Tectonics Considered. Between the Presence and the Absence of Artifice
Author(s): Carles Vallhonrat
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Tectonics Considered
Between the Presence and the Absence of Artifice

Carles Vallhonrat

Even if no one cared to ponder for long about how we build, it ought to be very clear, at least, that it is of consequence. Building affects us. The sensitivity toward physical constructions and spaces, like the sensitivity to mathematical notions or to music, is unique and cannot be acquired by borrowing or translating from another art, while not being a prime, conscious and finely developed sensitivity in all people. Building is of consequence also in that it exhibits the way we do things. What we build is proof of our consciousness, directness and powers of reflection, and the thoroughness with which we build is part of the meaning of delineated and configured spaces. If this were not so, we would be satisfied with merely representing spaces, and although representation is an immense art, we know that it does not contain the very essence of architecture. Representation is tentative. Drawings represent. We could place our drawings in three dimensions to represent space, but the wind would blow them all away. There is something terribly important in our understanding that representation is an experiment; we are overwhelmed by the finality of building.

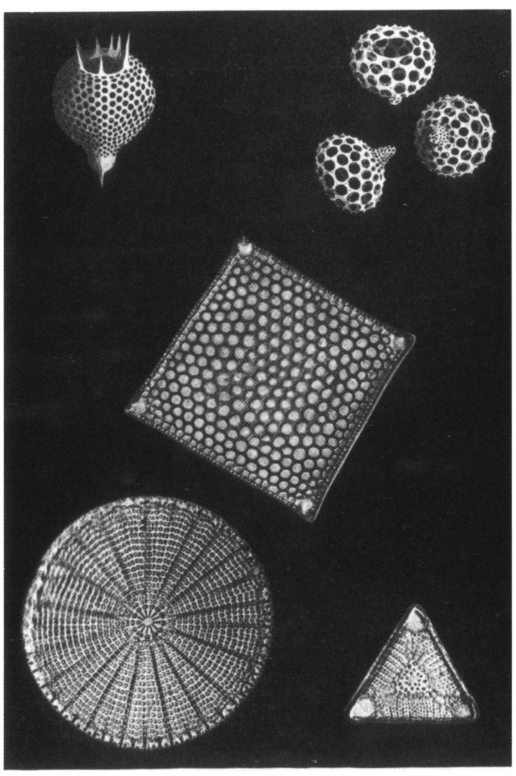
We must say then that it is important to build well. We have to understand the principles of tectonics. Must we do it to see that what we build will last the way nature lasts? Perhaps, but the grand craft of building can have a greater impact and be of truly fundamental consequence as a generating impulse at the origin and through the evolution of the work of art. If we feel compelled to make the intellectual distinction between the tectonic and formal ingredients of our compositional ways, we ought to see the role of tectonics as being part of those other formal ingredients. That its peculiarities be used in a highly expressionistic way or quietly subdued to other impulses is a matter to be defined by the overall compositional strategy. But it is within that greater plan that tectonics has its highest task.

Tectonics depends upon a very few fundamental aspects of the physical world. One, of course, is gravity and the physics that goes with it. Gravity affects what we build and the ground beneath it. Another aspect is the structure of the materials we have, or make, and a third is the way we put those materials together. How and why we do it affects the way they appear as the surfaces that bound space.

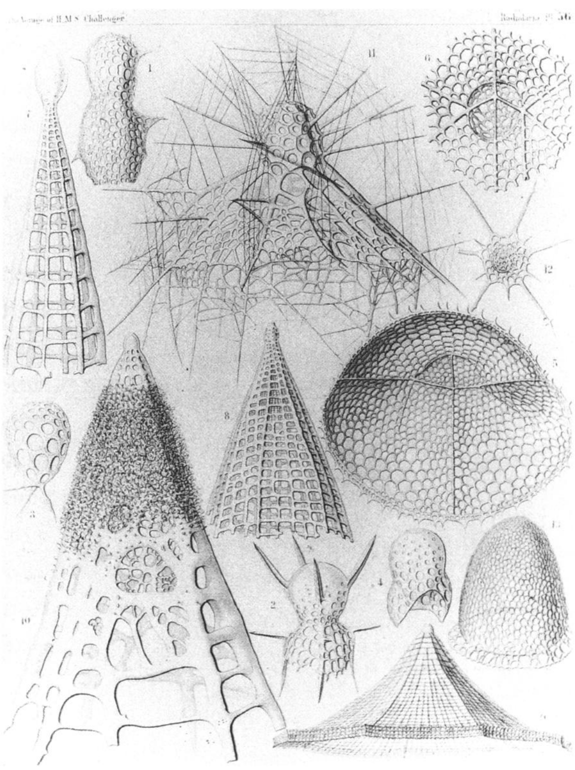
I remember a view of the enormous, heavy, cylindrical wall of Castel Sant'Angelo, its surface laced with embedded arches. Contiguous arches often come to rest on a common point which, in turn, rests on top of an arch below. I have wondered if the whole construction revealed the network of lines of travel of loads coming down to the ground, where it is easier to find fixity on points of support than to achieve sustained horizontal lines of support. Was it built this way? Was it done to avoid the breakage common to regular horizontal coursing in case of irregular settlement? Was it a way of allowing for a more controllable settlement as the wall was going higher and higher, so that any foundation displacement would not deform a too unforgiving geometry?

Gravity forces us to bring loads down, or up and then down. Little of our understanding of gravity and of how it affects our art has changed in this century. In FOUNDATIONS OF MODERN ART, Amedée Ozenfant shows several illustrations of radiolaria [2a,b]. Radiolaria are minute marine rhizopods that are found where the pressures of very deep waters make gravity an inconsequential force. A principal peculiarity of radiolaria is that the unique configurations of their skeletal structure seem to have evolved specifically in order to resist internal stresses and changing, external, dynamic forces. Their lesson, however inspiring, tells us nothing about the unidirectional force of gravity.

If modern engineering has found inspiration in the geometry of radiolaria, it has erred in taking them as literal models. Space-frames for instance, do not represent a solution to the problem of carrying loads to the ground, or to supports and then to the ground. Any structure made of struts, or groups of struts of equal dimensions, repeated *ad infinitum*, does not represent the trajectory of stresses traveling through the structure in their changing response to gravitational forces. Only multi-directional, external, dynamic forces could justify that kind of three-dimensional space structure. Some of the structures used in the space programs of NASA or Ariane, for example, are thus inherently justified. Here on Earth the unidirectional pull of gravity dictates



2a. Radiolaria.

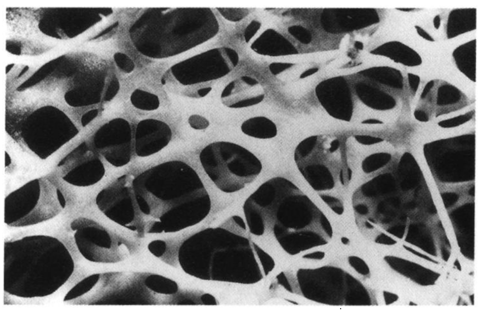


2b. Radiolaria.

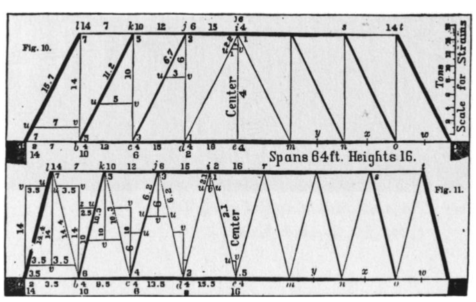
mathematically quantitative restrictions on the characteristics of materials and the limits of the stresses they can bear. These restrictions, in turn, determine dimensional matrices for materials and, with the notion of limits, comes the notion of edges. So, gravity breaks down infinity. We are thus presented with the counterpoint between, on the one hand, equal increments, zero weight, the very notion of infinity, and on the other hand, gravity, incremental stresses, and the notion of boundaries. Then, it is not contrived to say that gravity is bound space. Gravity makes us go from here to there. There is nothing open ended about that.

The French engineer Robert LeRicolais, who inspired so many architects in this century, used to have in his office a human skeleton and a photograph of a tibia, enlarged many times, showing that a bone is not only hollow, but a completely sub-divided space-frame with an immense number of voids. By virtue of its construction, a tibia can take both loads traveling downward and the lateral and rotational stresses of kneeling, running or kicking a ball – all while remaining very light in structure [3].

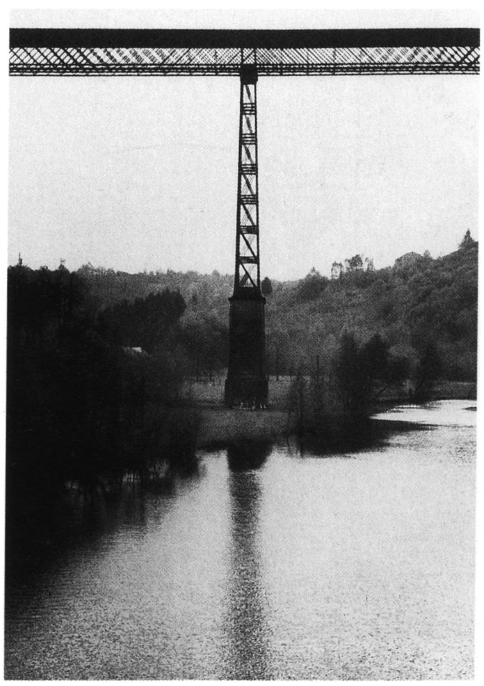
We, though, in our art, take gravitational loads most of the time in one of two ways, either down a column or wall or else, in the middle of a span, by way of a beam or several beams, a lintel, or an arch or slab. Columns are made as thick as they need to be for their axial loads and then fattened to avoid buckling, or instead trussed, somewhat like the inner structure of a bone [4]. From the assembly of these elements come others, such as capitals, keystones, tye cones and bearing plates. These elements are, to great extent, responsible for the sense of proper measure that results when we use them to delineate a vertical surface, to bring those ideal surfaces down. We break down infinity: weight and the characteristics of materials force us to subdivide. When we look today at Eiffel's aqueducts, we wonder if anything so dramatic as those structures has extended our understanding of gravity since the turn of the century [5].



3. Enlarged view of bone structure.



4. Diagram of engineered truss.



5a. Viaduct at Busseau (1864), Gustave Eiffel.

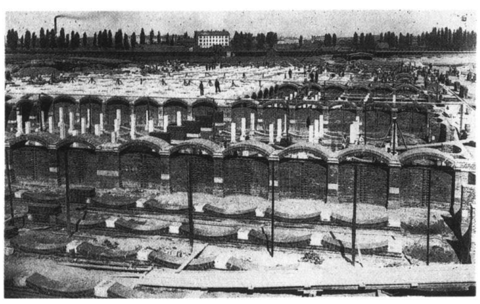
5b. Viaduct at Garabit (1880-84), Gustave Eiffel, detail.

Whatever we may build, and whatever its pertinence to the composition of our *urbes*, it is seldom of reparable consequence to the ground on which it stands. I have often thought that if a supernatural wind were to blow away everything above two feet from the ground in a city such as Washington, D.C., we would be left with an extraordinary reading of the city's substructure – its civil engineering works. Such a formidable armature would let us understand, like an archaeological revelation, the network of our civilized life.

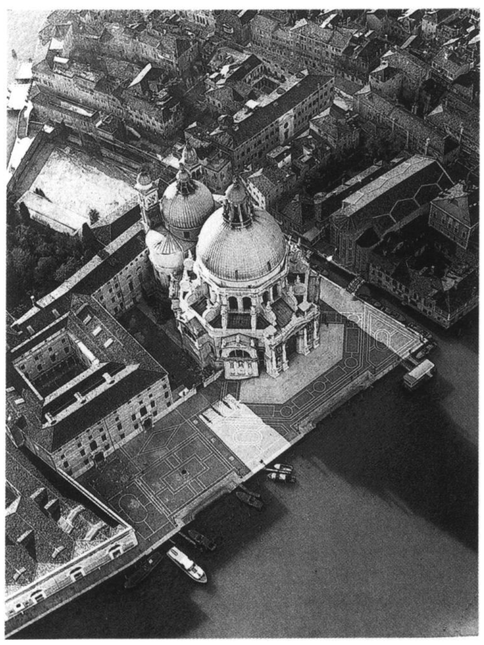
Before his book L'ARCHITETTURA DELLA CITTÁ was published, Aldo Rossi had been the assistant to the late Ernesto Rogers, then the editor of CASABELLA. If we look at those old issues, we see both the magazine and Rossi's writings full of illustrations, some real, some fictitious, which seem to represent a sort of archeology of architecture.

The building and its ground is an issue of intense drama and, archeology or not, its careful study is certain to dispose of any careless fantasies about the impermanence of the building's imprint on the ground [6]. At the most elementary level, gravity has as great an effect on the ground as it does on building. It is pertinent here to remember Longhena's La Salute on the Grand Canal in Venice [7]. The building is constructed on a giant solid cluster of wooden piles, a sort of immense *fascio* that occupies the whole diameter of the plan of the building (not the sort of *fascio* that Mussolini resurrected, seen in Terragni's Danteum, but one without the axe).

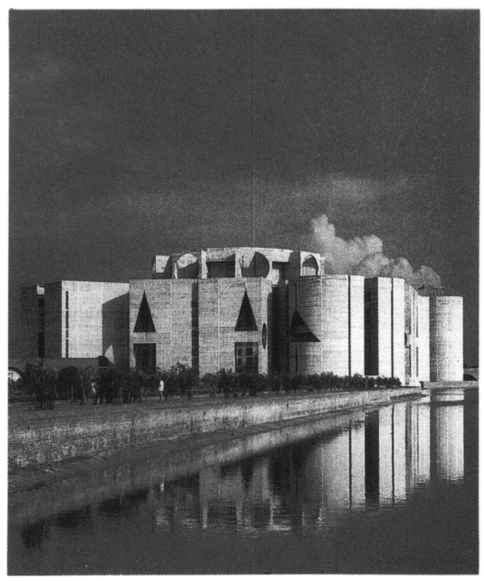
More recently, Louis Kahn's Parliament buildings at Banglanadar (once Dacca) in Bangladesh offer at least two lessons in the relation of building to ground. The soil on which they are built is alluvial. It has the bearing capacity of only 0.7 tons per square foot, close to that of a beach. Brick masonry construction, built on spread footings or a full bearing slab, cannot be heavier than the soil can take on the full area under the building. That amount of area can only bear so many bricks. Thus, one can build in brick only to a certain height before necessarily having to stop in order to avoid the collapse of the soil. That creates a plateau. Above that plateau at Banglanadar,



6. Waterworks, Berlin (1890).



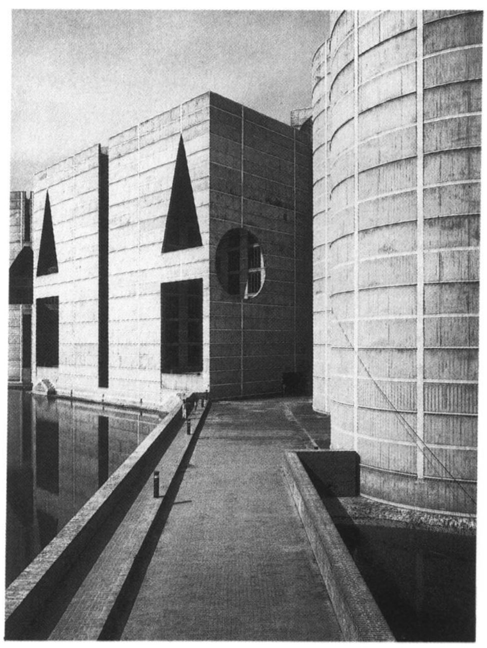
7. S. Maria della Salute, Venice (1631-82), Baldassare Longhena.



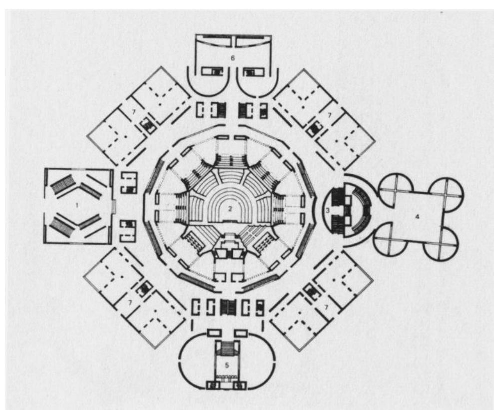
8a. National Assembly Complex, Dacca (1962-74), Louis I. Kahn.

the remaining structures are made of concrete, even though concrete construction was expensive for the then East Pakistanis, as the steel had to be imported from China. The concrete is built on concrete piles that are driven deep into the ground. In this case their bearing capacity is not equivalent to the area of soil they occupy, but to the friction between the sides of the piles and the surrounding soil all along their length, plus some bearing capacity provided by the ball cast at the bottom of the piles. The driving of the piles compacts the soil in the areas immediately against the shaft. That compacting pressure, which diminishes going away from the pile until it reaches an area of presumably undisturbed soil, determines the area of influence of the pile and that, in turn, determines the minimum distance between piles. Dividing the total area under the Assembly Building by the area of influence of each pile determines the total number of piles and with it the total weight that can be supported on that amount of area. The building continues to go up until the ground cannot support any more weight. Another plateau is reached, and there ends the concrete construction. Amusingly, the limitation on the permissible number of piles prevented the completion of the top of the Assembly Building with the concrete light hoods of the original design and forced the adoption of steel for the construction of the Assembly Room roof [8a-d].

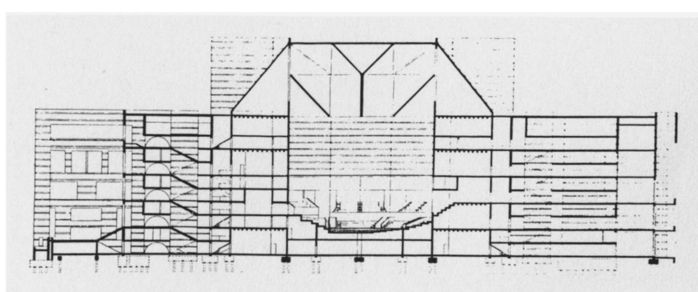
It is useful to remember that elementary experiment made in soil labs: a column on a large flat base is placed on top of a bucket of level sand and then water is added to the sand. Although the water occupies only the interstices between the grains of sand, the column becomes increasingly de-stabilized until it falls. Here the meaning is clear. No building exists without some soil work – this is a sort of permanence that will never go away. There is a certain inevitability between what happens above and below, a fixity of relation. One cannot disregard the enormous importance of the plane separating above and below. That plane is basic to the tectonics of building. If we have to build that flat plane in the open, we must pay attention to draining water well, and thus to the



8b. National Assembly Complex.



8c. National Assembly Complex, plan.

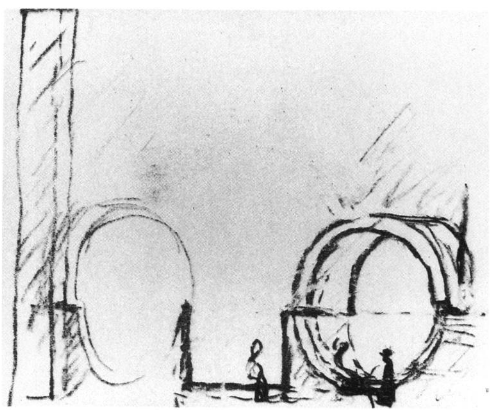


8d. National Assembly Complex, section.

geometry of slopes. That is what we do to build terraces and gently paved areas. It is the beginning of our taking possession of the land.

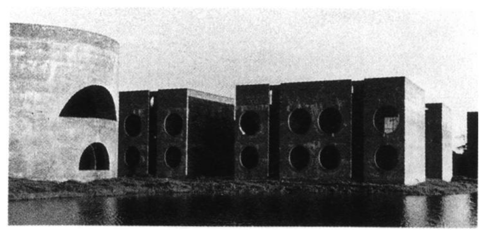
The subsequent realization is that soil, more often than not, is not after all a material that gives an easy fixity of support because of its granular nature. The case of foundations on rock can only be listed as an exception. A line of support is at best an assembly of points of support, and as such can only receive loads the same way. The consequence of this is that one can only assume a fixed horizontal line of resolution of loads only with great care.

Kahn and the structural engineer August Komendant were discussing one day the problems of the construction of masonry arches in earthquake zones. Komendant had just explained that the forces surging up from the ground during an earthquake were equal to those bearing on the arch under normal conditions because it is the same weight of the building that the soil is responding to during an earthquake, although in an upward direction. "Then," said Kahn, "if I draw an upside-down arch under a right-side-up arch, I have the right solution?" "Yes, that's right," said Komendant. Think how many double arches (holes) this has produced in places outside of earthquake zones! Some time later Kahn found a diagram explaining that same resolution of arches in earthquake conditions in one of Leonardo's Notebooks and was immensely pleased [9a,b].



9a National Assembly Complex, sketch of brick arches.

The question is often asked as to whether there are other materials significant enough for our work to belong to the basic repertoire of wood, stone, brick, steel and glass. We quickly think of concrete, of the work of Perret, Le Corbusier and, closer to our modern American heart, Louis Kahn. We do not seem able to forget that the first experiments with cast concrete were made by people working with plaster castings. The casting techniques and the inherent plasticity of the new material, rather than the advantages of the stronger mix, seem to have dominated the interest of Perret and Corbu. Kahn, with his profoundly philosophical mind, saw in concrete the potential for being the new material creation of modern man. He truly believed that the chemical

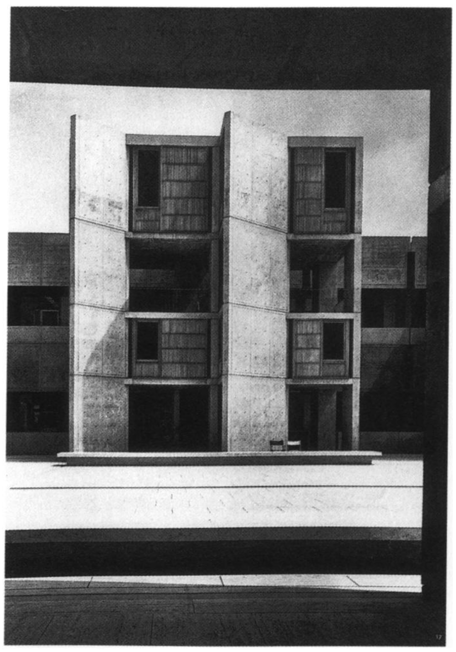


9b National Assembly Complex, brick arches.

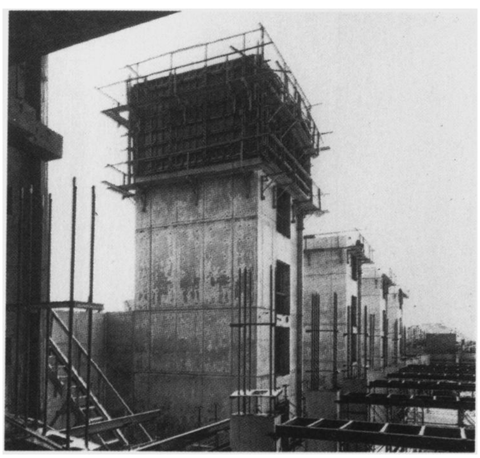
phenomenon of concrete's composition and transformation during the complex curing processes had its parallel in the natural phenomena that had always given us materials. The analytical methods that were simultaneously developing in the engineering of concrete interested Kahn less, perhaps because these techniques hinted at a sort of ingenuity that did not get to the nature of things but seemed, rather, to force a strict correlation between computational equations and shapes – too often one equation at a time.
The developing techniques required a specificity in the analysis of stresses that it was not in Kahn's nature to like.

There is perhaps a greater display of the nature and range of concrete work in the Richards Building and the Salk Institute than in any other pair of works by any other architect in this century [10a-c]. This is more because they display how concrete is made than because the behavior of the material is expressed in the construction of the buildings. Concrete – these days one always means reinforced concrete – is a complex material. The buried reinforcing obscures the fact that it can have its properties as an isotropic material either affirmed or denied by the design of the reinforcing. By the time we make the geometry of the reinforcing cages emphasize the linear path of stresses, we are equating the behavior of concrete with that of isotropic materials like wood and rolled steel, or extrusions where the long fibers of the material, or its shape, allow the structure to take stresses that are different along at least one of the three x, y, and z axes.

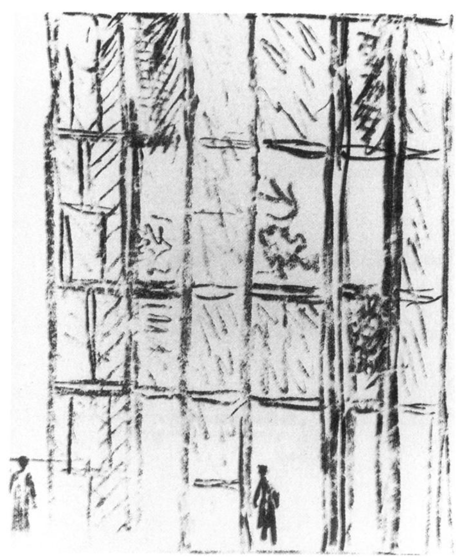
Because of the way in which concrete buries its reinforcing, it would be necessary to use some kind of X-ray machine to discover the truth behind the surface. Of course technical drawings show the steel reinforcing, but regular, devoted observers read form. It is form that makes the art. The miracles must be miracles of form.



10a. Salk Institute, La Jolla (1959-65), Louis I. Kahn.



10b. Salk Institute, service towers under construction.

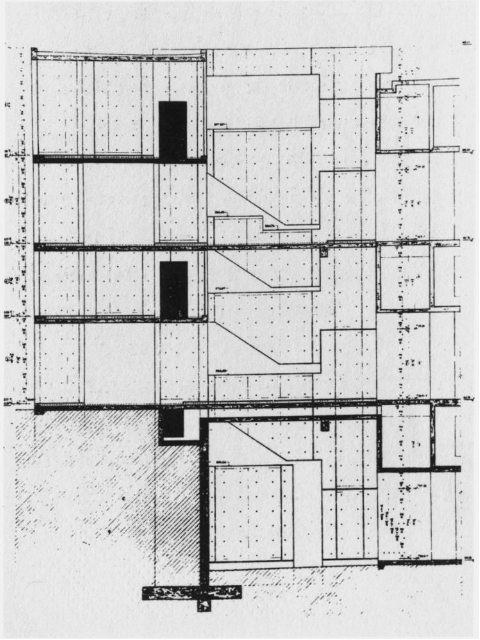


10c. Salk Institute, sketch.

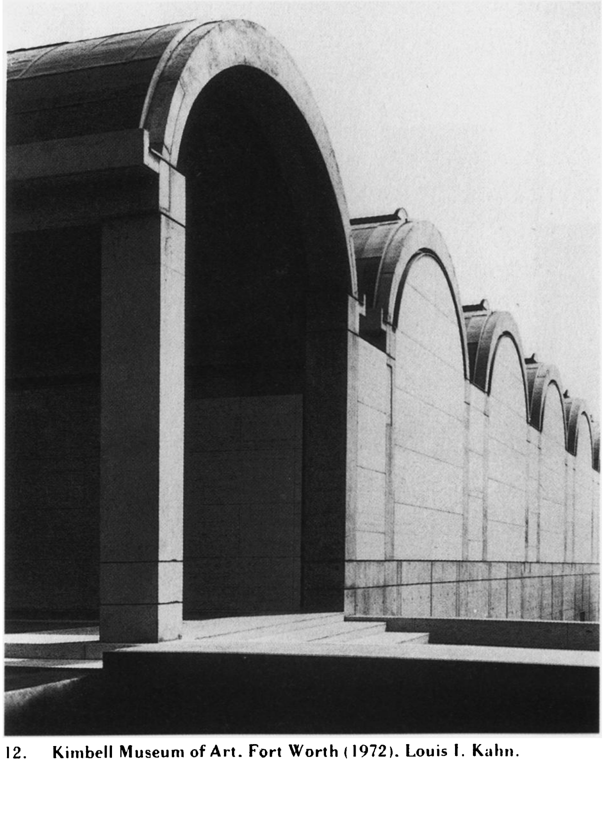
Those who study concrete as an architectural material without studying the history of its engineering development may find it perplexing. Since the work on the design of the Salk Laboratories, I have felt that the way those wonderful walls were made has had more influence on our contemporary understanding of concrete than has any other building of the last three decades. Kahn at Salk made walls greater. The greatness of those walls comes from the way they show how Kahn made them and, as he was very fond of saying, because of the way they "told, tell, and will forever tell" the way they were made [11].

Walls are generic elements, conceived of as having a very elementary task. Walls have no structural complexities; their principal job is to resist overturning and, when carrying a slab or a roof, they generally bear simple loads. Yet the imprint of the form work and the screw tie heads is a limited representation of their behavior or of the nature of concrete. At Salk it is easier to understand the walls than the intricacies of the more sophisticated parts of the structure, particularly the post-tensioned Veerandal trusses and the box girders. If the fact that the building is designed to resist earthquakes is added to these complexities, the intricacies become even more indecipherable.

Along the years, Kahn became interested more and more in the separation of elementary forces and in the simplest structural forms: compression, in a column, an arch, a vault; and tension, in a post-tensioned beam, a cable running straight down or in a catenary. The closing beams at the end of the roof vaults at the Kimbell Museum are a case in point [12]. At a certain moment in the design work, Kahn could not get the profile he wanted. The depth of the arching beams (they are not arches) at the end of the vaults is greater in the middle than at the supports, to his great regret – or fury, rather. Komendant, the engineer for that job, had developed and drawn six possible profiles for those beams, all tapered. That Kahn wanted a profile of even depth



11. Salk Institute, working drawing of concrete formwork.



12. Kimbell Museum of Art, Fort Worth (1972). Louis I. Kahn.

without stress-analysis specificity either had not been said to Komendant or else Komendant had not wanted to hear it. The calendar was catching up with the job. Komendant cantankerously refused to resolve the seventh profile, and Kahn had to live with it. The profile looks wonderful today only because Kahn's hand and sense of line and proportion could make most earthly things look glorious once he put a piece of tracing paper over them and retraced them. But the present profile of those arching beams does not express literally the beauty of the elementary outline that Kahn saw in those cycloidal vaults.

I do not know when the word technology started to be used extensively, but I suppose it was after the Second World War. Technology has been of only limited consequence to architecture, I think, principally for two reasons. One is that our understanding of the behavior of materials of use to architecture has not changed significantly in that time, and the other is that the development of materials has advanced at the service of industries and purposes generated by those outside our field. So all the progress in developing new materials serves us less than it might and, of course, compared with the technological advances in science generally, what new technology there is for architecture can only be viewed as a limited achievement.

The one technical innovation that has affected our art is the increase in the size of the increments with which we build: the size of glass, or the size of rolled steel, for instance. This development has brought about a change in our sense of scale, for the sizes have changed in relation to our customary cultural sense of good measure. This increase in the size of construction elements has also tended to make more remote and unclear the sense of the articulation of parts that one used to use to facilitate a reading of the behavior of materials. An enormous portion of Eiffel's beautiful aqueducts could today be made with one single rolled-steel I-beam. This is indeed an artistic catastrophe. A catastrophe for what it does not let us learn, a catastrophe for being bigger without being better, neither in its configuration nor in its use of the material.

The new fabrication equipment and tooling are, in fact, an explosion of the notion of the crafts as we understood them in the past. The extraordinary revolution in manufacturing that has come with the introduction of automation and computerized systems has not, in this country at least, touched the construction industry. That extraordinary technology has already the capacity for affecting the way we shape things now, but no such changes have reached us. Seldom has a new technique altered the imagery of building with anything less than a full cultural transformation. The evolution of Gothic structures and the development of modern construction, with the appearance of carbon steel in the second half of the nineteenth century, are cases in point. Such transformation requires a fusion, a oneness of formal and tectonic creativity that must be absolute to exist.

An enormous anxiety and desire for that level of creativity exists among us all. We can only lament that examples of that oneness are rare. The work of Auguste Perret had a good deal of that impetus. Closer to home, Kahn's doublet of Richards and Salk is an example of work that could have reached, if continued, a level of realization on that order. As it is now, however, the bureaucratic complexity inherent in building seems to have derailed that realization. I fear that the material, concrete itself, could prove to be not simple enough. It was Kahn's extraordinary intensity and depth of intent that prompted a sense of adventure in the other participants. There were those builders who were interested in building better than anyone else, who felt that they could foster an advancement in their art. They believed that new ways of building were coming into being for them to pioneer. There was at the time a general belief in innovation in construction, which seems now to have been suspended.

In the twentieth century, we have Perret and Kahn, who stand at the beginning and end of Modernism. I do not believe that the Moderns were moved by a desire for perfecting construction. Although affected by the new industrialization and manufacturing techniques, it was more in what they perceived as a total transformation of the old realism into a new one that they looked for the substance of their new art. A deep sense of realism was at the root of the work of such a man as Cézanne (Ozenfant said, very beautifully, that Cézanne had decided to put appearance aside) [13]. But the generating impulse for the Moderns was a new conception of space, a dissolution of the sense of boundaries and a yearning to go beyond that old sense of physical reality. They were interested in glass and thin steel because these were ideal materials to dematerialize their constructions. Even the Constructivists built like sculptors, decomposing and unbinding space, space that before Cubism, the Suprematists, Moholy-Nagy and the rest was always conceived of as bound. Their work does not express tectonic intent, with perhaps the single exception of Mies, and his contribution was rather late.

13. *Mont Sainte-Victoire* (1902-06). Cézanne.

The truly great Modernists were the early ones. In his preface to the 1952 edition of FOUNDATIONS OF MODERN ART, Ozenfant surprisingly and brutally oversimplified the complex impulses of the early Moderns by reducing their body of thought to a reaction against the work of the scientists: "Engendered by the most lyrical of scientists, the Atomic Age was secretly born at the University of Chicago on December 2nd, 1942. . . The new vision of the world was, but yesterday, the province of some few advanced specialists, physicists, and astronomers." The Modernists' adventurous excursion into the space of modern physics, where space and structure are nearly a mental set of liaisons, or *reseaux*, is still today the most powerful challenge to those for whom the ordinary physical nature of building is a reminder that we must build with materials as well as tell with art.

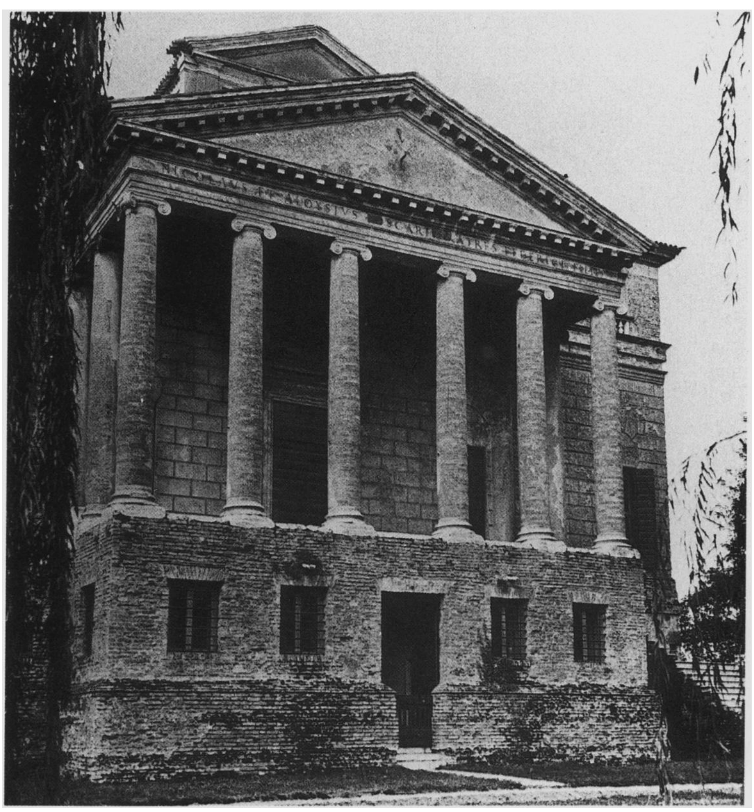
In that great cylindrical wall of Castel Sant'Angelo the masonry network seemed to tie the stresses to the wall, guiding them down to rest deep in the ground. That wall, it seemed to me, was made to produce the first graceful crack one could possibly think of. One knew that if a crack were to come, one could tell how it would travel. Thus, we can accept the proposition that to reticulate a surface controls cracks.

We know well a few materials which, by themselves, can do most of the tasks we perform to build. We have been able to build entirely of wood, or stone, or brick. There are also other materials to which it would be inappropriate to assign the job of performing all the building tasks. A room is not a steel tank. Steel is used to carry linear loads; every other task has to be performed by secondary materials. Steel frame construction requires the use of decks and panels, at which point the comfort of using familiar materials starts to fade away. But knowingly, we build with a controlled group of materials, and we combine systems.

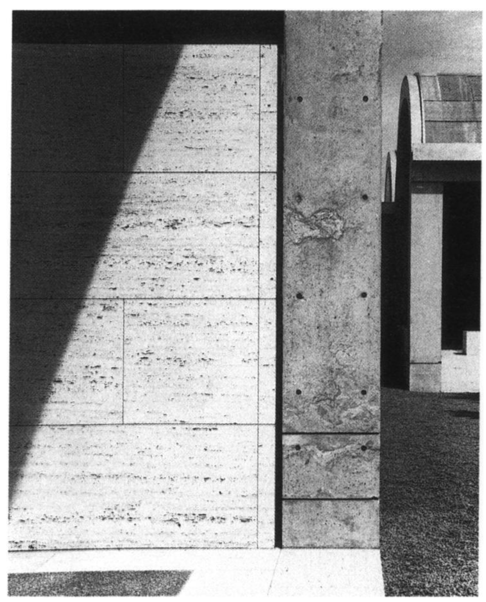
New materials generally come with narrow specificity and leave unresolved, more often than not, the problem of their relation to existing generic systems. One can imagine the entire repertoire of construction materials organized along that grand counterpoint between mass or masonry materials and that other group that comes out of point loads, and the notion of frame and infill panels. Consequently, we think about surface as an issue that pertains to both. Surface finishes are then applied. They mask structures. The use of surface materials without regard for the nature of the frame as a structural concept – thereby turning the wall into a panel – has a problematic lineage.

Of course the separation of appearance from substance has a long history, a quite dramatic one at that. Even the word color has, buried in its history, the notion of to hide or to mask. In the Villa Malcontenta, Palladio had imitated stone with beautifully layered stucco [14]. The upper coats of the stucco, a mix rich in marmolina, were of such transparency that the shadow of a wild, beautifully-hued lavender flower climbing the east wall seemed to travel deep into the material. Here the absence of stone had forced the creation of a new attribute in the surfacing material.

Vitruvius speaks of the separation of the surface of the wall from the rubble fill. It is extravagant to use strong and durable materials throughout the thickness of a wall. We know that a material will have a different task to perform in the center of a wall than on its surface. That gives us, to start, the license to consider surface a justifiable concept, but it does not absolve us from the duty of searching for a surface material that can be coherently integrated with the walls as, for example, a tile surface on burnt-clay masonry. The issue is one of compatibility of the chemical composition of the materials. Travertine and concrete are compatible materials [15]. The walls of the Big House on the Salk project were to have been of travertine and concrete. Modern construction, with the pre-eminence of the notion of frame and its ability to absolve the building fabric from the elementary duty of bearing loads,



14. Villa Foscari, "La Malcontenta," Mira (1555), Andrea Palladio.



15. Kimbell Museum of Art, detail of travertine and concrete.

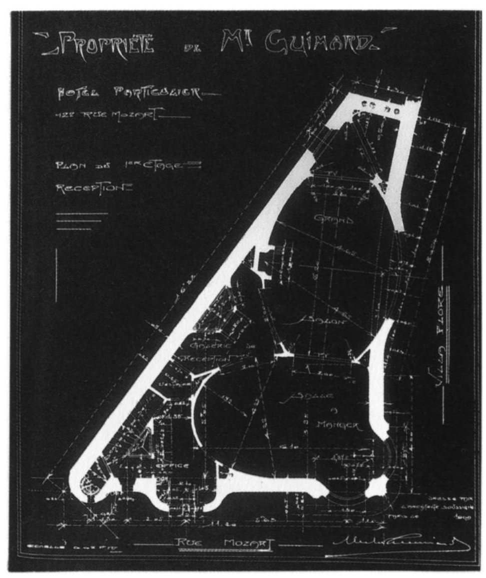
leaves us with the task of structuring, both figuratively and literally, the incremental parts and layers of the vertical surfaces. They remain as the planes where our eyes go to search for both the identity of materials and structure and for the character of the spaces we build.

Words have ages. It is perhaps because of the gentle rhetoric of the more academic critics in our field that we seem to have acquired, only recently, the word materiality. It is a word that we, in our schools, have come now to use as a coined clue to a position. When reference and allusion, sign, and the representational aspects of an object of criticism – a building, of course – have dominated the commentary, often someone will bring in materiality as a way of calling us back to sobriety and the forgotten virtues: How do we build? How do we structure what we build? What materials do we use? It is as if the mission of tectonics, or of the discipline of building, were to be the necessary antidote to our intemperance as readers of our architectural culture.

I believe that we are waylaid by a polarizing pair of notions, both of which do have, at least, the appearance of truth. One is that what we are offered by technology is naive and full of industrial expediencies and lacks truly scientific and philosophical substance. The other is that architecture does not need so much technical elaboration – post and beam and little more is all we need, as if the world were flat.

If we isolate materiality as an ingredient, as a principle even, to comply with, we will also isolate how to compose, as it were, perhaps, the very opposite. We can argue that to compose we do not need any of the order and repertoire of elements that materials and structure bring to architecture. Hotel Guimard is

16a. Hotel Guimard, Paris (1909-12), Hector Guimard.

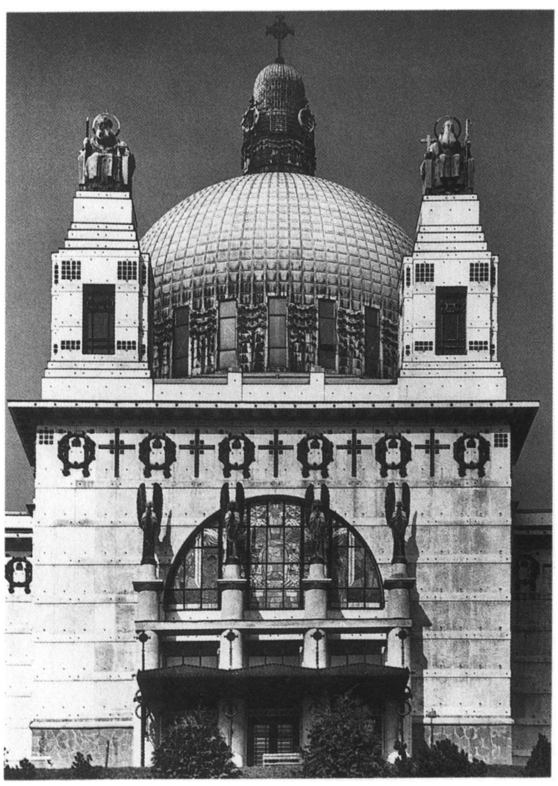


16b. Hotel Guimard, first floor plan.

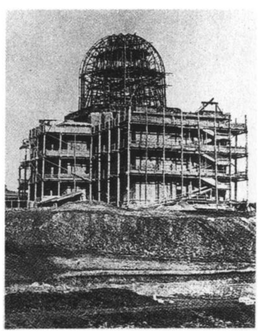
sheer, pure composition. The internal spatial reality of its rooms and sequences are, within those deep exterior walls, like a gift in a box, no matter that the box, meaning those outer walls themselves, are much less successful [16a,b].

At the other extreme, we have suffered the abuse of structural and systems expressionism – witness brutalism or abundant "hi-tech." This polarization between composition and materiality may also be seen in a comparison between two photographs of the Church Am Steinhof designed by Otto Wagner, that exquisite master of composition. These two images – one documenting construction, the other depicting the completed building – reveal an extraordinary proliferation of materials drawn from nearly all categories: metals (cast and rolled), aluminum and lead bolts, hand-wrought parts, stones, cementitious materials, tiles, solid masonries, sheathed and anchored woods, many kinds of glass. This excess is a genuine provocation to those not so early modern aesthetic "theologians" who called for austerity and truthfulness [17a-e].

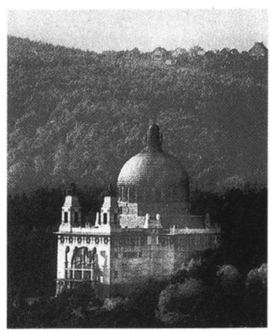
Regardless of the rhetorical exertions on both sides, to concede that we are totally, or even partially, back to that immoderation, with however gentle differences of style, would be lamentable – lamentable for our cultivation of the discipline necessary to build well. When we study old structures with a restricted repertoire of materials and groups of assemblies, or the works of architects who, for whatever reasons, built within genres of techniques, the clarity we gain is not simply in understanding a point of order and coherence, but in seeing that those genres represent a point of obvious compositional force. Above all, we cannot build without the sense that the way we build is an active ingredient of the compositional strategies by which we try to achieve the ideal, or the idea of bound, sequential, and delineated spaces. Yet, regardless of the gifts granted us by the construction as the artifice, our art exists between its presence and its absence.



17a. Church of St. Leopold, Am Steinhof (1905-07), Otto Wagner.

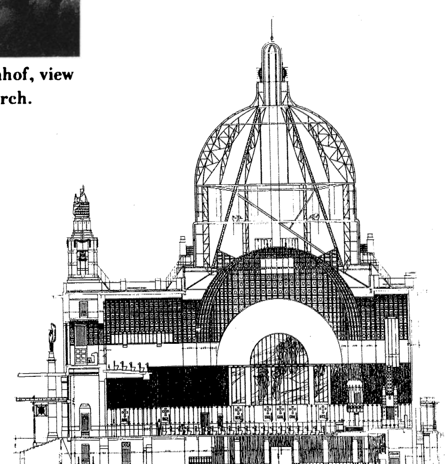


17b. Church Am Steinhof, construction photograph.



17c. Church Am Steinhof, view of completed church.

17e. Church Am Steinhof, structure between domes.



17d. Church Am Steinhof, section.