion of the post-Enlightenment disciplinary institution in which the "vigilance of intersecting gazes" (p. 217) maintains order, also effectively describes the Lancasterian model.

Although Lancaster fashioned a cohesive and self-regulating system of schooling, it did not always operate smoothly. One contemporary account asserts that there was "as much waywardness in the youth of Lancasterian schools as of any other," and many other reports make a similar claim (Hutton, 1973, p. 178; see also Sturt, 1967). Several factors were responsible for the disruptions. Monitors sometimes had an inadequate understanding of the material or were half-hearted in their work. There were also often too few monitors per student, and irregular student attendance interfered with the flow of learning. These shortcomings demanded significant change to the system if it was to produce more than "servile copyists," as one critic put it (Kaestle, 1973, p. 182).

In summary, although the monitorial system offered potential advantages over the grammar school model in terms of operational costs and classroom management, these advantages did not ultimately outweigh the plan's limitations with respect to the overall scope and quality of education it could provide. These limitations were widely recognized in Britain and North America

by the 1830s, by which time the monitorial system was quickly falling out of favor (although it had enjoyed considerable popularity in Britain and to a lesser extent in North America). Moreover, the monitorial system never escaped its historical association with the charity school movement: such schools always bore the stigma of poverty. The shortcomings of the traditional grammar school model were also increasingly recognized, however, and there was a gradual shift in policy discourse throughout the 1830s toward singly graded, small, single-teacher classrooms (McClusky, 1920; Reese, 2005; Remmel, 2006).

The Graded Grammar School
School reformers in Boston led the way in developing a school model that enabled a controlled classification of students by ability. Horace Mann, Henry Barnard, and other reformers helped set the relevant grading policy, which was done largely in imitation of the Prussian system. This policy in turn provided the necessary groundwork for the first fully graded school in North America: the Quincy Grammar School-House erected in Boston in 1847 (McClusky, 1920).

Quincy stood four floors. A large gymnasium was situated on the fourth floor, and the first three floors were dedicated to classrooms (Figure 3, Barnard, 2005). Each of these three bottom floors contained four classrooms, two on either side of a central hallway. The principal served as the head instructor on the third floor, which housed most of the advanced classes. A sub-master was in charge of the second floor, which accommodated the mid-level divisions. The first floor was headed by the lowest-ranking head teacher, the usher, and contained the lowest divisions. The head teacher on each floor was in charge of paid assistants who monitored the classrooms.

The Quincy layout marked an important departure from both the monitorial school model and the grammar school model: Quincy was in fact a radical synthesis of the two models. It resembled a monitorial school insofar as the sub-master, the usher, and the teaching assistants carried out the principal's instructions much as monitors would have carried out the headmaster's instructions in a monitorial school; but the teachers and assistants were assigned to separate schoolrooms, as were teachers in the grammar school model. Quincy was thus like a collection of individually graded grammar schools systematically joined together.

Barnard's (2005) landmark *School Architecture* identifies four advantages offered by the graded classroom over and against earlier school models. First, Barnard notes that students in individually graded classrooms are likely to be of a similar age, which in turn allows teachers to fine-tune their lessons according to the age group in their class. Second, discrete classrooms enable visual and acoustical separation so that students are not distracted by other classes as they work through recitations and other lessons. Concentration and classroom management are thus improved, as a whole class can be engaged in the same way and at the same time. Third, students who are ready to progress to the next level of study can be easily identified and shifted to the subsequent homogeneous class without being unduly hindered by less advanced students at any given time. Finally, the single-grade classroom allows the instructor to devote more time to mastering subject content and "the most skillful and varied methods of teaching" (p. 127) by eliminating the recitations that would other-
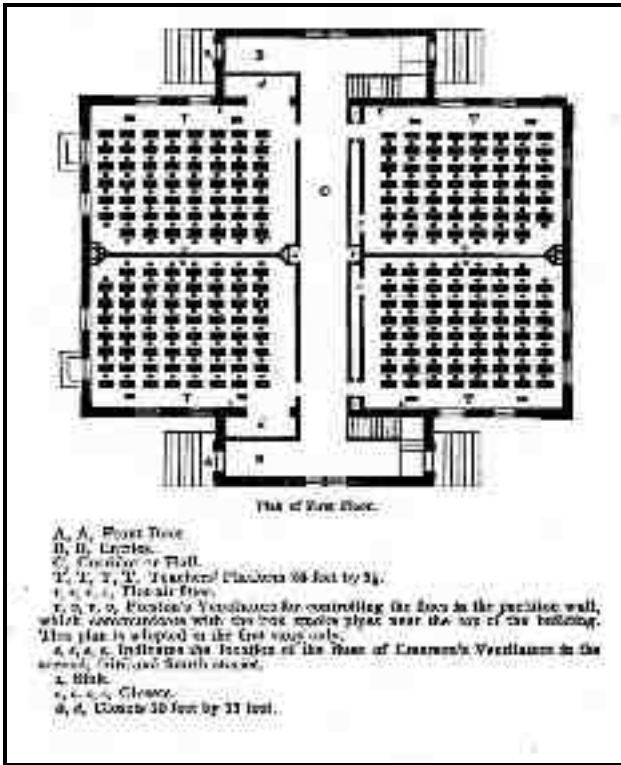
Figure 3. Quincy Grammar School-House, first floor.

wise be necessary to check the progress of varied classes. Taken together, these four factors reflect the inextricable link between the architecture of the graded classroom and the modern concept of the classroom teacher as a knowledge-able, pedagogically dynamic individual who is responsive to the needs of a given class. The Quincy Grammar School-House not only set an important architectural precedent, then, but further signalled a paradigm shift with respect to educational practice.

Modernization of the Graded Grammar School
Three trends particularly influenced the evolution of the revised grammar school model over the latter half of the 19th century. The first key trend was an increase in government funding and political support for public education. By 1871, legislation supporting compulsory attendance, centralized bureaucratic control, and public funding had been signed in Britain and Canada. Similar legislation was meanwhile gaining traction in the United States (Tyack, 1974). School design was affected in several ways by this influx of money. Quality blackboards became a fixture by 1860, whereas only a few schools had them before 1850 (Phillips, 1957). Moreover, few schools had visual items like maps and globes in 1850, but these too became standard equipment by 1875. Well-made individual desks, cloakrooms, improved ventilation and heating systems, running water, and good windows also added to building costs while improving the learning environment.

Funds were also poured into increasing the quality of school sites and façades. Relatively ornate Greek Revival, Romanesque, and Gothic Revival façades became common, partly as a strategy to raise the public profile of the common school and to erase the lingering images of pauperism that clung to the idea of widely accessible education (Gyure, 2001). These façades evoked the architectural details of mansions as well as the old high-status British grammar schools. The woodcut shown in Figure 4 from Robson's (1874) *School Architecture* offers a good illustration of contemporary trends in façade design.

The Tasker School incorporates the rounded window frames typical of the Romanesque style, as well as the triangular pediment characteristic of the Greek Revival. In all, it references the architecture of high-status domestic and civic buildings.

The 19th-century public health movement was another general trend that had a strong effect on school architecture. The public health movement was largely a response to the crowded and unsanitary conditions that developed as waves of new immigrants were packed into older sections of cities, creating a rich environment for epidemic diseases (Ross, 2006). In the 1880s health authorities were particularly concerned about preventing the spread of tuberculosis. Current scientific knowledge indicated that the tubercle bacillus was quickly destroyed by exposure to sunlight, so city authorities encouraged architects to plan large-scale buildings such as schools, hospitals, and tenements so as to maximize indoor sunlight. The authorities also created building codes that pressured architects to provide a higher level of natural ventilation, so that "a change of air" could be ensured and harmful bacteria could be removed from the atmosphere (cited in Ross, p. 43). The end result of the demand for more light and natural ventilation was that the design of public buildings moved away from a singly massed block—which is precisely what we see in the Academy, Quincy, and Tasker School—toward more articulated layouts that provided better access to the outdoor environment.

Figure 4. The Tasker school.

Urbanization and modernization also played a significant role in shaping the course of school design. As Remmel (2006) explains, the Quincy model depended on, and was informed by, the urban infrastructure.

> Such division into grade level[s] requires a large student body. This pre-condition has several architectural implications. First, it presupposes an urban environment where a large number of students live in close geographic proximity. Second, if the classes are to be housed in the same building, it requires a large schoolhouse with multiple classrooms. By extension, it implies a multi-story building, since the cost of urban land to build horizontally typically outweighs the added expense of building vertically. (p. 126)

The accelerating expansion of urban space throughout the late 19th century thus strongly supported the dissemination of the Quincy model. Further, the rise of the modern industrial and commercial economy pushed school curriculum toward more practical studies such as chemistry, physics, and early in the 20th century, manual training and technical subjects (Cremin, 1964; Phillips, 1957). This diversification meant that more specialized instructional areas had to be provided and that teacher education became more subject-specific and departmentalized. Schools thus grew larger as policymakers minimized costs by putting more students into each building; and curriculum became more compartmentalized and diverse as schools adjusted to the demands of the new economy. The tendency to increase school size while broadening the curriculum would eventually culminate in the layout of the comprehensive school in the early 20th century.

The combined effect of façade design, increased school size, curricular diversification, and physical articulation can be seen in the images from Donovan's (1921) handbook *School Architecture*. Consider the drawing of a proposed comprehensive high school shown in Figure 5.

Two light-courts flank the trunk of the sprawling E-shaped plan, allowing light and air into the core of the building. The school entrance reflects the use of Romanesque window elements, which are echoed in the light-court windows. Overall, the school's architectural aesthetic projects a sense of status and monumentality, whereas the layout reflects a focus on building hygiene.

The Group Plan of the Oakland Technical High School (Figure 6) represents an even more marked departure from the solidly massed plan of the 19th-century school. The Oakland plan is remarkable for its sprawling and variegated quality, which can be attributed to the combined influence of (a) the health movement, (b) curricular diversification, and (c) investment in land and building construction.

This layout directly anticipated the trend toward the highly articulated site plans that gained momentum in the 1930s. Such a loose configuration was ultimately made possible by the integrity of the classroom as a structural and educational unit: with individual teachers in control of separate classrooms, these rooms could be flexibly distributed without negatively affecting the integrity of the school as a whole. The large junior and senior high schools of the 1920s were thus immediate descendants of the Quincy classroom paradigm, but pointed toward a much more variegated and finely articulated type of school design.

Figure 5. Proposed comprehensive school.

1921-2009: The Development of Progressive School Design
Early Influence of Progressivism on School Design

Whereas public funding, urbanization, modernization, and the health move-ment heavily informed school architecture in the 19th century, progressive educational thought took center stage in the first half of the 20th century. The roots of modern progressive education predate the 20th century, of course. I would argue, at least for our current purpose, that progressivism's initial
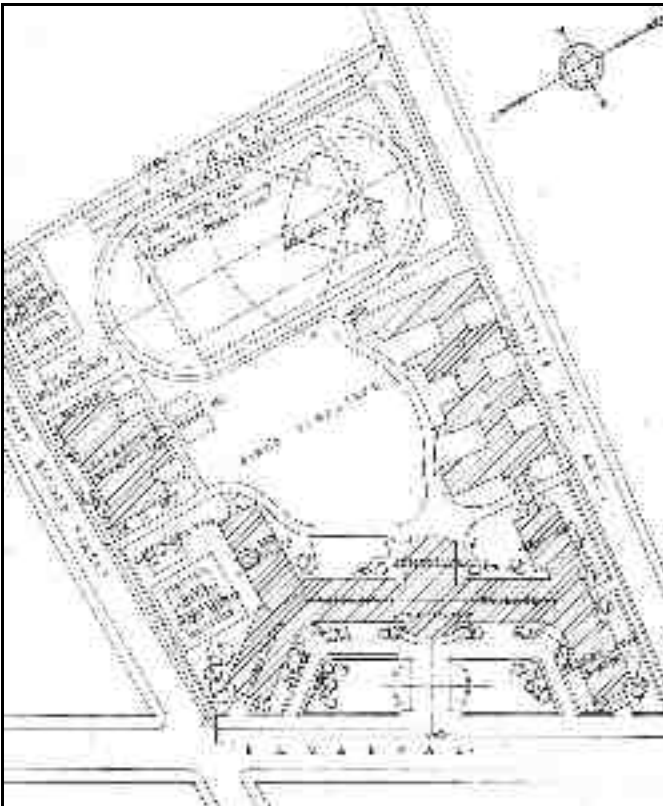

Figure 6. Oakland Technical High School.

defining moment occurred in 1896 when John and Mary Dewey opened their laboratory school for young children. As Rugg and Shumaker (1969) write, the school's goal was to enable students to pursue an education in harmony with their native interests. Dewey also wished to ensure that learning was grounded in real-world contexts and activities rather than abstract ideas or rote learning. Finally, Dewey felt that the educational process should mimic normal social behavior, as opposed to the regimented kind of work that he witnessed in traditional schools. The laboratory school thus represented a concerted effort to move away from the formalistic approach assumed by traditional education to a more intrinsically motivated, authentic, and context-rich educative paradigm.

Certain design features followed from the laboratory school's pedagogic program. First, the laboratory school used light and transportable furniture to allow for irregular spatial arrangements so that students could engage in guided observation, play, storytelling, and handwork. The Francis W. Parker School followed a broadly Deweyean approach, and the photo from Donovan's (1921) handbook offers a glimpse into how it looked in operation (Figure 7).

An open central area provides a flexible space for play, storytelling, and other group activities. The traditionally arranged desks at the bottom right corner of the photo are light and transportable, and the larger work desks in the adjoining space are available for creative handwork (note the tool cabinet at the center of the image).

Rugg and Shumaker (1969) expand on the significance of a school's physical setting in their influential work on progressive education *The Child-Centred School*:

> Informality, flexibility, freedom, mark the use of the plant in the new school. A classroom, depending upon the interests of the children using it, may be successively a shop, a studio, a bank, a store, a farm, a whole city, or a place to cook and dine. Certain activities requiring the use of specialized tools, to be sure, are localized. (p. 308)

Rugg and Shumaker go on to describe a number of specialized spaces: a pottery studio, a metal and woodworking shop, a painting studio, and so on. The key design principle for the authors is *flexibility*: they view school space and equipment as "raw materials out of which the children themselves under wise guidance fashion their own curriculum" (p. 309), and they believe that school settings should not be designed in a programmatically prescriptive manner. The value of flexible space and concrete learning opportunities for progressive education is expressed in Dewey's (2005) *Democracy and Education*:

> Where schools are equipped with laboratories, shops, and gardens, where dramatizations, plays, and games are freely used, opportunities exist for reproducing situations of life, and for acquiring and applying information and ideas. (p. 96)

Dewey and Dewey's (1962) *Schools of Tomorrow* provides other examples of the use of school space for the purposes of progressive education.

Whereas progressive educators such as Dewey, Rugg, and Shumaker were vocal about making changes to traditional pedagogy and school design, school

Figure 7. Kindergarten, Francis W. Parker School.

architects and policymakers were relatively quiet about school reform, at least until the mid-1930s. Donovan (1921) does gesture toward the need for change in *School Architecture*, warning that "excessive [architectural] standardization [would] likely lead to stagnation" (p. 28), as educational methods were changing and would have to be accommodated at some point. He is entirely quiet though with respect to the concrete changes that progressive reformers were recommending. Although not exactly conservative, Donovan is decidedly noncommittal, as were other architects at the time. However, the tide of educational change would eventually push architects and policymakers to consider how school design might be better aligned with progressive educational methods.

Growing Influence of Educational Progressivism
As Cuban (1993) observes, teachers slowly but surely adopted progressive techniques during the 1920s and 1930s. For example, traditional recitations were increasingly replaced by "socialized recitations," whereby students covered course content through "student-led and panel discussions, reports, staging of scenes from novels or plays, and debates" (p. 134). It was arguably this shift in the interior life of classrooms that drove the tectonic shift among architects evident in the seminal January 1935 issue of *Architectural Forum*. The foreword boldly states the case for change: "the current dominant type of

school plant is no longer representative or adequate for the present, let alone the future" (Moehlman, 1935, p. 22). The reasons for this inadequacy are unpacked in a subsequent article by Neutra (1935). Neutra writes that school should be a place where education "becomes a concrete experience and where the children do not learn, through reading and listening alone, what others have done" (p. 25). He concludes,

> School buildings, planned as places to acquire facts through motionless receptivity, defy every effort of administrators and teachers to meet the present demands of progressive educational practises. The redesigning of the *individual classroom unit* as the basic element of the school plant thus becomes a primary necessity. (p. 25)

Thus Neutra promotes progressive school design and calls for a transformation of the school's structural core. Meanwhile, Neutra views the façade as "the least valuable aspect" (p. 28) of school design (this attitude persists in the stripped-down modernism typical of most facilities today).

The architectural implications of Neutra's (1935) educational vision are seen in his plan for an elementary school activity classroom, shown here in a simplified form (Figure 8).

Two work compartments are located on either side of the entrance. One is dedicated to work with clay and cooking and the other to work with lumber, textiles, and paint (taken together, the two compartments reflect the contemporary interest in domestic studies and manual training). Each compartment is equipped with storage space, work surfaces, and so forth. The main space is furnished with transportable chairs and tables which can "be arranged in manifold manner both indoors and outdoors" (p. 34). A wide sliding glass door opens onto the outdoor classroom, which offers a secondary space for project-work and thus "unburdens the floor area of the interior room" (p. 33).

Neutra's (1935) classroom is custom built for activity-based work and provides a high degree of spatial flexibility. This classroom design echoes the layout of the Francis W. Parker schoolroom, albeit in a more formalized fashion. One finds, in both settings, (a) discrete workshop-type spaces, (b)
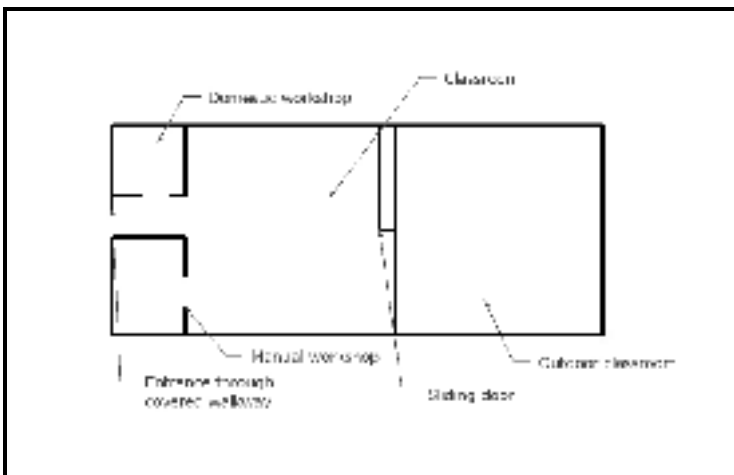

Figure 8. Neutra's activity classroom.

flexible open spaces, (c) transportable furniture, and (d) storage areas for supplies used in learning activities. It is, therefore, evident that Neutra's model is not a break from the past, but is rather a moderate reinterpretation of an existing classroom paradigm. Neutra's proposed building layout similarly recalls a number of earlier design concepts (Figure 9).

The plan groups classrooms in four parallel strips with five classrooms per strip. This finger plan is a variation on the kind of loosely configured layout seen in Donovan's Oakland plan. It also mirrors the health movement's interest in open exterior space and easy access to air and light: a theme that is evident in the Foreword, where Moehlman (1935) argues that schools should incorporate sun rooms to "secure the [antibacterial] benefits of the ultraviolet rays" (p. 22). Neutra (1935) adds a social hygiene component by asserting that outdoor spaces offer an "uncramped and unmutilated" counterbalance to crowded urban spaces, which he feels are bound to damage the "minds and social skills of the next generation" (p. 28). Neutra thus outlines an archetypal suburban world view in which open air and green space are seen as a remedy for the perceived social ills of densely populated urban space. Ross (2006) mentions that by 1930 a total of 1,105 open-air classes were operating in the US. Some of these accessed the outdoors through a series of windows or sliding partitions, whereas others were permanently open on one or more sides.

The sprawling, highly articulated, essentially suburban school plan sketched by Neutra (1935) and the other 1935 *Architectural Forum* contributors helped set the standard for school design in the second half of the 20th century. It bears repeating that these designs were not fundamentally new. Their relative flexibility in terms of building layout drew on existing architectural responses to the health movement, which in turn relied on the integrity of the classroom as a discretely functioning unit: a legacy of the Quincy model. Moreover, their emphasis on flexible classroom space mirrored fairly longstanding progressive educational practices. Nonetheless, Neutra's generation of architects actively promoted progressive principles as an architectural matter for the first time.

Progressive school design elements were realized in number of important buildings in the 1930s and 1940s. Weisser (2006) cites Neutra's (1935) Corona Avenue School, an elementary school built between 1934 and 1935, as the
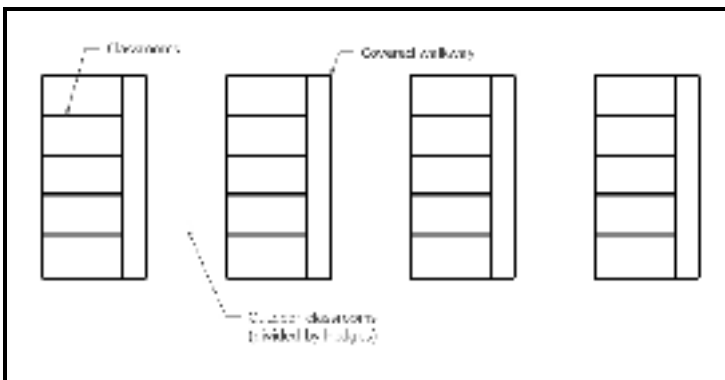

Figure 9. Neutra's proposed building configuration.

"physical realization of Neutra's Forum proposal" (p. 204). The Corona class-rooms employed Neutra's open-air, flexible-use plan and were grouped according to the finger plan arrangement. Weisser suggests that this layout "took Dewey one step further … [by exploding] the shell of the classroom" (p. 204). However, it should be remembered that the open-air arrangement and flexible seating both had deep historical roots and in 1935 were not in themselves radical concepts.

Classrooms in the Crow Island School, an Illinois elementary school that opened in 1940, similarly provided space for group activity and hands-on work. The classrooms were constructed in an L-shape, and work compartments were located in the small section of the *L* (Brubaker, 1998; Weisser, 2006; Zilversmit, 1993). Each classroom had a door leading directly outside as in the open-air model. The overall arrangement of the school is shown in the mass study, which foregrounds the back of the building (Brubaker, Figure 10). The facility's front entrance is shown in Figure 11. The modernist aesthetic and sprawling layout characteristics of the new approach to school design are plainly apparent at Crow Island.

Crow Island: Architectural Form Meets Educational Practice
Crow Island offers a powerful early example of progressive school design. The origins of Crow Island as a progressive school can in fact be traced back to 1919, when a young educator by the name of Carleton Washburne was sent as a novice superintendent to Winnetka, Illinois. Washburne brought expertise in individualized curriculum and assessment and soon set about revising Winnetka's programs so that students advanced through ability-graded texts rather than grade-specific expectations. Although this method resembled a partial throwback to the textbook-based approach used by grammar schools in the 19th century, Washburne's interest in the individual pupil mirrored the contemporary focus on nurturing the student rather than simply marching him or her through a lock-step program (Zilversmit, 1993). Washburne's philosophical orientation toward the interests of the individual child guided not only
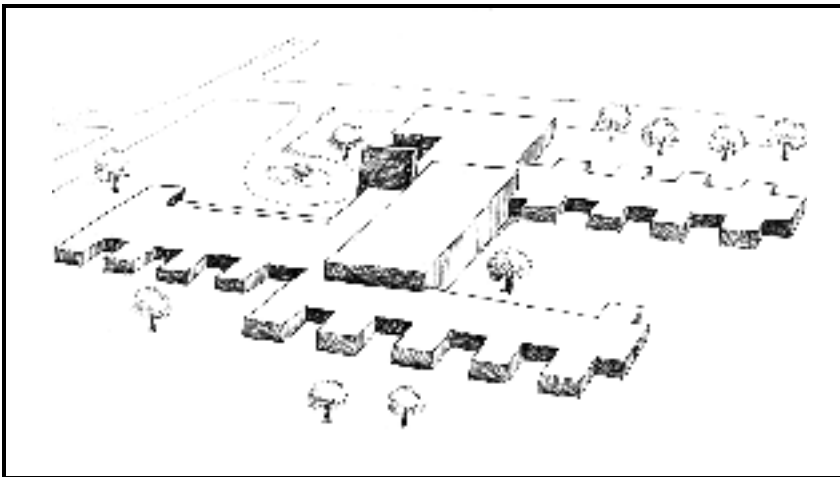

Figure 10. Crow Island School, mass study (drawn for the author by Judy Brown).
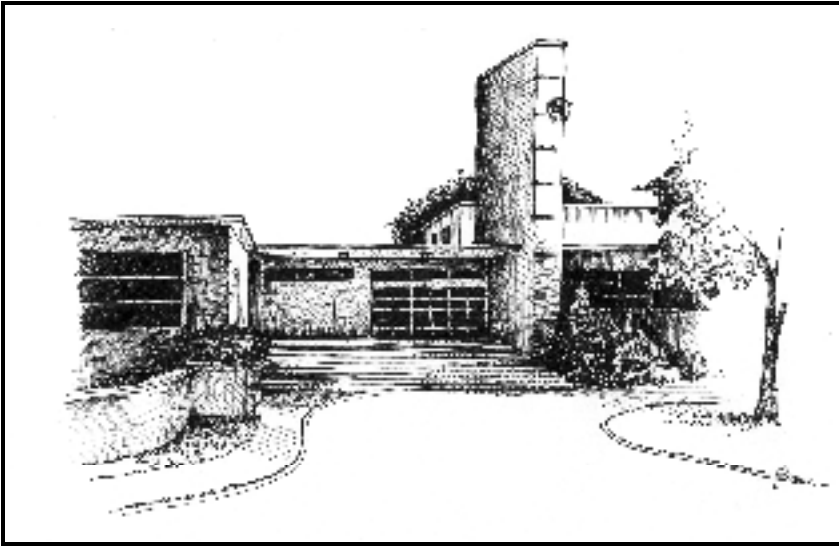
Figure 11. Crow Island School, front entrance (drawn for the author by Judy Brown).

his support for individualized instruction, but also his belief that children's native interests should be harnessed. Washburne accordingly promoted the use of art, music, discussion, play, field trips, and various kinds of group-work as a means of engaging children's creativity while drawing them into learning about the world outside school.

By the time the Winnetka district decided to add Crow Island to their stable of schools, Washburne's educational program—the so-called Winnetka Plan—had come to distinguish between two types of learning activities. In the morning students worked on their individualized learning materials and received direct instruction in math, reading, and writing. In the afternoon they engaged in group and creative activities. The goal of this split schedule was to ensure a balance between educational fundamentals on the one hand and collaborative and creative work on the other. Zilversmit (1993) notes that Washburne

> argued that the two parts of the curriculum should be kept separate because
> using group projects as a way of teaching basic skills involved too much
> hit-or-miss teaching—there was no guarantee that class projects would lead to
> teaching all the needed skills. (p. 53)

The Crow Island classrooms precisely matched the contours of the Winnetka Plan. The main space in each room contained blackboards and transportable desks, enabling easy arrangements for conventional teaching and group work, and the workshop section provided access to materials and space for the afternoon work.

Progressive School Design: Mainstream Adoption and Radical Interpretations
The school plans outlined in Caudill's (1954) major reference work *Toward Better School Design* reflect the fact that progressive design concepts had informed mainstream school construction by mid-century. The handbook is full of finger plan layouts and other articulated site arrangements in line with the

design patterns established by Neutra (1935), the Crow Island architects, and other early adopters. Caudill also focuses on issues related to flexible-use planning such as the implementation of movable classroom partitions, storage space, and indoor-outdoor connections. However, Caudill indicates that activities associated with "learning by doing" had not yet been properly accommodated in an architectural sense, and that "sweeping changes in design and layout" had to made, so that schools could adequately house the "different kind of curriculum" (p. 26) entailed by the activity-based approach. Progressive school design was, therefore, evidently still a work in progress in Caudill's time. Moreover, the full implications of progressivism for high school architecture pass largely untouched in Caudill's work, as it does in a somewhat later standard reference, Otto's (1966) *School Buildings 1*. Both these works show true flexible-use design only at the elementary level, where progressive principles had long been accepted.

The Educational Facilities Laboratories (EFL), a nonprofit group dedicated to studying and resolving issues in school architecture, conducted one of the first concerted efforts to formulate progressive design principles at the secondary school level (Marks, 2000, documents EFL's considerable effect on school design). EFL's (1968) publication *Educational Change and Architectural Consequences* transposes several key progressive themes to the high school context. For example, the core concept of intrinsic motivation is at play in EFL's emphasis on self-directed learning: "The high school student ideally becomes … responsible for his own learning. Guidance is essential, of course, but with self-reliance the norm" (p. 26). The authors accordingly argue for a daily schedule that assigns large blocks of time for (a) teacher-student consultations, (b) independent study, (c) small-group learning without the teacher's guidance, and (d) small teacher-led seminars that help students to work through complex ideas.

The focus of *Educational Change* (EFL, 1968) on student-centered learning is reflected in its proposed replacement for the classroom: the learning suite. The learning suite incorporates seminar areas and individual study carrels, as well as a lecture hall where a large number of students (about 64) can be instructed simultaneously. This configuration represents a major revision of the activity classroom not only in its emphasis on spaces for self-directed learning, but also in its size: the whole unit is about three times the size of typical classroom (Figure 12).

Several radical pedagogic and organizational implications follow from the suite model. For one, team teaching becomes viable and perhaps necessary given the large number of students located in one area. Another implication is that students need to be highly self-directed in their studies, as much of the space is dedicated to small-group and individual work. Finally, the traditional notion of the classroom as a discrete space under the direction of a single teacher is superseded by a more fluid and collaborative plan. The suite model thus departs from both the traditional classroom paradigm and the activity classroom plan and transforms the basic organization of schooling.

I would argue that the most recent iteration of progressive school design strongly echoes the ideas embodied by the suite model (Bergsagel et al., 2007; Cuningham Group, 2003; Nair & Fielding, 2005). In other words, modern
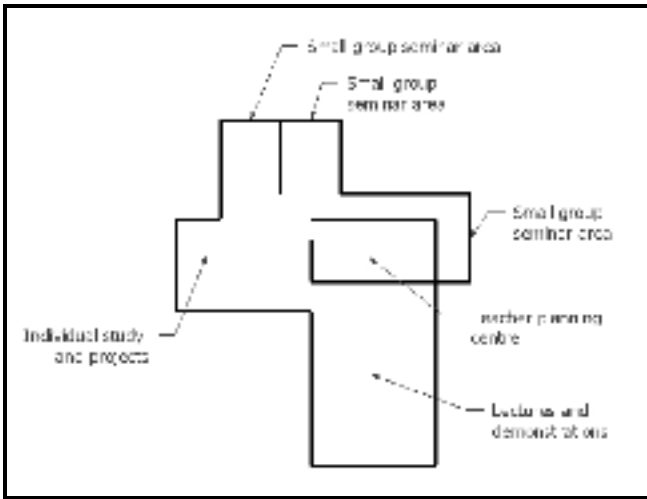
Figure 12. Learning suite.

progressive architects and educators are still working out what it means to accommodate a relatively large number of students in large, flexible-use spaces. Diverse schools in fact plan and use open-plan instructional space variably. At the School of Environmental Studies (SES), for example, the school's roughly 400 students are distributed into four home-base houses. These are physically divided from one another, but are internally open. Spatial differentiation in the houses is achieved mainly through seating arrangements and the strategic placement of whiteboards. Each house is taught by a team of teachers who collaborate to deliver an interdisciplinary environmental studies curriculum over the course of a three-hour daily block. The open space directly facilitates team teaching and flexible grouping (Gislason, in press). At the High School for Recording Arts (HSRA), however, the school's large, open advisory space is not used as a vehicle for team teaching, but rather as a flexible in-dividual work space where students can freely consult with teacher-advisors as they work on individually developed projects.

In a general sense, SES and HSRA share one basic feature despite their differences: their incorporation of open-plan instructional space signifies a move away from the traditional classroom toward a large-scale activity model. Both schools are essentially activity schools rather than simple receptacles for activity classrooms or traditional classrooms. It would indeed be difficult to use the open areas in these schools for classroom-scale teaching on a continual basis, as they contain so few physical barriers that offer visual and acoustical isolation.

Conclusion

Given the disjuncture between open-plan space and traditional classroom teaching, current progressive school design will influence mainstream school architecture only insofar as educators and the public come to support the pedagogical principles that underpin open-plan schools. Such principles cur-rently enjoy a fair level of support from a variety of sources. School reformers such as Washor (2003) explicitly support progressive school design. Prominent reform-oriented organizations such as the Coalition of Essential Schools, mean-

while, promote progressivism at an institutional level. The present academic interest in constructivism, which is conceptually linked to student-driven learning and group work, similarly points to a group-intensive, activity-based approach (Gould, 2005). Finally, a growing public interest in nontraditional school models, particularly small specialized schools, may ultimately spur architectural diversity and introduce new opportunities for the implementation of progressive design ideas (Schneider, 2002; Stevenson, 2007).

Whatever tomorrow brings, it is certain that school design is dynamic and will change, however imperfectly, in accordance with educational theory and practice. Perhaps the critical question for now is whether the classroom will continue in its basic form, or whether it will be supplanted by some version, or multiple variants, of the learning suite. If the learning suite model ever becomes a major paradigm, it will mark a radical shift in school architecture: a whole form of pedagogy based on the individual graded classroom will have given way to an educational model only remotely related to Quincy's legacy.

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