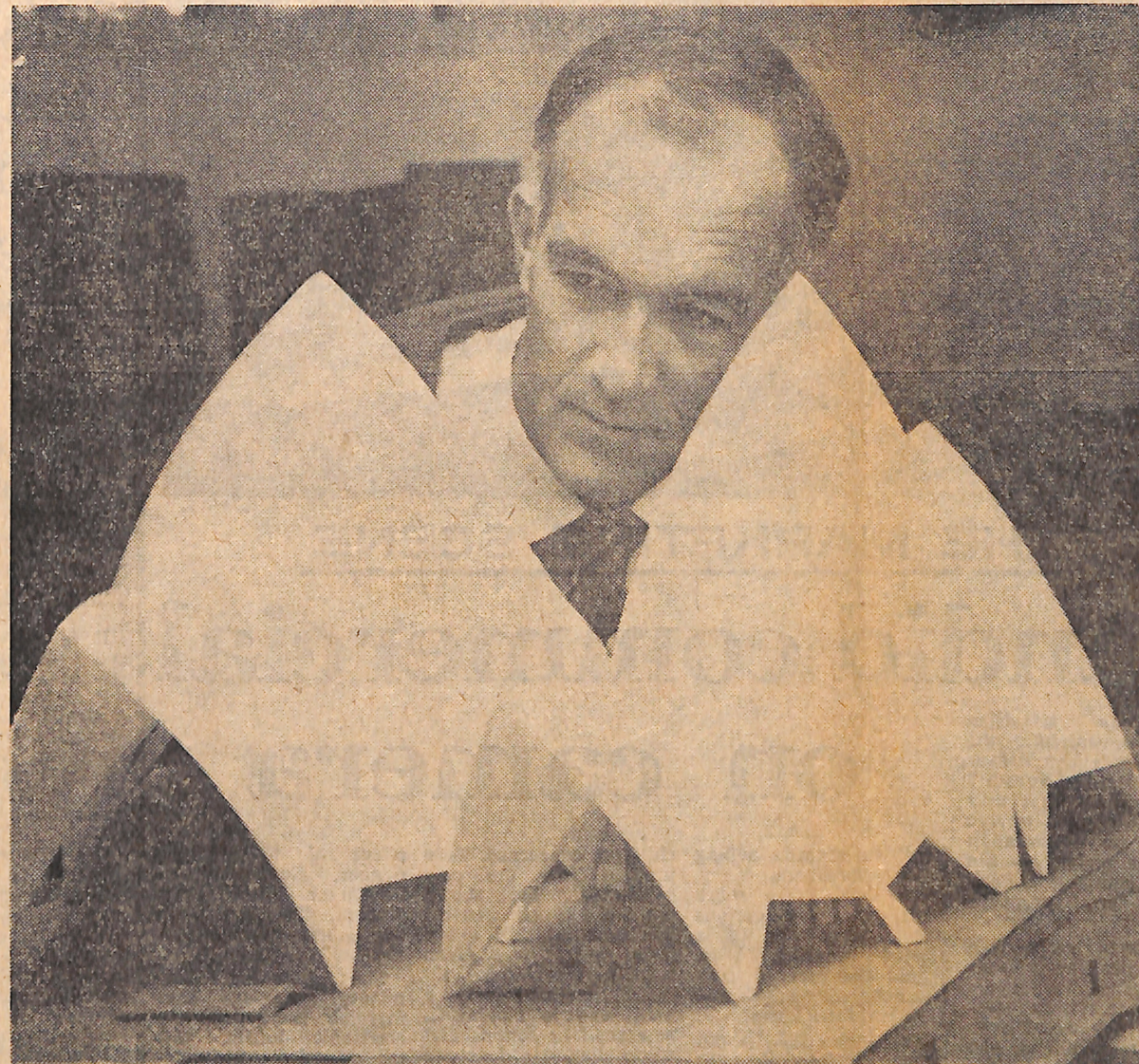




## This Opera House — Part Two

Costs have soared like its billowing concrete sails and the public, still buying its lottery tickets, wants to know why. ROBIN BOYD gives the answer . . .



competition sketch that caught Eero Saarinen's eye.

Yet the concrete of the ribs under the sails, as now erected, had to be feet thick, rather than inches thick as it would have been if shell concrete had been possible. That's where most of the money went.

More of it went on the stage machinery, mostly produced in Vienna—some of it already in Sydney. It serves three halls and is almost certainly the most complicated and extensive stage machinery ever to be installed in a single building.

More money went in accommodating adequately this elaborate equipment, and more again in original research and mock-ups throughout every stage of design.

A year or two ago the original white sail vision seemed in danger of being lost when it was announced that black lines were going to stripe the sails. These were to be lines of black tiles inserted at the vertical expansion joints between panels of white tiles. There was an instantaneous and strong reaction.

Now it is said that the black lines were never intended; it was all a misunderstanding based on a preliminary diagram of the tiling layout.

### Delays

In any event the black lines are gone now. The sails will have no more than faint off-white lines at the expansion joints, like the sewn lines on canvas sails. The incident is forgotten, but it was significant because it gave evidence that the most important thing to Sydney really is not the rising cost nor the lengthening delay.

These will be forgotten one day, but if the original pure, fine vision goes bad after all this Sydney will never recover from the shock and the shame.

**TOMORROW:**  
Sydney, the  
reluctant patron

# Where the money went

“If anyone had wanted to scrap the design they would not have been able to . . . it was a political issue.”

picked up and re-erected in the sail formation.

The consistent radius transformed the problem of construction. It became possible to calculate the exact curve and stresses at every point. It was possible to divide each sail into panels and to pre-cast these in standard moulds.

Thus the sails (still called "shells" on the job for nostalgic reasons) have been built up, with great ribs visible on the inside but a plain surface, as ever, on the outside where the white tiles will be applied.

Even this slight change to regular spherical segments worried some Sydney people. Would the first fine careless rapture go when geometry came in?

I think they should not worry. The overall idea is barely changed but the fact that all the curved surfaces are part of a single mother sphere ties them together visually. This may prove more successful than the informal, free association of the less related and less architectural shapes in the first

been widely publicised. He subtly changed the shape of the sails, curbing their freedom just enough to conform to a geometric discipline. With great ingenuity he made the curve of each sail, big and small, conform to the same radius. Imagine that one huge concrete ball was dropped on Benelong Point and shattered into big bits; then the pieces were

would be able to figure out how to build it. Any shape can be built in shell concrete—or so they thought at that time. So the shapes which won the prize went to engineers. But in the best back rooms of the world heads were shaken and it was said that these shapes could not be made by any of the known techniques of shell concrete. In England a team of engineers spent months in trying to find a way, but could not.

### Political

By the time this was finally established the project had gone beyond a point of no return. By now Sydney was firmly attached to the vision of white sails. Even if anyone had wanted to scrap that design and start again they would not have been able to. It was no longer just an architectural matter. It was a political issue.

The problem went back to the architect. It was Joern Utzon—not an engineer—who finally devised a way to build it. Utzon's revised solution has

THE late Frank Lloyd Wright, most renowned architect of this century, never entered an architectural competition. A competition is inevitably, he thought, a deadly process, a choice made from a number of mediocre entries by a panel of mediocre judges.

In the case of the competition for Sydney Opera House, how wrong he was!

There was nothing ordinary, nothing safe and nothing sure about the winning design. It was pure excitement, imagination, adventure.

And the reason for this unusual result from the frequently dreary, averaging-out, competitive process was simply a matter of personnel in the judging panel. This was far from mediocre.

Among the distinguished gentlemen invited by the NSW Government to sit on the judging panel was one whose standing in the architectural world was unequalled. He was Eero Saarinen, a Finnish-born American. Whereas Wright represented the first generation of modern architecture, Saarinen was the star of the second generation.

He concentrated a charmed career into the 1950 decade, his every work achieving world fame. He died in September, 1961.

### Panel

Saarinen was at the height of his fame, and immersed in his most constructive period, when he came to Sydney briefly to join in the judging of the Opera House competition. The panel activities were private, of course, but it can be guessed that this brilliant, blunt, strongly opinionated man dominated the proceedings, despite his late arrival.

At this time Saarinen was engrossed in the problems of sculptural form in architecture. He was fascinated with the possibilities of shell concrete: giving strength to thin concrete by shaping it in continuous curves, like an egg shell. The year before he had finished, not without difficulties, a famous three-pointed dome at the Massachusetts Institute of Technology.

At this time he was working on a free-formed airport terminal for TWA at Idlewild (now Kennedy) Airport, New York, which had great wings symbolising flight.

In his office a big team of key

men modelled such exciting shapes to his directions. Sometimes they made several large scale models before he was satisfied that he had the best shape.

He had a broad, functional and structural scheme in mind but he worked to please his eye. When he had achieved a shape that satisfied him he sent it off to the engineers to figure out the thicknesses of the concrete and where to put the reinforcing steel.

I met him in his office in Detroit a day or two after he returned from Sydney. He was still bursting with enthusiasm for Joern Utzon's winning design. He regarded the selection of it as all his own doing, and was happy to be responsible for it.

### Dashing

The free, dashing design submitted by Utzon was indeed something after Saarinen's own heart. The exciting external form was only part of the attraction. The design had as

well an entrancingly simple solution to the main problem of planning: the problem of moving large audiences quickly and safely into—and, more urgently, out of—the two main auditoriums. Some competitors' drawings showed a formidable tangle of stairs and tortuous corridors such as are familiar enough in any big old theatre.

### Hillside

Utzon, solved the problem almost as simply and directly as if the two auditoriums were open-air theatres set beside each other on a grassy hillside, which allowed people to approach or leave at any point of their perimeters.

He planned to build virtually a hillside of concrete steps on which he placed the auditoriums, side, by side, but apart, with space all around each of them, allowing the audience free access everywhere. Then he enclosed the whole of his concrete hillside with an overall envelope

The envelope might have taken many forms. In Utzon's hands it became the famous set

of sails. One of his reasons undoubtedly was the awkward height of the scenery loft of the main stage. This is the dominating external element of most theatres and has no special attractions for a romantic architect.

The repetition of free flying shapes enabled Utzon successfully to subdue the stage loft. He tucked it under the highest sail where it lost identity and became only one of a harmonious group of similar elements.

Again, the repetitious shape might have been almost anything, but in Utzon's hands it became sail-like undoubtedly because of the associations with the Harbor, and the romantic reflection of canvas filled by the wind.

The whole concept exemplified the most advanced mood of European architecture at the time. The simplicity of the plan, the symbolism of the forms and the daring scale and boldness of it all quickened the pulse of advanced architects everywhere. Eero Saarinen was not the only one to be excited by it, and to take for granted that the engineers in the back room