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Chapter 6 - Diagrams, pp. 99 - 111
"Envisioning Architecture" An Analysis of Drawing
by Lain Fraser, Rob Henmi

Diagrams

Diagrams are those drawings which engage in a self-conscious reductive process, attempting to make clear a specific interpretation through the exclusion of that information which the authors deem irrelevant. Yet the differences between diagrams and conventional orthographic, axonometric, or perspectival drawings are subtle and relative, making it difficult to establish a clear boundary. This relativity is illustrated by a series of eighteen axonometric drawings by Peter Eisenman of House IV (Figure 6.1). In subtly differentiated stages, the drawings indicate a rigorous transformational process based on a set of

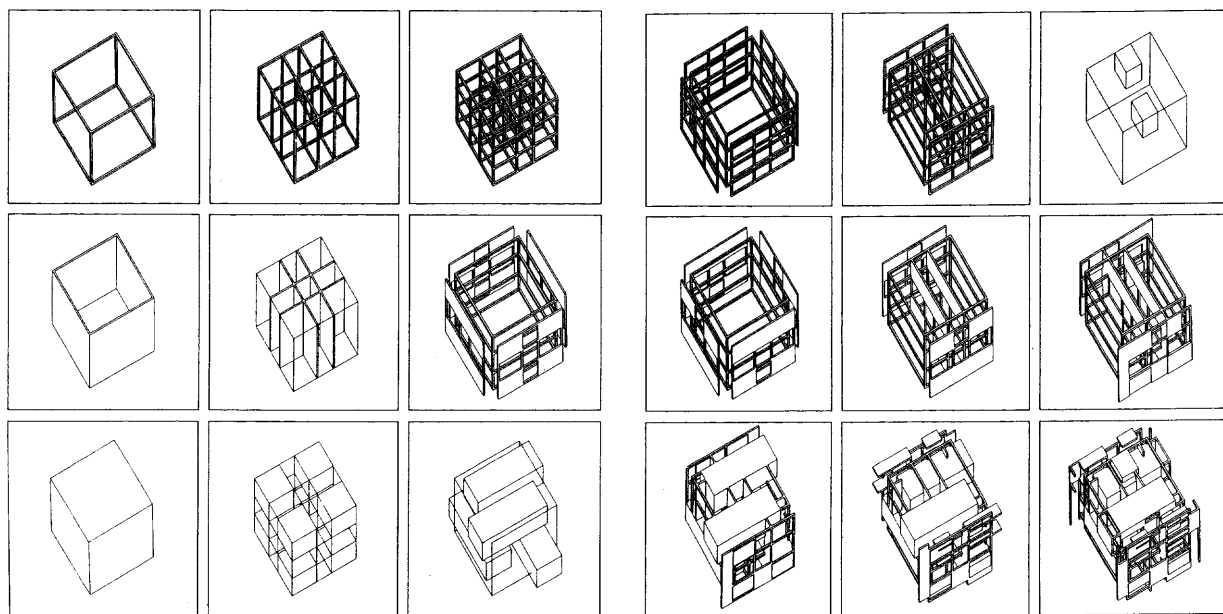
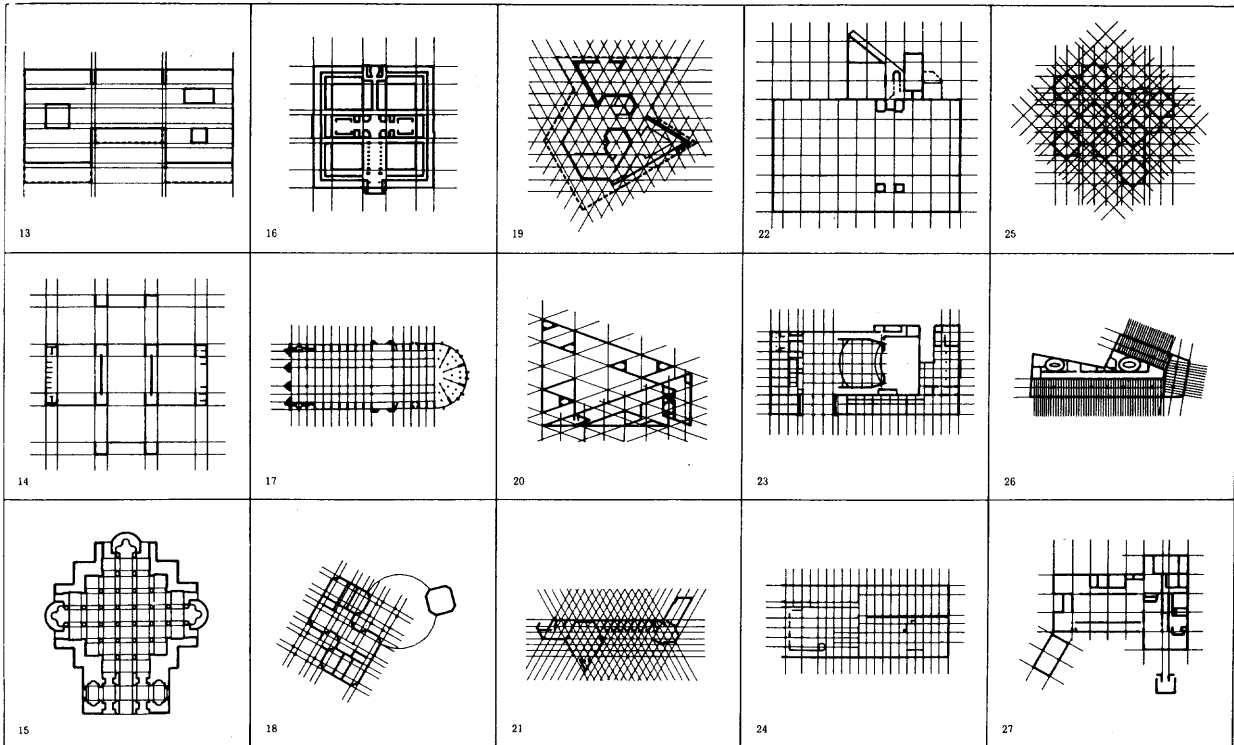


Figure 6.1 Peter Eisenman: Transformational diagrams, House IV, 1971. Plan obliques. (Courtesy of Peter Eisenmann, Architect).

predetermined rules. They show a sequence that moves both from top to bottom and from left to right. The top row depicts manipulations involving the frame, the second planar changes, the third volumetric transformations. As the drawings move from left to right, the articulation of space and mass increases. The “end” result may be seen in the last drawing in the lower right-hand corner, which gives the final configurations of walls, frame, and volumes.

In this sequence of drawings, is a diagram of the project found in the first or third or fifth column of drawings? How much does the information of a project need to be reduced in order to be defined as a diagram? Is there a point at which the act of elimination is too much, sacrificing important aspects so that the diagram becomes misleading, incorrect, or incomplete? In this set of gradually changing forms, each drawing to the left of another could be called a diagram of the other. Yet even the last drawing is still diagrammatic in the sense that it does not delineate many details such as window and door frames, roof edges, material changes, etc. This final drawing could still be considered a diagram when compared to a highly refined axonometric such as the drawings of the Electra Bookstore by Stirling in Chapter 3 (see Figure 3.4).

This set of drawings demonstrate that every drawing is an abstraction, where authors make choices of what and how to draw: a line for an edge; tone as a shaded plane; a scrawled pattern as texture. Each of these choices involve a process of elimination and reduction, subduing certain aspects while highlighting others. The advantage of diagrams is their ability to simplify the consideration of formal or conceptual qualities by minimizing the elements presented. Their essence is analysis. By isolating specific aspects of a subject, a diagram allows one to clarify other features and compare one subject with another or the same subject seen through different filters.¹ The possibilities of graphic codification limit the interpretive result, but the similarity of graphic format allows one to easily see two or more things in an equivalent way. Diagrams aim for clarity and conciseness, avoiding ambiguity and focusing on one specific issue in isolation. By establishing a consistent graphic filter, diagrams are effective tools to compare different situations. Discovering the common elements shared by buildings, spaces, or cities, diagrams give visual form to a specific issue or aspect. In a sense, they can generalize about seemingly disparate things, rhetorically presenting their specific interpretations and conclusions.



Roger Clark and Michael Pause aptly demonstrate this point in their book *Precedents of Architecture*, which was developed to compare the formal properties of noted buildings. In Figure 6.2, fifteen plan diagrams compare the effects of regulating grids on building composition. Collectively, they reveal a great variety of configurations that regulating grids may take, the role they play in the coordination of the designs, and the commonalities of geometric order in buildings which vary greatly in size, purpose, construction, and historical period. In each diagram, thin regulating lines of plaid, triangulated, shifted, or rotated grids appear as a background upon which the abstracted footprint of the building's plan is superimposed in thicker, bolder lines. The drawings depict regularities of pattern, rhythm, proportion, and geometry as well as variations, irregularities, exceptions, and the addition or insertion of unique and nonconforming elements.

The office of Richard Meier and Partners uses diagrams to serve a series of functions, including designing and presenting. They use diagrammatic sketches in the office as they design, helping to reinforce conceptual concerns and clarifying the development of the design to themselves. They also use diagrams to elucidate their formal and conceptual intentions to an outside audience. An example of the latter are five diagrams for their project for the Royal Dutch Paper Mills Headquarters Building

Figure 6.2 Roger Clark and Michael Pause: Comparative plan diagrams (published in *Precedents in Architecture*, 1985).

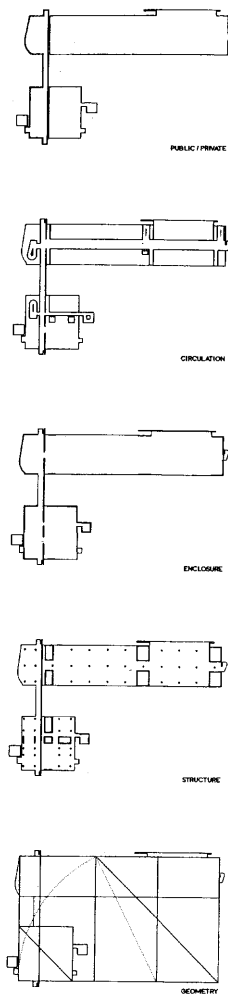


Figure 6.3 Richard Meier & Partners, Architects: Royal Dutch Paper Mills Headquarters, Hilversum, Netherlands, 1987–92. Plan diagrams.

in Hilversum, the Netherlands (Figure 6.3). Comparing each of the drawings to the first level plan (Figure 6.4) illustrates the ability of diagrams to reduce information of some types in order to increase clarity in other ways. For example, the diagram of structure eliminates all indications of partition walls, stairs, openings between floors, bathroom fixtures, etc. The drawing has stripped the plan to essential structural features, indicating at a glance one of the ordering principles of the building. In a similar manner, the circulation diagram clarifies the idea of two primary perpendicular linear corridors intersected by shorter cross corridors by simplifying their actual plan shapes. By eliminating many details such as recessed doorways and depicting the corridor with straight sides, the diagram clarifies the role of the space to be a linear connector. In the public/private diagram, the linear solid wall indicated in all of the diagrams can be seen as a formal element delineating the difference between functional zones. Here the drawing connects the role of a formal element to a conceptual ordering principle.

As illustrations of a singular issue, of geometry, public/private, structure, circulation, or enclosure, each diagram forces a viewer to see a particular aspect, to focus on a particular issue, in a sense to see the intentions of a plan. An author eliminates from a diagram all that he or she considers extraneous to its particular focus, showing a concentrated interpretation by extracting everything else. In these diagrams, eliminating information from the plan drawing helps clarify how this building has been ordered on a proportional system, how an important long stone wall acts as a conceptual divider between public and private, how structure articulates the circulation

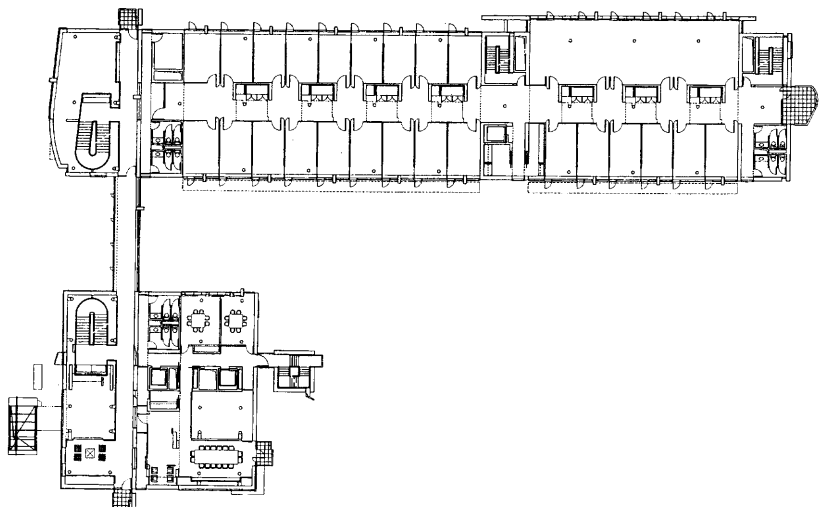


Figure 6.4 Richard Meier & Partners, Architects: Royal Dutch Paper Mills Headquarters, Hilversum, Netherlands, 1987–92. First Level Plan.

system and vice versa, how enclosure highlights particularly important spaces. Each of these diagrams is a wordless explanation, a mode of clarification.

In the Museum for the Decorative Arts in Frankfurt am Main, Germany, Meier illustrates the formal ordering systems of the building through plan and elevation diagrams. The five analytical diagrams (Figure 6.5) clarify the seemingly complex geometry laid out in the two plans by indicating the geometric order of the formal beginning points. In sequence, the set moves from the plan of the existing villa, to the villa inscribed in a sixteen-square grid, to a second grid shifted parallel and perpendicular to the alignment of the river, to a vertical line which relates to the site context, and finally to a new courtyard space, a void equivalent in volume to the existing villa. Having viewed the diagrams, the plans can now be more clearly seen as organized around sixteen squares with three of the four corner squares defined by the gallery spaces of the new part and the fourth by the existing villa. The diagrams make clear that the three corner gallery spaces reiterate the original villa in both size and placement. In addition, the oblique line of the skylit main circulation system can be seen as geometry derived from the alignment of the river. In other words, the diagrams show more clearly how the new construction is intended to make a conceptual linkage to the existing villa and river through the formal ordering systems.

Any drawing type whether orthographic, axonometric, or perspectival, can be used for diagrams. In an example of a use of an elevation for diagrammatic purposes, Meier uses four drawings (Figure 6.6) to formally link the facades of the original villa to the new building. The grid that overlays the facade of the original villa does not always correspond precisely to window openings and patterns, but the drawing demonstrates clearly the degree of correspondence and the discrepancies. Secondly, the viewer is left with the image of the gridded facades of both old and new, in effect seeing the two as tied together by a common regulating order. The diagram leaves its impression, highlighting the architect's intention.

When an architect needs to clarify or summarize a design or some important aspect of it in a quick, synoptic manner, he or she sometimes produces a "thumbnail" diagram sketch. By compressing a scheme into a compact format, as small as an inch or two, a "thumbnail" drawing presents a simplified,

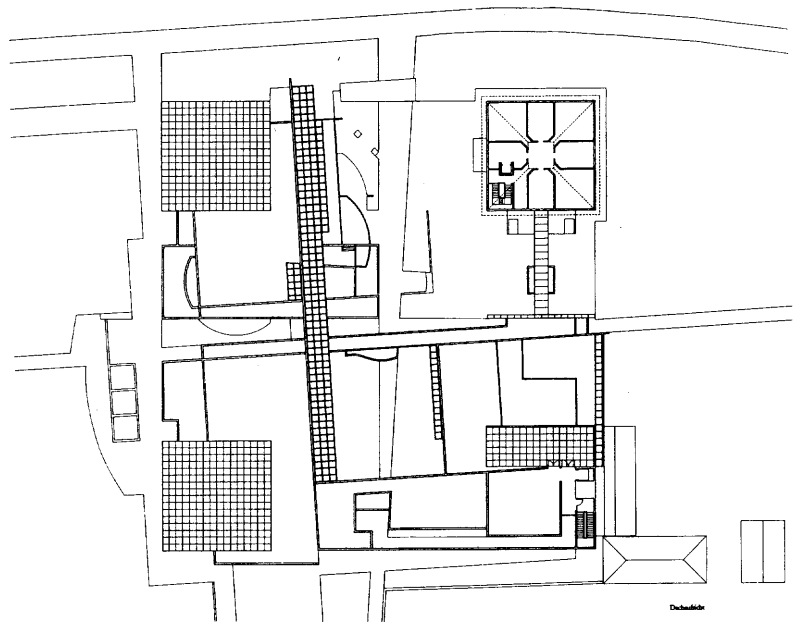
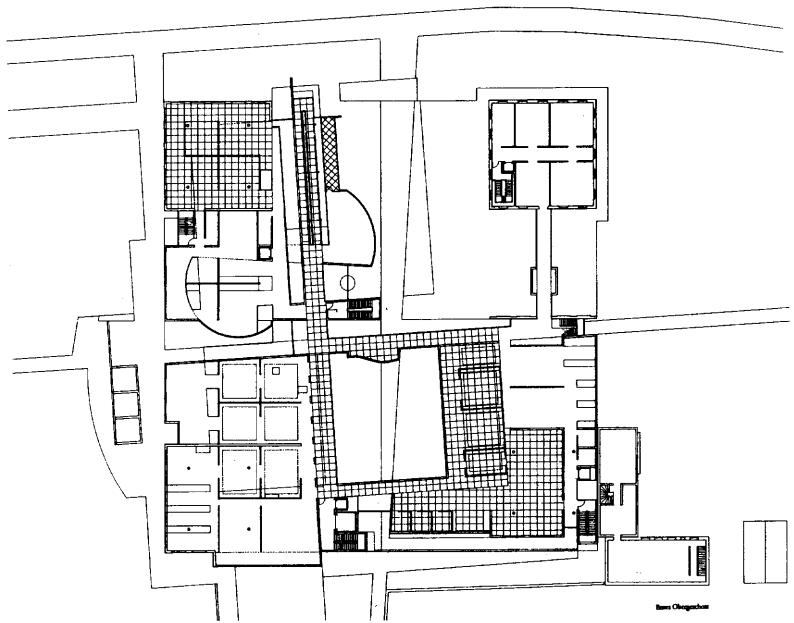
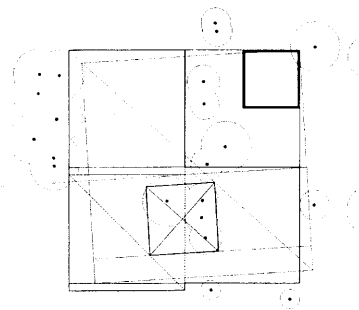
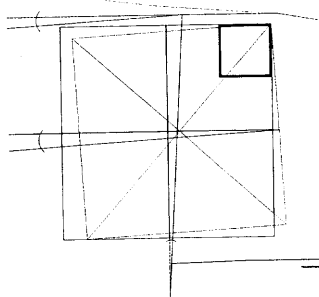
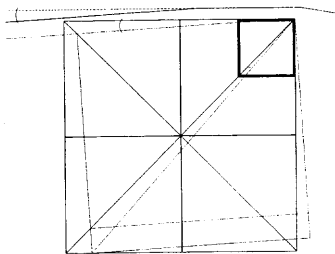
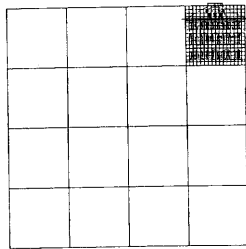
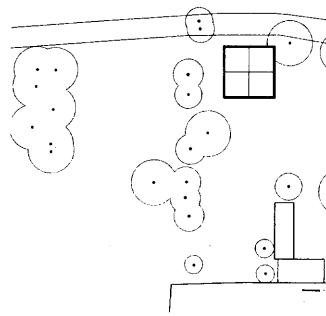


Figure 6.5 Richard Meier & Partners, Architects: Museum for the Decorative Arts, Frankfurt am Main, Germany, 1979–85. Plans and plan diagrams.

abstracted, and therefore diagrammatic version of a design. Its small size makes drawing details difficult, requiring each mark to be thoughtfully considered and significant. Because of the small format, each line becomes relatively large in proportion to the white space of the paper, increasing its individual impact and presence. An example is Figure 6.7, a series of sketch diagrams by Helmut Jahn of Murphy/Jahn for the State of

Illinois Building in Chicago, Illinois. The illustration is of two small sheets drawn one week apart, each only 5½-by-4¼ inches. In the series of drawings on the right, Jahn indicates eight different schemes through small plans and axonometrics. Each pair of drawings shows a plan and massing strategy, quickly and simply revealing through a consistent graphic format a set of formal and spatial possibilities. He contrasts a “broken donut” shape to a tower on the west or north, a “cut block plaza” to a “curved block.” The reduction of buildings to simplified forms allows a comparison of type and scheme by eliminating detail and specific articulation of these shapes.

In the second set of drawings to the left, Jahn uses quick cryptic graphic codes to diagram a treatment for the exterior skin and base. He uses simple abstracted patterns to symbolize treatment of arcaded base and glazed skin, eliminating detail in order to concentrate attention on the idea of the curved shape resting on a heavier base. Finally, a diagram of the site just to the right shows the footprint of the new project in the extreme upper left and indicates in solid black important buildings and their locations. The drawing emphasizes patterns and locations relative to open space, clarifying the relationship of new to existing.

A comparison of Arata Isozaki’s visually striking diagram of the Museum of Modern Art, Gunma, Japan (Figure 6.8), to a

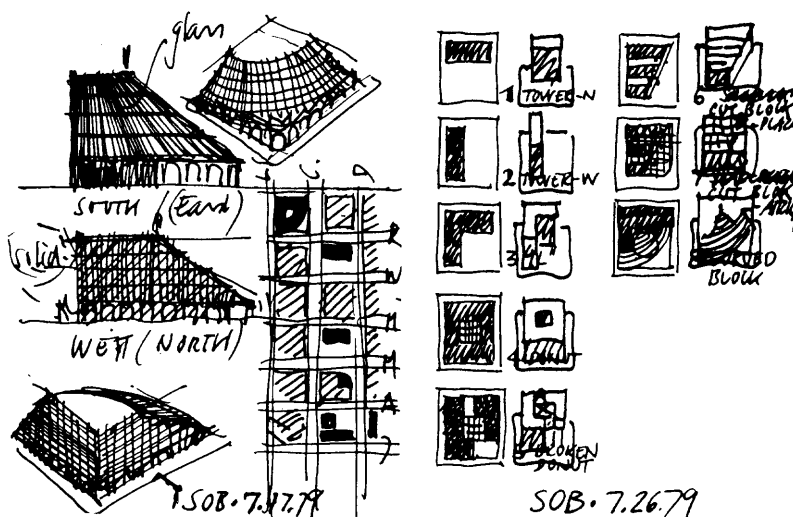


Figure 6.7 Helmut Jahn (Murphy/Jahn): State of Illinois Building, Chicago, Illinois, 1981. Plan and axonometric sketches. Ink on paper, two sheets, 5½" × 4¼".

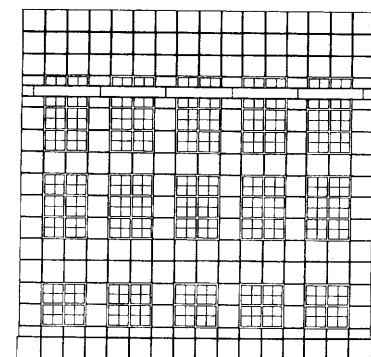
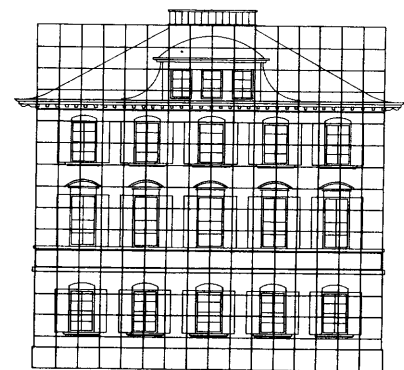
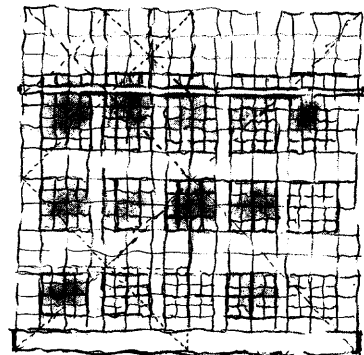
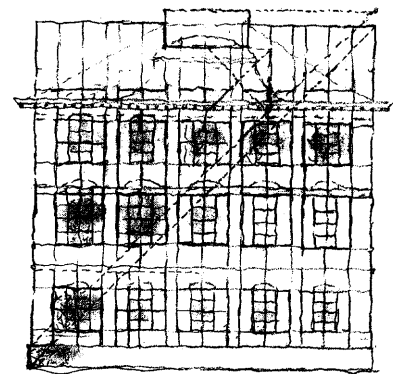


Figure 6.6 Richard Meier & Partners, Architects: Museum for the Decorative Arts, Frankfurt am Main, Germany, 1979–85. Elevational studies.

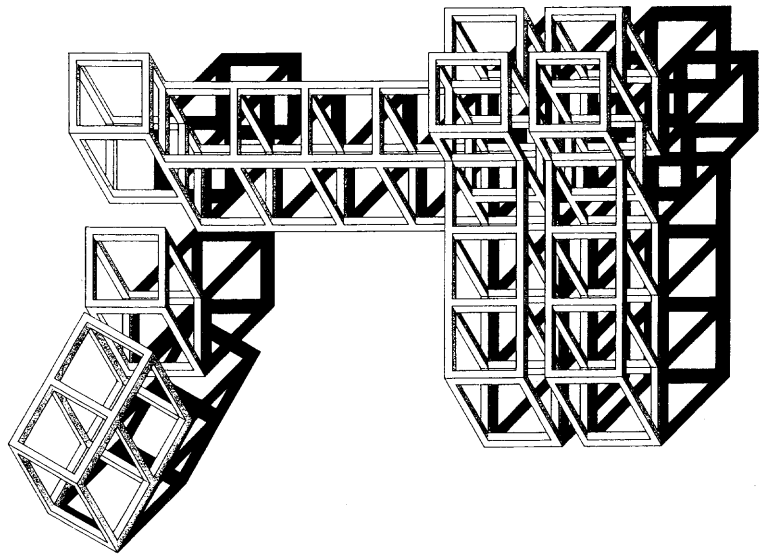


Figure 6.8 Arata Isozaki: Cubic frame study drawing, Museum of Modern Art, Gunma, Japan, 1971. Plan oblique.

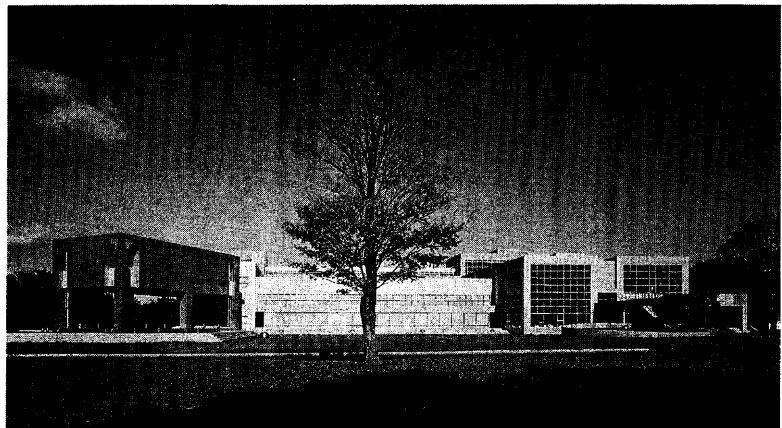


Figure 6.9 Arata Isozaki: Museum of Modern Art, Gunma, Japan, 1971. Photograph by Yasuhiro Ishimoto.

photograph of the built museum (Figure 6.9) demonstrates the capabilities of a diagram to remove elements and concretize a particular and sometimes obscure interpretation. The diagram indicates his interpretation of the building as a set of cubic modular frames. He has eliminated any indication of exterior skin, materiality, and interior spatial differentiations. Stark frames cast shadows on the ground, defining an abstracted and altered view of the building. The photograph depicts one view of reality, while the diagram clarifies a reduced but potent other.

Another reality that remains purely conceptual but clearly a force in the figural composition is the ideal of a sphere, diagrammed as a circle in the elevation of Thomas Jefferson's Library at the University of Virginia (Figure 6.10). Though

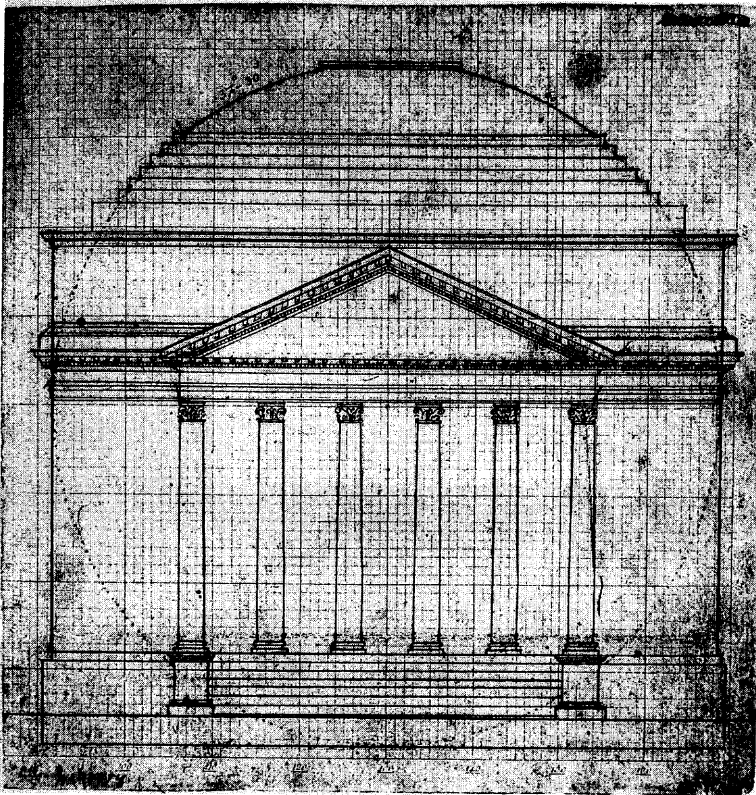


Figure 6.10 Thomas Jefferson: Rotunda, The University of Virginia, Charlottesville, Virginia, c. 1821. Elevation. Ink on gridded paper, $8\frac{3}{4}'' \times 8\frac{3}{4}''$ (Thomas Jefferson Papers, Special Collections Department, Manuscripts Division, University of Virginia Library).

represented in the building only by a portion of the roof and completed in the drawing by arcs of carefully spaced dots, it is the essence of the scheme, symbolizing wholeness and perfection and helping to order the geometry of project. Having experienced the diagram, viewers are predisposed to look for the wholeness of the circle/sphere and the idea of perfection both in the design and in the built form. The diagram becomes an icon of the ideal.

In Figure 6.11, Colin Rowe and Fred Koetter use figure/ground diagrams to make a dramatic graphic and conceptual comparison in their book *Collage City*. Two examples of contrasting paradigms for urbanism are presented: one of Le Corbusier's project for Saint-Dié and the other of medieval Parma. The striking drawings by Wayne Copper, where the "figure" or mass of the buildings is indicated in black and the "ground" or void of space is left white, highlight the reversal between the two designs of the proportion and configuration of public space to building mass. The clarity of the differences is a function of greatly reduced data: Information of height and use are eliminated, as are facade treatment, material, transparency, and entry, in addressing the singular issue of the relationship of

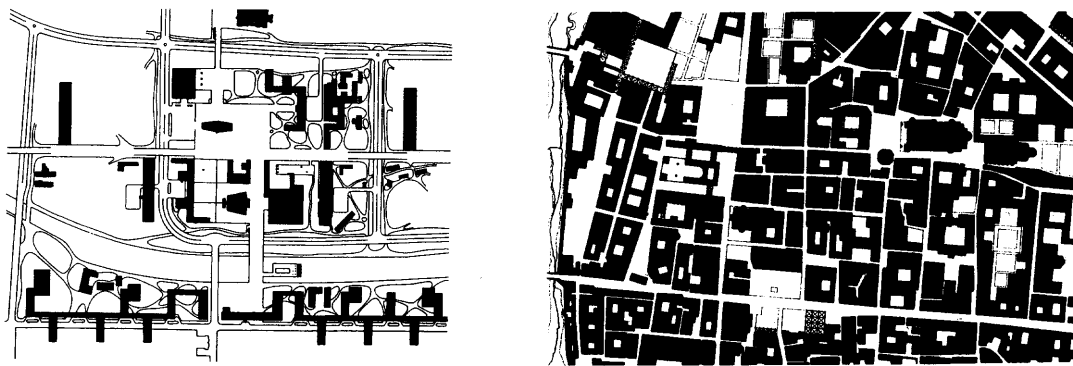


Figure 6.11 Wayne Cooper: Figure/ground drawing of Le Corbusier's plan for the city center, Saint-Dié, France, and of Parma, Italy (published in *Collage City*, 1978). Figure/ground plan diagrams.

solid to void. The selection of what to show (building footprint), how to show it (in plan), and what to leave out (height and just about everything else) are critical tactical choices in the debate. The contrast gives dramatic support and visual presence to an ideological point of view.

In a second example of urban diagrams, Rob Krier compares twenty-four different urban spaces (Figure 6.12), emphasizing the manner in which space is defined by buildings. Although these urban squares were constructed at times ranging from 1284 until 1971 and located in cities from Italy to England, the use of the same drawing construct (plan view) and the same graphic technique (line drawing with diagonal line hatching for tone) for each allows one to see them in an equivalent way. Dark hatched tones focus attention on white voids defined by the surrounding dark. What is clearly defined by the graphic technique is urban space (as a resultant void) surrounded and defined by dense building fabric with streets leading into the space. Solid and void, space and containment, figure and ground are brought out unambiguously and exclusively. Omitted from considerations in these drawings are aspects such as paving patterns and materials of the spaces, heights and elevational treatments of surrounding buildings, functional uses of spaces and buildings, sizes, colors, etc. Each of the illustrated squares *could* be graphically described and compared in a variety of other ways, but it is the ability of drawing to exclude information and thereby to highlight specific considerations that allows these spaces to be emphasized as space and to be compared in shape and access. Krier's method presents an edited, abstracted vision of a series of places that enables an equivalent comparison otherwise unperceivable.

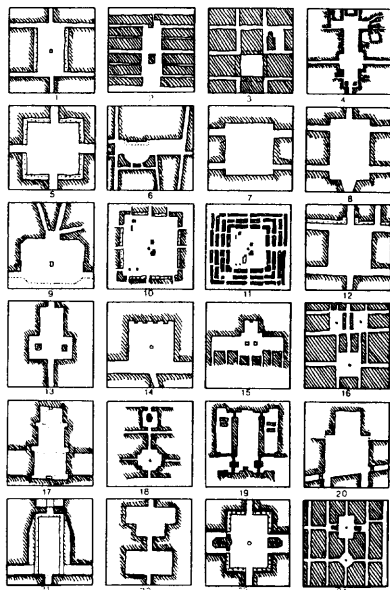


Figure 6.12 Rob Krier: "Orthogonal Plans for Squares," 1975. Plan diagrams.

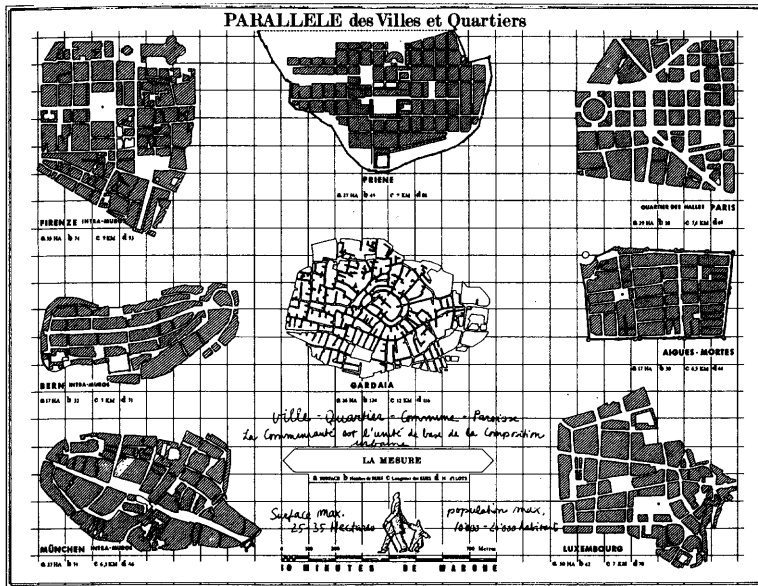


Figure 6.13 Leon Krier: “Parallel of Cities, the Human Dimension,” 1978. Plan diagrams.

Leon Krier graphically compares and contrasts seven European cities, relating places of very different character and quality to each other (Figure 6.13). Drawn to the same scale, with the same graphic technique and degree of abstraction, the drawings manifest commonalities of scale in block size and street width, pattern and size of open spaces, and of density of building mass. Representing different traditions and attitudes of city building, they are brought together on the same sheet and compared graphically and statistically. The shape and size of their urban spaces and the patterns and sizes of streets are shown in the common cross-hatching of the blocks. The streets and public spaces are represented by voids of white, while comparative statistical data is provided below each diagram for surface area, the number and length of streets, and the number of blocks. A final distinguishing feature of the drawing is the underlying grid, scaled and proportioned to walking time. Each square represents one hundred meters, eight of which take ten minutes to cross, allowing one to calculate pedestrian travel time. Thus each city is compared graphically by patterns of building masses and streets, quantitatively by cumulative statistics, and experientially by the measure of time.

Walter Gropius diagrammed the relationship of building height to open space in a set of highly abstracted drawings (Figure 6.14) in order to illustrate his ideas about the reordering of high-density dwelling on the hygienic criteria of fresh air, sunshine, and open space. His drawings promote an architecture based on these particular, radical, and quite limited criteria. For example, diagrams *a* (plan) and *b* (section) show

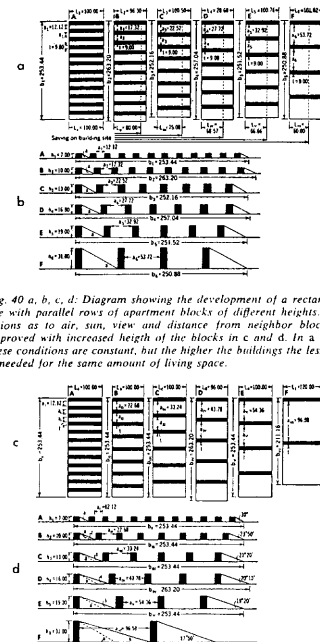


Fig. 40 a, b, c, d: Diagram showing the development of a rectangular site with parallel rows of apartment blocks of different heights. Conditions as to air, sun, view and distance from neighbor block are improved with increased height of the blocks in c and d. In a and b these conditions are constant, but the higher the buildings the less land is needed for the same amount of living space.

Figure 6.14 Walter Gropius: “Diagram showing the development of a rectangular site with parallel rows of apartment blocks of different heights” (published in *Scope of Total Architecture*, 1937). Plan and section diagrams.

that increased building height reduces the amount of land needed for the same dwelling area. Alternatively *c* and *d* claim to show increased “improvement” in conditions of air, sun, view, and distance from adjacent blocks. The diagrams are filled with quantitative notes on building height and site dimensions, distances between buildings, degrees of sun elevation, and cryptic algebraic notations comparing site dimensions or sun angle increases. The drawings have a particularly rational character, authoritative in their accurate and comparative measurement, but exclude many issues of mass dwelling and urban form, such as human scale, orientation, and access and connection to urban thoroughfares.

The drawing by Louis Kahn of downtown Philadelphia’s traffic flow (Figure 6.15) represents an entire type of diagram in which intangible factors such as movement, access, sound, view, function, and time are symbolized and thus given visible form. Buildings and other structures, sidewalks, streetscape, and park landscape have been omitted, highlighting Kahn’s particular focus on vehicular issues. Through its density of arrows and dots, the drawing gives the viewer an immediate impression of intensity of use and correspondingly the importance for traffic flow of specific streets. It shows directions of movement, clockwise or counterclockwise, around each block and eddies of flow created by the dominance of one-way streets. Also shown are areas which are effectively vehicle-free (parks and blocks) and those that are densely packed with side streets or alleys.

Every drawing can be considered diagrammatic in the sense that it involves a process of abstraction and a corresponding reduction of information. Each graphic selects parts of the infinite visual data available, interpreting reality through conventionalized or idiosyncratic filters. A plan diagram defines a plan in a particular manner; an axonometric diagram removes elements and therefore adds meaning of a different type. Diagrams offer the capability to take this degree of abstraction beyond the normal conventions of other drawing applications, pushing a level of reduction for rhetorical and analytical reasons. Intrinsically, therefore, diagrams critique and, in their act of reduction, increase understanding.

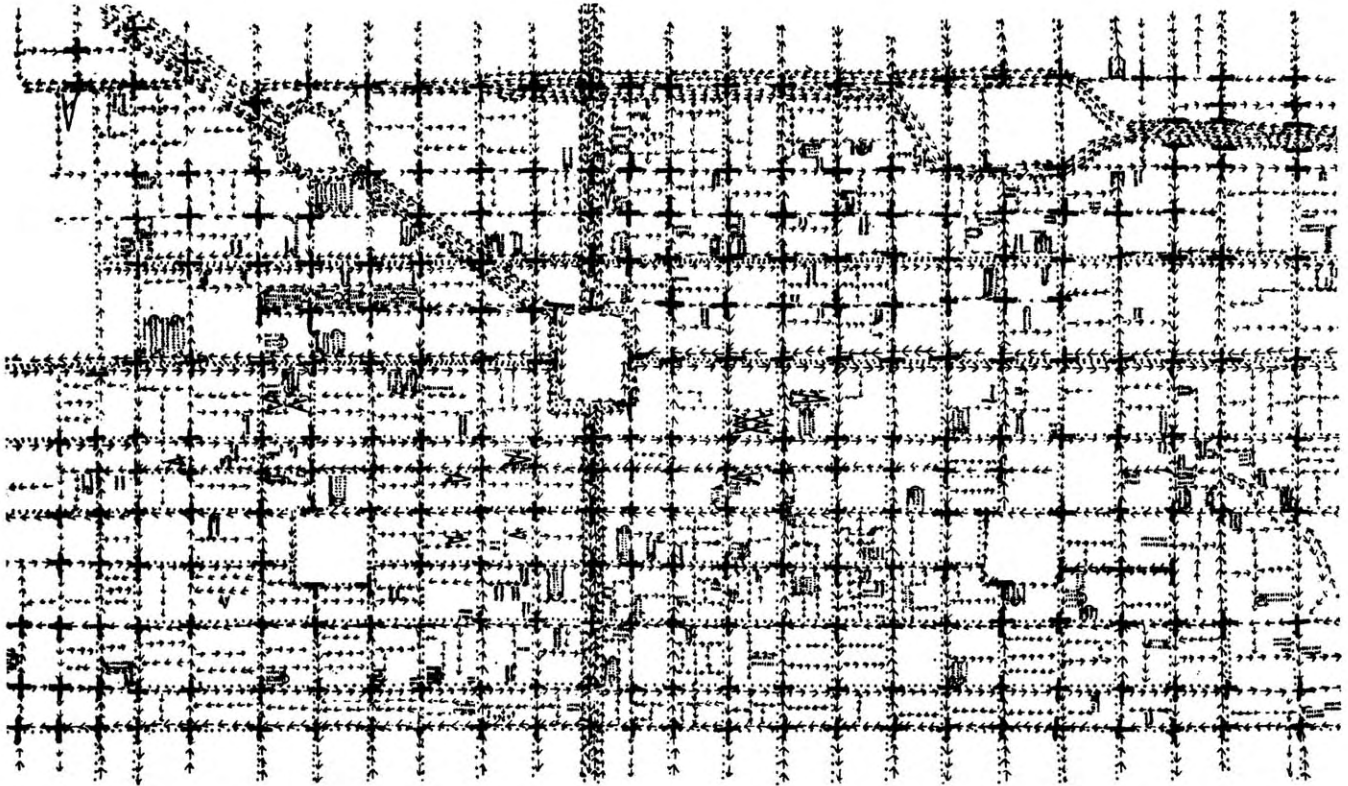


Figure 6.15 Kahn, Louis I.: "Traffic Studies, Center City, Philadelphia." Project, 1952. Plan of existing movement pattern. Ink on white paper, 25¼" × 42". (Collection, The Museum of Modern Art, New York. Gift of the architect).