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Louis I. Kahn, Architect: Alfred Newton Richards Medical Research Building. University of Pennsylvania, Philadelphia, 1958-1960

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LOUIS I. KAHN, ARCHITECT ALFRED NEWTON RICHARDS MEDICAL RESEARCH BUILDING

UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, 1958–1960

The postwar years have brought to the United States a building boom and an architectural ferment unique in our history. The projects of the aesthetic revolution of the 1920s and 1930s are everywhere evident and the three great innovators of modern architecture, Le Corbusier, Mies van der Rohe and Frank Lloyd Wright, are not only universally recognized but have been able to amplify early theoretical studies, and often to build them, either in this country or abroad. A generation of successors and disciples has followed, refining and elaborating these earlier aesthetic innovations. But this generation is more prolific than innovative; the stature of the three giants is at the moment intimidating; by and large the work of the younger generation is dominated by their influence and only restlessly and tentatively explorative.

On this scene Louis Kahn's Richards Medical Research Building has made a dramatically authoritative appearance, and is probably the single most consequential building constructed in the United States since the war. It is simultaneously a building and a manifesto. Its impact is derived from its inventive and rigorous integration of form, function, space and structural technique. More than any other building recently constructed in America it is principled, vigorous, fundamental and exhilarating; it states, teaches and questions.

Kahn is an architect who has come to creative maturity later than many. His executed buildings are few, and the Richards Research Building, the largest and the most fully realized of his works to date, is the most recently completed (actually still unfinished, as 2 additional towers will soon be added). Much of his life has been spent theorizing and teaching, and it is as a teacher that Kahn has had an influence on students even before he built a work of the first importance. Teaching has also served to develop Kahn himself, providing him with a milieu in which to constantly question his own and others' ideas. He has said that "a good question is always greater than the most brilliant an-

swer" and that "the right thing badly done is always greater than the wrong thing well done."

This conviction made a quick facility impossible for Kahn. Early projects were often characterized by contradictory or overly emphasized architectural ideas. But his work was always distinguished by an obvious refutation of a superficial, momentarily effective solution. At times it seemed as though the crystallizing of an idea was willfully arrested; the need to question again was stronger than the desire to resolve. Resolution might freeze further discovery, or at least the investigation, of, "what a thing wants to be." So, although this commitment may first have tormented, it eventually nurtured and focused Kahn's abilities. Today he is building with an ethical sense of purpose strong enough to control and qualify pure aesthetic invention, and equaled by no other architect in this country.

Kahn is most articulate about his architectural philosophy.

A great building, in my opinion, must begin with the unmeasurable, go through measurable means when it is being designed, and in the end must be unmeasurable. The design, the making of things, is a measurable act. At that point, you are like physical nature itself, because in physical nature everything is measurable—even that which is as yet unmeasured . . . But what is unmeasurable is the psychic spirit. The psyche is expressed by feeling and also thought and I believe will always be unmeasurable. I sense that the psychic existence-will calls on nature to make it what it wants to be. I think a rose wants to be a rose. Existence-will, man, becomes existence, through nature's laws and evolution. The results are always less than the spirit of existence.

In the same way, a building has to start in the unmeasurable aura and go through the measurable to be accomplished. It is the only way you can build. The only way you can get it into being is through the measurable. You must follow the laws, but in the end, when the building becomes part of living, it evokes unmeasurable qualities. The design involving quantities of brick, method of construction, engineering is ended and the spirit of its existence takes over.

More specifically Kahn has been preoccupied in recent years with the following convictions in approaching the design of a building. He has said "I believe the architect's first act is to take the program that comes to him and change it. Not to satisfy it, but to put it into the realm of architecture, which is to put it into the realm of spaces." Further, he believes that architecture must make visible the "life of the building." Finally, for many years Kahn has struggled in his work with the expression in buildings of the differentiation between "served" and "servant" spaces. These convictions are architecturally stated in the Richards Medical Research Building.

Given a restricted site, it was mandatory that the building take a vertical form, but the way in which this verticality might be handled arose out of Kahn's particular interpretation of the program. Two observations by him strongly conditioned the final form of the building. First, that the scientist works alone or in a small group, but may require psychological and actual contact with other groups. Second, that the potentially dangerous working operations require that the service facilities must not interfere with the work spaces and that pernicious fumes must be immediately removed. These form the basic rationale from which the form of the building was derived: a cluster of 3 vertically stacked open "studio" laboratory towers, roughly pinwheeling about a fourth enclosed service tower, housing common utilities such as elevators, stairs, access halls, conditioned air vents, and animal rooms. Abutting the service tower, at the rear of the building, are 4 monumentally scaled air-intake stacks, with openings or "nostrils" near the base, which carry fresh air to the top of the building where it is conditioned and distributed down through interior stacks and ducts to the separate laboratory spaces. Placed against the perimeter of each laboratory tower are vertical exhaust stacks and exit stair towers. The overall image is of a dense conglomeration of vertically thrusting towers, some enclosed and some tiered and glazed.

Each of these architectural elements appears to be constructed separately and set against or adjacent to each other, their junctures highly articulated. The laboratory towers, approximately 45 feet square, are each supported by 8 columns of pre-cast concrete, placed at the third points of each face, leaving the tower corners as free cantilevers. These corners are infilled with a brick spandrel

and glass above. Between the columns, but independent of them, are placed the brick-veneered exhaust stacks and exit stairways. The horizontal structure of the laboratory towers is composed of pre-cast concrete two-way trusses, highly articulated not only to demonstrate the reduced cantilever load at the corners of the towers, but also to make visible the open network character of such a structural system. The voids between this horizontal structural network provide at each floor an area for the ducts, pipes and conduits feeding the laboratory work spaces.

The resulting interior spaces reveal the character of this bold and complex structural system, and of the closely adjacent positioning of the separate towers. From each laboratory studio the viewer is made aware not only of the activity in an adjoining tower, but also of the constant presence of the architecture. Not to participate in "the life of the building" is impossible.

Economy has dictated leaving these interior spaces bare, and to this has been added the seemingly arbitrary and at least visually confusing division of the laboratory studios, required by the scientist-occupants. It is unfortunate that one of the laboratories could not have been left open to demonstrate clearly Kahn's conception of the interior spaces. This can be experienced, in part at least, in the entrance portico. One approaches the building along a narrow campus walk, enters diagonally up steps onto a brick platform under one of the laboratory towers. He is held momentarily by the presence of the brick towers and the columns on the perimeter and by the weight of the hovering space frame above. It is one of the most heraldic entrances in modern architecture.

To the present building will be added two additional towers to house laboratories, offices and classrooms for the Biology School. These will complete the structure. Kahn's contribution to the University of Pennsylvania complex is a building of tremendous independent vigor and assertion which, nevertheless, has the startling by-product of being in harmony with its neighbors. This is accomplished in part at least by the continued use of materials already present on the campus: a deep red-brown brick with light-colored cut stone trim, the latter being paralleled in Kahn's structure by the precise pre-cast concrete structural members. To this can be added the similarity of the complex

and broken roof line, common to the old buildings and to Kahn's as well.

Many influences are apparent in Kahn's work: a bold use of concrete and the sculptural complexity and exuberance of Le Corbusier; the close attention to the visible expression of structure, to the articulation of detail and to the juncture of architectural elements of Mies van der Rohe; the feeling for expressive intricacies in plan and mass of Frank Lloyd Wright. Unlike many of his colleagues Kahn has not felt it necessary to reject the influence of one of these men in favor of another. He has extracted certain common ideas, redefining these for his own purposes, and he is the first to have accomplished a synthesis of what have seemed to others disparate approaches.

Added to these influences are strong echoes of the medieval architecture of European town and building complexes. Kahn is open in his admiration for Carcassonne and San Gimignano, as well as the more "archaic" stages of development in all periods of architecture. For instance, he is more exhilarated by Paestum than by the Parthenon. It would seem that it is the quality of direct purposefulness in medieval architecture which particularly attracts Kahn. They were conceived and built to satisfy a direct and immediate need. Their strength is derived from the resolution, in terms of architectural form, of the problem at hand.

Kahn's work also continues in the mainstream of the functionalist movement of early modern architecture. Many contemporary architects have now found this to be an inadequate, or even irrelevant basis for their own work, but Kahn, by his redefinition and expansion of the limits of the functionalist theory, has disclosed its continuing usefulness as a generator of meaningful form.

Whatever the near or distant historical influences may be on Kahn's work, and whatever way they have been used by him, the Richards Memorial Research Building is as individually authoritative an act of architecture as exists in this country today.

Wilder Green

Acknowledgments

On behalf of the Museum I wish to thank Louis I. Kahn and his staff for their generous assistance in the preparation of both the exhibition and this publication. Particular thanks are due to Mr. Marshall Meyers and Mr. David Rothstein.

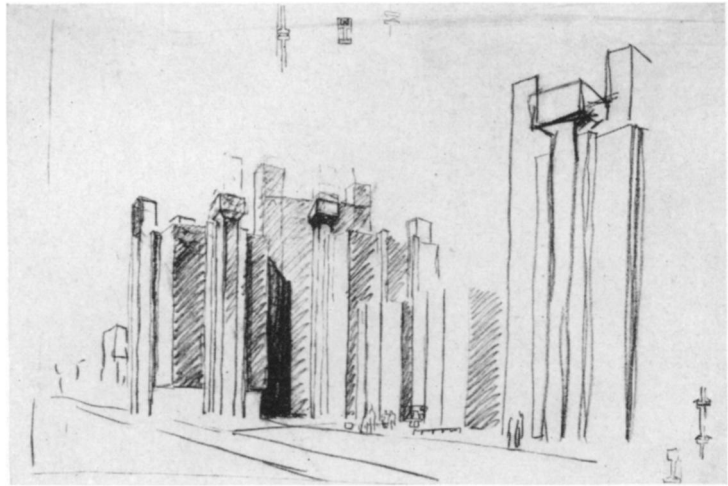
We are also grateful to Mr. Malcolm Smith and to Mr. George Barrows for their painstaking photography.

Also, I thank Mr. Jan Rowan for permission to use quotations by Kahn he has compiled in his article in "Progressive Architecture," April, 1961.

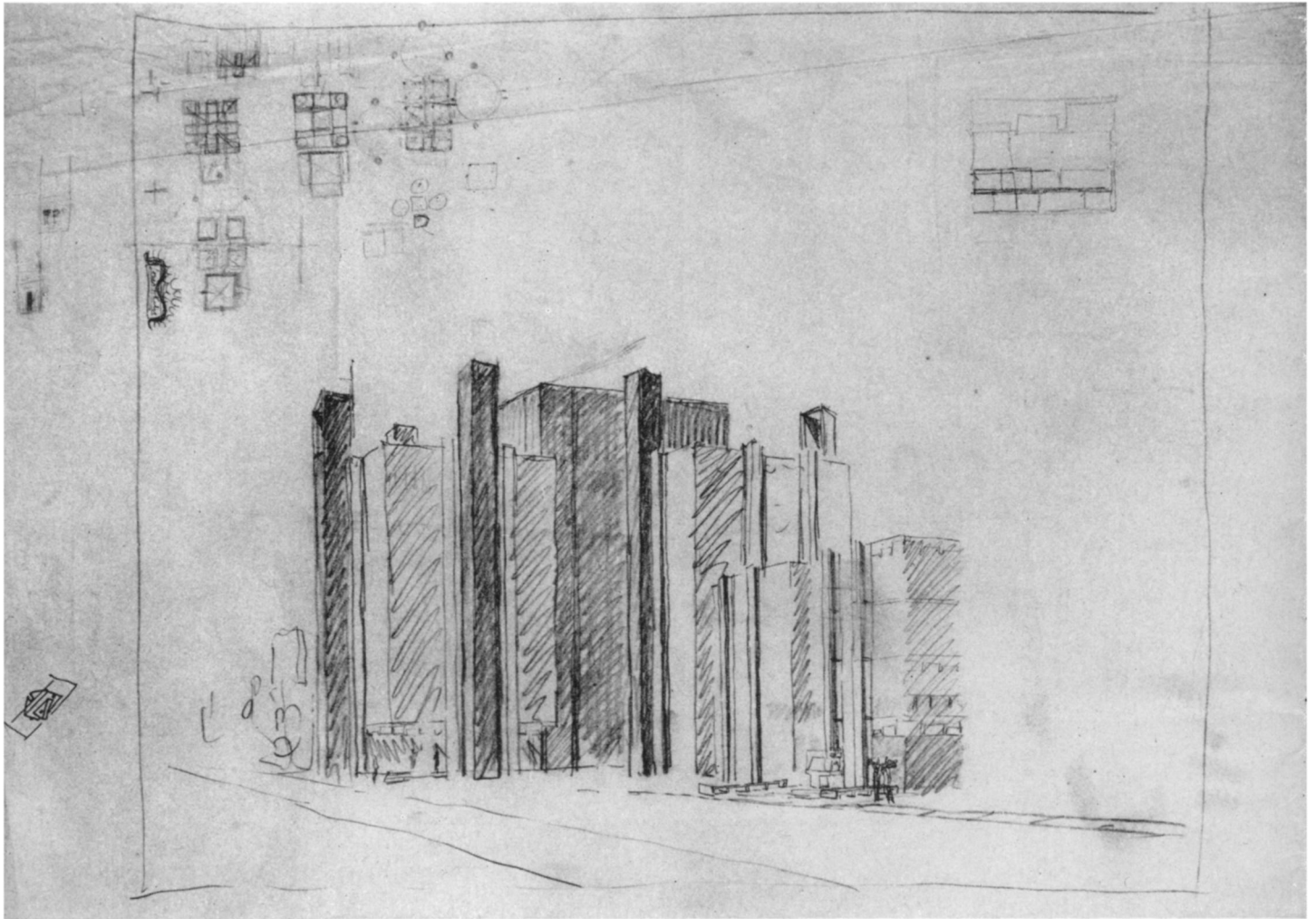
Finally, I wish to express our gratitude to Mrs. Phyllis B. Lambert and to Mr. G. David Thompson for their generous support of the exhibition and the publication, respectively.



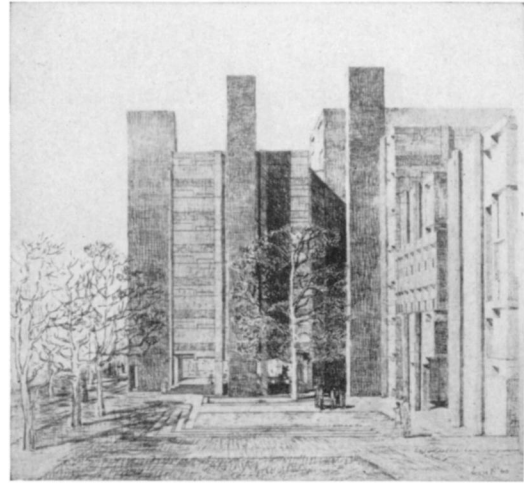
View of Richards Medical Research Building showing relationship to campus dormitory.



Perspective studies: architect's conceptual sketches of tower complex.



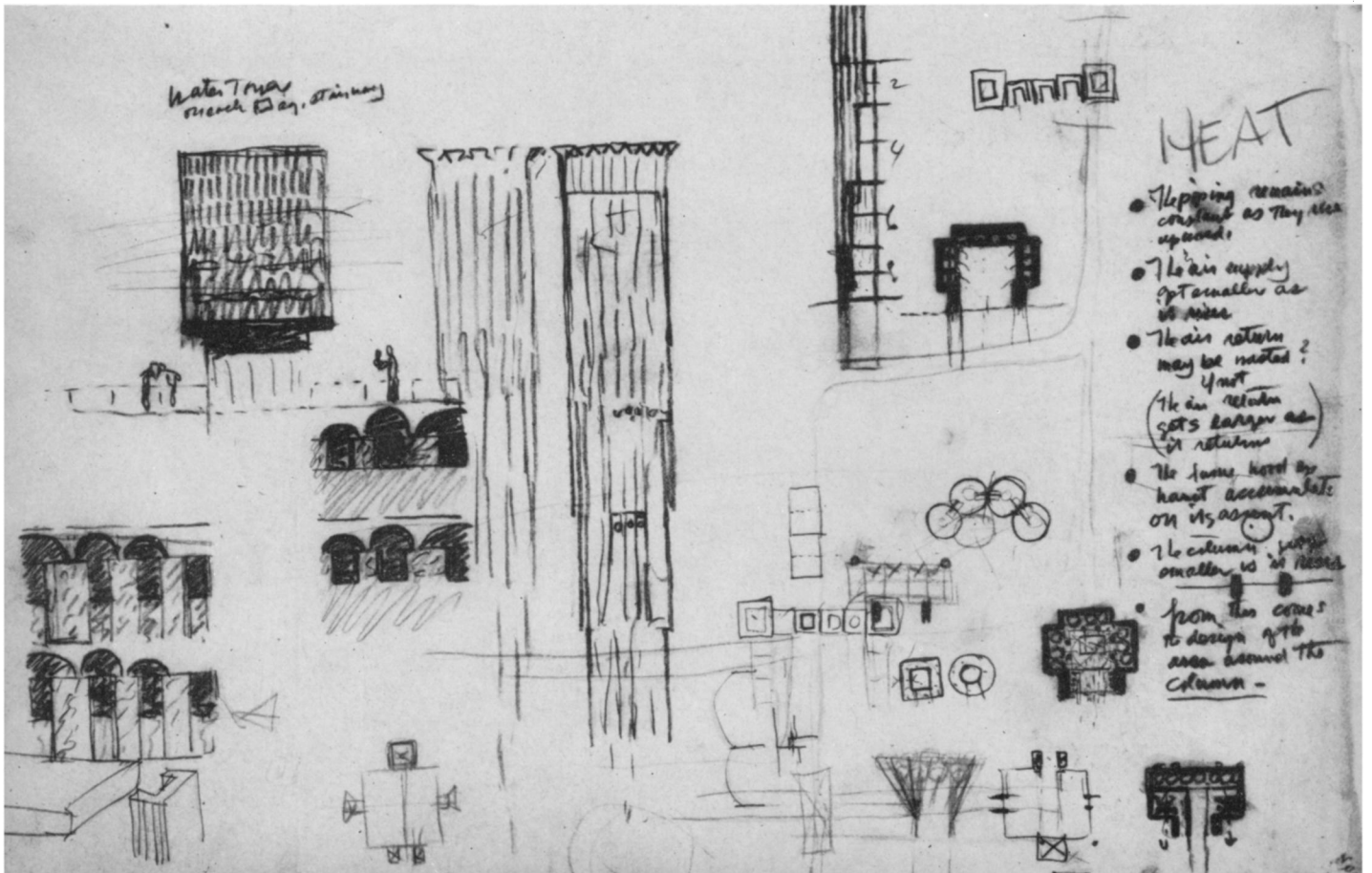
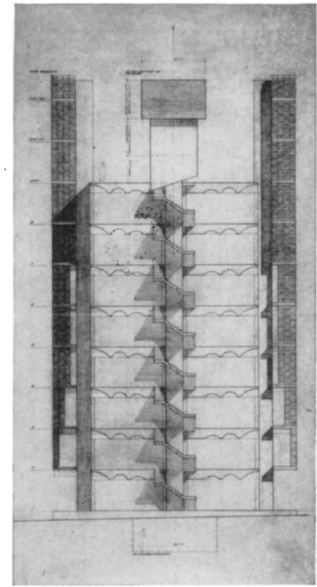
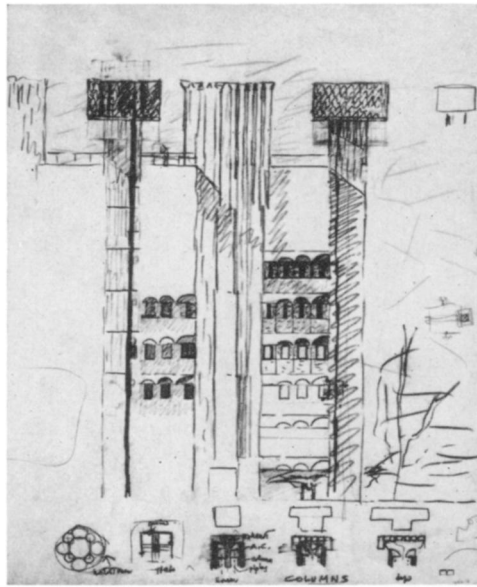
right: Perspective study: definitive version.
below: Perspective study: intermediate
version with cantilevered and ribbed ex-
haust stacks.

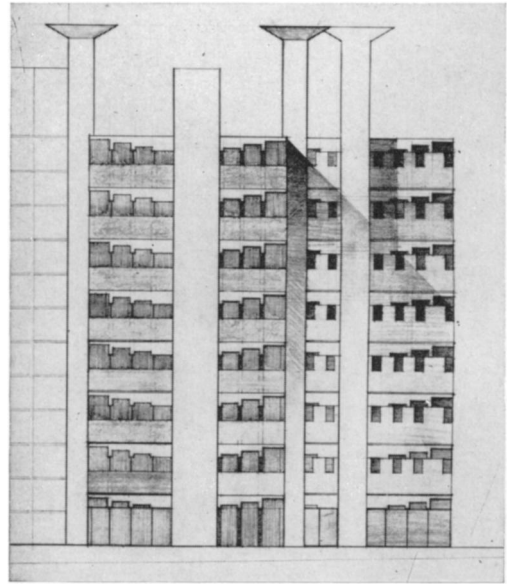
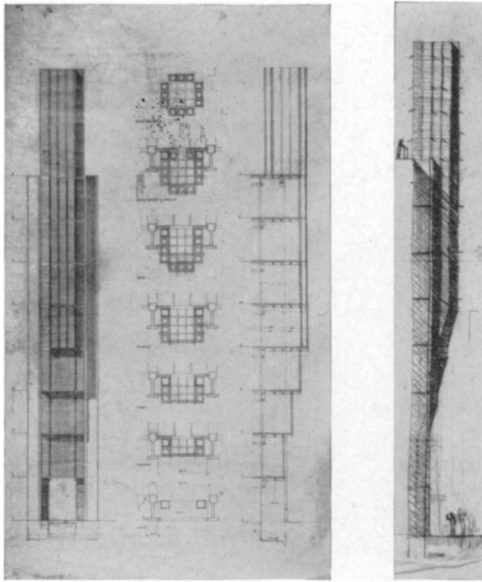


right: Architect's early elevation study.

far right: Early section drawing through laboratory tower showing cantilevered exhaust stacks, and arched structural system.

below: Architect's early sketches and notes for exhaust stacks and arched structural system.

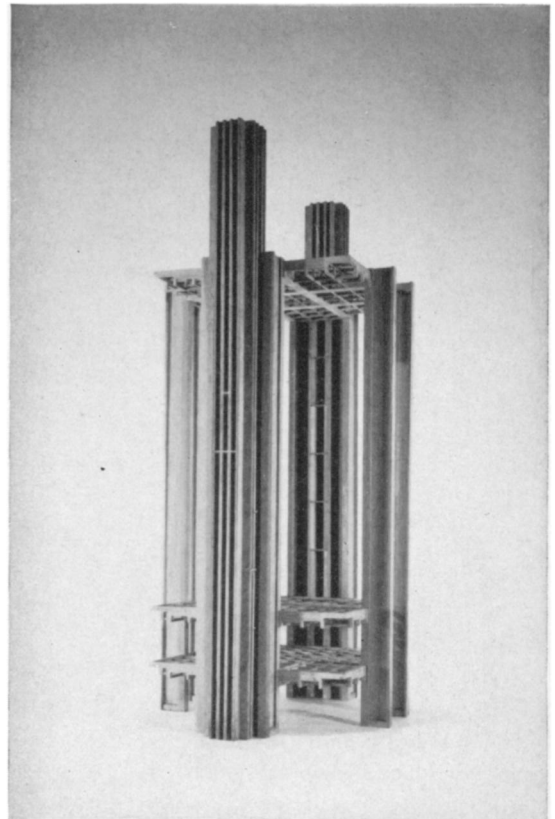


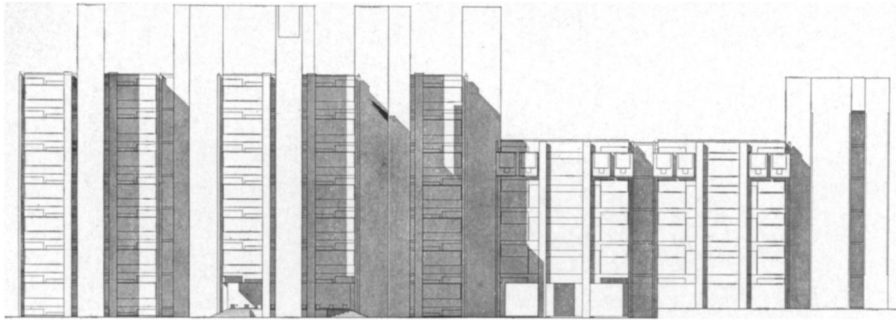


above left: Early elevation, section and plans of cantilevered exhaust stacks.

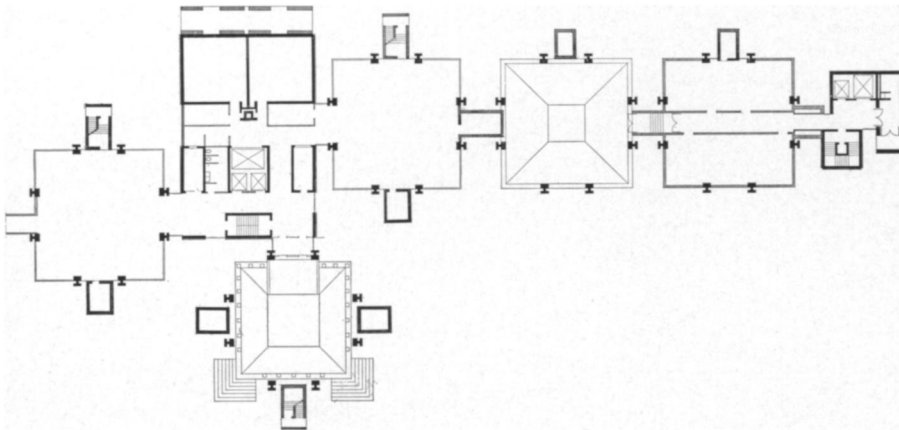
above right: Early elevation of towers and exhaust stacks, with cantilevered rectangular two-way trusses.

right: Model: early study of typical laboratory tower showing pre-cast concrete structural system and ribbed service stacks.

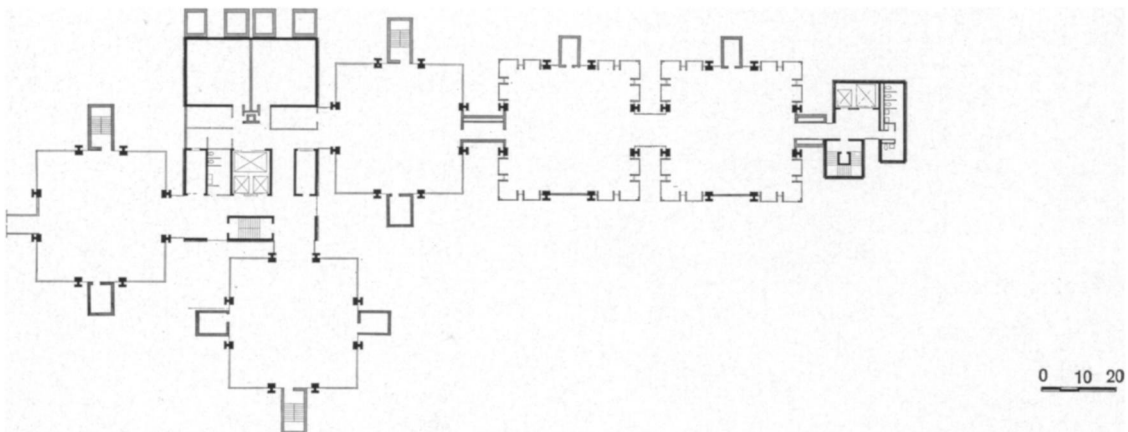




North elevation. Final design; low towers at right to be constructed at later date.



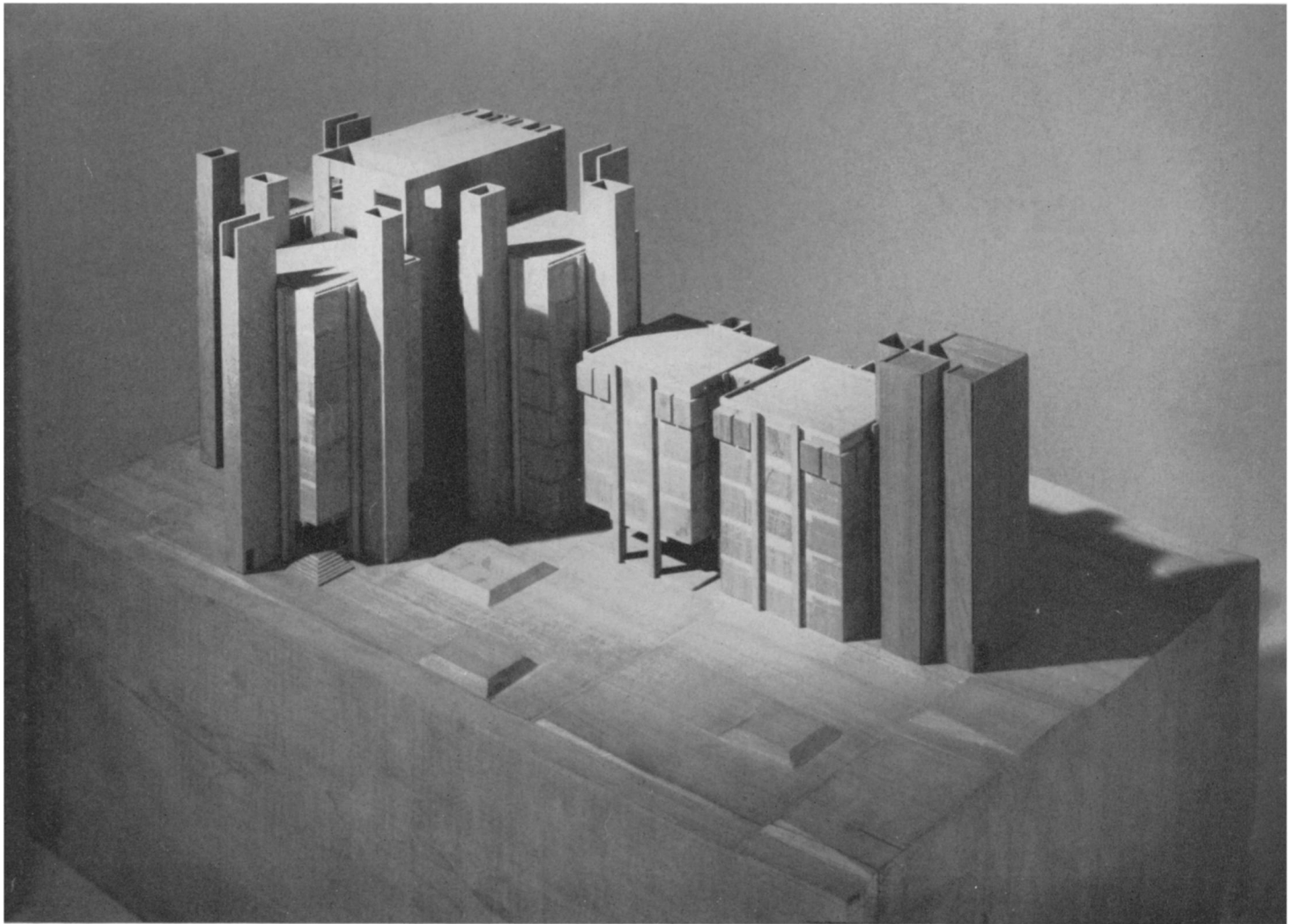
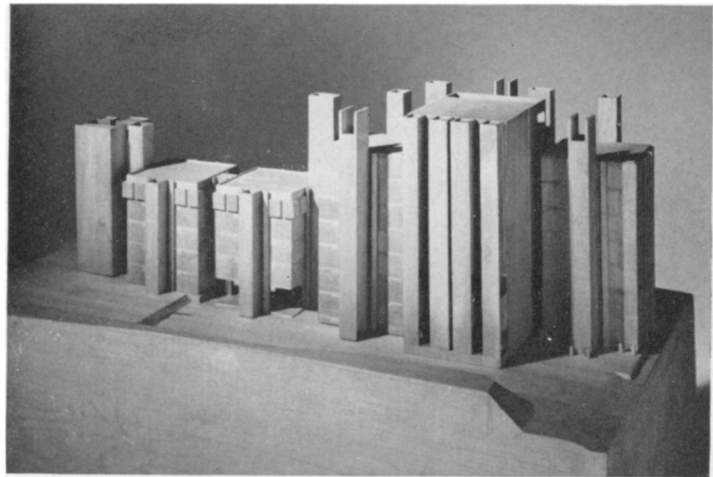
Typical laboratory floor plan.

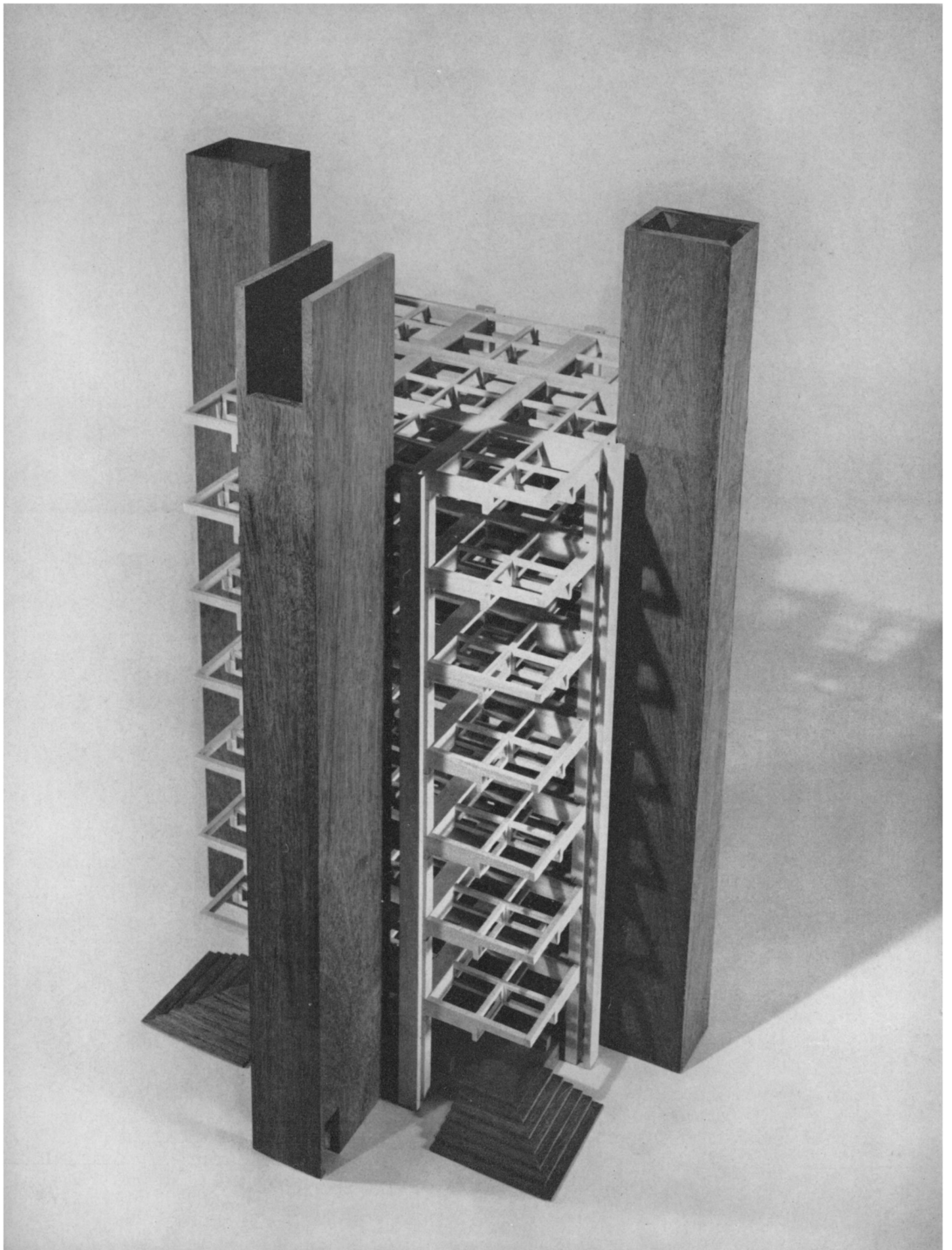


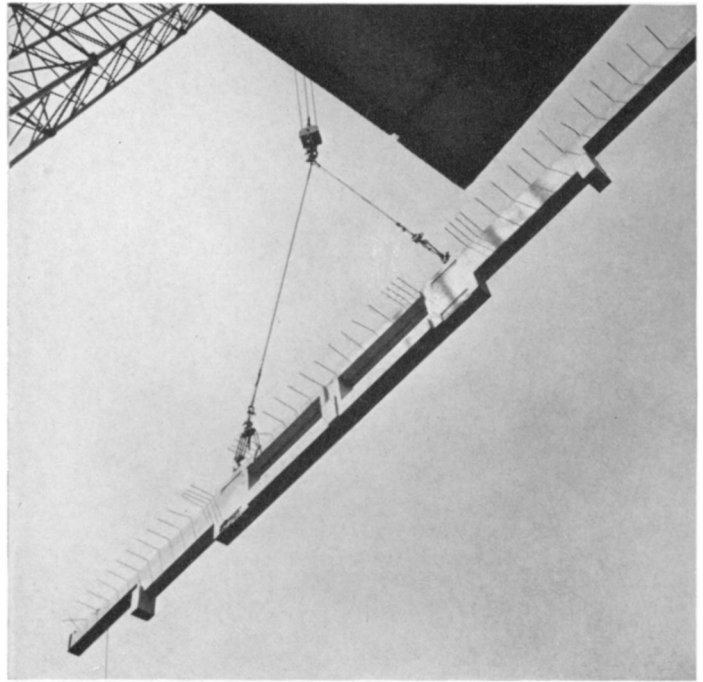
Ground floor plan.

right: Model. South (rear) elevation.

below: Model. North and west elevations. Entrance steps visible at lower left. Three lower towers at right to be constructed at later date.



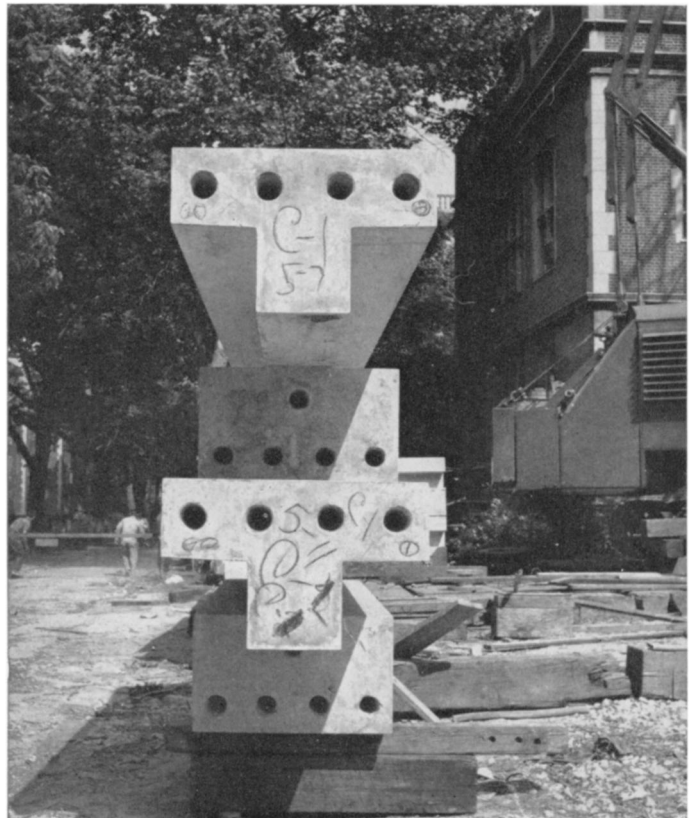


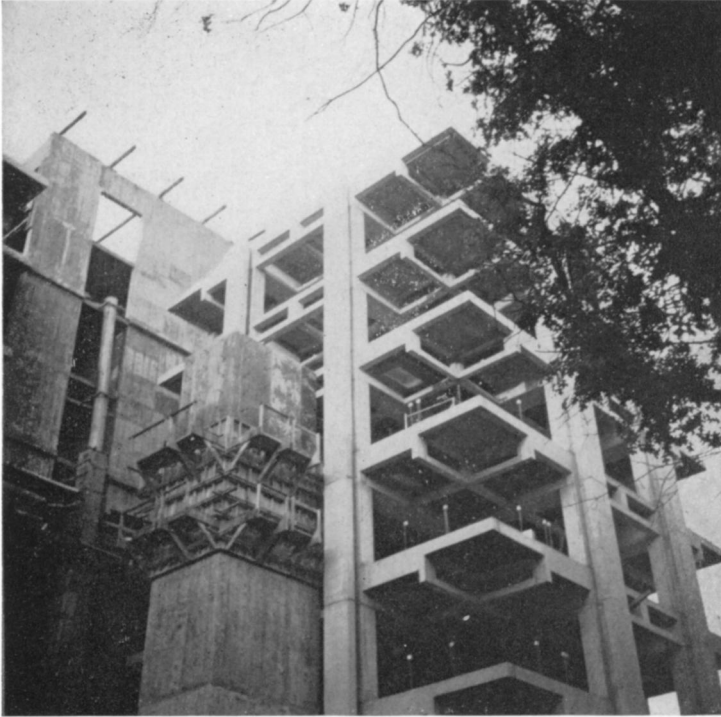


left: Model. Main laboratory tower, showing pre-cast concrete structure, vertical exhaust stacks, stair tower and entrance steps.

above: Pre-cast concrete beam for two-way truss being raised into place.

right: Pre-cast concrete column sections ready for assembly.



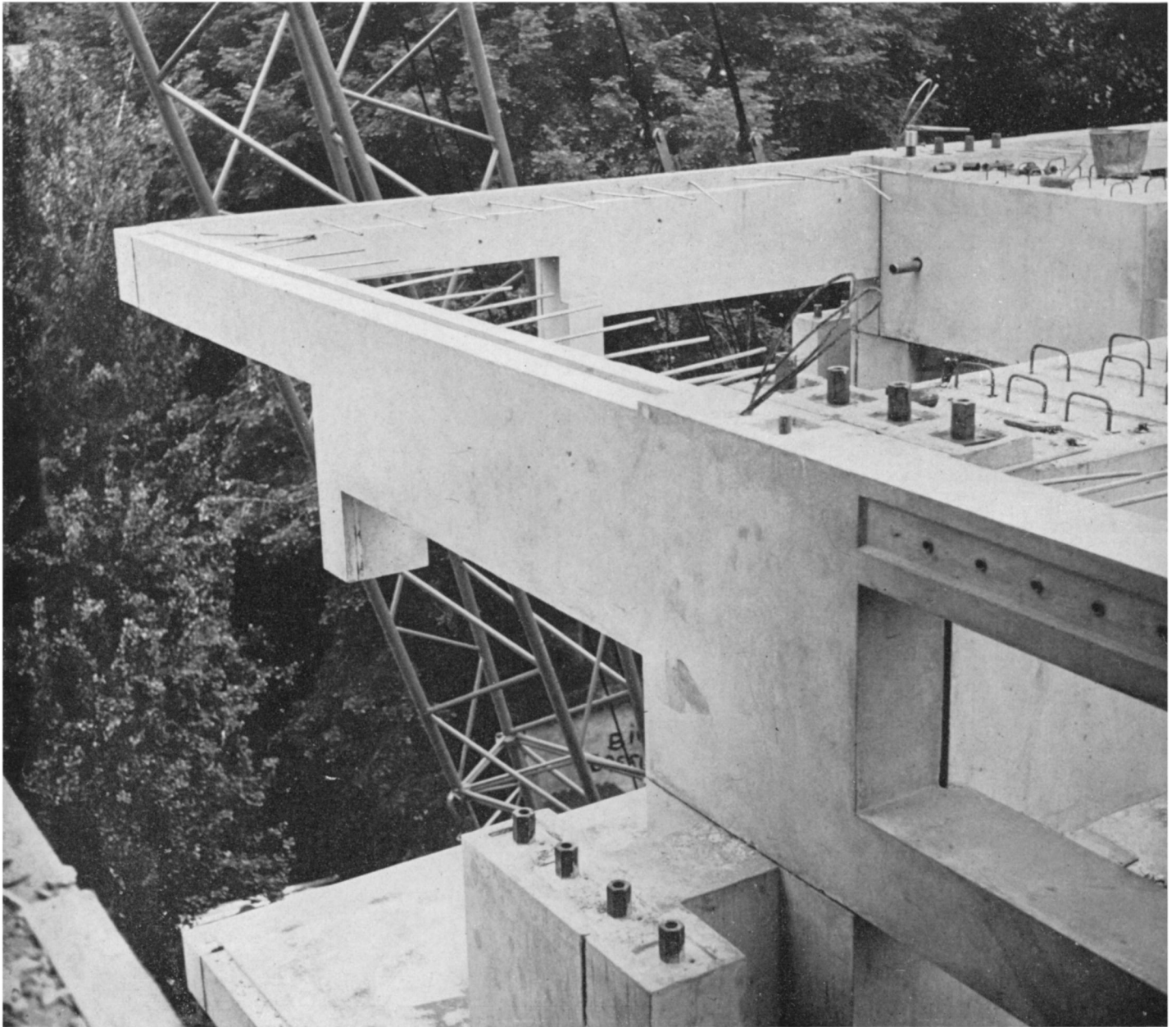


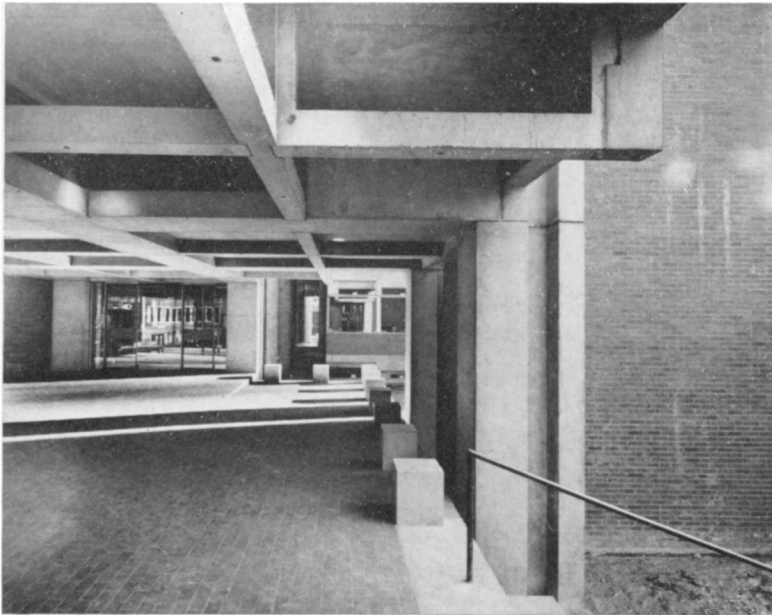
Laboratory tower and adjacent service stack under construction.



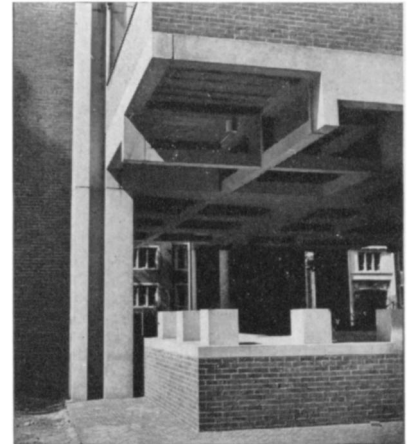
Adjacent laboratory towers under construction.

Cantilevered beams and column section in place.

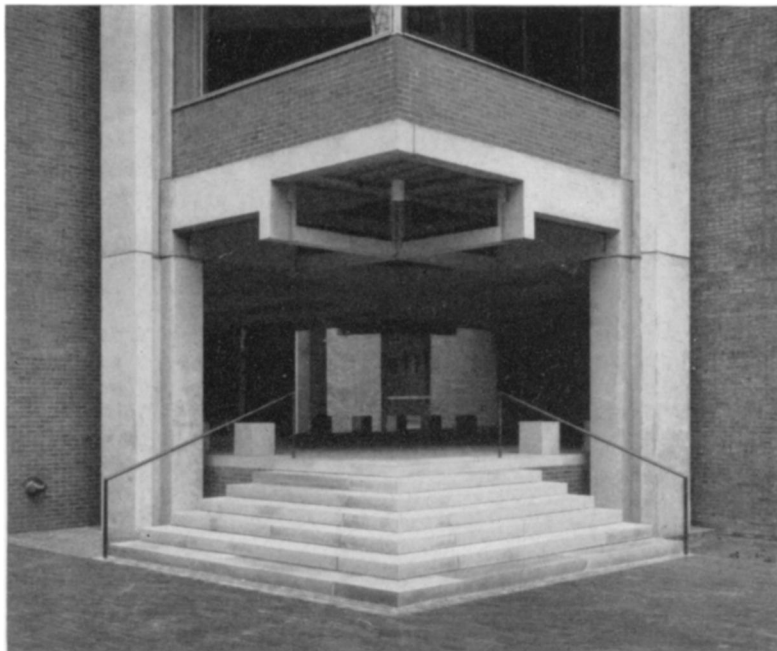




Entrance portico under main laboratory tower.



Detail of portico. Granite cubes serve as seats.



right: Laboratory towers and service stacks, north elevation.

Corner entrance steps.

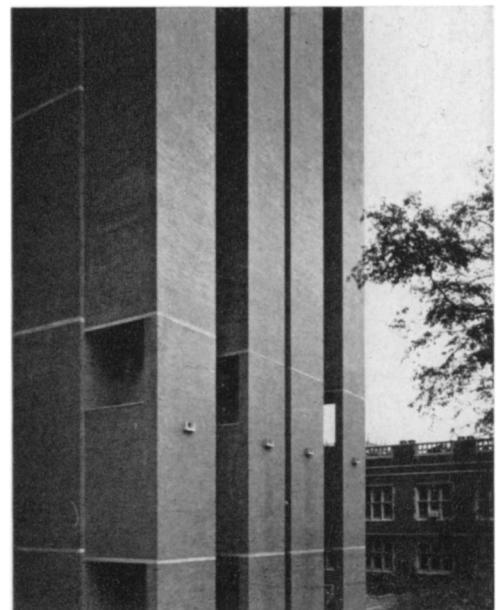






Laboratory towers, exit stair towers (right and left) and four air-intake stacks, south elevation.

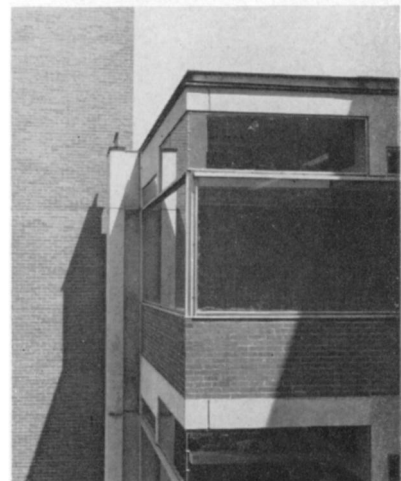
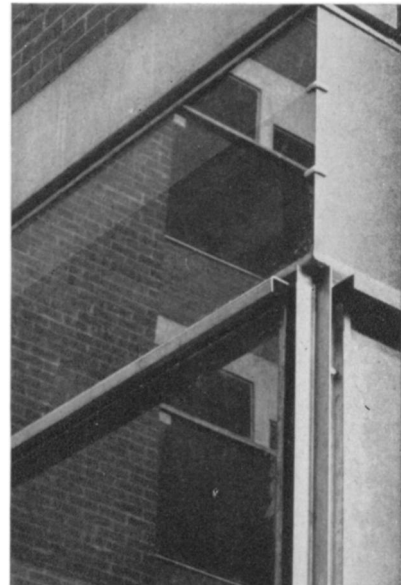
Detail, air-intake stacks.



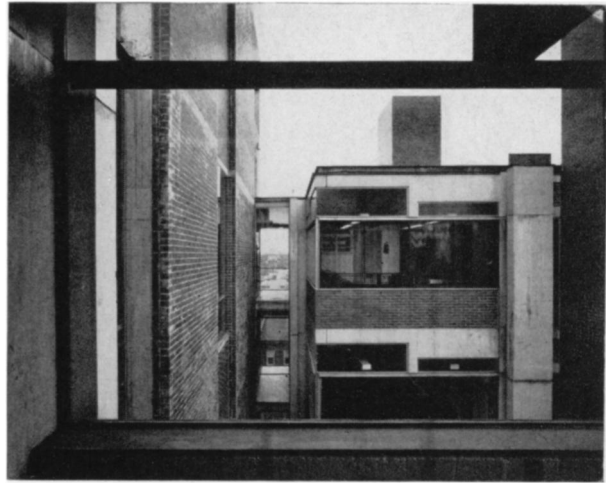


Exit stair tower and cantilevered corner of typical laboratory tower.

below: Details of window corner. Upper area of tinted, glare-resistant glass, stainless steel frames.



right: Interior view from laboratory studio to adjacent laboratory tower.



below: Interior view of typical laboratory studio before partitioning.



opposite page: View from roof showing exhaust stacks and relationship of adjacent laboratory towers.

right: View from roof showing exhaust stacks and exit stairway.

below: View from corridor, showing adjacent laboratory towers.

