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Architectural Design as Research Programs: The Schools at Cranbrook by Eliel Saarinen

At the Teachers' Seminar of the Association of Collegiate Schools of Architecture (ACSA) held at the Cranbrook Academy of Art in June 1985, one of the subgroups of teachers undertook to demonstrate an approach to criticism through a written study of some of the works of Eliel Saarinen at Cranbrook. In several working sessions over two days, without access to archives or libraries, the team was introduced to the method to be used, surveyed the extensive grounds of Cranbrook, argued its observations and analyses, and wrote a short essay. An edited text of that essay follows. The observations and arguments of the version delivered at Cranbrook are here unchanged as a demonstration of what was achieved in collective work under severe constraints.

This text was a collective effort but principal responsibility for the several parts is as follows:

Introduction and Conclusion

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The Cranbrook School for Boys

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The Kingswood School for Girls

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Those who wrote the essay also benefitted from the discussion of Gerald Allen, architect of New York, and Jennifer Bloomer of the Georgia Institute of Technology, Atlanta, GA.

Introduction

Lakatos's Research Methods

The approach to criticism advanced here, based on Imre Lakatos's *The Methodology of Scientific Research Programmes*,¹ fits all or none of the types of criticism recognized in the title of this Teachers' Seminar: criticism "through the press, over the boards, and off the wall." It fits none in that it has not yet been shaped for a particular purpose. Nonetheless, the method may serve any of these forms of criticism as well as the theory and historiography of architecture. The method in no way eliminates the difficult questions of criticism but rather has its value in forcing the construction of more specific and closely argued claims, thus encouraging challenge and stronger alternative formulations.

Artifactual Research Program

For some years, Royston Landau and Stanford Anderson have pursued mutual and parallel interests in the relation of architectural thought and practice to the philosophy and history of science.² Characteristically, with any mention of science outside its own strict domain, it becomes necessary to forestall the fears that one is embarking on a positivist philosophy and seeking to scientize other disciplines. Lakatos's method, however, comes within a now fifty-year-old tradition that recognizes the incapacity of positivism. Some strands of that antipositivist tradition draw the radically relativist conclusion that "anything goes," refusing a rational search for superior explanations. Lakatos, on the contrary, seeks to analyze

science in such a way as to preserve criticism and the formulation of progressively better explanations.

In this very brief introduction, only the roughest sketch of Lakatos and his method can be attempted. In seeking to go beyond the problems of earlier philosophies of science, including those of his teacher, Karl Popper, Lakatos took the distinctive step of shifting the unit of theoretical analysis from the theory to the research program. As the name implies, a research program is more complex than a theory and is necessarily extended in time. Lakatos abandons any notion of strong and definitive test of theories. Theories exist, rather, in a series of states within a program. Relative to any problem, there can be a range of alternative programs, and it is the judgment of programs—never absolutely definitive judgments—that replaces the vain hope of decisive theoretical tests.

Lakatos proposes a certain structure of research programs. He claims that any program, in order to preserve its integrity and to realize its own development, must have a constant set of principles or fundamental hypotheses—what he calls a “hard core.” Since the exploratory and hypothetical nature of a program is acknowledged, this core is obviously not preserved by the invulnerability of its truth but rather by the methodological decision to grant immunity to that core.

If the hard core simultaneously reveals the conventionality of the program and guarantees its

preservation, there must be another feature of the program that allows adjustment of the theoretical state of the program. This is accomplished through what Lakatos refers to as the “auxiliary hypotheses” of the program.

Thus we can envision a constant hard core surrounded by a series of changing auxiliary hypotheses that together constitute the successive states of a program. The succession of states may be guided by either or both of the following: recalcitrant data and a heuristic that is conceived to elaborate and explore the implications of the hard core.

In adapting Lakatos’s method to architecture, it is plausible that certain adjustments must be made, and these have been discussed elsewhere.³ However, the participants in the Cranbrook team worked with the slightest discussion of these matters, and thus this brief introduction may also serve for the appreciation of the study of Cranbrook that follows.

It will be seen that we place both the Cranbrook School for Boys and the Kingswood School for Girls in the long and broad tradition of the Arts and Crafts movement, which extends from the time of John Ruskin and William Morris in the middle of the nineteenth century to, at least, the Cranbrook schools. However, this long history incorporates attitudes and works that are as significant for their diversity as for their continuities. The ACSA team surprised itself in finding that the two secondary schools of

Cranbrook, both designed by Eliel Saarinen, and so similar in purpose, patronage, and date, are nevertheless representatives of quite different programs.

NOTES

- 1 Imre Lakatos, *The Methodology of Scientific Research Programmes*. Philosophical Papers, volume 1 (Cambridge: Cambridge University Press, 1978).
- 2 Stanford Anderson, “Architecture and Tradition,” *Architectural Association Journal* (May 1965); also published in Marcus Whiffen, ed., *The History, Theory and Criticism of Architecture* (Cambridge, MA: MIT Press, 1966). S. Anderson, “Environment as Artifact: Methodological Implications,” *Casabella*, no. 359–360 (December 1971), pp. 71–77. Royston Landau, “Methodology of Research Programmes,” in B. Evans *et al.*, eds., *Changing Design* (London: John Wiley & Sons, 1982).
- 3 S. Anderson, “Architectural Design as a System of Research Programmes,” *Design Studies* (London), V (July 1984), pp. 146–150.

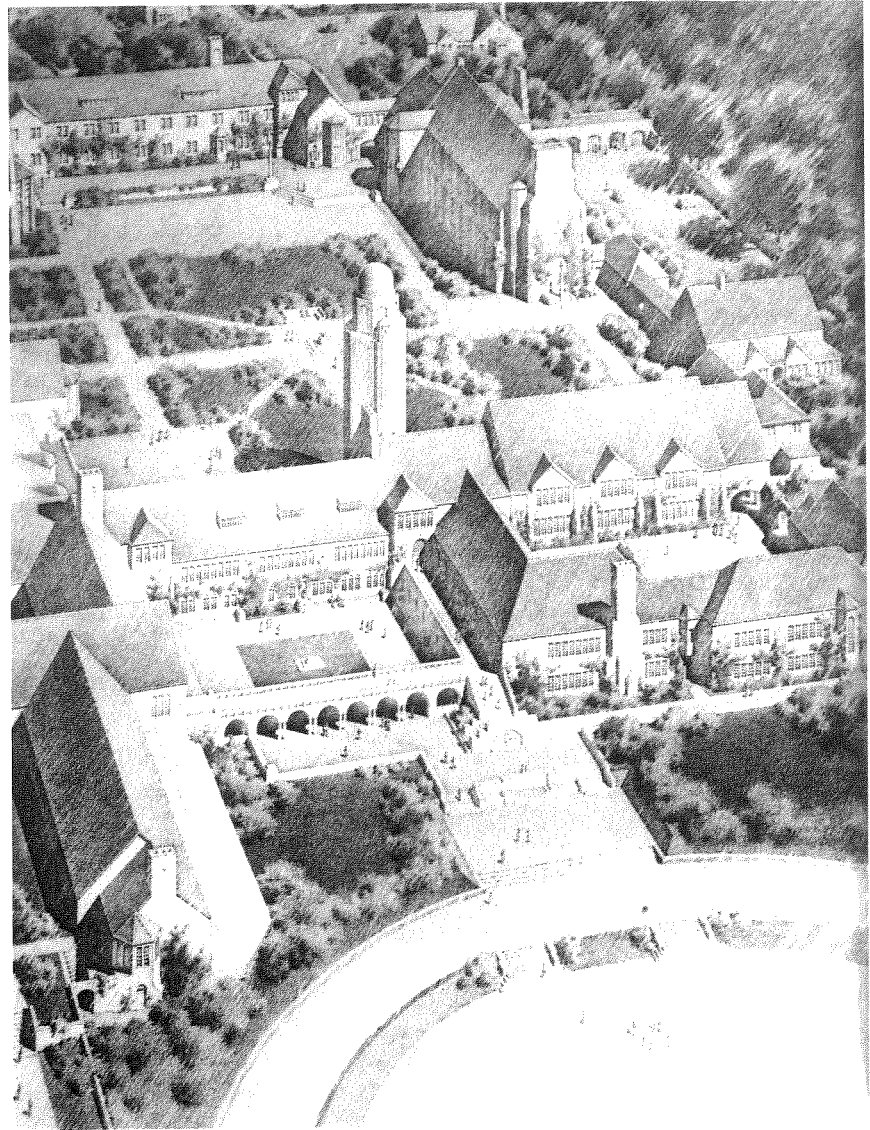
The Cranbrook School for Boys

Cranbrook School was located on the site of a farm in 1925. The first proposal involved extensive remodeling of the existing farm buildings. Contractors, however, estimated that “a new project could be built more cheaply.” The new proposal, therefore, replaced the existing buildings with schoolhouse facilities, counterparts when possible: the observatory tower for the silo, the library for the blacksmith shop, classrooms for the stables, and so forth. The final proposal included, according to the building committee, “an impressive group of courts, quadrangles, halls and terraces.” They gave it “a delighted acceptance.”

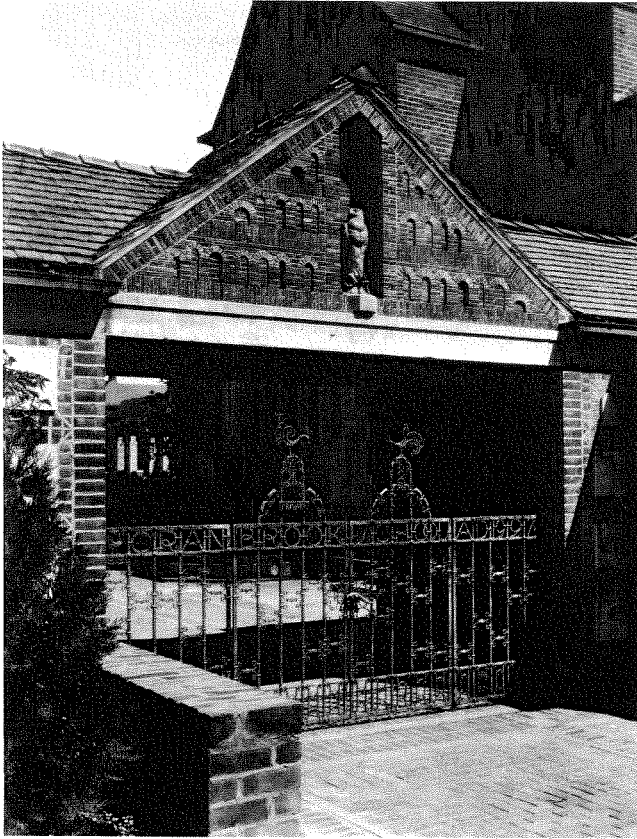
This site development is consistent with Saarinen’s design philosophy, which he stated four years earlier: “Monumental squares, spacious boulevards, and the like, have their place in a city, just as well as picturesque piazzas, intimate street scenes, and sequestered courtyards. Carefully planned monumentality and picturesque intimacy should be used to render the modern city attractive.” His views on “carefully planned monumentality” were exemplified in Chicago in 1923 and in Detroit in 1924. Cranbrook School is the first application in the United States of his concept of “picturesque intimacy.”

Hard Core Hypotheses

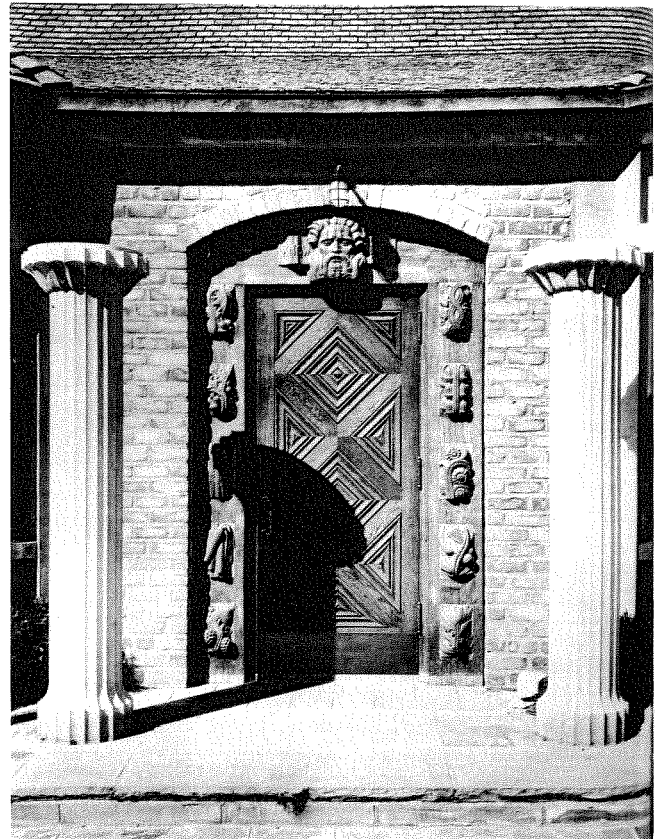
We propose the following two hypotheses within the “hard core” of Saarinen’s Cranbrook School. First, the style is informed by and makes reference to Ruskinian



I Cranbrook School, aerial perspective drawing by Eliel Saarinen, 1926. Photograph courtesy of Detroit Institute of Arts and the Metropolitan Museum of Art, *Design in America: The Cranbrook Vision 1925–1950* (New York: Harry N. Abrams, 1983), p. 34.



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2 **Cranbrook School**, entrance gate, 1928. Eliel Saarinen and Oscar Bach (fabricator). Photograph courtesy of *Design in America*, p. 157.

3 **Cranbrook School**, Door of Knowledge, 1927–1928. Eliel Saarinen and Geza Maroti. Photograph courtesy of *Design in America*, p. 236.

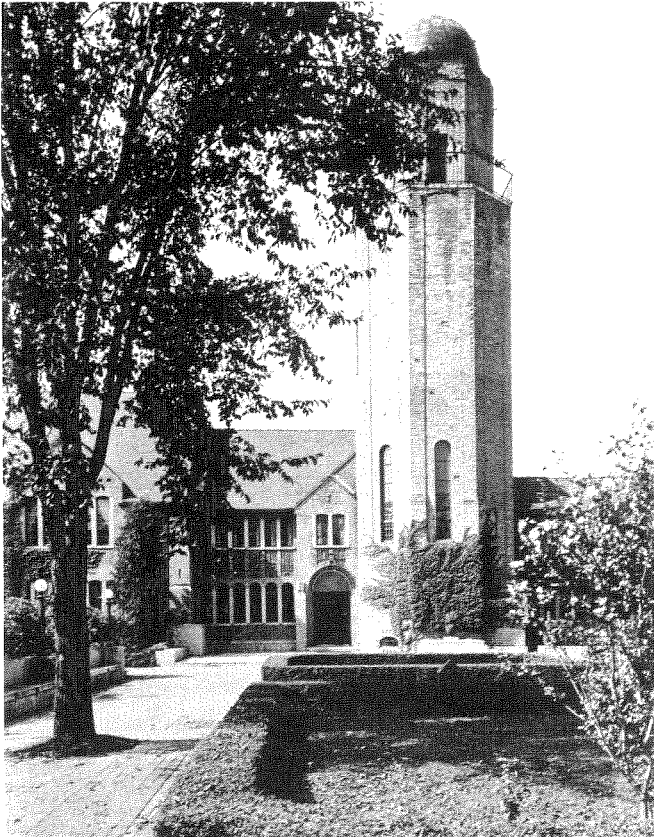
principles embodied in the phrase “joy of work” and includes considerations about labor, materiality, and ornament. Second, the main generating principle of the plan is an open-ended interplay of vistas and axes and an inwardly focused integration of buildings, plazas, and courts; the outdoor space is positive and all elements are placed sensitively in the landscape.

First Hard Core Hypothesis. The first hypothesis, involving joy of work, is based on Ruskin’s attitude toward crafts. It concerns the

relationship between labor, material, and ornament.

The craftsman should not be a machine, mechanically making objects by hand according to the dictates of a designer. Rather, the craftsman is a living, thinking being who should have input into the design of the object as he makes it. This joy in his work results in a building that has the imprint of the craftsman’s character, a building that has life.

This Ruskinian joy of work is evident in the buildings of Cran-



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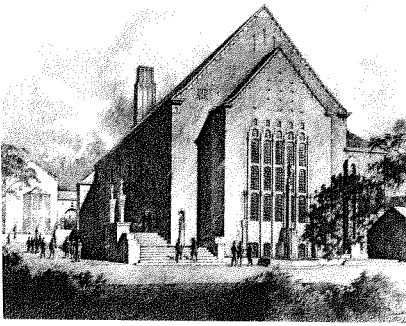
brook School. During construction, workers were allowed to make decisions within the framework provided by Saarinen. Different shades of brick are used in walls. Single bricks are intermittently pulled in or out from the surface. A wide variety of brick patterns are used, sometimes asymmetrically, as in the gable of the entrance gate, and sometimes spontaneously, within a large expanse of wall. Imaginative variations of motifs are found in the stone ornament, for example, in the applied decoration of the dining hall and in the form of the columns of the pergola. Similar

decision-making by the craftsmen is evident in the designs of the doors and in the patterns of the decorative ceramic tiles on the floors and in chimney pieces.

In his work, the craftsman uses the material honestly, in a manner that exploits and expresses the nature of the material. At Cranbrook this materiality, based on a builder's craft rather than an artist's craft, is manifest in the juxtaposition of different kinds of material of different colors and shades, in varying forms and sizes. Brick is used with thick flush joints that

4 Cranbrook School, academic building and tower, 1925 ff. Eliel Saarinen. Photograph courtesy of Cranbrook School.

5 Cranbrook School, dining hall and academic building from the east. Eliel Saarinen. Photograph courtesy of *Design in America*, p. 55.



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6 Cranbrook School, perspective of the dining hall by Eliel Saarinen, 1928. Cranbrook Academy of Art/Museum. Photograph courtesy of *Design in America*, p. 54.

emphasize each unit rather than create an integrated surface. The qualities of smooth, grey granite and concrete used around windows are emphasized by their contrast to the brick walls. This same variety of materials, emphasizing the individual character of each part, is used in the pavement. In addition, the windows are divided into patterns of panes yielding slightly faceted planes that emphasize the shiny and reflective nature of glass. Roofs are sheathed with red tiles or slate that show gradations of color and size. The malleability of metal is experienced in the iron entrance gate, the cupola, and in interior metalwork.

The Second Hard Core Hypothesis. The second hypothesis involves the overall organizing principle of open-ended, generative, geometric growth based on a loosely ordered system of axes and vistas. Major spaces, such as the dining hall, are tied to other major spaces, such as the meeting room or library, by a series of connecting elements. This sequence of forms is used to create a wide variety of interconnected courts and minor outdoor spaces. The perimeter of the courtyard steps in and out, focusing inward and defining the outer boundary of the school.

The generating principle, then, is open-ended and indefinitely extendable. While there is major massing around the focal point marked by the observatory tower on the main quadrangle, the complex as a whole has no central focus. The geometry implies that

connecting elements could be added to any major unit at the periphery and the geometry continued.

Auxiliary Hypotheses. The first auxiliary hypothesis is that fragments embedded within their surrounding structures contribute to the organizing scheme. This theme is repeated at all scales. Gables are set within gables and shed dormers are lifted out of steeper roofs. Walkways are almost always terminated by significant elements, such as windows or benches, but seldom connect door to door, being instead offset or interrupted by other paths. Each pathway then becomes a fragment embedded in the larger circulation system.

The second auxiliary hypothesis proposes the use of detail to establish picturesque intimacy. Each courtyard, having been generated by the geometry, is filled with small-scale elements. Sculpture as well as street furniture, such as benches, sun dials, and fountains, mark several of the pathways. Archways and doorways often contain inscriptions. Walkways contain icons and a wide variety of paving patterns. All contribute to a sense of small-scale intimacy.

Many other auxiliary hypotheses can be identified for Cranbrook School. The use of the English Gothic style, a request of the patron, is one viable system of both generating and controlling decisions necessary for the realization of the general program. A more inventive hypothesis serving the same

The Kingswood School for Girls

purpose is the use of particular, differentiated materials to solve problems of scale.

Summary

The two hard core hypotheses and many other auxiliary hypotheses sketch out the research program for Cranbrook School. They manifest Saarinen's principles of urban planning as stated in 1921. While Cranbrook would not fit most definitions of urban planning, Saarinen believed that there was no division between architecture and planning. The principles, therefore, carry down through this small village to the benches and brick details of its walkways, buildings, and landscape.

While the program of the Kingswood School may seem at first to be remarkably similar to that of Cranbrook, a closer examination reveals significant differences, which is surprising given the lapse of only two years between the projects. Obvious causes for the differences seem to be contradicted by the evidence. Kingswood is a school for girls, which in 1929 would have suggested a more delicate, finer-grained environment, yet the architecture at Kingswood is consistently more rigid and more austere than that of Cranbrook. The intervening depression of 1929 would have diminished the cost of labor, allowing even more elaborate, specialized use of craft and material, yet the tendency was to do the opposite. Clearly, a different research program was in effect, and a different set of hard core hypotheses is needed to define it.

Hard Core Hypotheses

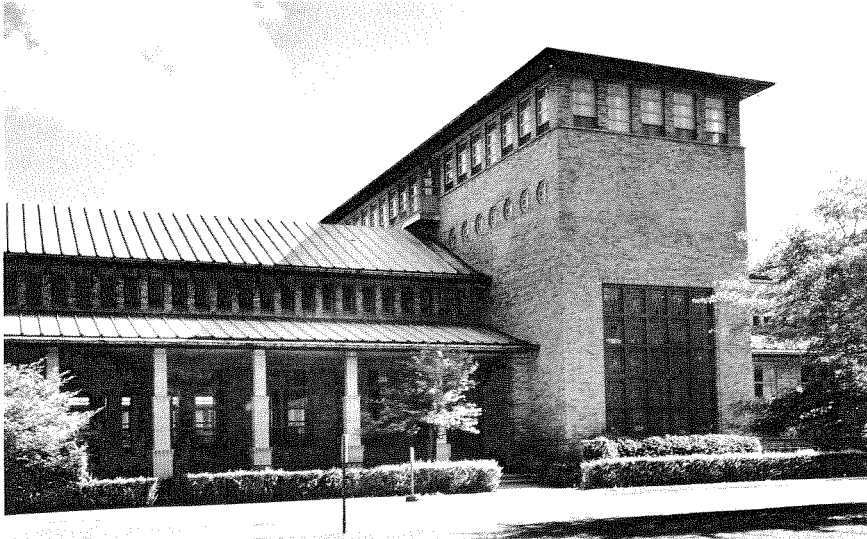
We propose that the following define the overall program at Kingswood: (1) an aesthetic that stems from what Frank Lloyd Wright called the "Art and Craft of the Machine"; (2) the use of an orthogonal plan, comprised of sections of uniformly built elements; and (3) the contrast between distant readings of a picturesque object in the landscape and close-range readings of rigid, axially organized space.

First Hard Core Hypothesis. The concept of the "Art and Craft of the Machine" stems directly from the Arts and Crafts sensibility already noted in the Cranbrook School.

Here, however, in the basic fabric of the building, the contributions of many skilled craftsmen were not required. Rather, the machine was used to make ornament more accessible to everyone. Metal can be inexpensively cast or stamped, and stone and wood can be cut thin and layered into decorative patterns. Thus, the quality of surfaces and the use of repetitive, machined elements becomes the primary mode of ornament, an attitude that is found in the whole of the contemporary manner termed art deco.

An auxiliary hypothesis is that the artist emerges as the sole giver of form, and his designs are explicitly carried out by craftsmen who no longer have a role in defining the product of their craft. An example of this is the use of repetitive stamped copper patterns under the eaves; another is the use of standardized industrial sash windows. Where exceptional windows occur, such as the large leaded-glass windows at the lobbies, the pattern is cellular and repetitive.

Another auxiliary hypothesis is that materials are used to define hard, uniform surfaces, which is in sharp contrast to the embedding of many elements and soft definition of the edges at Cranbrook School. The palette of materials on the exterior of Kingswood School is held to a minimum: brick, green-stained bricks, green copper roofs, sandstone, glass, and painted metal sashes. Articulation of construction and the "truth" of the materials is de-emphasized, as elements of



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7 Kingswood School, view from the north, 1929–1931. Eliel Saarinen. Photograph courtesy of Rotch Library, MIT.

8 Kingswood School, dining room. Eliel Saarinen. Photograph courtesy of Rotch Library, MIT.

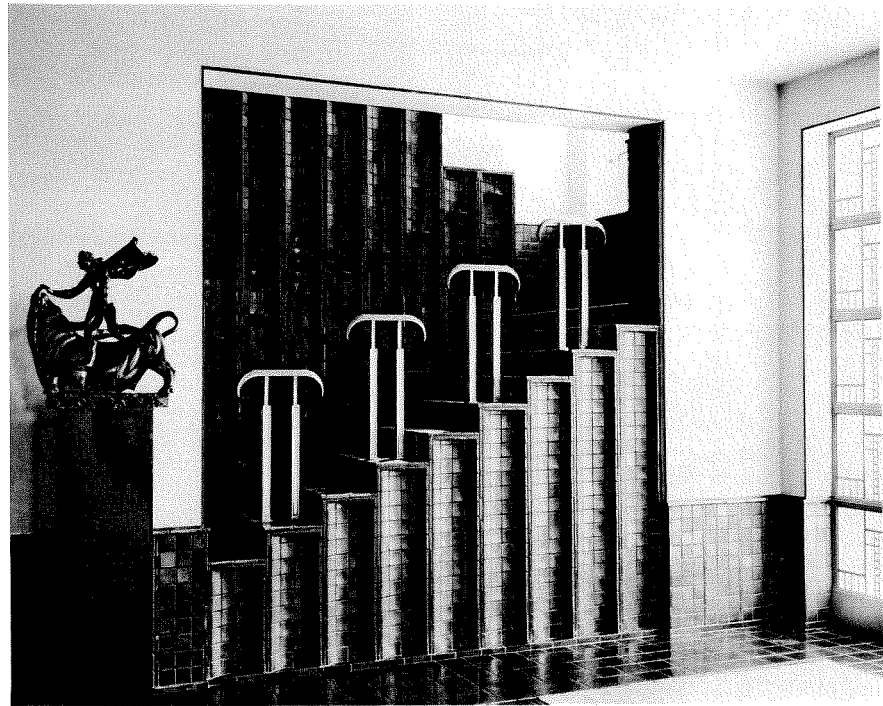
the wall are all subsumed by the insistent reading of surface. For example, the mortar joints between bricks are raked on the horizontal and flush on the vertical to create a reading of horizontal banding. This effect is further emphasized by the use of bands of green-stained brick with green mortar, which wrap the entire building. These bands serve as lintels and sills, eliminating the need for the intrusion of any foreign element on the surface. Courtyards are paved with monolithic materials such as asphalt or concrete, further emphasizing the idea of uniformity of surface.

In the interior of the Kingswood School buildings, the auxiliary hypothesis of primacy of surface continues to hold true, even though the palette and materials are very different. Highly finished pale wood, ceramic tile, polished metal, glass, textiles, plaster, and paint are decoratively applied to surfaces, and their placement is independent of the construction of the walls, ceilings, or floors. The muted tones of the exterior are not used, and violent colors such as shocking pink, azure, green, and silver are played against smooth white plaster walls. Moreover, functional elements are so stylized that they lose their connection to function. For example, the polished brass free-standing handrails on the green stairway are more sculptural than useful. The cuplike tiles on the opposite side of the stairway are barely recognizable and useful as hand grips. Thus, paradoxically, as the spaces grow more precious, they simultaneously become more austere and unapproachable.

Second Hard Core Hypothesis. Another identifiable element of the hard core of Kingswood is its extruded orthogonal configuration. The plan can be read as a building composed of a dominant axis, with wings of nearly constant cross section projecting outward, defining a few courtyards. This plan, which at first appears to be a fragment of a grid, proves to be a closed system in which each projection reaches a termination, unlike the open-endedness of Cranbrook.

Third Hard Core Hypothesis. The orthogonal configuration generated in Kingswood by the built circulation patterns can be seen to imply a further hard core hypothesis, that there is a confrontation between the built and the unbuilt, as seen specifically in the design of the courtyards. These open space elements, which at Cranbrook are so convincingly transformed into positive space and constitute a major design statement, remain simply voids in the fabric of the Kingswood buildings.

Kingswood School, unlike its counterpart, exists as an abstract object in open space from both inside the scheme and from without. Therefore, Kingswood must be read in different ways than Cranbrook. The confrontation between the interior and the exterior aesthetic can be observed, and this, too, must be posited as an element of the hard core of the work. Although the interior space is axial and directional, the exterior massing is informal and irregular. Kingswood's massing of dominant horizontals, its rooflines of varying heights,



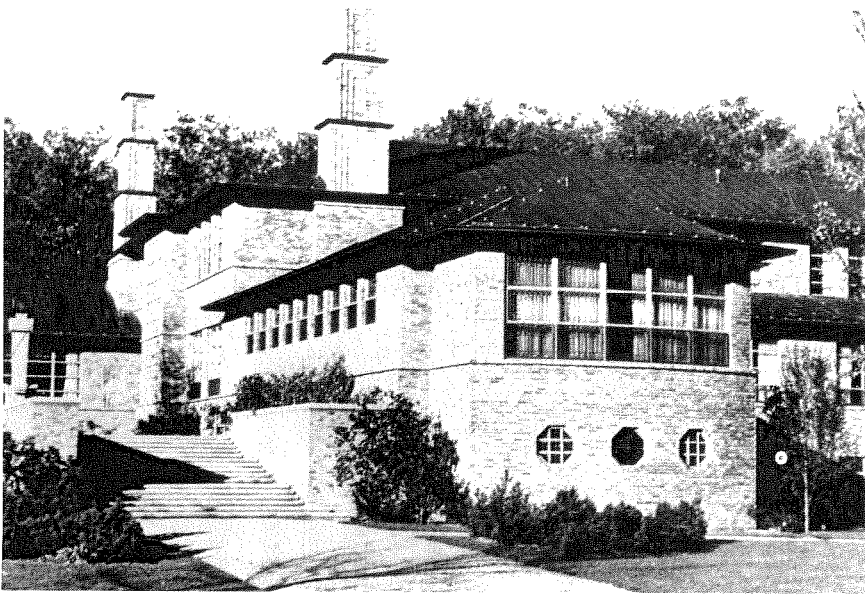
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9 Kingswood School, entrance hall. Eiel Saarinen. Photograph courtesy of Rotch Library, MIT.

10 Kingswood School, aerial view. Eiel Saarinen. Photograph courtesy of Cranbrook School.



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and the overhanging eaves strongly contribute to the picturesque aesthetic of irregularity.

The picturesque tradition of viewing a work from a distant vantage point is further invited by Saarinen through his whimsical inclusion of an Italianate pavilion across the lake, which is so significant a part of the school's landscape setting. Best viewed from this pavilion, Kingswood is transformed into a total composition of organic irregularity fully embracing its natural setting.

Thus we see that Saarinen's creativity at Kingswood is hidden in layered qualities and changing scale, ranging from the immediacy of ornament to its self-revealing axial plan, to its visual statement within the larger context of the landscape.

11 **Kingswood School.** Eiel Saarinen.
Photograph courtesy of Rotch Library, MIT.

Conclusion

The preceding sections are the quickly achieved construction of the research programs of Cranbrook School and Kingswood School as written by a small team at an ACSA Teachers' Seminar. Some traits of the method may be explained by rehearsing some of the steps we have taken and those one might yet conceivably take.

The team first arrived at a conviction about the Ruskinian hard core of Cranbrook School. Under the notion of a program, the question was then whether this Ruskinian program was extended in Saarinen's next major work at Cranbrook, Kingswood School.

As argued earlier, we quickly convinced ourselves that Kingswood School did not share this Ruskinian hard core. This hypothesis would not, however, necessarily lead to the conclusion already presented, that is, that Cranbrook and Kingswood are under two different programs.

We first had to ask ourselves at least two other questions. First, should the proposed hard core of Cranbrook School be restated in more general terms such that both the Ruskinianism of Cranbrook and the distinctly arts-oriented program of Kingswood were subsumed? It would not be difficult to formulate such a proposition, since there are strong historical and ideological ties from Ruskin to Wright's "Art and Craft of the Machine" and even down to Saarinen's work at Cranbrook. However, such an extraordinarily inclusive statement would

capture so many programs and works as to be useless.

The second question is could one demote the Ruskinianism of Cranbrook and the arts program of Kingswood to the role of auxiliary hypotheses under a more powerful hard core that would then show the continuity of program from one school to the other? This is certainly a possibility, but we failed to identify commonalities between the schools of a sufficient power to play that role. Perhaps our failure to find such a strong hard core will encourage others to make such a contribution.

Having answered the first of these questions negatively, while failing to find an answer to the second, we drew the conclusion that the two schools are indeed under two quite different programs.

Having two programs for only two projects places limits on the utility of the method proposed here. Under current constraints, we could not pursue a program from one work to another. Without access to records of the design process at Cranbrook or Kingswood, we also could not examine the effect of the program within the design development of a single work.

Nevertheless, the distinction between the two schools has been characterized. Also, we have moved some distance in proposing and revising the program of each school, seeking a congruence between our formulation and the formal/physical traits of the school.

This is not to say we have arrived at *the* definitive position, but further criticism can more fruitfully challenge our structured account than it could an account that takes fewer explanatory risks.

Further potential of the work offered here would be its use in the examination of later works of Saarinen and in placing Saarinen's work within more general architectural developments. Recalling, for example, the Christ Lutheran Church in Minneapolis, would one see it as an extension of either of the programs advanced here? Initially, one might speculate that this church does again follow some of the principles of Cranbrook School. The side courtyard and side entrance, together with the internal circulation of the church, may be related to the organization of movement and of open and closed space at Cranbrook. The attention to material at the church is not as idiosyncratic as in certain parts of Cranbrook, but it is plausibly related to, say, the dining hall at Cranbrook. The church is remarkably styleless, but we have argued that the stylistic features of Cranbrook are auxiliary hypotheses, perhaps only heuristics. One might, then, succeed in showing significant continuities across time and building types where we have found distinctions between the sister schools of Cranbrook.