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TOPOLOGY AND ORGANICISM IN THE WORK OF LOUIS I. KAHN

NOTES ON THE CITY TOWER

Louis Kahn and Anne Tyng's proposal for a new office building at the Philadelphia City Hall is a speculative project in its purest form – a forceful expression of ideas present in more subtle forms in actual built work, which, in turn, enlightens our understanding of that work. In fact, an examination of the City Tower reveals a pattern of planning in Kahn's previous and subsequent projects where either frameworks or clusters of cells, or a combination of the two systems is employed to organize space. The proposal is a visual record of the ideas Kahn and Tyng had been talking about, reading about, and sketching: growth, organicism, topology, structure, and monumentality.

Kahn's early preoccupations with structure surfaces in his 1944 paper, *Monumentality*, where he looks for 'a continuous structural unity worthy of being exposed,' and can be seen as preliminary ideas for what he will develop later with Tyng in the City Tower. As Kenneth Frampton suggests, Kahn's idea of monumentality can effectively be called 'structural monumentality.'[1] Tyng's interest in molecular structure is clearly manifest in the City Tower project, where structure is the language used to explore connectivity and growth at a monumental scale. Kahn's interest in topology and organicism is magnified in this project, which was an opportunity for him to reach beyond accepted dispositions for columns, beams and walls.

THE NATURE OF THE STRUCTURE

Kahn and Tyng published the final version of the City Tower as 'an exploration into the nature of a high-rising structure.'[2] The publication by the Universal Atlas Cement Company begins with text on the importance of voids in modern structures:

> *In Gothic times, architects built in solid stones. Now we can build with hollow stones. The spaces defined by the members of a structure are as important as the members. These spaces range in scale from the voids of an insulation panel, voids for air, lighting and heat to circulate, to spaces big enough to walk through or live in. The desire to express voids positively in the design of structure is evidenced by the growing interest and work in the development of space frames.*[3]

The proposed building is described as the product of a constant search for order. This order, and the structure that delineates it, could not be concealed. As Kahn had written before, the nature of spaces and their making had to be identified.[4]

The tower is explained in the proposal as 'a gigantic wind resisting, weight-distributing space-frame consolidating the many needs of a central city location.' Kahn does not hide the wind-resisting frame but forcefully expresses it. His intent is to clearly show how the building was made – it was important that none of the levels of the construction process be erased. Kahn presented the project as a structural idea allowed to grow into a building, without being forced into a preconceived, purely formal notion.[5] (figure 1)

The structure is a precast, pre-stressed, concrete, triangulated strut frame, integrally braced by cross framing that intersects the column system every 66 feet. Each intersection is crowned by a capital 11 feet deep that houses storage, toilets and sub-stations for mechanical services. (figure 3) Conduits and pipe run through hollow columns. Intermediate level floors (up to 6 within the 66 foot vertical bays) can be moved up and down within the triangulated envelope to suit specific planning and sectional requirements. No two adjacent floors align in plan.

Triangulated membranes and arteries form 3 foot deep precast light-weight concrete floor slabs that can span up to 60 feet and harbor air conditioning, lighting, wiring and all piping. The continuous mechanical system affords flexibility in space division. A central core of vertical shafts, which houses stairs, elevators and air ducts, rises through the building without disturbing its structural continuity.

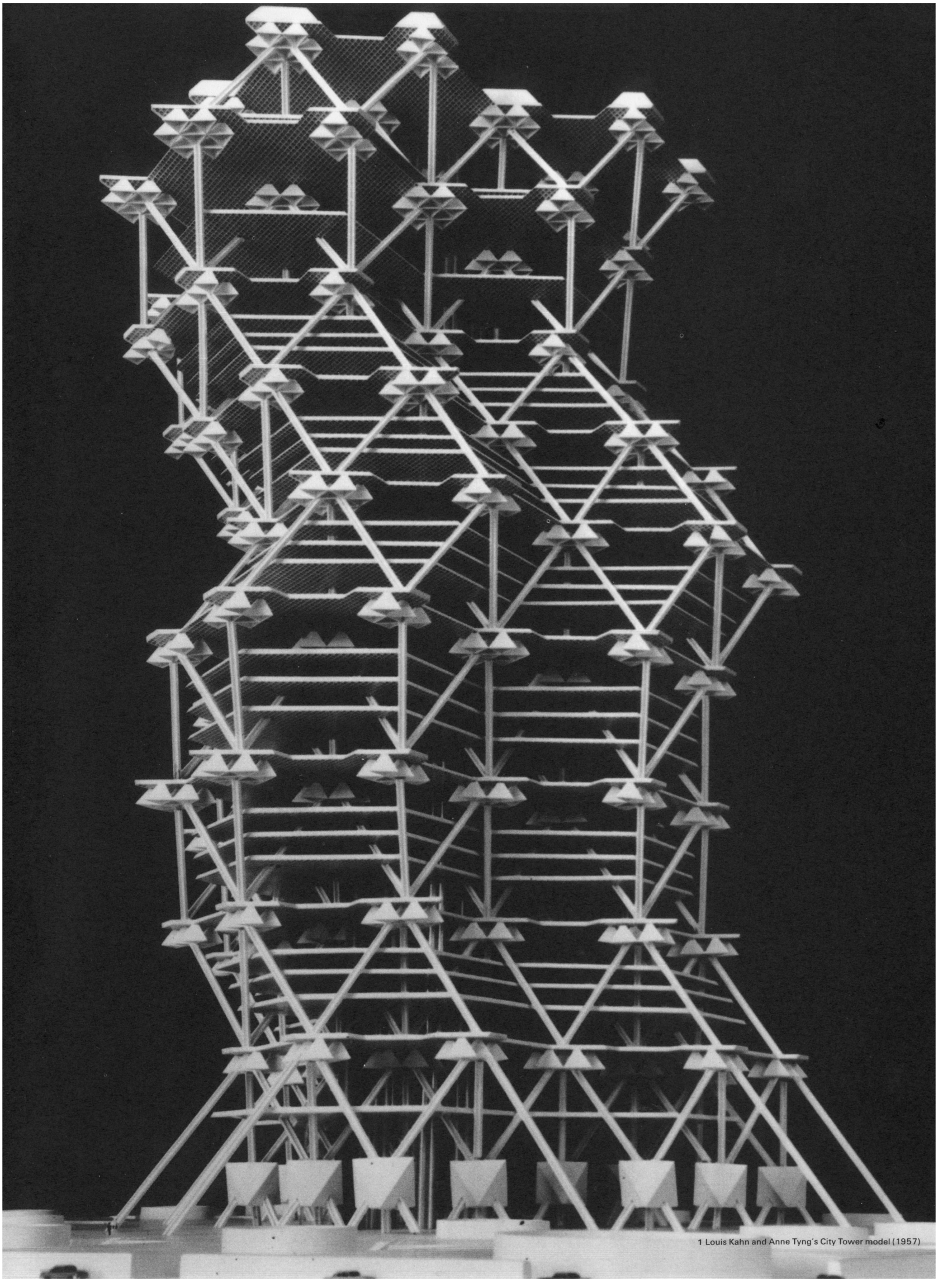
Modernism required the separation of a tower's structure from its skin– both elements had to be pure in their function. Instead, Kahn conceived of building skin as an intermediary element between interior and exterior- the beginning of the structural reaction against wind and gravity forces.

The proposal shows a permanent scaffolding of aluminum, which would secure the glazing panels and block sunlight, covering the entire exterior. From a distance, windows would dissolve into the flickering collage of the skin as a whole. The multi-plane form of the building sets up a range of positions for the sun louvers, which also break up and distribute wind loads. This purposeful design adds up to an intricate tracery texture modeled by changing color, light, and shade (figure 10):

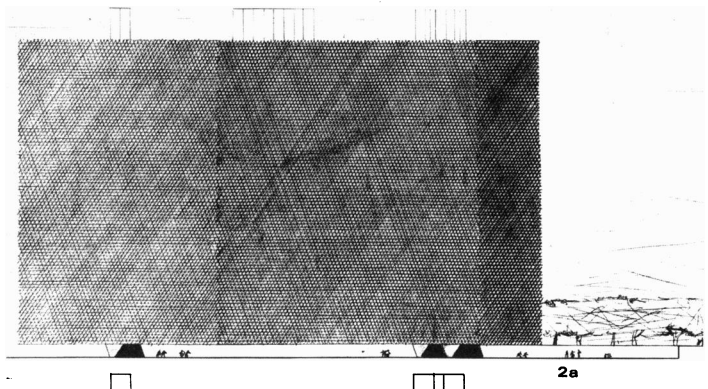
> *A lacey network of metal reflecting the color of the light and its complementary color of shadow would be seen by the passerby.' The shimmering quality of the building produced by the structure, the many planes, the multi-positioned sun louvers, the sun and the shade.* [6]

FROM THE YALE GALLERY TO THE CITY TOWER

Many of the ideas for the City Tower originated in the Yale University Art Gallery (1951-53) (figure 4). The sketch Kahn made in the process of designing the Adath Jeshurun Synagogue (figure 5), after finishing the construction of the Art Gallery, represents an understanding of the frame as an organism with an integral, geometrical order. In her elementary school project Tyng 'increased the layers of the single layer tetra hedron/octahedron truss used by Fuller and Le Ricolais to 'grow' columns of the same geometry.'[7] The integral frame idea would later be developed in the tower by Kahn and Tyng, where the structure is understood as a continuous framework, instead of as a cluster of separate



1 Louis Kahn and Anne Tyng's City Tower model (1957)



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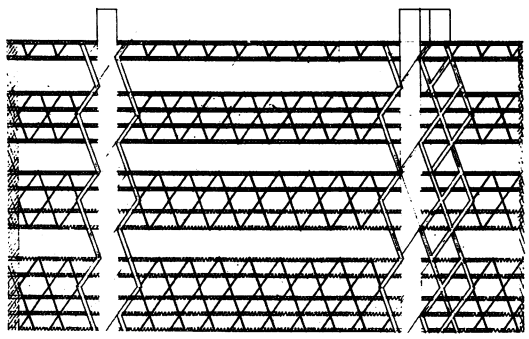

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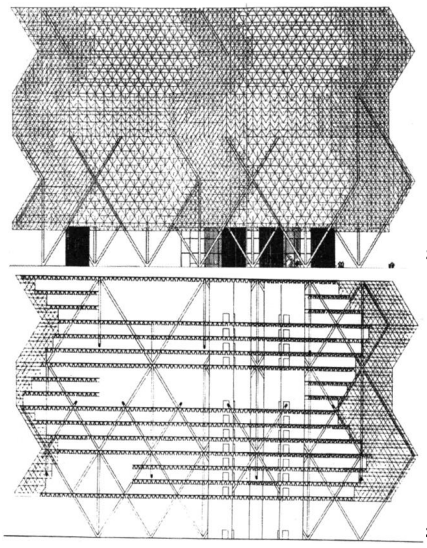

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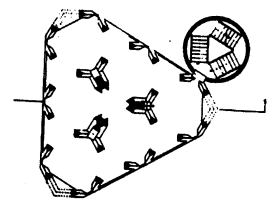

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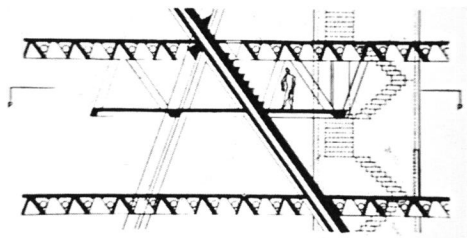

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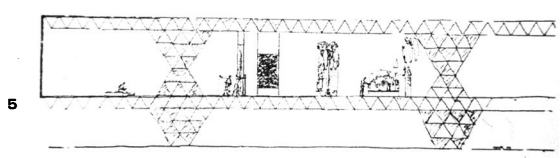

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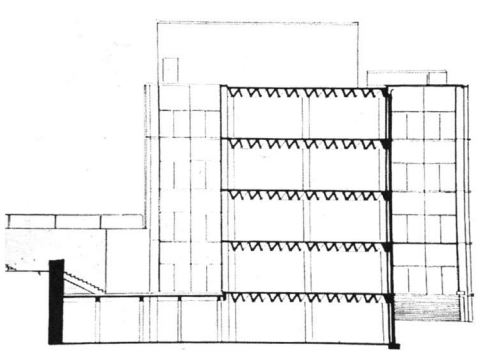

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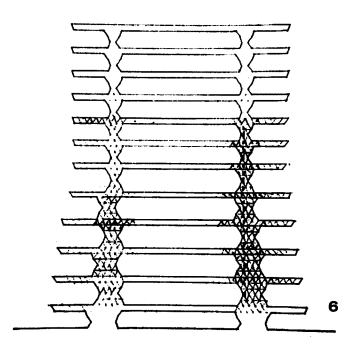

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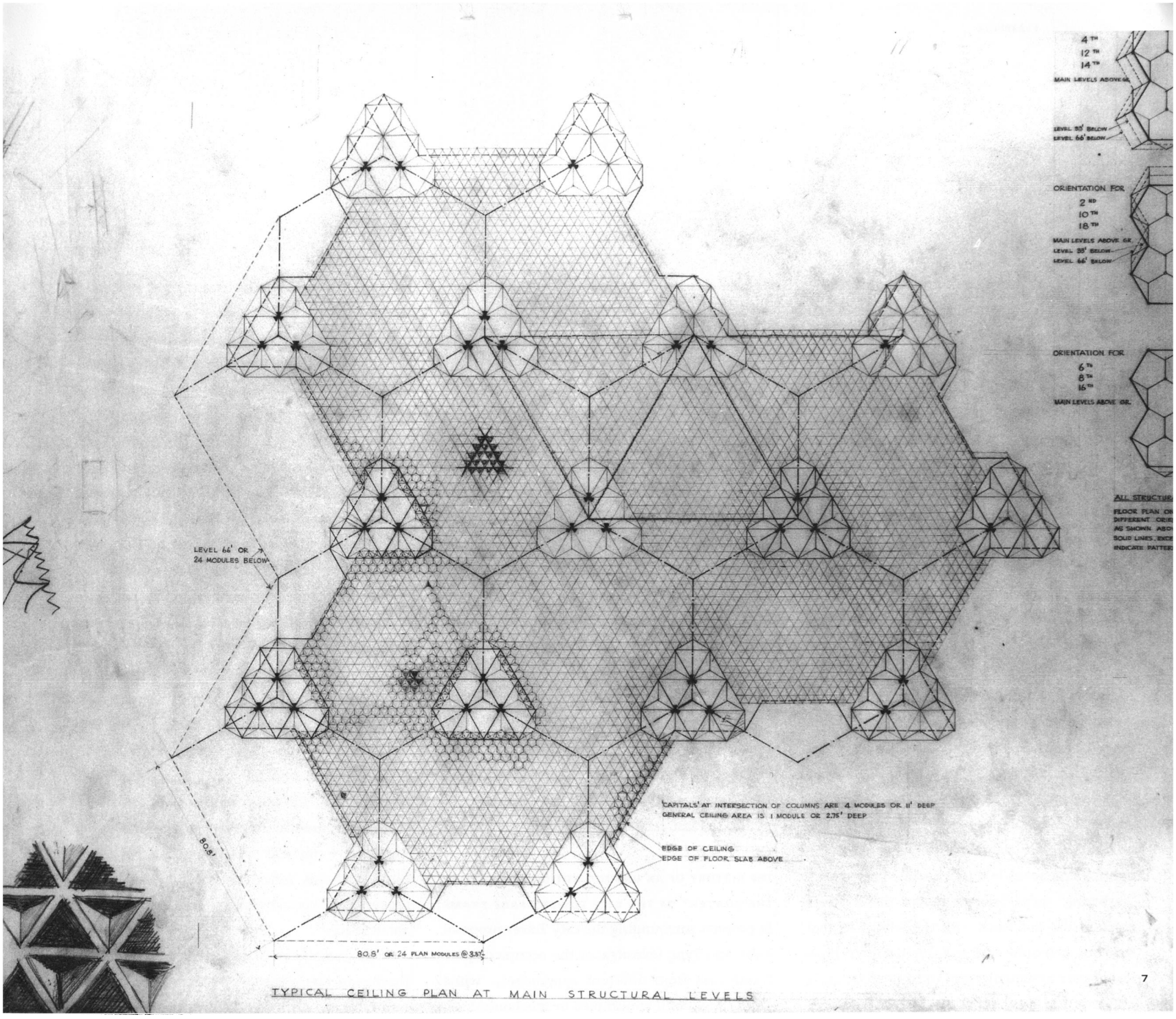

TYPICAL CEILING PLAN AT MAIN STRUCTURAL LEVELS

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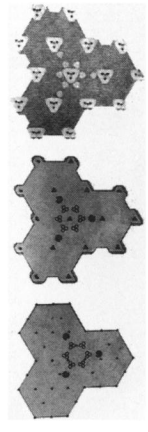
2a-b Elevation and section, first City Tower proposal (1953)
2c-d Elevation and section, second City Tower proposal (1953)
3a-b Plan and section of 'Hollow Capital,' final City Tower proposal (1954–57)
4 Section, Yale University Art Gallery, New Haven (1951–53)
5 Idealized section sketch, Yale University Art Gallery (1954)
6 Section sketch, tridimensional extension of the Yale University Art Gallery tetrahedral floor slab
7 Typical ceiling plan at main structural levels, City Tower
8 Structural ceiling plan, structural floor plan and intermediate floor plan, City Tower
9 Final section, City Tower (1954–57)
10 Study of exterior skin, City Tower



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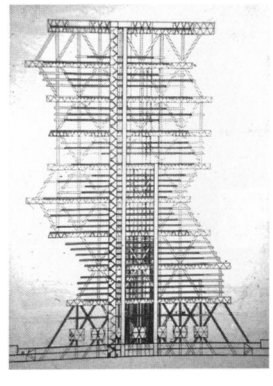

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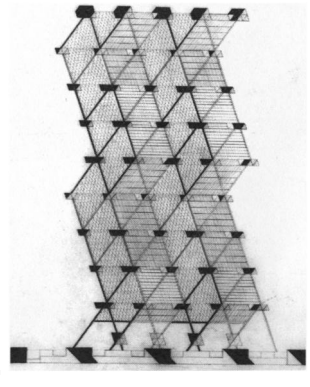

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elements as in other Kahn's projects of the 50's. The Adath Jeshurun Synagogue drawing can also be interpreted as a postscript of the earlier art gallery, or some sort of recognition of what the project should have been. Kahn noted when he made that sketch that the structural order implicit in the tetrahedral floor slab of the recently finished Art Gallery should also have been extended into the columns:

> *A tetrahedral concrete floor asks for a column of the same structure.* [8]

However, in the building as it was made, the construction system of the floor was not actually a space frame, but a conventional floor slab in which the beams were inclined, and the hollow spaces between the concrete tetrahedrons allowed the utilities to be exposed. The value of the project as a space frame is more its intention than its reality, and that intention is pushed further in later projects.

In the mid-50's, after the Art Gallery was finished, Kahn became severely critical of it. The tetrahedral floor slab adequately housed ducts, lighting and acoustic utilities while protectively 'harboring' those beneath it, but the concrete columns did not work with the whole. At that moment, it became clear to Kahn that it was illogical to place a triangular grid within a rectangular building. The absolute continuity of the geometrical order, without any break, was central to his thought. He demanded absolute integrity of the structure and insisted that a building should clearly show how it was made and serviced.

These developing intentions would be fully explored during the design of the City Tower, in which Kahn and Tyng derived forms by extending the triangular space-frame vertically. A three dimensional extension of the Art Gallery's tetrahedral floor slab is the basis for early sketches of the City Tower (figures 6, 19, 20). Although all of the versions of the Tower use the triangular geometry, the later version reflects a much clearer structural principle and hierarchical order (figure 2). The main difference amongst the designs is the external presence of the space frame and its relationship with the enclosure. In the first project, the glazed walls do not clearly express the major structural order against the forces of wind, which is so important in the others. The development of the tower design can be described as a progressive liberation of the glazed skin from the traditional conventions regarding prismatic office buildings. In the series of proposals, one can see increasing interplay between enclosure and structure, ending with the glazed skin becoming part of the structure in the last version.

THE HISTORY OF AN UNBUILT NOTION OF GROWTH: THE CONTEXT OF THE CITY TOWER SPACE FRAME

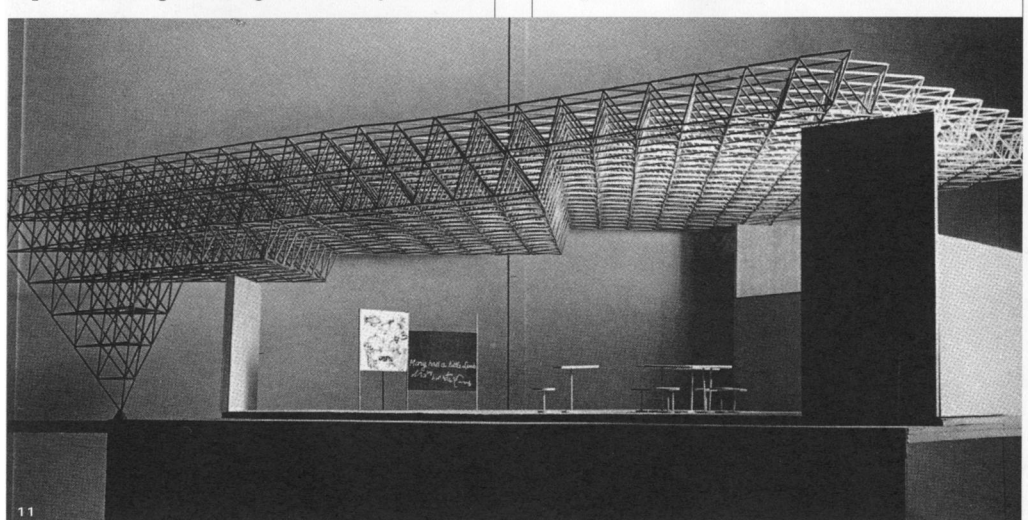
In projects surrounding the City Tower proposal Kahn and Tyng invesitgated the occupied space frame idea from different approaches; while Kahn thoght of it as occupied by mechanical services, Tyng introduced the idea of a space frame occupied by humans. While Kahn was working on the Yale Art Gallery, Tyng was designing an addition for her parents' house using large scale tetrahedral geometry (figure 13). Tyng refers to her parents' house as 'the first built habitable total space frame' and the tower as 'the first conceptual tower structure that was a totally triangulated habitable, space frame.' Kahn later used the tetrahedral frame in the roof of Clever House (figure 14). Tyng's Wolworth Tyng house uses the new geometry in a more extended way, encompassing the whole building instead of just the roof. However, Clever House presents a clearer distinction between the two tectonic orders that Frampton calls earthwork and roofwork and develops a more gradual connection to the ground.[10] The roof can be read as an exploration of Tyng's organic geometry, while the massive elements in contact with the ground are closer to Kahn's interest in the physical materiality of the 'beginnings' of architecture. As in the Trenton Bathhouse, (figure 12) the walls and roof have independent structural forms.

If Tyng defines architecture as 'the art of giving form to number and number to form,' that is to say, the possibility of giving sensible reality to numerical order and vice versa, Kahn's way to give physical presence to his ideas was fused with his reflection on the contruction process, the experience of material, and his ideas about space.[11]

The remainder of Kahn's search for approaches to the hovering or habitable structural frame occurred in unbuilt projects, where the strongest structural ideas lie in the intermediate stages of design.

The Trenton Bathhouse that was actually constructed represents a minimal part of the entire proposed complex. The main part of the project, the Community Building, was never built. One scheme for this building uses a spatial grid composed of octagons and squares, more complex than previous grids using the sole tetrahedral element. The elevation (figure 16) clearly shows ideas about the natural growth of structure that also occur in the City Tower.

A proposal for the Bryn Mawr Dormitory (figure 15) shows a three-dimensional grid of interlocking octagons and squares forming the stepped-back volume of five floors. This octagonal grid is similar to the one used for the Community Building in Trenton, but it is more developed three dimensionally. The cells in Bryn Mawr are not only juxtaposed on a horizontal



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plane but combined in an organic frame, very close in concept to that of the City Tower. Tyng prepared most of the material in this first stage of the project.[12] The similarity of this version of the building to the DNA models developed by James Watson and Francis Crick has been suggested. For that reason, this scheme was called 'the molecular plan.'[13] Although an ingenious solution for the problem of the multiplicity of dorm rooms, it was not satisfactory for the public spaces. Kahn finally decided on a very different solution, paying more attention to the public courts. Tyng remembers that Kahn rejected the first scheme because he 'did not like the zig-zagging facade of the rooms.'[14]

Tyng's devotion to molecular form came to fruition in her scheme for the the General Motors Exhibit (figure 17) at the 1964 – 65 New York World's Fair, which is based on the four fold carbon atom bond. Individual pavilions, in the shape of halved tetrakaidecahedrons form a semi-circular cluster, which is supported by inflated forms derived from the geometry of the cluster and anchored down by cables. This scheme was rejected by Kahn, but it is evidence of the intensity of Tyng's investigation into organic form, which was a presence in his office.[15]

TOPOLOGY AND GROWTH

As reflected in the title of the Universal Atlas Cement Company brochure, 'A City Tower: A Concept of Natural Growth,' the notion of 'growth' seems to be central in the City Tower, as well as in other projects realized during those years.[16] The Adath Jesurum Synagogue and the Adler House (1954) are two projects that epitomize Kahn's ideas toward organic form, and they sit at the two poles that underlie the City Tower organicism: 'branched' and 'cellular' structure.

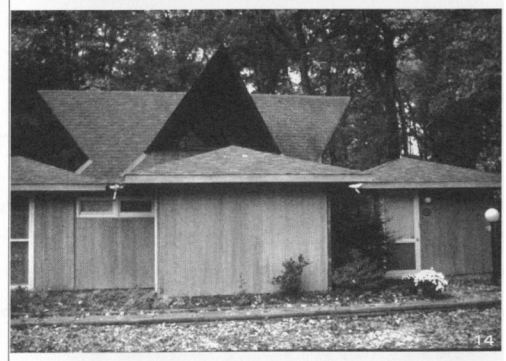
From one project to another, throughout his career, these two extreme models fix the limits of Kahn's work: the natural growth of the space frame and the addition of space units. Kahn's work can be seen as an interplay between these two poles: the continuous framework vs. the clustering of elements.

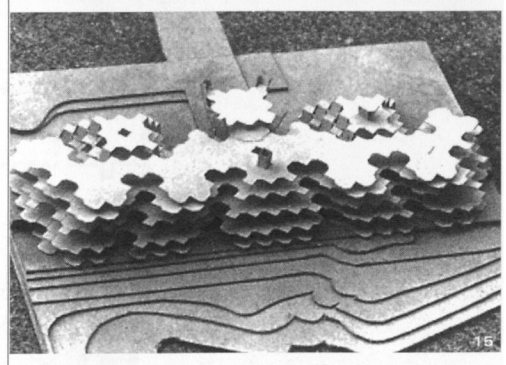
The City Tower seems to reflect both extremes: on the one hand, it is generated from a tetra-octahedronal tree-like structure as a whole; on the other, the connectivity between the geometric cells is also a concern in the spatial conception of the tower. This duality, expressed with the most strength and clarity in the City Tower, is a thread that runs through all of his work.

There is an approach to the building as a living being, as an organic structure. Kahn's own organic approach can be compared and related to two main references. The first one is a scientific discipline: Topology, through the influence of the French engineer Robert Le Ricolais. The second refers to the notion of 'growth' and D'Arcy W. Thompson's ideas on biology in his book 'On Growth and Form,' which comes to Kahn through the influence of Tyng and her interest in the geometric principles of form.

Topology is the branch of mathematics that studies properties of geometric forms that remain constant under continuous transformations. Two figures are topologically equivalent if one can be obtained from the other by stretching or curving without cutting it. This property has caused topology to be called 'rubber sheet geometry,' since a square can be transformed into a circle, but not into a ring. Ideas of opened and closed, connected or disconnected are central to this discipline. Topology is also the science of connectivity in the realm of form.

Topological ideas were central to Robert Le Ricolais' thought. As a 'mathematician of structures,' Le Ricolais was the first to introduce Topology as a tool for mathematical structural analysis.[17] In the fall of 1953, Kahn received a letter from Le Ricolais, who had seen the project for the City Tower in Perspecta and told Kahn about his coming to teach at the University of Pennsylvania in 1954. In that issue of Perspecta appeared the famous statement by Kahn about 'the hollow stone'[18] that houses a building's systems. A parallel thought from Le Ricolais' mathematical approach to structures appears when he states that his goal was hollowing the solid, in the paradoxical conclusion that 'the art of structure is how and where to put the holes.'[19] Le Ricolais would teach courses in experimental structures in tandem with Kahn's design studio.





11 Model of elementary school project, Anne Griswold Tyng
12 Trenton Bathhouse, Jewish Community Center, Erwing Township, New Jersey (1954–59)
13 Walworth Tyng House, Cambridge, Maryland, Anne Griswold Tyng (1951–53)
14 Clever House, Cherry Hill, New Jersey (1957–62)
15 Model of Erdman Hall, Bryn Mawr College, Bryn Mawr, Pennsylvania (1960)

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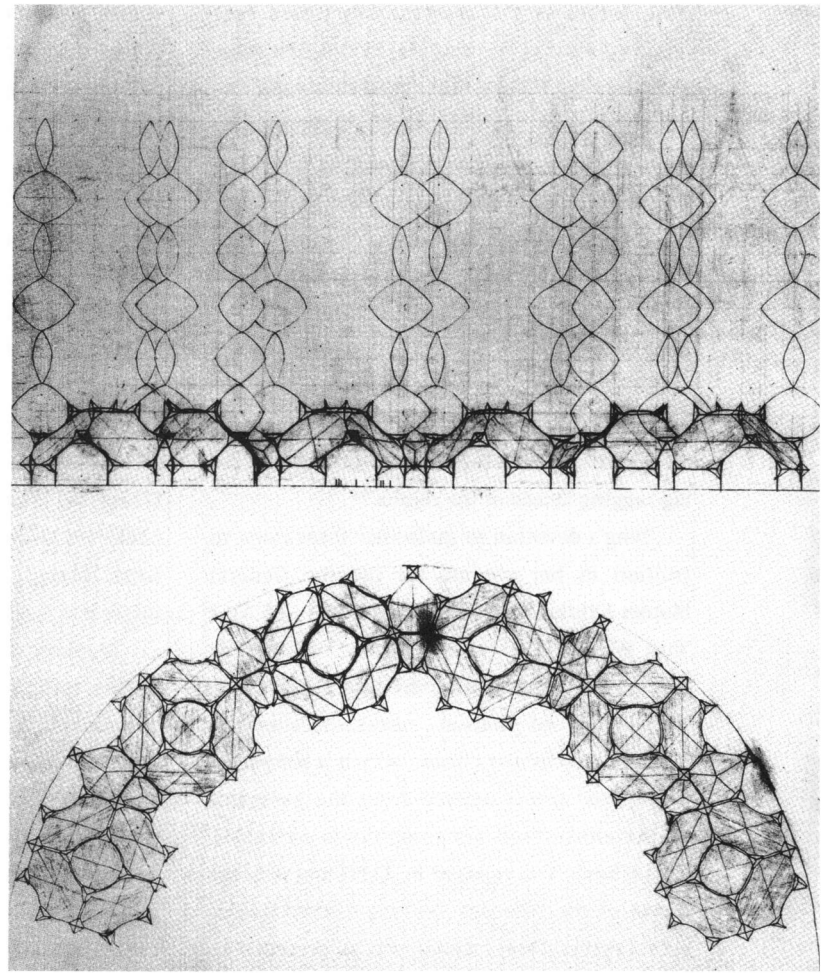

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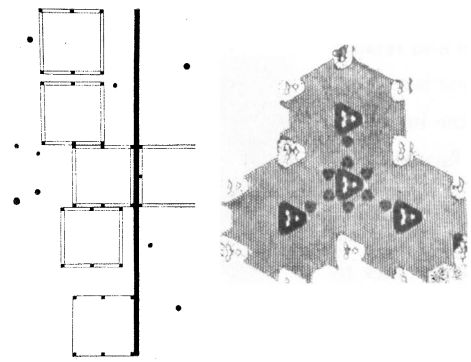

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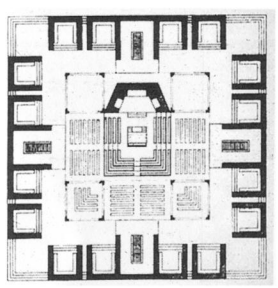

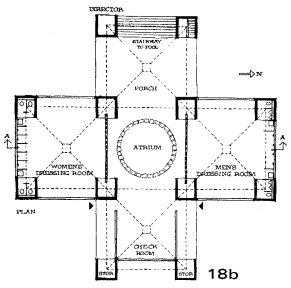

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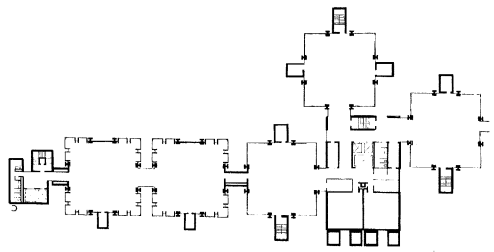

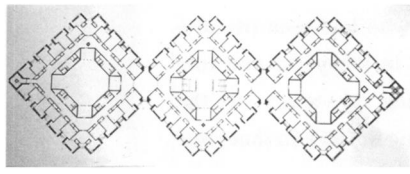

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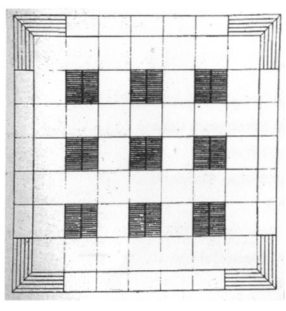

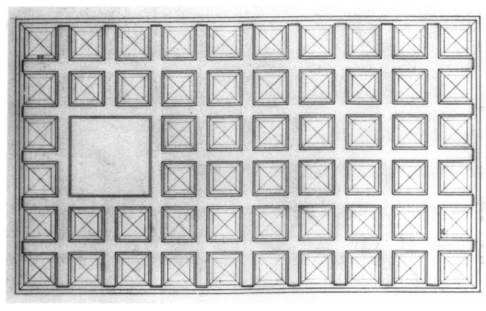

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16 Elevation of Trenton Community Building. Jewish Community Center, Erwing Township, New Jersey, Kahn (1954–59)

17 Proposed Elevation and Plan, General Motors Exhibit 1964 World's Fair, New York, Tyng (1960–61)

18a Cluster dispositions
De Vore House (1954–55)
City Tower (1954)

18b Concentrical dispositions
Hyrva Synagogue (1967–74)
Trenton Bath House(1954–59)

18c Chain dispositions
Richards Medical Research Building and Biology Building (1957–65)
Bryn Mawr Dormitory (1960–65)

18d Grid dispositions
Memorial to the Six Million Jewish Martyrs (1966–72)
Yale Center for British Arts (1969–74)

In 1955 Le Ricolais wrote an article called Topology and Architecture that opened with the following quotation by Cyril Stanley Smith, then director of the Chicago Institute of Metals: 'How could Architecture, which deals with connections, ignore Topology, which by itself is the science of connectivity?'[20] Actually, what Kahn understood as form – 'conceptual patterns without dimensions' – was very close to some kind of 'topological order' in the project.

For Le Ricolais, the realm of structures and poetics was based on the same quality: 'arrangement,' or 'topological organization.' Creative energy is only liberated in 'disposition,' not 'composition,' which is based only on visual considerations. Arts and Techniques are grounded in this idea:

> *It is really just a matter of 'arrangement'. Physics, with electrons, Poetry, with words. Everywhere wild energies are at hand, so to speak, ready to break loose. No doubt, in most cases our perceptions are obtuse, and to discover these arrangements, something or someone has to remove a veil.*[21]

Le Ricolais' notion of 'arrangement' in considering form as a more open way of analysis than 'composition' also explains what Kahn understood as Form. Kahn's projects can be analyzed following Le Ricolais' suggestion that what constitutes the project is not the external form, but its internal topological arrangement.

Kahn's desire seems to lie in seeking out the formal structure of the project. This means that the origin of the project can be traced beyond any specific formal solution. What Kahn means by 'Form' can be understood as a flexible disposition or arrangement, an open form organizing space. The nature of the building, what the spaces 'want to be,' is rooted in the relationships between spaces, in their internal connections or disconnections, and in their proximities and separation, but not in the concrete form.

Many of Kahn's projects clearly show 'connectivity.' There are clusters of cells, basic elements following different topological patterns. Sometimes they are merely juxtaposed; other times they are connected or interlocked. They also constitute a kind of synthesis between the addition of unconnected elements and the natural growth of the structure. The total autonomy of the cells interacts with a proposal for totality when their structures connect or intersect. Even in three-dimensional terms, the connection reveals the nature of the structure in the City Tower. The capitals crowning the intersections of the triangulated strut frame were called the 'knuckles' of the structure. Kahn tells us with these ideas that a definitive part of the project it is not in the spaces themselves, but in the way the spaces relate to each other or grow together according to topological laws.

The connection with D'Arcy Thompson's idea of growth is more explicit than others. Kahn had Thompson's book and became excited with discussions about it at his office. Tyng, who more thoroughly went through Thompson's ideas, points out that Kahn was always interested in connection to nature and that he was motivated by Thompson's drawings, which related natural and man-made products. She also remarked that Kahn's own drawings of natural elements such as people and trees, with their intense vitality, show his connection to nature. [22]

These ideas connect Kahn with the general context of the architectural debate in the 50's and later. After Bruno Zevi's Towards an Organic Architecture (published in English in 1950) many different attitudes were labeled 'organic' and recognized as critiques to rationalism. Broader than the Wrightian interpretation of the concept, Alison and Peter Smithson's ideas of 'growth and change,' Fumihiko Maki's Investigations in Collective Form, and Reyner Banham's Megastructure reflect successive readings of organicisms metaphor. Some of the drawings for Kahn's project of the Adath Jeshurun Synagogue (figure 20) are not far from Maki's definition of megastructure as a large, harboring frame that houses the functions of the city.[23]

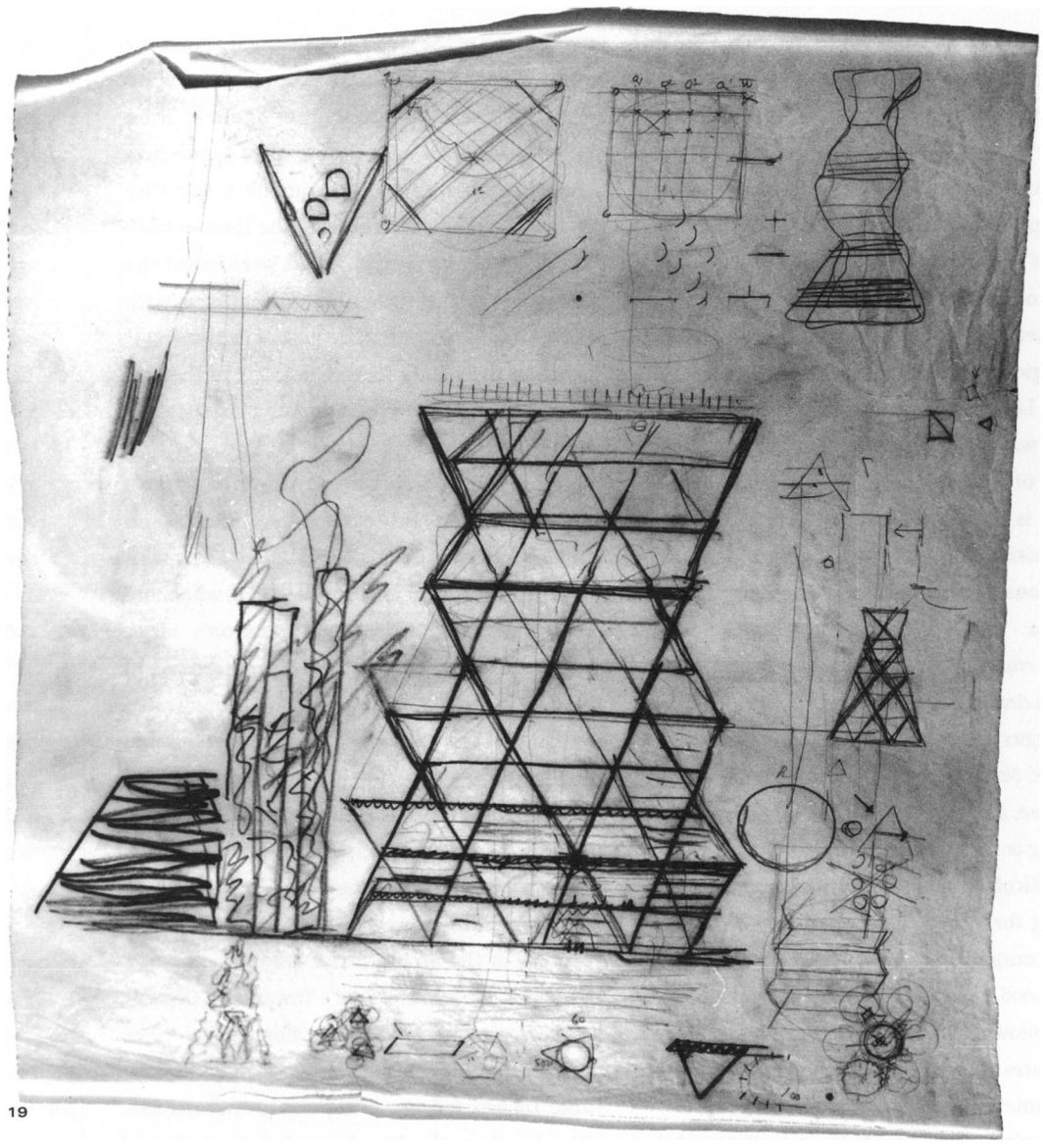
Referring to the idea of growth in the Tower, Tyng explained some of their intentions as a non-literal representation of natural principles. Linked to Kahn and Tyng's notion of growth is the idea of hierarchy:

> *...a unique opportunity to express hierarchical shape as well as hierarchical quantity that can resonate with human scale and vision is presented by the multi-storied tower. Although one may try to count the number of floors in a high building such as the World Trade Center in order to know objectively how many stories there are, the subjective sense of scale or of levels of identity through the clusterings of twos and threes is not there. The plan is repeated unchanged in the vertical dimension as an extruded two-dimensional pattern. There are no clues for the intuitive perception of its scale. In the proposed City Hall Tower for Philadelphia on which I was associated with architect Louis I. Kahn from 1952 to 1957, clues for scale were intuitively rather than consciously integrated into its design. The three-fold hexagonal plan of the structure rotates in vertical increments every 66 feet. These undulating shifts of level result from the natural completion of the triangulated space-frame in its upward helical movement. Hierarchical expression occurs in variations in floor level between the main 66-foot structural levels, in the hollow triangulated 'capitals', high enough for a person to stand in, and the three-foot-deep hollow ceilings of octahedron-tetrahedron geometry. In this project, hierarchical expression of structure is integrated with hierarchy of quantity and of shapes in triangle or hexagon.*[24]

The plans grouped under the category 'patterns of topological growth' (figure 18) show Kahn's interest in the notion of growth, linked to the idea of connectivity and in harmony with geometric principles. In 1959, on the occasion of Frank Lloyd Wright's death, Kahn wrote:

> *Wright gives insight to learn that nature has no style, that nature is the greatest teacher of all. The ideas of Wright are the facets of this simple thought.* [25]

However, assuming Kahn's organic statement that 'man through his consciousness senses inside of himself all the laws of nature,' at the same time he admits an essential difference between the conscious and the unconscious.[26] Kahn asserted that architecture is not only the expression of natural, organic forces, but also comes from conscious Inspiration, an impossible to elude desire-to-express, because 'nature does not build a house, nature does not make a locomotive, nature does not make a playground. They grow out of a desire to express.' [27]



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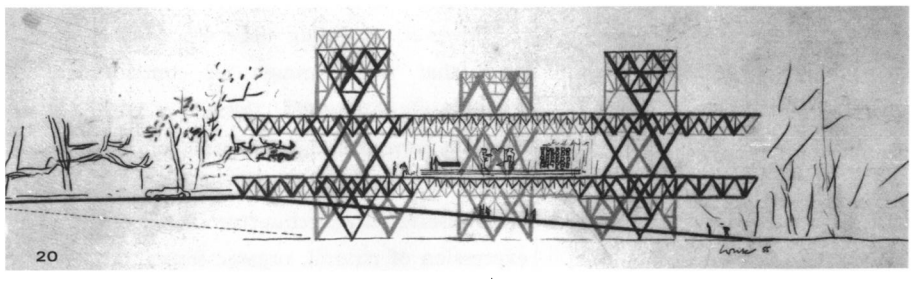

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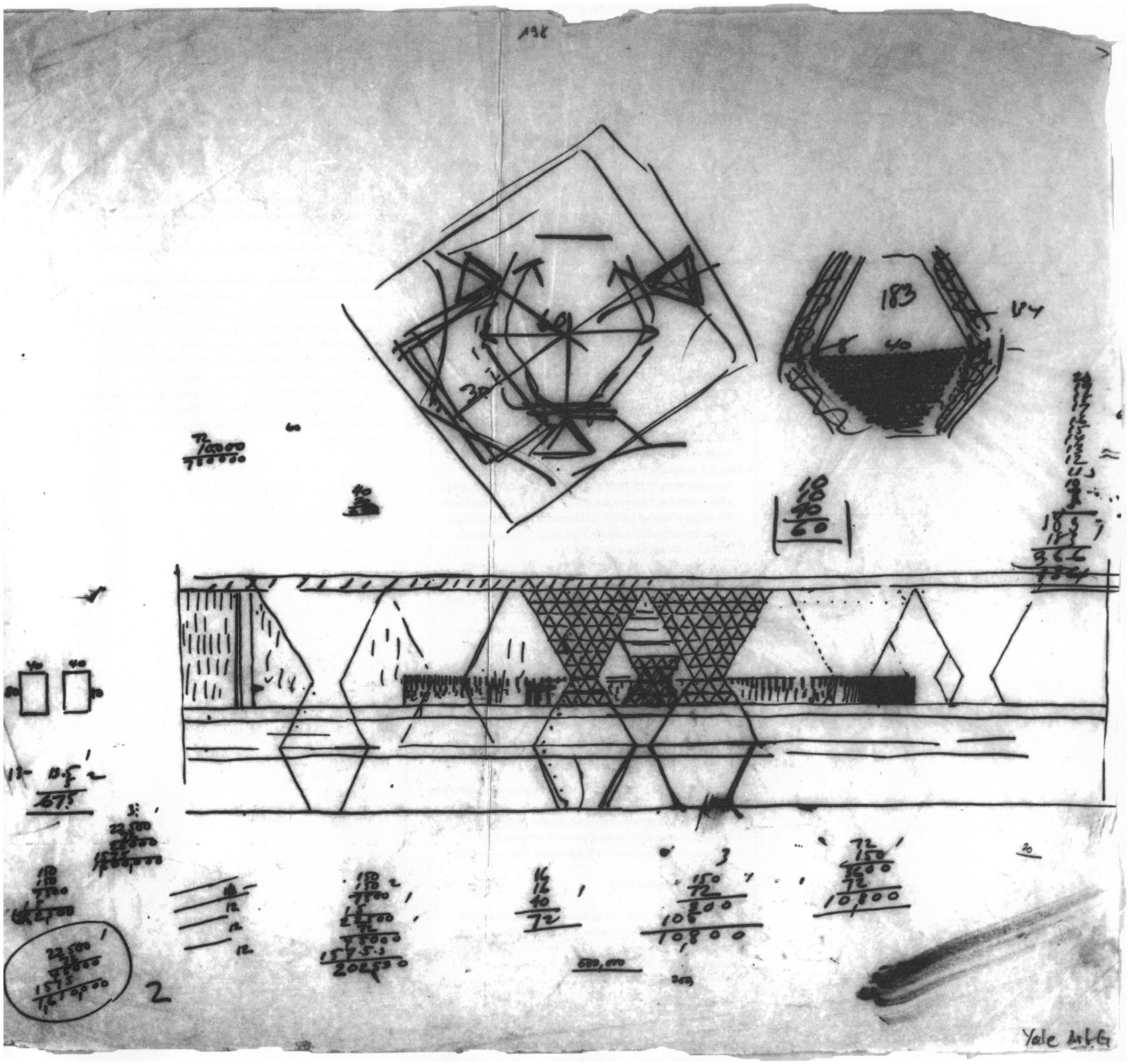
21

19 Conceptual sketches for the City Tower.
20 Sketch for the Adath Jeshurun Synagogue
21 Sketch for Yale University Art Gallery



1 Frampton, Kenneth, 'Louis I. Kahn and the French Connection', *Oppositions 22* (Fall 1980), pp. 21-53.

2 Kahn, L. I. and Tyng, A. G., 'A City Tower: A Concept of Natural Growth' Universal Atlas Cement Company, United States Steel Corporation Publication 110, no. ADUAC-707-57 (5-BM-WP), New York, 1957.

3 Ibid. First published in Kahn, L. I., 'Towards a Plan for Midtown Philadelphia', in *Perspecta 2*, The Yale Architectural Journal, 1953, pp. 10-27. Reprinted In LATOUR, A. (ed.): Louis I. Kahn: writings, lectures, interviews, Rizzoli International Publications, Inc., New York, 1991, pp. 28-52.

4 Kahn, L. I., 'Towards a Plan for Midtown Philadelphia', in *Perspecta 2*, The Yale Architectural Journal, 1953, pp. 10-27. In Latour, A. (ed.): *Louis I. Kahn: writings, lectures, interviews*, Rizzoli International Publications, Inc., New York, 1991, pp. 28-52. Also published later in KAHN, L. I. and TYNG, A. G., 'A City Tower: A Concept of Natural Growth' Universal Atlas Cement Company, United States Steel Corporation Publication 110, no. ADUAC-707-57 (5-BM-WP), New York, 1957.

5 Two years after the publication of the final project for the City Tower, at the conclusion of the CIAM in Otterlo, Kahn made an allusion to the Seagram Building, criticizing its lack of structural principles. This statement, without being an explicit allusion to the City Tower, can certainly be interpreted as the justification Kahn would have given to such a structural typology chosen for his building. See Kahn, L. I., 'New Frontiers in Architecture, CIAM in Otterlo 1959'. In Newman, O., *New Frontiers in Architecture: CIAM in Otterlo 1959*, Universe Books Inc., New York, 1961. Reprinted in LATOUR, A. (ed.): Louis I. Kahn: writings, lectures, interviews, Rizzoli International Publications, Inc., New York, 1991, p. 96.

6 Kahn, L. I., quoted by Ronner, H. and Jhaveri, S., Louis I. Kahn: *Complete Work 1935-1974*, Birkhauser, Basel and Boston, 2nd. edition, 1987, p. 33. and Kahn, L. I. and Tyng, A. G., 'A City Tower: A Concept of Natural Growth' Universal Atlas Cement Company, United States Steel Corporation Publication 110, no. ADUAC-707-57 (5-BM-WP), New York, 1957.

7 Tyng, A, from unedited version of response to this article 1999.

8 Kahn, L. I., quoted by Ronner, H. and Jhaveri, S., Louis I. Kahn: *Complete Work 1935-1974*, Birkhauser, Basel and Boston, 2nd. edition, 1987, p. 76.

9 Tyng, A., interview by Alessandra Latour, in LATOUR, A., *Louis I. Kahn, l'uomo, il maestro*, Edizioni Kappa, Rome, 1986, p. 51.

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11 Tyng, A., 'Resonance Between Eye and Archetype', Via 6, 1983, p. 47.

12 Brownlee, D., LONG, D.: *Louis I. Kahn: In the Realm of Architecture*, The Museum of Contemporary Art (Los Angeles), Rizzoli, New York, 1992, p. 353.

13 Katherine Elizabeth McBride, president of Bryn Mawr College since 1942, who primarily dealt with Kahn during the design of the project, dubbed this scheme 'the molecular plan'. In BROWNLEE, D., LONG, D.: *Louis I. Kahn: In the Realm of Architecture*, The Museum of Contemporary Art (Los Angeles), Rizzoli, New York, 1992, p. 353.

14 Tyng, A, note to editor 1999.

15 Ibid

16 Kahn, L. I. and Tyng, A. G., 'A City Tower: A Concept of Natural Growth' Universal Atlas Cement Company, United States Steel Corporation Publication 110, no. ADUAC-707-57 (5-BM-WP), New York, 1957. and In the chapter 'The Mind Opens to Realizations', in Brownlee, D., Long, D. D.: *In the Realm of Architecture*, Rizzoli, New York, 1992, p.50-76.

17 Sabini, M., 'Between Order and Form. Fragments and Idea of Architecture', in *Rassegna 21*, March 1985, pp. 14-22. and Le Ricolais, Robert, 'Expose on Structural Researches', Institute for Architectural Research, University of Pennsylvania, in 'Le Ricolais', Box LIK 56, Louis I. Kahn Collection, University of Pennsylvania and Pennsylvania Historical and Museum Commission. See also review of 'The Work of Le Ricolais'. Notes on 'Tension Structures, Inc. Background Material on Tension Structures'. 'Le Ricolais', Box LIK 56, Louis I. Kahn Collection.

18 The first proposal of the City Tower was published in *Perspecta 2*: Kahn, L. I., 'Towards a Plan for Midtown Philadelphia', in Perspecta 2, The Yale Architectural Journal, 1953, pp. 10-27. In LATOUR, A. (ed.): Louis I. Kahn: writings, lectures, interviews, Rizzoli International Publications, Inc., New York, 1991, pp. 28-52. Tyng refers to Le Ricolais letter in Tyng, A., interview by Alessandra Latour, in Latour, A., Louis I. Kahn, l'uomo, il maestro, Edizioni Kappa, Rome, 1986, p. 51.

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