Mathesis Bound:
Kahn's Geometry and Its Context

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"Mad mathesis alone was unconfined,
Too mad for mere material chains to bind,
Now to pure space lifts her ecstatic stare,
Now running round the circle finds the square."
                                        - Alexander Pope

The greatest portion of Louis Kahn's work took place after the Second World War, at a time when many architects had abandoned the lessons of their Beaux-Arts educations and embraced a more progressive social agenda and the modernist architectural expression that accompanied it. No less an admirer of the classical tradition than Sir John Summerson said in 1957:*" as far as architecture is concerned, the old systems of proportion belonged to a formal order which is dead and buried at a time when the source of unity in architecture is in the social sphere, in other words, in the architect's program."* Summerson was speaking at a R.I.B.A. debate on the theme:*"The determination of whether or not systems of proportion make good design easier and bad design more difficult",*[1] a suggestion Albert Einstein made to Le Corbusier when presented with a copy of the *Modulor.* In London, the motion was defeated, 48 for and 60 against. Bruno Zevi summed up the mood: *"No one really believes in proportioning anymore."*[2]

From the distance of more than thirty years, the most powerful architectural works from the fifties and sixties are precisely the ones that made thematic the play of geometry and proportion, works by Le Corbusier and Louis Kahn. In Le Corbusier's work, proportions were a means towards an end: the achievement of graceful and harmonious structures. In Kahn's work, the primal severity of form was an iconic end it itself. Yet there is a battle within Kahn's work between the dogged, regular fixity of geometrical figures, a-material and pure, the unfolding of forms in rough, lovingly crafted, heavy materials, and their Inhabitation with the specificities of program. Kahn's work seems to reconcile the apparent opposites of ideal form and concrete materiality, and in so doing, to raise each to new levels of refinement and synthesis.

It is tempting to see Kahn's passion for geometry in tandem with his emphasis on light and apodictic pronouncements such as *"Order is"* as aspects of a Neo-Platonic vision of the world. Plotinus uses the metaphor of light and its dispersal to explain how the "One" created the universe in its successive emanations. Much the same could be said for Kahn's method of manipulating simple, primary figures and finding within them richness and diversity.

The stark formal rigor of Kahn's work contrasts with the whimsical idiosyncratic inventiveness of many of his contemporaries. Eliel Saarinen, Kahn's colleague at Yale in the fifties, declared that *"to lean upon theoretical formulas is a sign of weakness ...that produces weak art".*[3] In such a milieu, where did Kahn develop his ideas about form and geometry? Vincent Scully suggests that Kahn's trip to Egypt in 1951 was seminal in the formation of his mature aesthetic sensibility. Yet there was an even broader context out of which his personal method of using geometry arose. Colin Rowe claims that he personally gave Kahn a copy of Wittkower's essay on geometry and proportion, *Architectural Principles in the Age of Humanism* [4], complete with many illustrations from Renaissance theoretical treatises and Wittkower's chart of the tartan 9-square grid. Even before that, while a student of Paul Cret at the University of Pennsylvania, Kahn received a solid Beaux-Arts education in both theory and method. A love of strong geometric order, of formal patterns that organize served and service space, and of nested geometrical figures derive from such training. Even basic geometric drawings exercises practiced in the academy bear a striking similarity to the manipulation of pure volume in Kahn's work. In 1951 when Kahn was a fellow at the American Academy in Rome, there was a large section on "Divine Proportion" in the Milan Triennale, an exhibition in which Le Corbusier's *Modulor* ll was unveiled.[5] Here, Kahn could have encountered major sources and images fundamental to the tradition of proportion in western art and architecture. It is not clearly known if Kahn took the short train ride to Milan to see the exhibition, but such an important cultural event was very much in the news in Italy and could not have escaped the notice of the community at the American Academy.

The geometric methodology of Kahn's Beaux-Arts education was the rational, systematized geometry of Durand,

not the "Divine Proportion" of Luca Pacioli, whose treatise *De Divina Proportione* [6] gave the Milan exhibition its name. However, mystical geometrical lore was also popular at the time of Kahn's formation as an architect. The anti-positivist movements that arose out of German Romanticism and mysticism spawned movements such as Theosophy, the Rosicrucians, and the cult of the crystal (central to Expressionist dogma). For the Theosophists, geometry was one manifestation of the correspondence between things on the sublunary realm and things above. Many of Kahn's pronouncement on the "Psyche" seem as though they could have been scripted by Madame Blavatsky on "the Astral Soul" [7,] although Kahn was not formally attached to the Theosophical movement and developed a personal strain of mysticism. Kahn wrote: "I *feel that the Psyche is made of an immeasurable aura, and that physical nature is that which lends itself to measurement. I think that the Psyche prevails over the entire universe.*" [8]. The Theosophists looked for traces of cosmic order in natural phenomena such as vibration patterns on metal filings and physiological studies of animal and plant forms. Common to all was a clear, fixed, geometrical order, a kind of natural hieroglyphics which appeared to reveal the very structure of the universe. According to Blavatsky and the Theosophists, *"God geometrizes"* [9]; *"Dots, Lines, Triangles, Cubes, Circles, and finally Spheres-- why or how? Because... such is the first law of nature and because nature geometrizes in all her manifestations".* [10]

Reading the writing of nature as form was an idea that would have attracted Kahn greatly. He owned a copy of D'Arcy Thompson's On *Growth and Form* and claimed that if one could read only one book, that should be the one." In his dissertation, Joseph Burton argues that one of Kahn's ambitions was to make a symbolic architecture the elemental primacy of which goes back to back to "Volume Zero", the origins, the language of God. [12] Similarly, Kahn relied on his Jewish heritage (his maternal grandfather was a well-known Talmudic scholar) and imbedded ciphers from cabalistic tradition into his work. Most striking is the correspondence between his plan for the Mikveh Israel Synagogue and the Sephirothic Tree of the Cabala. The drawing of the descent of the Sephiroth provides a series of more simplified diagrams which seem to structure a great number of Kahn's works. Even the Star of David represents two pyramids reflecting back on one another, illustrating the cabalistic motto: "As it is above, so shall it be below."

Kahn would have been aware of mystical associations with geometry. Theosophists were everywhere and the ideas they promoted were brought directly to the attention of architects by Jay Hambidge, who popularized the distinction between "Dynamic Symmetry" and "Static Symmetry" [13] in his analyses of Greek art and architecture and in a monthly magazine called *The Diagonal.* Claude Bragdon [14] codified Hambidge's and Matila Ghyka's [15] related theories into a rule books specifically for the practical use of architects. For Hambidge, static symmetry finds its order only with reference to the center of a geometrical figure. Dynamic symme-

try, on the other hand, unfolds geometrically along the diagonal or "root" according to the laws inherent in the form. Dynamic symmetry, root rectangles, geometric progressions and reciprocal relationships among primary figures all derive from the square. Kahn claimed *"no matter what, I always start with a square",* [16] although few of his buildings
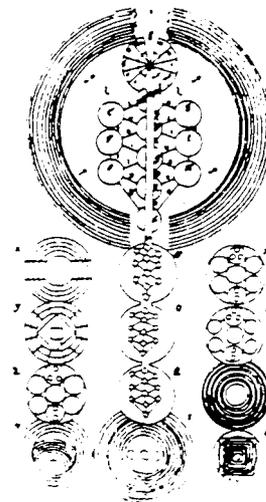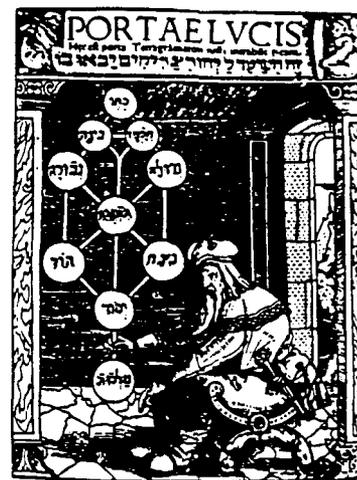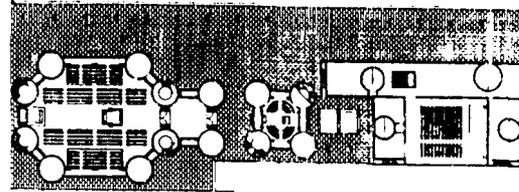

Fig.1. Louis Kahn's project for the Mikveh Israel Synagogue, Philadelphia, 1961-72 (A), derives its plan from the Cabalistic diagram of the Sephirothic Tree (B), here illustrated in Paulus Ricius's *Portae Lucis*, Augsburg 1516. The drawing of the descent of the Sephiroth (C) provides a series of more simplified diagrams which seem to structure a great number of Kahn's works, here illustrated in Knorr von Rosenroth's Luranic text, *Kabbala Denata,* Frankfurt, 17th century.
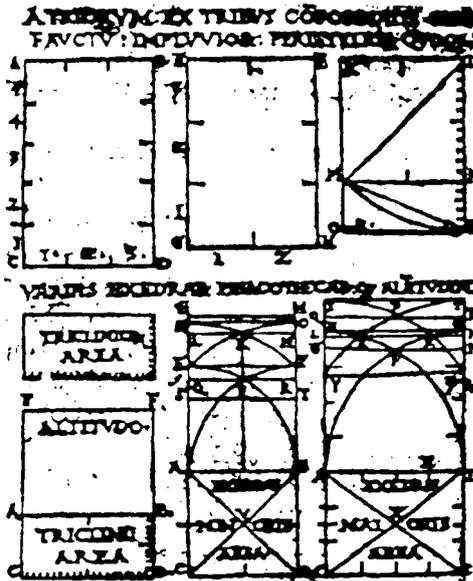
Fig. 2. Page from Cesariano's Vitruvius, c. 1521, included in Wittkower's Architectural Principles in the Age of Humanism, showing different methods for breaking down a rectangle. At the upper right is a 2 rectangle.
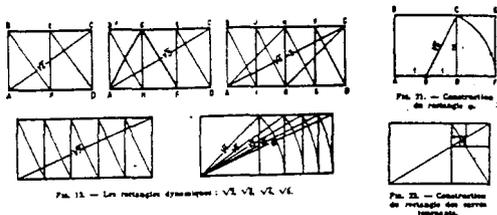

Fig. 3. Matila Ghyka, plates from Le Nombre D'Or, Paris, 1931.

end up as squares. Such ideas are not new: Hambidge shows that they were central to Greek aesthetic theory; Cesariano illustrates a 2 rectangle among the primary figures of his *Vitruvius.*

Le Corbusier's *Modulor* grows directly out of popular twentieth century investigations of dynamic symmetries and similar root rectangles. Although Le Corbusier did not admire mystical intellectuals, he was exposed to their ideas during his apprenticeship in Behrens' office, where standard reference texts included Berlage's book[17] with geometric diagrams inspired by Dutch Theosophism.[18] Many of these diagrams show a rhythmic banding which seems to augur the weaving of served and service spaces that characterize Kahn's work.

Kahn greatly admired Le Corbusier and acknowledged in an interview entitled "How'm I doing Corbusier" that *"...Corbusier was my teacher. I say, Paul Cret was my teacher and Corbusier was my teacher..."*[19] At a time when most architectural practice had abnegated its traditional role with respect to history, both Kahn and Le Corbusier embraced tradition and sought to build for eternity. Kahn's partnership with Oscar Stonorov provided even closer access to Le Corbusier's thought, design and methods. Stonorov

was personally involved with the social and aesthetic programs of European modernism; moreover he worked briefly in Le Corbusier's office and was one of the editors of the first volume of *Oeuvre Complete.*

When one thinks of Kahn's buildings, a few potent icons come to mind: the cubic library at Exeter with a cubic void of space within; the taut, concentric interlock of primary geometric solids at Dacca; the manipulated play of quadratic figures that determine the plans of Erdman Dormitories or Richards Medical Towers. However, as we have noted, Kahn had available to him more geometry than just the solids of Plato. Indeed, his associate, Anne Tyng stated: *"I was not*
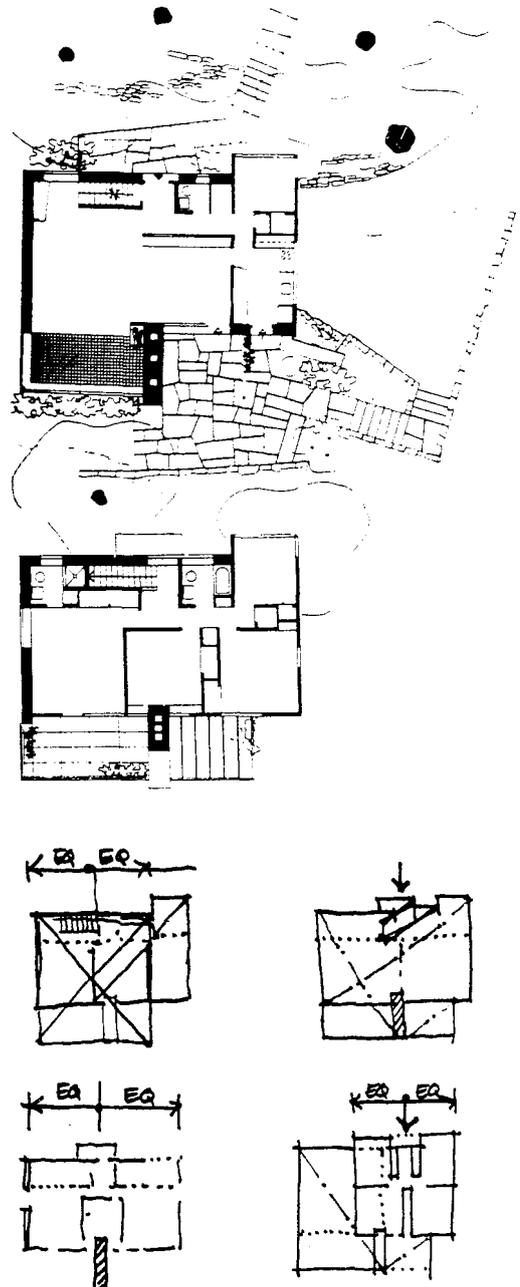

Fig. 4. Louis Kahn, Oser House, Elkins Park, PA, 1940-42 and diagrams showing ways in which contrasting themes of symmetry and asymmetry are developed.

satisfied with the pure symmetry...and was determined to find principles of asymmetry to extend these shapes in different ways. In retrospect, I believe my enthusiastic exploration of geometries on evenings and weekends in the office offered Kahn an Ordering source ... " "[20]

One of Kahn's first built designs was the Oser House in Philadelphia, 1940-42. The modernist influence of George Howe, Kahn's former associate, is apparent in the simple volumetric massing, comer windows, and spare detail. Yet already here an opposition is established between monocentric, static symmetry and dynamic symmetry which sponsors multiple centers. Symmetry is first timidly indicated by the placement of entry and the detailing of paving; these notations are then corroborated and reinforced by the thick, lineal mass of the central chimney. Asymmetrical readings dominate, established by the interlocking play of squares and shifted, decomposing golden rectangles. Organization along the diagonal is emphasized by the pairing of two thick walls (north and west) against two thin walls (south and east). An equipoise is created between forms organized around their centers and forms organized by slots of space skewering their perimeters.

Kahn's interest in geometry at the time was greatly enhanced by discussions with Tyng. Influenced by the writings of Carl Jung, she claimed that geometrical order was archetypal. In letters of support to the Graham foundation Kahn wrote *" [Tyng] knows the aesthetic implications of the geometry inherent in biological structures bringing us in touch with the edge between the measurable and the immeasurable."* Buckminster Fuller, who wrote on her behalf for the same grant proposal went even further: *"[Tyng has discovered] the golden mean relationships between the whole family of Platonic solids. These relationships, according to the records, have not been previously known by man... Anne Tyng has been Louis Kahn's geometrical strategist."*[21]

Kahn's Escherick House, Chestnut Hill, Pa, 1959-60 reprises many of the themes already stated in the Oser House, but with less deference to modernist asymmetry. The entry sets up a clearly articulated A-B-A facade with a band of service spaces on to one side. Hence, the house can be understood as a four-square grid, with habitable slots of space threaded through the cross axes. In the north-south direction, the slot is voided and organizes entry and vertical circulation; in the east-west direction, the slot is implied by the bracketing masses of the two block-like chimneys. However, the service spaces, dining room and entryway comprise a perfect square while the geometry of the "ideal" four-square part of the house is truncated. The aforementioned square is subdivided into rooms according to both proportions and dimensions which seem to have been pulled from Le Corbusier's Modulor, while the remaining part is organized by a two-square rectangle, centered on the mass of the fireplace.

In the Fisher House, 1960-67, in Hatboro, Pennsylvania, Kahn is even more explicit in his reference to the Modulor. The proportion and arrangement of spaces in one pavilion
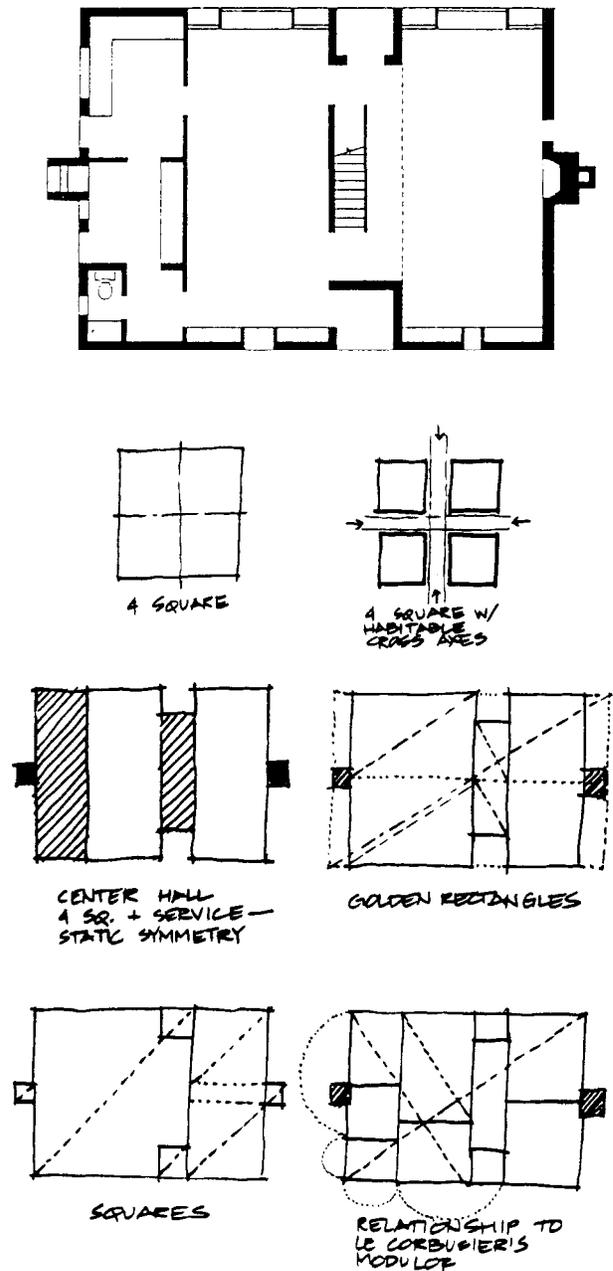

Fig. 5. Louis Kahn, Escherick House, Chestnut Hill, PA, 1959-61, plan and proportional diagrams.

derives almost directly from a diagram in *Modulor II* which likens the Modulor system to that of the Egyptian cubit. Such notions of primal geometry would have appealed to Kahn's quest for origins.

Kahn has described his method of working as a search for pure form which is then tested with the burdens and constraints of site and program. If the ideality of the form is violated, then the form is wrong and one must begin anew. However, in the Morton Goldenberg House, 1958, Rydal, PA, Kahn admitted that the ideal form could not meet programmatic needs. Even so he did not discard the diagram. Rather, he willfully distorted it. "I *felt this was rather a*

discovery in the desires of the interiors-- interior spaces... a house is a building which is extremely sensitive to internal need. In this satisfaction there was an existence will of some kind... but there was an existence will for this house not to be disciplined within a geometric shape. "Kahn **took advantage**

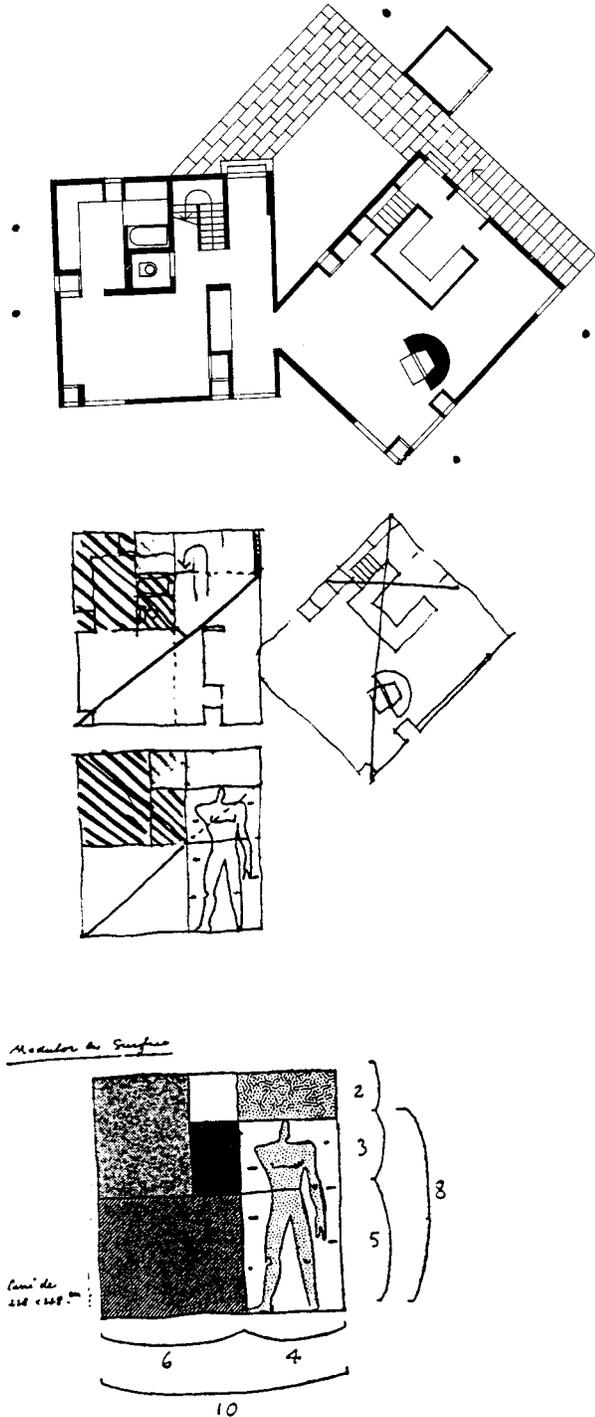of radiating, 45-degree diagonals to foster a more relaxed, more flexible order.

Fig. 6. Louis I. Kahn, Fisher House, Hatboro, Pennsylvania, 1960, plan (A) and diagrams (B) showing the proportional relationship between Le Corbusier's Modulor (C) and Kahn's Fisher house; diagram from *Modulor II,* showing the coexistence of the Modulor and the Egyptian Cubit system.
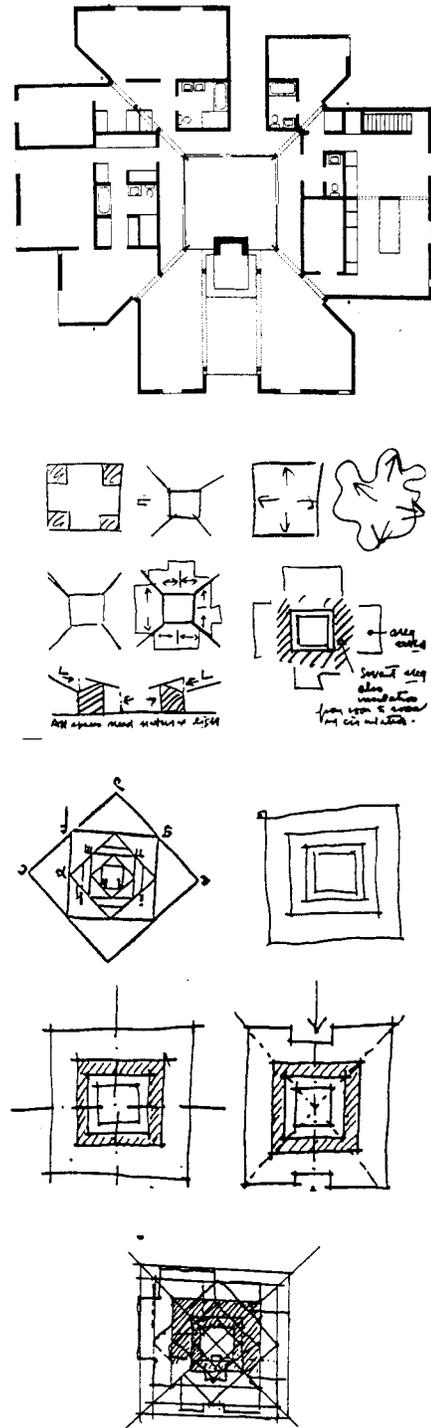

Fig. 7. Louis Kahn, Goldenberg House, project, Rydal, PA, 1958. Plan (A); Kahn's diagrams illustrating the pressure of interior space versus the idealized envelope (B). Geometric schema of the Goldenberg House which allows apparent disorder to unfold. Kahn uses the geometric expansion of the rotated square to organize the proportions of the Goldenberg House (C), a technique illustrated in Panofsky and Frankl's 1942 *Art Bulletin* essay entitled "The Secret of the Medieval Masons", and diagrams (D.)

Some of the playful, contradictory statements of symmetry and asymmetry in the Goldenberg House might be due to the influence of Robert Venturi, who began working for Kahn in 1956, after his stay at the American Academy. Denise Scott Brown states the following: ***"Lou learned from Bob about mannerist exception, distortion, and inflection in form... Through Bob, he investigated the layering of enclosed spaces and the layered juxtaposition of walls and openings, and he discovered that windows could be holes in the walls again."*** [22] As we have shown, Kahn already explored the simultaneous presence of conflicting themes in his earlier work and probably would have been very receptive to Venturi's ideas.

Kahn's most idiosyncratic, apparently casual design is his project for the **Dominican Motherhouse** in Media, Pennsylvania, 1965-69. The asymmetrical, non-orthogonal, fragmented dispersion of elements is not typical of Kahn's work. Even the method of design was experimental. The conception of the Motherhouse as a *"society of rooms"* was taken so far that plans of each space were drawn separately, cut up and reassembled by collage.

Still, the final design reveals a controlled re-examination of building type and geometry. A possible starting point for Kahn's investigation was the four-square paradise garden, historically and typologically linked to convent architecture. As in most cloisters, the garden is wrapped by an inhabited perimeter of rooms, with pavilion comers accommodating special rooms. Here, evoked memories of a longitudinal church exert pressure on the four-square garden, stretching it to a golden rectangle. The entry edge is likewise transformed from a horizontal perimeter bar to a centralized square entry tower whose edge delimits two precincts: one square and one golden rectangle. Program is organized according to this division. Secular elements (living, dining, reception) are contained within the square, while sacred activities are housed within the golden rectangle. Only the fireplace of the dining hall slips into the space of the golden rectangle, signaling Kahn's understanding that some aspects of everyday life still have ritual power. The overall size and disposition of elements in the Dominican Motherhouse can be further explained according to the logic of slipped golden rectangle spirals.

When the Richards Medical Towers were built in 1957 Kahn's reputation was finally established. The building was heralded at time as a synthesis of the best ideas of Le Corbusier, Mies and Gropius. At the same time, the building is pure Kahn, and makes use all the elements typical of his mature work: primary geometric figures; clear zoning of served and service spaces; innovative use of structure; poetic use of material; and thoughtful analysis of program as a generator of form. The plan of the building is commonly said to be pin-wheel of squares. However, not all the pieces are square. The entry "square" is deformed by the addition of service elements. The apparent distortion of the entry piece actually holds a key to the understanding of the disposition of the whole. Starting from the nexus of small
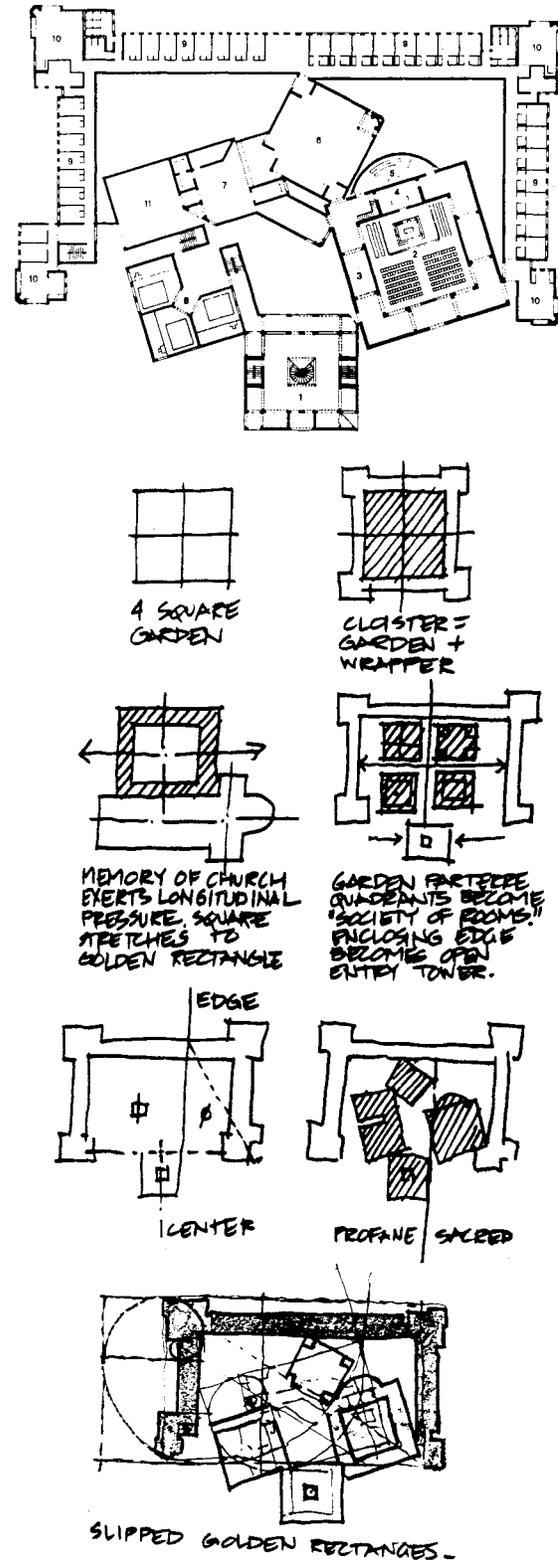

Fig. 8. Louis Kahn, project for the Dominican Motherhouse of St. Catherine de Ricci, Media, Pennsylvania, 1965-9, plan **(A)** and diagrams (B). The odd disposition of parts can be understood as a controlled study of typology and geometry. The overall proportions and locations of the "society of rooms" are determined by slipped golden rectangle spirals.

rooms at the service core, a golden rectangle spiral extends which clarifies the dimensions of arrangement of the entire site. General massing and fenestration of the building is based on the same geometrical system of golden rectangles and squares.

Entry to the Richards building takes place through a voided comer, on the diagonal. This is also the case in many of Kahn's buildings, such as the Erdman Dorms and the Mellon Center for British Art. One is tempted to fault Kahn for this apparently ill-conceived strategy, i.e. that the Platonic clarity of his form is too pristine to accommodate messy human activity. However, there may be another way of understanding Kahn's preference for comer entry. By forcing movement along the diagonal, Kahn reveals the root of the square, the root which sponsors subsequent geometri-

ELEV.

PLAN

GOLDEN RECTANGLE SPIRAL IN RICHARDS. TOWERS PINWHEEL WITHIN THE GOLDEN RECTANGLE; THEY DEFINE A LINE IN THE SQUARE
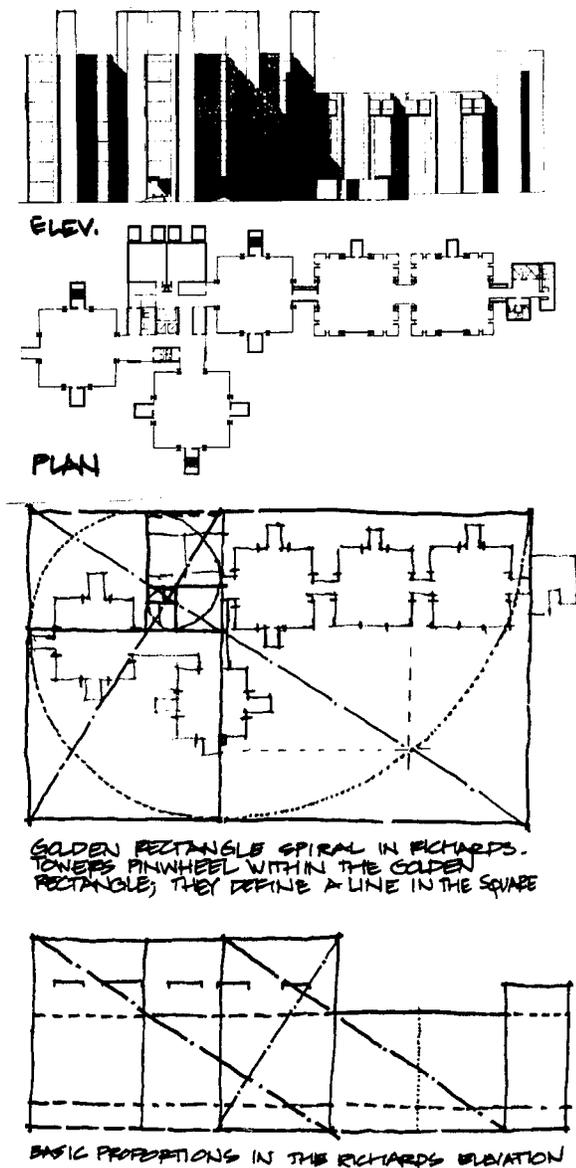
BASIC PROPORTIONS IN THE RICHARDS ELEVATION

Fig. 9. Louis I. Kahn, Richards Medical Research Building and Biology Building, Philadelphia, Pennsylvania, 1957-65, elevations and plans, according to a golden rectangle spiral.

cal development.

One of Kahn's problems at Richards was the connection of the diverse laboratory towers. At Richards and the Biology Building, service towers are replaced by connective links. At the **Erdman Dormitory,** Bryn Mawr, the diagonal of the square is used spatially to link pavilions, without the need of intermediary blocks. The implication of the diagonal within the square, suggested at Richards and the Goldenberg House, is fully realized.

Kahn's most focused essay on the geometry of the cube is his Library at Phillips Academy, Exeter, New Hampshire, 1965-72. The building is apparently so straightforward that is seems to sidestep the contrast of opposing themes of center/edge; square/rectangle that we observed in many of his other schemes. However, Exeter Library is not a cube, it is too short, and the interior volume it houses is likewise not cubic, but extended in the vertical dimension.

One clue to the deformation of the cube comes from the treatment of enclosing walls. They are pulled away from the body of the building, voiding the comers, asserting the diagonal axes, and creating walkways around the perimeter at the base and top of the building. If the walls were not pulled out, they would meet to enclose a square on a 4 x 4 structural bay system. When pulled away, each perimeter bay forms a 2 rectangle, the same rectangle that reconciles the space of the entry stair with the center. In section the spatial breakdown of voided center, two-story piano nobile, and over-all volume can likewise be explained by a simple 2 expansion. The centric inclination of the root diagonals gestures towards the completion of the figure as a 2 pentagram. Indeed, if the pentagram were completed, the desired cube would be restored through the implications of geometry. Kahn continues the play between the 2 rectangle and the square in his treatment of the facade. At ground level, the openings in the wall are 2 rectangles. The splay of jack arches over the windows is used systematically to increase the size of the openings and diminish the mass. At the top, liberated from the contamination of earthly things, the mass of the wall is reduced to columns and the openings in the arcade are perfect squares. In Kahn's work there is a preponderant use of the 2 rectangle. This is consistent with Kahn's quest for origins. The 2 rectangle is generated by the root of the square. The word "root" suggests not only a diagonal trace, but organic growth and living transformation. The root is the generatrix and life-giver of the square. Natural and geometric order are reconciled.

Kahn's persistent use of geometry is not enough to account for the lasting potency of his work. Many of his contemporaries were even more rigorous in their investigation of geometry, and today they are assigned no more than small footnotes in the history of twentieth-century architecture. Kahn's contemporary at the University of Pennsylvania, Buckminster Fuller, is a case in point. His geodesic domes are too single-minded in their investigation of structure and too neglectful of the hierarchical breakdown of space required by the ceremonies of human interchange.

TYPICAL PLAN

ELEVATION - OPENINGS TRANSFORM FROM √2 RECTANGLES (BOTTOM) TO SQUARES (TOP)

√2 RECTANGLES IN PLAN

SQUARES IN PLAN

SECTION

SECTION BASED ON √2 EXPANSION. THE COMPLETION OF THE √2 PENTAGRAM MAKES THE VOLUME TRULY CUBIC.
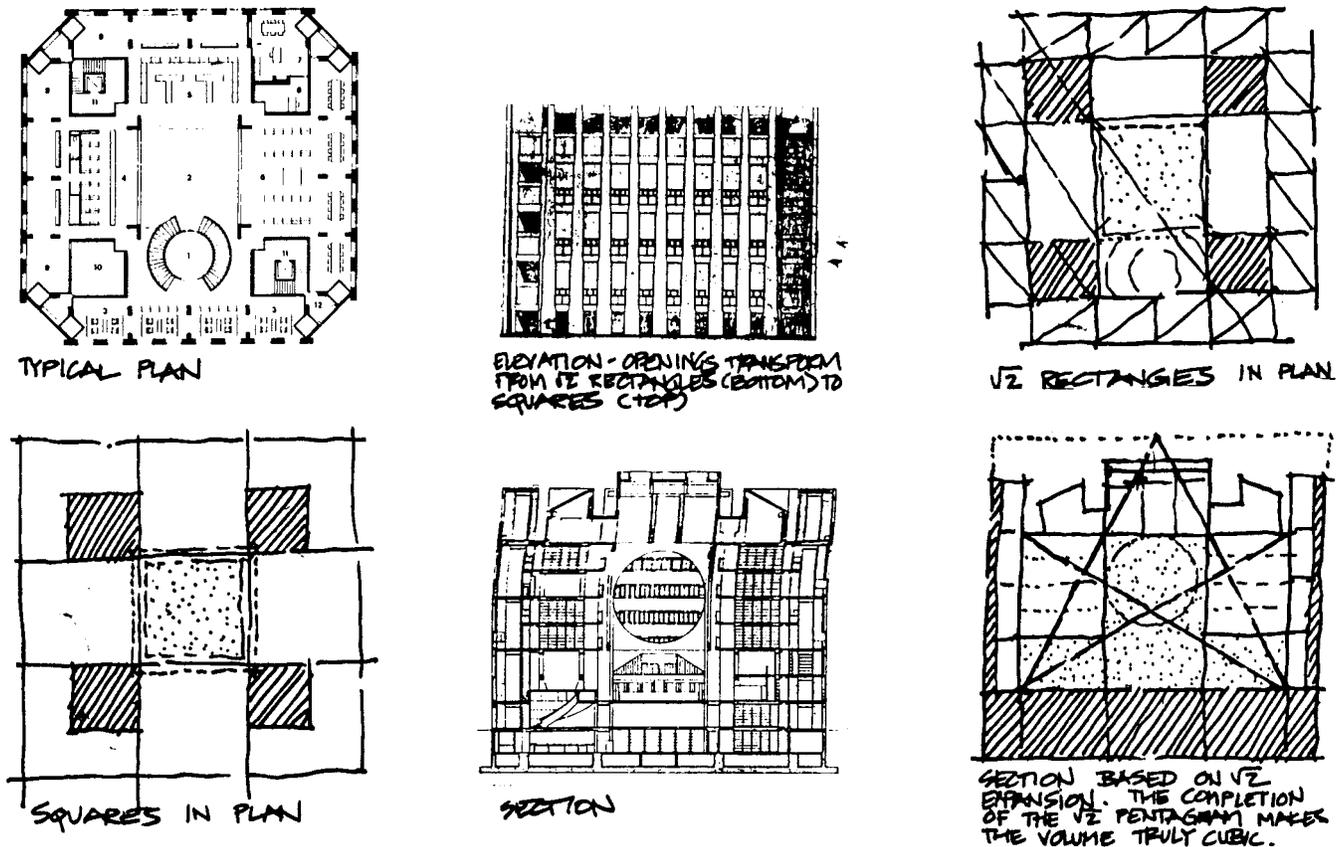
Fig. 10. Louis I. Kahn, Exeter Library, Exeter, New Hampshire, 1965-72, showing the role of the square and the 2 rectangle in generating plan, section and elevation.

Walter Netsch is another example. His geometric fields appear as no more than perverse schemata to structure conventional architecture. The geometric figures do not congeal with the same iconic clarity as in Kahn's work, nor do they develop inevitably from a concern for program, material and making. Hence, like geometry, tectonics and technique are ways for the truth to appear.

NOTES

[1] Sir John Summerson, quoted in R. Wittkower, *Idea & Image: Studies in the Italian Renaissance,* Thames & Hudson, New York, 1978. Einstein as reported by Le Corbusier in *Modulor,* Harvard University Press, Cambridge 1954, p.58.

[2] Bruno Zevi, *L'architettura,* Milan 1957.

[3] quoted in Wittkower, *op. cit.*

[4] Wittkower, *ibid.*

[5] Le Corbusier, *Modulor II,* Harvard University Press, Cambridge 1958, p.20. "[the Modulor was] *shown prominently at the 'Divina Proportione'Exhibition at the 1951 Milan Triennale, in the company of manuscripts or first editions of the works of Vitruvius, Villardde Honnecourt, Piero della Francesca, Dürer, Leonardo da Vinci, etc. etc........"*

[6] Luca Pacioli, Venice *1509, Divina Proportione, opera a tutti gl'ingeni perspicaci e curiosi necessaria que ciascun studioso di Philosophia , Prospectiva, Pictura, Sculptura, Architectura, Musica, e altre Mathimaticae suavissima, sottile, e admirabile doctrina conseguirà ....de secretissima scientia,* Venice 1509, reprint, ed. C. Winterberg, Vienna, 1889.

[7] Compare Helena Blavatsky in *The Secret Doctrine,* New York 1887: "He is in it, as it is in him, for the world-pervading element fills all space, and *is* space itself, only shoreless and limitless".

[8] L. Kahn, "A Statement by Louis I. Kahn," *Arts and Architecture.* Vol. 81, May 1964, p. 19.

[9] H. Blavatsky, *Isis Unveiled,* Pasadena 1887, Theosophical University Press, 1960, pp. 506-7; or C. Leadbeater, *The Aura,* Madras, Theosophist, 1895, p. 5-6. The Theosophists claimed the statement came from Plato.

[10] H. Blavatsky, *Secret Doctrine,* 1:97.

[11] J. Burton, "Notes from Volume Zero: Louis Kahn and the Language of God", *Perspecta 20,* 1984, p.84. Quoted to Burton by Kahn's nephews, Dr. Marshall Alan Kahn and William S. Huff. Huff says that Thompson, quoting Plato, says "God always geometrizes".

[12] Burton, Joseph, *The Architectural Hieroglyphics of Louis I. Kahn: Architecture as Logos,* University of Pennsylvania Dissertation, Philadelphia 1982.

[13] Jay Hambidge, *Dynamic Symmetry: The Greek Vase.* New Haven Connecticut, 1920; *The Parthenon and Other Greek Temples: their Dynamic Symmetry.* new Haven 1924; *The Elements of Dynamic Symmetry,* 1926 1 New Haven, Connecticut, 1948.

[14] Claude Bragdon, *The Beautiful Necessity: Seven Essays on Theosophy and Architecture,* (1916), 4th edition Knopf, New York 1939; *The Frozen Music, Being Essays on Architecture and the Art of Design in Space,* Knopf, New York 1932.

[15] Matila Ghyka, *The Geometry of Art and Life,* New York, 1946; *A Practical Handbook of Geometrical Composition and Design,* London, 1952.

[16] L. Kahn, quoted in *H. Ronner & S.Jhaveri,* Louis I. Kahn: Complete Work, 1935-1074, *2nd. ed. Basel* and Boston, 1987., p. 98.

[17] H.P. Berlage, *Gedanken uber Stil in der Baukunst,* Leipzig, 1905.

[18] J.L. Lauweriks, "Het nut en doel Kunst", (Nothing New in Art) *Theosophia* 1907, cited by H.M. Tummers in *J.L. Mathieu Lauweriks,* Hilversum 1968; "Einen Beitrag zum Entwerfen auf Systematischer Grundlage in der Architektur", in *Ring,* Heft 4, April 1909, p. 34, cited by W. Pehnt in *Die Architektur des Expressionismus,* Stuttgart 1973. Peter Behrens and Lauweriks taught together in the architecture school in Düsseldorf; Adolf Meyer was one of Lauweriks' star students. Le Corbusier had already become familiar with theosophical reasoning from *L'art de demain* (1904) by Henri Provensal while studying under L'Eplattenier in La Chaux-de-Fonds.

[19] L. Kahn, "How'm I Doing, Corbusier", interview with Patricia McLaughlin, *The Pennsylvania Gazette,* vol. 71, no. 3, December 1972, Theosophia 1907, *cited by H.M. Tummers,* . 19-26, 1971, included in A. Latour, ed. *Louis Kahn: Writings. Lectures, Interviews.* Rizzoli, New York 1991.

[20] Anne Tyng, "Louis I. Kahn's "Order" in the Creative Process", from *Louis I. Kahn: L'uomo, il maestro",* , ed. A. Latour, Rome, Kappa 1986, p. 285.

[21] Graham Foundation letter of recommendation to Mr. Entenza, 1965, quoted by Brownlee & Delong, p. 60.

[22] Scott Brown, "A Worm's Eye View of History". 73. quoted by Brownlee & Delong, p. 65.