

# Symbolic construction in non-discursive media: The design development of Kahn's Unitarian Church in Rochester

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## Abstract

The emergence of the final design solution of Louis Kahn's First Unitarian Church is used as a case to describe some characteristic aspects of the architectural design process. It is suggested that these characteristic qualities are explained if we consider architectural design as a matter of developing a non-discursive symbolic system. Nelson Goodman's theory of symbolic functioning is evoked to give a detailed description of the final design as a symbolic form.

## 1. Introduction

This paper is written in the context of an ongoing research on the relationship between architectural works and theories of space syntax. Below, I discuss an episode from Louis Kahn's design process of the First Unitarian Church at Rochester, New York, an episode that covered roughly a one and a half year period between January 1960 and June 1961. In an earlier paper, presented at the last space syntax symposium in London, I had suggested that architectural form is often governed as strongly by considerations of corporeal form as it is by considerations of spatial form, and that choices made at the level of corporeal activity can have serious repercussions (Bafna, 2003). In the current paper, I explore the question of what structures the corporeal form in architecture, and use the theory of symbols advocated by the late Nelson Goodman to propose an account of the manner in which Louis Kahn's design of the Unitarian Church achieved its final visual form.

## 2. An architectural case

Figure 112 right shows a set of floor plans for the First Unitarian Church designed by Louis Kahn between 1958 and 1962. The plans are different versions developed during the design of the second scheme and were produced roughly between June 1960 and January 1961. Such plans, depicting the successive versions of the designs produced, represent moments of relative resolution within the course of evolution of a design process. The activity of designing a building progresses in spurts, with sequences of relatively messy sketch design exercises focused on specific problems, interspersed with moments when the entire project is drawn out and the design is seen as a whole—a situation somewhat close to the moment when the painter steps back to consider his painting as a whole. It is interesting to consider what causes the change from one of these moments to the next. Often the factors influencing change are external, as clients react to the project, and as programmatic requirements are altered; at other times, there are internal issues, such as demands created by altering elements to meet engineering specifications, or when new problems emerge as a result of the proposed design. But in a few remarkable cases, it is

the architect himself who instigates changes, propelled by dissatisfaction with the manner in which the design is evolving. Such considerations are difficult to articulate, but it is these that offer the most insights regarding the design process.

A situation quite like this emerged as the detailed plan of Kahn's church evolved gradually. Within the sequence depicted above, the focus of our interest is version 3, where a thick undulating wall begins to appear in the plans.

Here is how Kahn himself described the move in a later interview (Kahn, 1966):

“At this point I felt this is the big change here: before, the window's flat. Here the windows are punched out of the walls. We felt the starkness of light again, learning also to be conscious of glare every time... If you looked at a Renaissance building... or a building in which a window has been highly accentuated architecturally - with its ... well, like this for instance: (Figure 112a).

This is very good because it allows the light that came in on the sides to help again to modify the glare. When you saw light on the side of a wall, it helped you to look and so I felt that it would be well to have a framing of the window and to have blinders on the side of the window to give you softness so that when you're not looking starkly out ... when you're in the room off at an angle you can choose to see the light directly or not, depending upon the reveal of the window itself. I felt a need to reveal. And this is the beginning of the realization that reveals are necessary.” (Figure 112b)

Ignore for the moment any minor embellishments that might have crept into Kahn's a-posteriori rationalization of the events, and consider this retelling of the design events. At one level, all that has happened here is that Kahn has found a treatment for wall surface that both solves a functional problem—the avoidance of glare—and also allows a more sculptural handling of the exterior wall. However, at a different level, Kahn seems to have achieved considerably more. Again, in his own words (Kahn, 1961, pp. 16-17):

“And this came about also because there was a desire to have some window seats - there's a great feeling that a window seat should be present because there is no telling how the room will be used ... it adds a friendliness, a hate [apparently an error in transcription here] of comfort and kind of getting away from someone and being alone even in a room where many are present ... this window seat had a lot of meaning and it became greater and greater in my mind as meaning associated with windows. And that is what it is. There is a true beginning of it in this plan. And it became really well expressed ... in this plan when the windows - instead of being so very prevalent as in this plan - became much more carefully considered. And the windows were in a place really you need them you see ... For instance, there's a window seat here on the first floor and there is another one on the second floor, but it is not the same configuration as the one on the first floor as the wall recedes inwards... (Figure 112c) It's a play really of wall and variety in the getting of various conditions around the windows which caused one to make these changes. And in some instances this window seat turns into a thing which you don't need at all above and that would not be expressed here.”

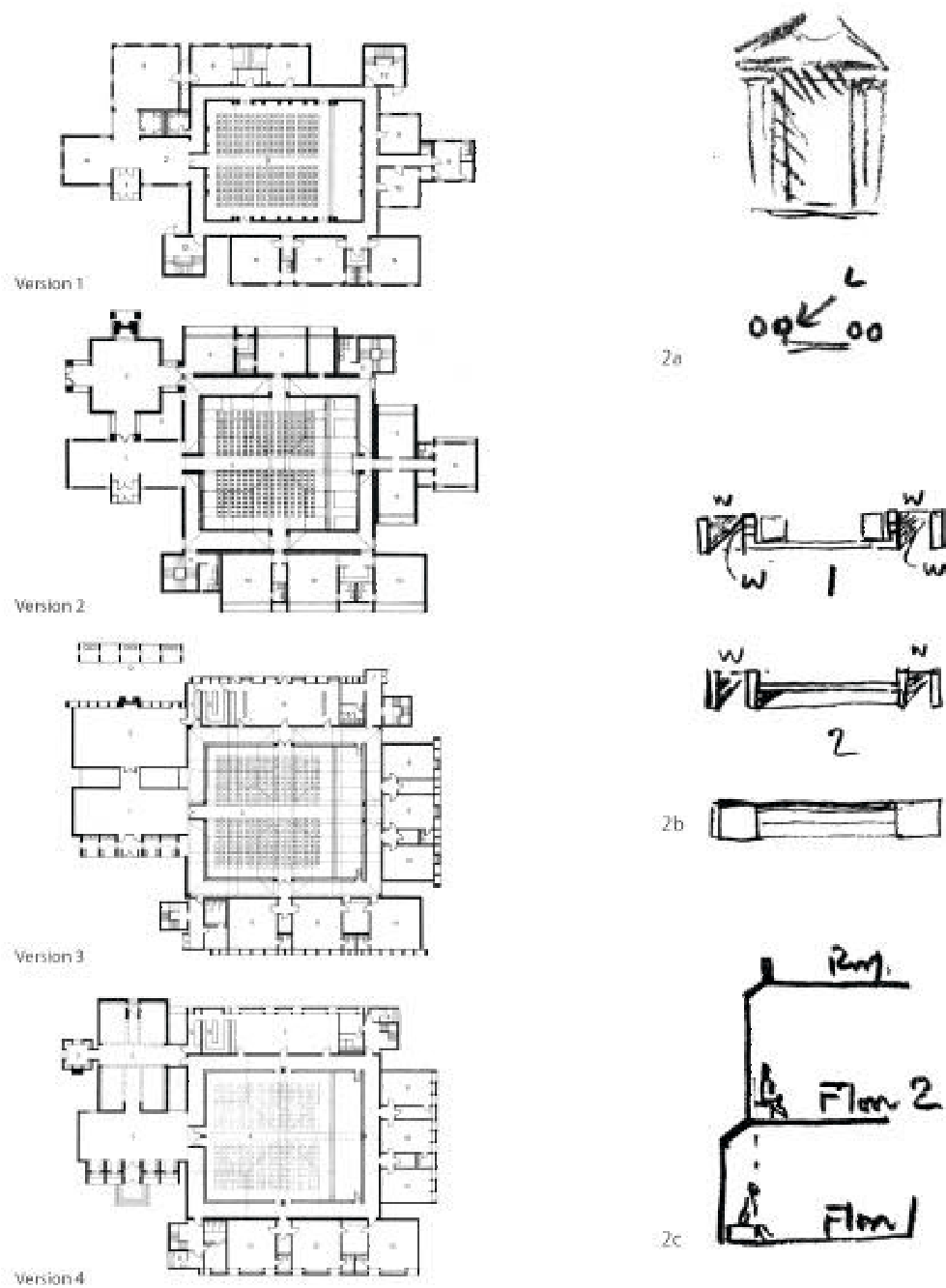


Figure 112: Right: Successive plans of the First Unitarian Church, Rochester, second scheme (c. January 1960-June 1960). Left: Kahn's sketches illustrating the development of the motif of the stepped wall with the boxed-window element. The sketches were made during the course of an interview with the editors of *Perspecta* and published in *Perspecta* 7: 9-28.

The implications of these statements are better understood in light of Kahn's larger architectural concerns of this period. Although Kahn had been in active practice since the 1930s, in the early 50s he had begun to develop a distinctive approach to architecture. An overriding concern for him from this period on was to instill a sense of permanence into his buildings, so that his work could match the dignity and poise of the ruins he had seen in Italy and southern Europe. In particular, he began to develop a style that severely played down the role of circumstantial factors as determinants of design. This meant two things, a reversal to the classical compositional attitude based on symmetry and an emphasis on visual expression of the weight. His vocabulary, however, remained resolutely modernist in its formal abstraction, in the use of wide spans, and in his disregard of axial movement paths. This contrast often set up an irresolvable conflict for Kahn in designing building façades, as the modernist ideal called for a functional placement of windows, doors, and other openings, while the classical sense of formal order called for strictly ordered apertures. Kahn had begun to experiment with a number of different design solutions to address this concern; this included expressing visually strong structural elements on the façade, or using large window openings with geometric shapes whose symmetries respected the verticality of the façades, but whose internal arrangements could vary with the functions housed behind them.

These concerns were played out in his successive designs for the Unitarian church as well. His first scheme, in 1959 had relied upon simple volumes, whose schematic programming assignments allowed Kahn freedom to formally organize his façades. Under pressure from the clients, however, he was forced to clarify the programmatic functions assigned to spaces, and the resulting spatial arrangement began to lose its formal order. Kahn's first reaction to this situation seems to have been to develop a formal arrangement based on the repetition of a modular unit. This was a strategy he had tried out before, in designing several residences. But apparently this was not a satisfactory solution. Economy demanded that different rooms be of different sizes, in accordance to their functions, and as Kahn tightened up the plan, the idea of single sized modules provided unnatural constraints. The resulting elevation shows this: whatever their function, the rooms have similar windows; and the need to fit the toilet slit windows on the façade composition makes the dimensions and locations of such service spaces rather inflexible.

The realization, which Kahn mentions in the quote above, of the significance of the reveal at the windows and the consequent decision to run a continuous jamb around them, not only resolved a number of his problems with a single stroke, but it also took his design further in a direction that he liked. The window seat and the stepped-in walls that developed out of this idea gave a specific character to the generic, multi-functional rooms which populated Kahn's plan; his planning acquired a necessary flexibility in terms of actual dimensions, without losing the strong visual order on the façades. We can see the gradual development of these ideas in the sequence of plans. In versions 1 and 2 of the second scheme, the walls are planar with windows that stretch between structural elements; the plan for version 3 shows the emergence of the fins, but these are treated as large elements that stretch from one end of the façade to another and are partitioned into regularly spaced bays. On the exterior walls of the workroom, the characteristic internal niche with undulating walls makes its appearance. By the time version 4 plans appear, this manner of articulation of the external walls has taken over all the sides of the plan, and the building as whole is now developing a distinctive sculptural character on its façades.

### 3. The structure of symbolic activity

This incident allows us some important insights into the nature of architectural design. Most of us as architects will be familiar with the way a minor change instituted for a local reason has a large effect on the entire design. Still, it is worth discussing why the change of windows—a local affair within the design process—had such an escalating effect on the design of the entire building. This is partly explained by recognizing that Kahn, in developing the design, was developing not just an appropriate form to house and manage a given set of activities, but was rather working out an architectural language that would give a sense of coherence to the emerging design. The term “language” is used somewhat allusively here, but it is appropriate in the sense that it recognizes that architectural activity is rule-bound. But architectural activity also transcends this sense of language, in that it is characterized by a concern about, and self-consciousness towards, rules that a designer thinks with, converting them into rules that the designer thinks of (Hillier, 1996). This self-consciousness towards the rules underlying his design made Kahn aware of a new set of possibilities in his design when he developed the window with deep reveals, and Kahn took advantage of these possibilities to reorganize his design. But this explanation is not quite complete, for it glosses over a crucial question: why should architectural forms be rule governed at all? One obvious response to this is that the rules govern the spatial forms of buildings and guarantee their sociological function. But Kahn’s concern in this case was expressly with the corporeal aspects of the building, not the topology of spatial form that governed its sociological functioning. Why should the corporeal form of a building be rule governed? The answer that I want to suggest is that the role of the corporeal form in architecture is not just to structure the topology of the spatial form, but rather to give it a coherent and intelligible form. It carries this function by operating within the context of a symbolic system.

Symbolic systems are a mediated form for presenting different aspects of the world. We can more simply understand them as entities that engender meanings by referring to matter extrinsic to themselves. The best account of symbolic functioning is given by the philosopher Nelson Goodman (1975). Symbolic systems range from languages, and notational systems, to productions in various media such as music, painting, and architecture. Goodman analyzes such systems into two components: a symbolic scheme, which is an ordered system of characters, and a compliance class, to which the scheme is mapped. The characters of the symbolic scheme are then to be understood as symbolizing those aspects of the compliance class that they map onto. In a musical notation, for instance, the written symbols for notes are the characters and the played notes, which these symbols map onto, belong to the compliance class. Characters, it should be noted, are not identified simply with individual, inscribed figures, but are defined as sets of such inscriptions (so that it is possible to allow minor variations in the writing of character symbols).

Works of art, according to Goodman, can be described as symbolic systems with very particular properties (Goodman, 1976, pp. 252-254). Works of art are typically characterized by a dense ordering of the characters, as is the ordering of members of the compliance class. Goodman (1976, p. 227) specifically points out that the specification of density applies to the ordering of the defined characters in the symbolic scheme, not to the actual inscriptions of characters in a work, which may be quite discrete. For instance, in a group portrait photo, the relative size of an image of a person is interpretable as a character that refers to the actual relative size of the person. Since, in principle, the sizes of people and their corresponding images can vary continuously within a range, the ordering of

characters here is dense, even if a finite number of persons are portrayed in the photograph.

Another requirement for works of art is that the characters in the character class be replete. Repleteness refers to that quality of character inscriptions by which any given property or aspect of the inscription of characters is significant, making it impossible to substitute a given inscription with an alternative, even if both unambiguously belong to the same character. This is the reason, according to Goodman, that it is very difficult to exhaustively describe the meaningfulness or symbolization in artistic works. Not only is the mapping to compliance endless in principle, it is also impossible to exhaustively describe the character class, since all possible aspects of the inscribed characters count as significant.

How does this idea play out in architecture? The first step is to recognize that architecture is a symbolic activity at different levels. At a rather straightforward level, there is the mapping from drawing to building; the mapping at this level is typically notational—the designer uses inscriptions on paper to discuss built form—and, at the moment, does not concern us. But symbolic activity also occurs at a second, less tangible, level. The domain from which the character class is drawn at least is clear. It is the domain of ‘building’—the physical artifact that is proposed, even if not exactly executed. The domain of the compliance class is less obvious. Provisionally, I want to define it as the materialized program of a building, taking the materialized program to mean not just the list of spaces with their particular requirements that architects use to design the buildings, but, following discussions by Hillier and Hanson (1984, particularly pp. 146-147), and Hillier (1996, pp. 246-255), as including, 1) the activity and behavior that may be observed in the building (what Peponis (1985) has called its “spatial culture”), 2) the perception of this activity by the inhabitants and visitors associated with the building, and, 3) the cognition of the distribution of this activity as an articulate and intelligible form. What architects do, according to this view, is essentially give cognizable form and sociologically relevant configuration to a given set of activities. It must be noted that although a generic “program” domain is available as a compliance class, each architectural work actually constructs its own specific program as the particular class of compliants.

This brings us to an unexplained problem regarding the definition of character and compliance classes in works of art in general. How, for a given work of art, are the character and the compliance class constructed? In the case of discrete notational systems, such an operation is relatively straightforward—individual elements of a character class can be systematically mapped onto individual elements of the compliance class. But if the character and the compliance classes are dense, then there is no pre-existing list of characters to be used to establish reference. There is, in principle, an endless set of possible characters. How, then, are the character classes and their corresponding compliance classes specified?

The only way to do this is to establish a principle of correspondence suggesting a mapping between the character and compliance domains. In other words, the mapping is not specified exhaustively for each character, but is rather constructed based upon an operational relation between the two domains. A good illustration of this situation can be seen in pictorial representations. Take a drawing showing a number of free flowing curves, either closed or reaching to the edges of the drawing, and drawn such that none of them intersects any other. If one now finds numerical labels attached to these curves, such that it is possible to read them as elevations from a fixed datum, each line can be read as a contour line. The entire drawing then can be seen as representing the topography of a landscape. This can be seen as a symbolic system mapping from a drawing to a landscape, and it has a dense specification of characters; any number of potentially interpretable contour

lines may be constructed between any two given lines. But what is most interesting is that the set of characters is not exhausted by the contour lines. It is possible, for instance, to define new characters—valley, hill, ridge, and slope—which were not initially specified, but can be described within the domain of the drawing and interpreted within the domain of the depicted topography.

#### 4. Symbolic functioning in the Unitarian Church plans

What I want to suggest, following this example, is that a key requirement for the specification of characters in dense schemes (and possibly in discrete ones as well) is that of figuration; one must have a systematic way of reading these schemes that acknowledges certain salient features within the dense ordering of the character class. But a densely ordered set of characters does not come intrinsically equipped with a structure that would suggest a figural reading. It is only through its mapping onto a compliance class that such a figural reading can emerge, a point that recalls Ferdinand de Saussure's discussion of the paradoxical nature of units in language, which has "entities that are not perceptible at the outset, yet (do) not (permit) us to doubt that they exist... (Saussure 1959, p. 107)", and, "the characteristic role of language... is to serve as a link between thought and sound under conditions that, of necessity, bring about the reciprocal delimitations of units." (1959, p. 112).

The development of the windows with deep reveals in version 3 of the second scheme for the Unitarian Church was one such act of figuration, as Kahn (1961, p. 18) himself recognized: "It avoids the development of a continuous roof line... it takes the boxed-in windows which reach all the way up to the corner of the rooms, and frees them as elements." (Figure 113)

This move changed the essential nature of the symbolic mapping in the project. We have seen how the first version was based upon a modular arrangement; the modules can now be seen as the basic figural elements of a dense character class. Operations like scaling and reorienting allow the modules to be mapped onto the class of programmatic entities—to elements like workroom, meeting room, class room and so on—producing the individual characters of the scheme (Figure 114). The entire design then can be seen as an interpretation of the institution being housed, making manifest a complex relationship of its constituent units.

The problem, however, was that the constituent elements of the compliance class were not those that emerged in design, but rather those that were pre-specified in the program. At its best, Kahn's architecture creates an original and unanticipated, but in hindsight an entirely natural, interpretation of the program by concretizing otherwise intangible programmatic entities. Such, for instance, are the scholars' towers in the almost contemporary Salk Institute at La Jolla, California. These elements not only work functionally, in the manner in which they are attached to the laboratories, but also create a rich, symbolic backdrop to the day-to-day activities of the inhabitants. The collection of towers refers to the community of scholars, all potentially visible from a single vantage point anywhere within the courtyard. The open porches on the ground produce an unexpected compliance class, as they make a subtle reference to the form of cloisters, carrying a long association with the sheltered life of scholars. In other words, once a basic principle of mapping is established—from the rooms in the towers to the individual offices of the scientists—a whole set of hitherto unspecified characters emerges in the built-form. The emergent characters



Figure 113: Kahn's sketch from *Perspecta* illustrating the boxed-window



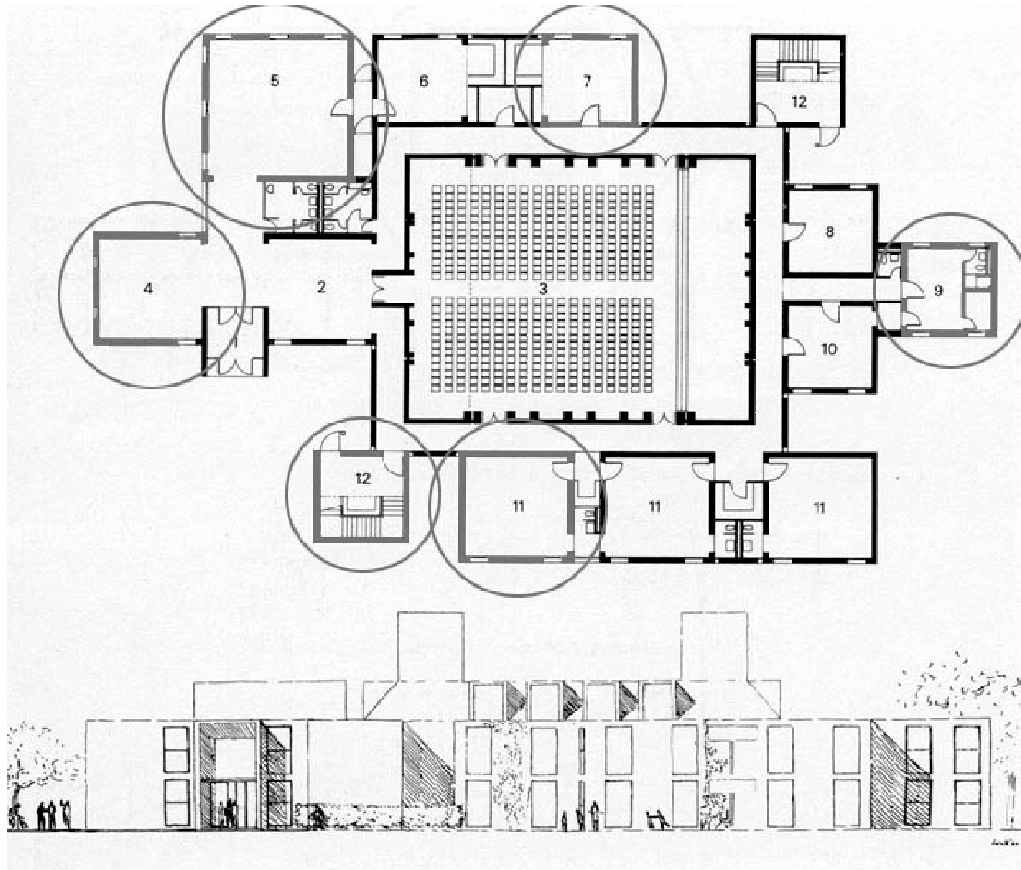


Figure 114: Version 1 of the second scheme for Unitarian Church (refer fig. 112, top). Plan, above and entrance elevation, below. Circles highlight different variations of the square module. Legend: 1. Entrance 2. Foyer 3. Sanctuary 4. Lobby 5. Meeting-Room 6. Kitchen 7. Workroom 8. Committee Room 9. Minister's Room 10. Office 11. Classroom 12. Staircase

do not merely make reference to aspects of the program, they literally bring a new program into being.

In the version 1 of the Rochester design, it is difficult to see any such emergent, interpretive, treatment of the program. The scheme allows for an indefinite set of characters, as a result of the density of the character class, but it is difficult to find emergent characters at any other level. Kahn's design activity in the next two versions was either concerned with the physical aspects of the built form—the structural system, the roofing system, the development of window elements—or with developing programmatic elements, particularly the shape of the meeting room. But the two aspects of design seem to be quite exclusive of each other. There is a syntactic coherence to the building in each of the three versions but it does not seem to translate into its semantic operation. The programmatic conception of the project had, since the beginning, been fluid and undefined (Kahn, 1961, p. 15). The direct mapping of the modules upon the programmatic elements brought that uncertainty into the visible form of the building.

In contrast to all these schemes, what the discovery of the boxed-window element allowed Kahn was to rethink the entire symbolic operation of the design. First, it turned symbolic activity away from the more abstract plan to the more material façade treatment (Figure 115). The treatment of the boxed-window as a design motif allows Kahn to develop a complex articulation in his façades, where he could simultaneously explore various aspects like modeling, rhythm, construction details, surface articulation, placement of constituent elements, and scaling of the block. Note the difference between the schematically outlined façades of the first version (Figure 115, bottom), and the carefully rendered ones of the fourth (Figure 116). Not only does Kahn exploit the sensual or experiential aspects of the façades in version 4, the design of the façades has an intellectual aspect as well. The rhythm seems to suggest complex rules involving symmetries, but, simultaneously, it also suggests freedom from rule-bound design solutions. Decisions such as locations of overhangs, the depth of reveals, sizes of openings, and punching of windows in the bays between the boxed windows all seem to be taken as locally needed with little more than a nod to any overall scheme of arrangement.

To some extent the use of the boxed-window motif is like his use of the module in the previous versions of the design. The module, like the boxed-window, was used parametrically; its scale, orientation, and order of fenestrations freely modified to suits its mapped programmatic activity. But the differences are significant. First, the module is a relatively abstract element, which does not entail any commitment to type of construction or material. Second, the module is a directly interpretable element, each instance of a programmatic label being mapped onto a specific transformation of it before the design was formulated. The consequence of the first property is to reduce the repleteness of the character set in the symbolic scheme underlying versions 1, 2 and 3. The consequence of the second property is to induce a certain amount of discretization into the scheme. The reference of the modules is relatively independent of the design as a whole, so they exist as more or less complete entities. In the end, specific design moves—changing constructional materials, construction details, sizes of rooms, or structural systems—have almost no effect upon the symbolic content of the design.

The boxed-window module, in contrast, was a concrete form, already imbued with a sense of material and construction. But what is fascinating is its formal quality; it is a strange mix of negative and positive forms, reading like a void at the bottom, but emerging as an object at the top (Figure 113). This allows it a rare repleteness with regard to its properties, and a potential lack of discreteness. It is not possible in this case

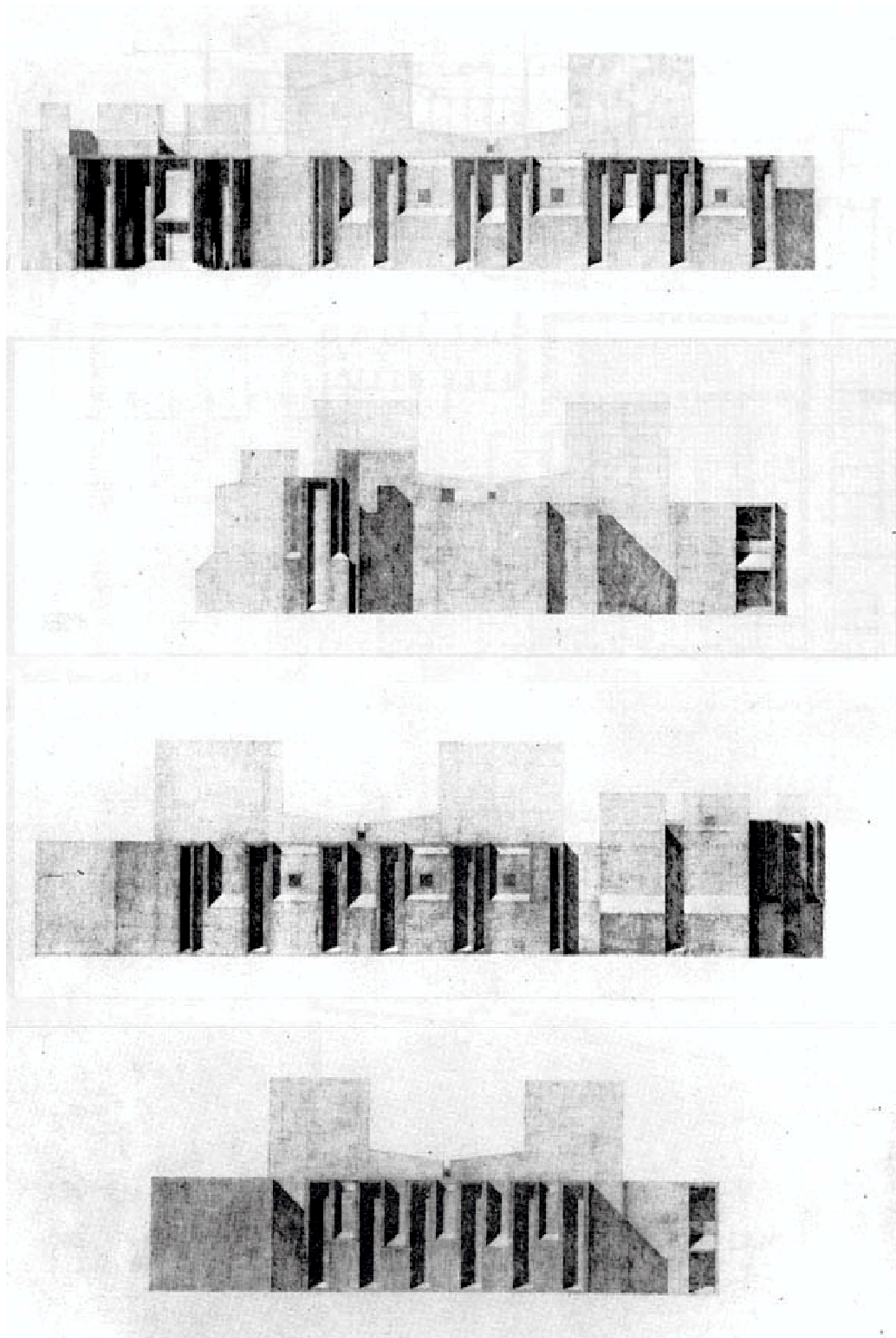


Figure 115: Rendered presentation drawing of the elevations of version 4 of the second scheme. The order of elevations runs clockwise around the building, beginning with the façade of entrance/classroom block at the top.

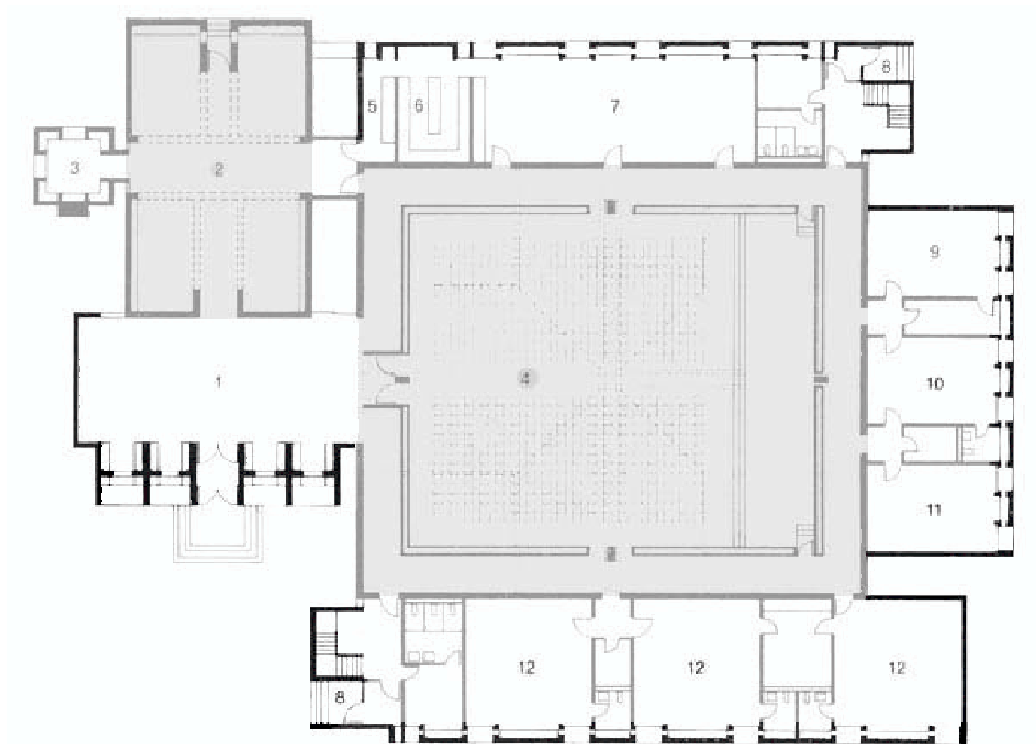


Figure 116: The plan of version 4, showing the deployment of fragmentary wall elements around the figural shapes of the sanctuary and the meeting room. Legend: 1. Entrance 2. Meeting Room 3. Inglenook 4. Sanctuary 5. Pantry 6. Kitchen 7. Workroom 8. Side entrance 9. Committee Room 10. Minister's Room 11. Office 12. Classroom.

to isolate the module as a character in symbolic scheme-it does not seem to have any direct interpretation within the compliance class of the materialized program. This means that the interpretive principle in the design operates not at the level of the individual motif, but at the level of the entire design within which specific characters (i.e., gestalt-type figures with specific mappings to elements of the compliance class) may be isolated. What the possible individual characters may be, however, is not such a simple question to answer.

One important quality that Kahn was able to achieve in his treatment was a complete integration of the elements of each of the façade into a perceptual whole while preserving a surprising amount of clarity in its articulation. The boxed-window, for instance, is a distinctively articulated element in each façade but it is impossible to subtract it from the façade without leaving behind an incomplete entity; in other words, although there are several figures in the façades, there is no real ground. Even the actual windows, which in the earlier versions are conceived as the figural elements in the façade, are placed in version 4 in deeply recessed bays, and so almost disappear in the renderings, leaving only the permanent and structuring features visible. The façades that emerge from this treatment have the quality of mystery and timelessness that characterizes ruins-a quality that Kahn is known to have been actively seeking during this period. Here is Kahn during the same

interview in which he discussed the First Unitarian Church, but this time describing his work on the American Embassy in Luanda (1961, p. 15):

“So therefore I thought of the beauty of ruins... of the absence of [window] frames... of things which nothing lives behind, and so I thought of wrapping ruins around buildings; you might say encasing a building in a ruin so that you look through a wall which had its apertures by accident.”

This point helps us formulate the basic principle of mapping underlying the fourth version. What Kahn achieved here was essentially a re-description of the institutional program in terms of “an architecture of walls”. But the class of characters here is not simply made up of parts of the façades. Potentially, it also includes overlapped, or fused, fragments of buildings that are produced by the complex figure-dominated modeling of the façades. It is such fragments, visualized, but not actually there, that offer an entirely new conception of the compliance class. The institution is now not so much an assembly of similar units, each housing a specific program (as in versions 1 and 2), but rather a complex fusing together of buildings around a sanctuary. The sanctuary itself is visually signaled not by a pyramidal roof as originally conceived, but by a wall with a distinctive silhouette.

This symbolic scheme also translates into the elements of the plan, which while keeping to the original conception of the individual programmatic spaces situated off a corridor running around the sanctuary, is now conceived much more in terms of fragments of walls surrounding the basic figural volumes (Figure 116). The ultimate result is that the entire design is endowed with subtle historical overtones. In Kahn’s own words (Kahn, 1961, p. 18):

“... the plan is strangely reminiscent of something which is derivative. You know, it is funny. The plan looks very much as the older Saarinen did it. It looks somewhat like it, and it came with very little consideration of it. It came by backing a façade to it, various ways which were brought to it and then the rightness of it...as you felt the rightness of it is what established it. It is very Gothic isn’t it? Does that bother you? I like it myself.”

## **5. Conclusion**

A significant methodological point emerges from the discussion above. The morphology of corporeal form is incomplete without a description of its functioning as a character class within a symbolic system. Such a description would include, as we have seen above, an understanding of the compliance class and of the sense of figuration developed in the form as a consequence. What is particularly worth noting about this description is that it allows us to directly the qualities that make it significant as an architectural work, and to make those an integral aspect of its morphology. But, what is also worth noting is that a discussion in terms of character and compliance classes shifts the object of analysis; our interest lies not in the structural description of the given work but in the structure of the symbolic system underlying it. The morphology of architecture is a morphology of a language not a morphology of objects.

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