

The Glass Roof

For the purpose of this essay, the juggling of the positions and numbers of required courtrooms will be of less significance than the on-going process of designing an appropriate roof. This process reveals facts and techniques that contrast and parallel those which characterized the process of constructing Rattenbury's dome.

As stated earlier, the glass roof is the crowning achievement of the Robson Square concept. It is of a type that is, on the one hand, a logical outgrowth of iron and glass nineteenth-century structures like the Crystal Palace and, on the other hand, an exercise in the contemporary space frame, which is a concept Erickson had worked with before, specifically in his design for the roof of Simon Fraser University's mall.

As with other aspects of the design of the Law Courts, upon first presentation on February 16, 1973, Erickson had a general (not a particular) impression of the visual impact and structural components of the glass roof. At the time the model was unveiled for provincial and civic officials, the gallery of the courthouse was described, for example, in this simple way:

Along the western side of Block 71, the north-south pedestrian spine passes through a large glass-covered public space extending almost the full length of the block.

By the time Schematics 1974 was presented, however, Erickson's office had a detailed impression of the roof's physical appearance:

The glazed roof over the public space is a light steel space frame structure. The structure has a three dimensional system of diagonals that form a pyramid with a rectangular five foot by six foot base. The space frame will be fabricated from light tubular metal sections and supported on concrete frames which are extensions of the . . . wall systems. The space frame extends down to the edge of the main court floor thereby enclosing the main public space.

The glazing skin of the roof will be supported by an independent mullion system which is superimposed onto the space frame structure. All vertical glass walls will be suspended from the space frame. . . .

The impact of the roof upon the mechanical systems of the building was also noted in this document:

Although the space below the glass roof is fully enclosed it will basically be exterior in character and a wider comfort range has to be accepted than for fully air conditioned working environments.

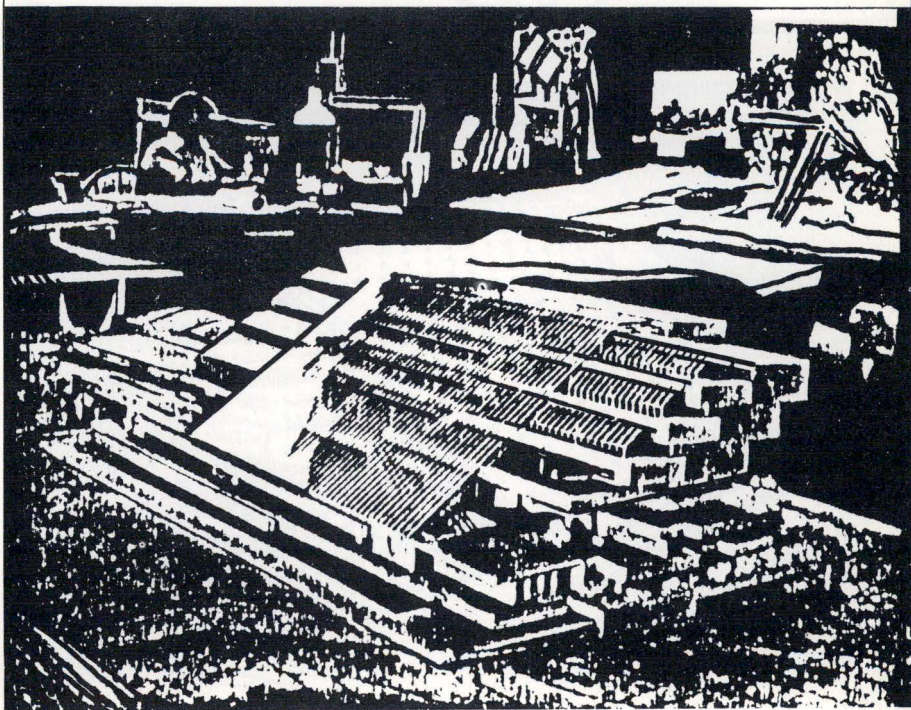
In order to reduce solar heat gain and to lessen glare on people passing through the space, the roof is glazed with tinted heat absorbing glass. Large overhangs of the roof will shade the clear vertical glass walls at critical heat gain periods.

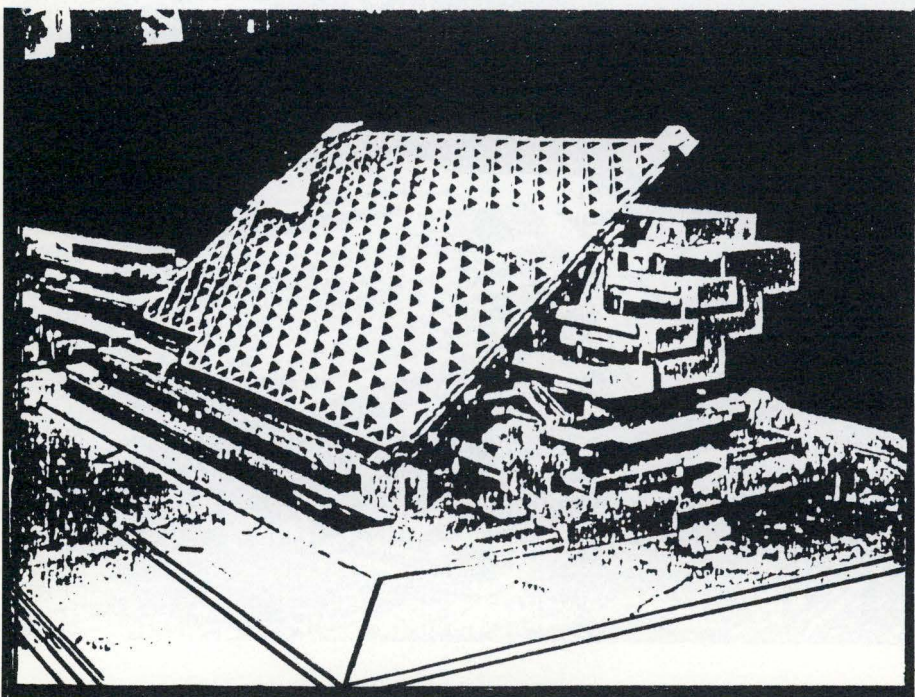
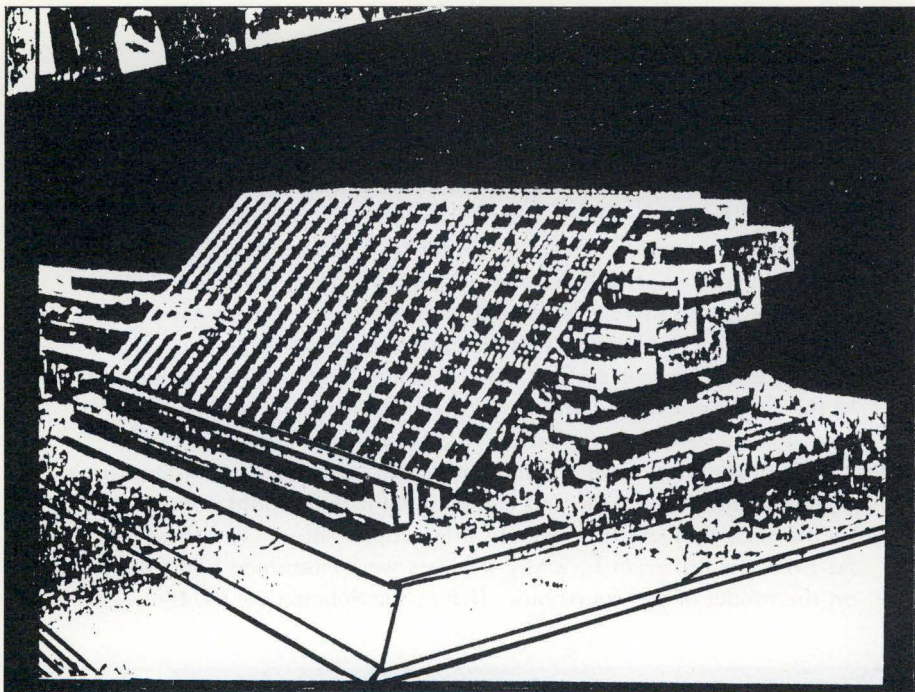
The main space will be ventilated by making use of the natural stack action. Ventilation openings at the bottom and the top of the main space will insure sufficient air movement to control the summer temperature inside to 5 to 10 degrees above outside temperatures.

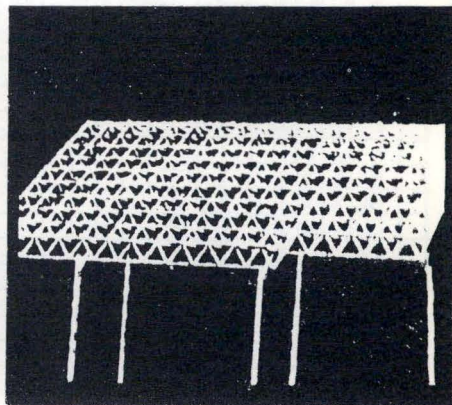
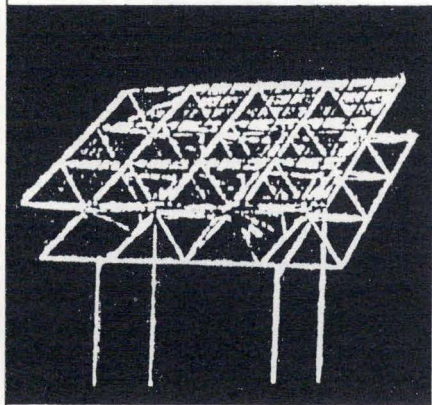
Many very precise glazing requirements are outlined in Schematics 1974. Not only would the work comply "with all governing codes and regulations pertinent to it but also very specifically outlined technical factors should be followed as it was designed." Under "Provision for Thermal Movement," the Schematics document states that the "wall should be so constructed as to provide for noiseless expansion and/or contraction of component materials as will be caused by an ambient temperature ranging from plus 10 degrees F to plus 180 degrees F." Under "Structural Properties" it warns that the "aluminum curtain wall and all its related components shall be designed for both flexural and torsional stresses" as determined by the document; the "allowable stresses for all curtain wall structural elements shall be established by the wall contractor and shall conform to the minimum standards as published in the Aluminum Association's *Aluminum Construction Manual* . . . dated November 1971."

Schematics 1974 also contains much useful general information regarding the tasks of the various professionals, manufacturers, and suppliers who would be responsible for the erection of the glass roof of the courthouse. It alludes to studies, drawings, building code regulations, and materials' standards to which the participants in the project had to adhere. Correspondence and other materials preserved in Erickson's office document the lengthy process that led to the final appearance and final specifications of the materials assembled in the glass roofed main gallery of the Law Courts.

One of the most fundamental considerations was the relationship between the metal frame and the glass infill that would comprise the finished roof. As this series of photocopies shows (and these are far from the full record), many schemes were examined and tested on the model of the courthouse. Before the Schematics 1974





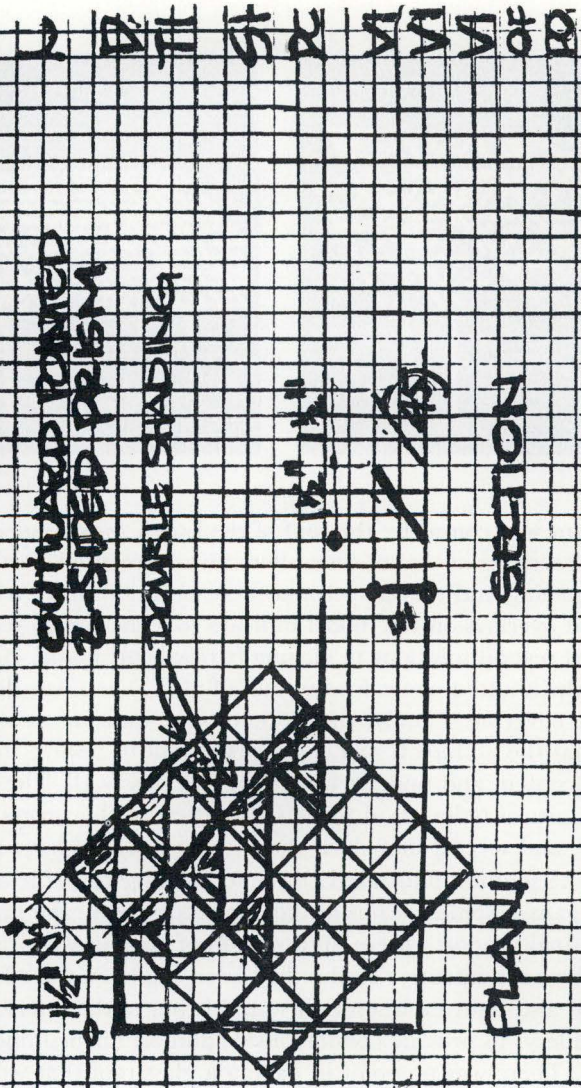


document was complete, the roof of the Law Courts underwent several revisions in shape; even after it was presented, further studies of the glazing and the space frame were undertaken. Further, the celluloid overlays on the model indicate that the design team explored several solutions to glazing (striped, prismatic, curved) before the abutted one-colour system of glass sheets was decided upon as covering. Finally, these photocopies indicate some of the ways that the architects and engineers sought to resolve the metal support system and understructure for the glass wall. The photocopies of balsa wood models also attest to the various solutions devised, and several show how the structures would have received glass. The solution illustrated on the top of page 52 — the most simple and elegant — comes closest to the one employed in the final scheme.

The final support system and method of glazing were reached only after very intensive studies had been made on the effects of the heat and light each solution would bring to the interior of the glass gallery, to provide comfort inside and an unencumbered view outside. There was no point in having a glass roof that would overheat the building and no point in using glass if one could not see out of the courthouse. If either of these problems had no proper solution, the “enticing the public” aspect of the building’s “Design Philosophy” would not have been accomplished.

GLASS ROOF BLK I

SHADING DEVICE II



PRODUCED SHADE PATTERN

Helmut Kassautzki's extensive tests—run on the basis of statistics taken from solar and temperature patterns—documented the results expected through the various combinations of glass types and support systems at four particularly critical times of the year. This most thorough examination provided a data base that assisted the team in making a final and appropriately tested decision.

Most of the essential decision making concerning the new Law Courts' roof, as erected, did take place before the August 1974 presentation of Schematics. In the period during which redesign of the courthouse took place, however, some further consideration was given to the size and type of the glass units which glazing consultant Eugene O. Tofflemire Associates would supply. These details were worked through with Helmut Kassautzki, the person on the design team responsible for such matters. The space frame material that was finally fabricated and erected omitted a very critical series of holes specified by Erickson's firm. This error caused some warping when water froze in members of the support system during construction and led to negotiations, corrections, and delays. As with Rattenbury's dome, then, even to the very last moment the roof of the New Law Courts presented special difficulties in construction.

It is clear that the procedures which led to the finished Rattenbury Courthouse and those that accomplished this glass roof tell us a good deal about the continuity and change that have taken place in architectural practices and conduct in the almost seventy years that separate their dates of inception.

IMAGES

PAGE

51	Arthur Erickson Architects.
52	Arthur Erickson Architects.
53	Arthur Erickson Architects.
54	Arthur Erickson Architects.
56 & 57	Nathan Hohn.



