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EXCHANGE BETWEEN MOSHE SAFDIE AND RÉJEAN LEGAULT ABOUT THE ARTICLE “THE MAKING OF HABITAT 67. *A Tense Pas de Deux* between Moshe Safdie and August Komendant”

January 1st, 2022

Dear Réjean Legault,

I recently read your paper on the making of Habitat, and I want to congratulate you on a thorough and insightful investigation and analysis of the evolution of Habitat, from the inception of my McGill thesis in 1960 and all the way to the Habitat 67 so-called Phase 1 at Expo 1967 (Phase 1 was used to express our hope that one day Phase 2 would be built, *i.e.*, the original twenty-five storey project). I was impressed that you even dug up the Y67 project which attempted to intercept Habitat and take over with a different design. You also have a sharp eye. I was amazed that you observed in figure 14 that it was a model of the Giza project hanging on the wall behind me.

Let me clarify, one of the main reasons for abandoning the thesis frame structure with inserted standardized modules was the inability to resolve the problem of fireproofing. Both the modules and the frame required three-hour ratings. Thus the frame had to be either a concrete or concrete clad steel structure, while the boxes in concrete ended up being extremely heavy. The dream of a light fireproof material had not come true then and has not come true even today. This is what drove me into the load-bearing approach, taking advantage of the structural capacity of the heavier box. In retrospect this approach has its limits, probably up to eight and ten floors; when you go real high rise it is not an option.

This having been said, I think there are a few turning points, and a couple of factual items that need clarification and correction. One of the first conclusions I reached after completing my thesis, is that it would be better to stack the units in terraced formation on the incline, thus opening the gardens to the sky and rain, rather than the vertical stacking as I did in the three systems of my thesis. Thus emerged the idea of a half-open pyramid which would balance one plane leaning against the other, while forming a large void below that could serve as the public realm. I was surprised that you found the sketch in which I first applied the idea in Meadowvale, which as you noted was a personal speculation beyond what had been developed and presented to the client. I went on to apply that to the Giza plan and then to the early iteration of Expo Masterplan.

There were two fundamental shortcomings to the pyramid scheme: the space under was isolated and did not aggregate to form a continuous public space within the district. Moreover, it was very difficult to arrange these half-pyramids in a manner that would provide consistent optimal orientation, generally facing toward the south. The breakthrough in resolving this came during an intense four-week period with David Rinehart and myself working together, in which we evolved the rhomboid concept. The rhomboid resolved the orientation issue while also facilitating a continuous public space below. Since the rhomboids only touched each other at the corner, it was necessary to introduce the A frames into which we located the vertical circulation. Somewhere in that Expo archive must be our correspondence with OTIS in which they assured us that they could develop inclined elevators in time for the project opening at the Expo. It was at this point, with the rhomboid scheme in hand, that David and I travelled to Montclair, New Jersey, for the first meeting with August Komendant. Looking over the rhomboids showing the streets and the A frames, he said: "Yes, it could be done." The photo of the model which you show and attributed to Komendant was a model we took with us to show Komendant. I am not sure whether we went there with a cardboard model, which was followed by the wood model; both of which were made in our workshop in Montreal and delivered to Komendant and remained in his possession. Komendant is appropriately credited by you of moving us toward the precast, prestress load-bearing structure. When we embraced this, we realized that the one thing we gave up was the standardization of the box which was, by definition, carrying loads of increasing weight, and would therefore not be standardized.

You are correct that there was a great deal of tension surrounding Komendant's involvement in the project, but I think you overstate the tensions between him and I, and underestimate to what extent I spent much of my time defending, even protecting him with the various engineering factions in Montreal, the associate engineers (the engineers of record), as well as the structural review committee appointed by the city of Montreal. On the whole, he enjoyed the confidence of Ed Churchill who decided to proceed with construction even though the structural committee said the project would collapse if constructed as designed. They were primarily referring to the absence of expansion joints, and the ability of the structure to deal with the temperature difference in the absence of traditional expansion joints.

By the early 1970s, I began working with Ed Rice who had been a partner with T.Y. Lin who had developed chemically stressed

concrete and was offering a three-inch concrete box which we deployed in the unrealized projects for Habitat Puerto Rico and Habitat Israel. On the other hand, my relationship with Komendant continued. I consulted him on the unbuilt integrated resort in Queensland in 1978 and worked with him on a scheme for the National Gallery of Canada in the mid-1980s. Unfortunately, we could not realize his scheme for the National Gallery, which did not get the support of the client who went for more traditional framing for the building.

As for your summary conclusion, I think you are right that Habitat as realized had a shortcoming of compromising the fundamental idea of repetitive mass production. On the other hand, to our surprise, it proved extremely flexible for the residents. As you probably know, many residents have joined two and even three apartments, borrowed openings between them, and reconfigured them in numerous permutations. Had we anticipated that, we could have actually provided block out panels in the boxes for those connections. The other factor that made this possible was the concept of the subfloor, thus enabling residents to move plumbing fixtures around at will. This is a feature that we came to by default, rather than by design, but it has had far-reaching applications.

Again, my appreciation for your thorough study.

Best wishes,

Moshe Safdie

February 14, 2022

Dear Moshe Safdie,

It was with great pleasure that I read your response to my recent article on Habitat 67 published in 2021 (vol. 46, no. 1) in the *Journal of the Society for the Study of Architecture in Canada*. If it is all too rare for a historian of architecture to receive a written comment about a publication, it is rarer still for a historian of modern architecture to receive a commentary by the main protagonist of the project under study! In return I would like to respond to some of your points.

Since beginning work on Habitat 67 in the early 2000s (which led to the preparation of a heritage report for the Ville de Montréal in 2007), I have been convinced that the well-known project required deeper study in light of the long process that led from the 1961 McGill master's thesis to the building completed for Expo 67. It was clear to me that the accepted trajectory that charted a more or less continuous path from the student project to Habitat as it was built needed to be more closely examined, even challenged. The evolution—even mutation—from the thesis to the complex inaugurated in 1967 has rarely been scrutinized. I identified two distinct moments that seemed especially crucial to draw into the historical record: the first being the transition from the 1961 thesis to the first proposal of December 20, 1963, submitted to the Canadian Corporation for the 1967 World Exhibition; the second, the shift from the December proposal to the first official project presented to the Expo review board on February 21, 1964.

The reconstruction of such a complex design process through the matching, and sometimes confrontation of documentary evidence and interpretive insights is obviously a delicate operation. The richness of the archive or archives can make this work even more challenging. Your explanation regarding these two phases of the design process offers some important clarifications to my reading. Your corrective regarding the emergence of the idea of the half-open pyramid is of great importance I believe. It makes it clear that the option of the load-bearing module appeared quite early in the process, the result of your own critique of the vertical frame of the thesis. What I read as a pyramidal proposition that appeared to be primarily formal and spatial was therefore also based on serious structural considerations. Likewise, your clarification regarding the design of the rhomboidal planes of the February 1964 project is crucial. I was unaware of the intense four-week period—from December 20 to mid-January 1964 I assume—when you and David Rinehart

reworked the first proposal and turned it into the rhomboid concept. I now understand that it was this concept you presented to the engineer August Komendant at the January 15 meeting held at his office in New Jersey. It was then and there that he confirmed the feasibility of the project. This new insight is significant. It makes clear that the idea of the structural A frames came from the architect, not the engineer, and that it is only at this moment that Komendant entered the design process and joined the “design team.”

My attempt to provide a more comprehensive reading of Habitat 67's genesis came from my conviction that the consulting engineer played a more complex role in the project than the historical account had previously portrayed. I tried to show that architectural design and structural studies were complementary, working in tandem—and sometimes through conflict—to advance the Habitat project. My exploration of the Komendant archive at the University of Pennsylvania, which had not been thoroughly researched, uncovered many visual and written documents that brought new insights to the evolution of Habitat. Research in this archive led to unexpected discoveries, including drawings, photographs, and models documenting the early steps in the process. Even if some of these pieces of the puzzle are undated and unattributed, the overall picture seems to me to be one of dynamic exchange rather than linear progression, providing a much better insight into the design process and the relationship between architecture and structural engineering.

This research also brought into further play the interaction of and relationships between many actors in the building process. The tone as well as content of some of the letters in both archives revealed significant tensions between various protagonists. This is, of course, not surprising; the project developed in a hothouse environment. As many of these documents show, much of the “heat” came from Komendant. Given the engineer's tendency to feel unrecognized, a character trait also apparent in his relationship with Louis Kahn, I may have been predisposed to read his outbursts as being primarily directed at you, the architect. But as your letter suggests, this characterization needs to be slightly finessed. I recognize that you may not have been Komendant's main target, your role as the architect having placed you at the centre of a tug of war between many protagonists. But Komendant's “postmortem” rants about the shortcomings of Habitat's design and especially his claims about the paternal role he played in all the phases of the project—“design, manufacturing and erection” as he put it—could only encourage me to portray his relationship with you as a “tense *Pas de Deux*.”

History writing has often been theorized as a genre of writing that could very well be called documented fiction. Obviously, the historian must handle and interpret documentary evidence with the most rigorous methods and the most unbiased insights possible, a practice that is at the core of the discipline. But history writing also has to do with the construction of a narrative, a practice that can hardly be done without employing the devices of storytelling. My account of the history of the design and construction of Habitat 67 was based on the close examination of the documentary evidence available. Yet behind any historical reconstruction lies a way of telling, a narrative plot. Given the status of the characters involved and the importance of their role, the dramatic plot was the only narrative device that could do justice to Habitat's captivating story.

Thank you for reading my essay with so much attention and for clarifying these very crucial aspects of the Habitat story.

Sincerely,

Réjean Legault

P.S. I contacted the editor of the *JSSAC* to let her know of your response to my article. I raised the possibility of publishing it along with my own response (this letter) in the next issue of the journal. She and I believe it to be a necessary and valuable addition to the article. Would you agree to this publication arrangement?

February 14, 2022

Dear Réjean,

Many thanks for your thoughtful and detailed response. It comforts me to know that as an architectural historian who has devoted so much time to the history of Habitat, that I have been able to explain to you some crucial moments in the evolution of the design. The few weeks working with David Rinehart in which the rhomboid emerged were some of the most exciting moments I have had as an architect. We felt that we were breaking new grounds in trying to merge orientation, the idea of a housing membrane, and structural stability. To be clear, when we travelled to Montclair, New Jersey, with the model and drawings, we still had no idea how this would be built.

In no way do I want to underestimate the extraordinary and crucial role of Komendant in the conception and realization of Habitat. Of all the projects I have done, perhaps with the exception of Jewel Changi Airport and Marina Bay Sands, the engineer was a true partner in the process of creation. Perhaps that was also the reason for some of the tensions.

Komendant was not an easy man; actually Estonian, he was very Germanic. He was the "doctor professor" everyone should obey. Most of the engineers around Expo, including the ones that represented us, respected him. But he did not respond in kind. He could be really rough on them. On the other hand, I should document that one of the most important relationships Komendant had in the realization of the project was the trusting friendship he formed with Cipriano Da Re, who was the project engineer on behalf of Franco, the precast contractor. Cipriano was self-educated and self-trained. He had much respect for Komendant, and that was fully reciprocated. The working out of the post-tensioning details and many of the other relevant construction details of the project were the product of the *ménage à trois*, Cipriano, Komendant, and the architects.

You might enjoy the anecdote that at the beginning of his involvement, Komendant asked if his daughter, Merika, an architect, could join the office. We of course agreed and Merika proved to be a very productive and creative member of the team. Everyone used to joke, however, that Merika was Komendant's spy. There would be nothing that would happen in the office of which he was not aware...

Thank you again for your detailed response. Thank you especially for the history of the project that you have so ably crafted.

I am happy to have this published together with your comments in the journal, as you proposed.

Best wishes,

Moshe