Tony Smith
Born Orange, New Jersey, 1912
Resident South Orange, New Jersey

Jane Livingston met with Tony Smith in New York in April, 1969 and suggested to him the notion of doing a work for A & T. Smith talked about executing a "soft" suspended sculpture (he used the term *pneumatic* in describing his intention), using perhaps some sort of inflatable vinyl or plastic in biomorphic configurations. Smith later discussed this idea:

> I had wanted to do a project that was technical in nature in that I wanted to make a certain type of structure in which all of the compressive elements would be made of air or gas in compression, and therefore all the materials would be in tension—that is, whatever contained the air would be in tension, and then there would also be some lineal elements, also in tension.

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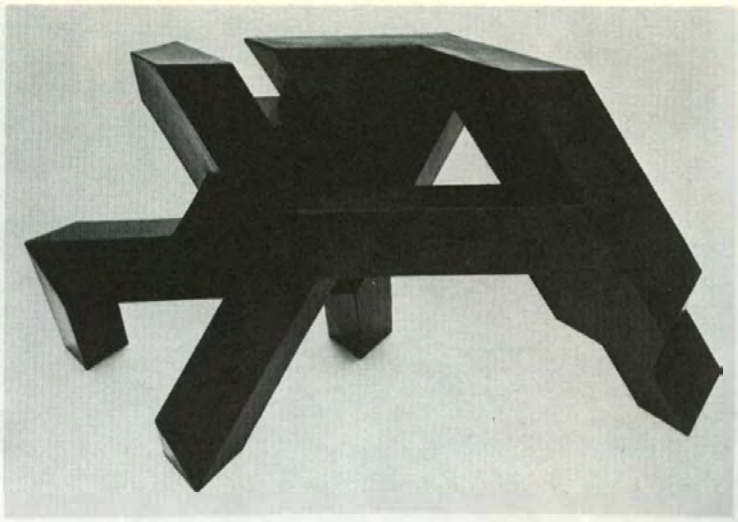
Since none of the corporations contracted to A & T were equipped with the kind of technology or materials appropriate for the kind of structure Smith described to her, JL encouraged him to consider working with Container Corporation of America. Tony seemed interested in this possibility and mentioned in particular his long-standing interest in doing an architectural-sculptural work using fourteen-sided modules. It occurred to him that this might well be executed in paperboard.

Smith went to Aruba for several weeks, and then to the University of Hawaii in June. In the meantime, Hal Glicksman investigated the possibility of soliciting a corporation that could execute an inflatable or pneumatic sculpture, but we finally abandoned the pursuit.



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At the same time, we talked to Anthony Marcin, Public Relations Manager of Container Corporation in Chicago, about collaborating with Smith. Marcin discussed this with his colleagues and indicated that they were enthusiastic. (Several artists had previously expressed interest in CCA—specifically Oyvind Fahlstrom, Francois Dallegret and Les Levine—but their proposals never developed sufficiently.) Marcin was to be unusually cooperative throughout the collaboration and seems to have been directly responsible for many of the important decisions which enabled the project to come to fruition.

Smith stopped in Los Angeles en route to Hawaii; he discussed the work in some detail with us, still with an idea of using the fourteen-sided module. Then in a letter from Hawaii of June 23, 1969, he said:

> My reason for temporarily abandoning [the 14-sided solid] as the module for a piece is that it would become too much of an engineering feat. I would prefer to achieve esthetic and psychological effects. The ingenuity of the Corporation's engineering and technical resources would be called upon to help me achieve such results. As I once said, in speaking of *Amaryllis* [1], I wanted to make a cave. Since I have all the maquette components from which I intended to develop the piece for the [Hawaii] campus, and for which I now have no immediate use, I'll start to work with them today on your project . . . .

The maquette modules referred to were of two geometric configurations—the tetrahedron and the octahedron; this combination was to become the basis for the artist's final conception of the piece. In speaking further about the history of his interest in making a cave-like work, Smith said,

> I've always had a certain interest in caves, and one of the reasons that it was particularly important in this case was that I had started a series of pieces which ended with the making of a piece called *Gracehoper* which is in Bennington, Vermont. [2] This piece has

certain inner forms that struck me as not necessarily cave-like in themselves, but they suggested the idea of making a further piece in the series which would literally have more of the sense of a cave. Around that time I saw a photograph of an eroded part of the desert in Arizona or somewhere in the West and it gave me something of the sense of the way in which I wanted to develop the piece. [3] Now, it would have required so many components that I wanted to use the same parts that I had used in the previous piece, but the model was kept by the people who built *Gracehoper* and I realized that I didn't have the energy to start making the great number of components that would be necessary to start a new model, so I always felt somewhat frustrated in that . . . . *Gracehoper* was probably done in 1962, and I would have made the following piece, which I had thought of as more cave-like, at that time had I had the components, but it's very boring to make those little parts and so I never did make that piece. So it's just something that had been in my mind for a long time and immediately before going to Los Angeles to discuss this project with Jane Livingston, I had been in Aruba and had visited some bat caves there. I think that when we spoke of the possibility of doing something for the Container Corporation, I recalled the previous intention of making a cave and then coupled that with the very recent experience I had in caves in

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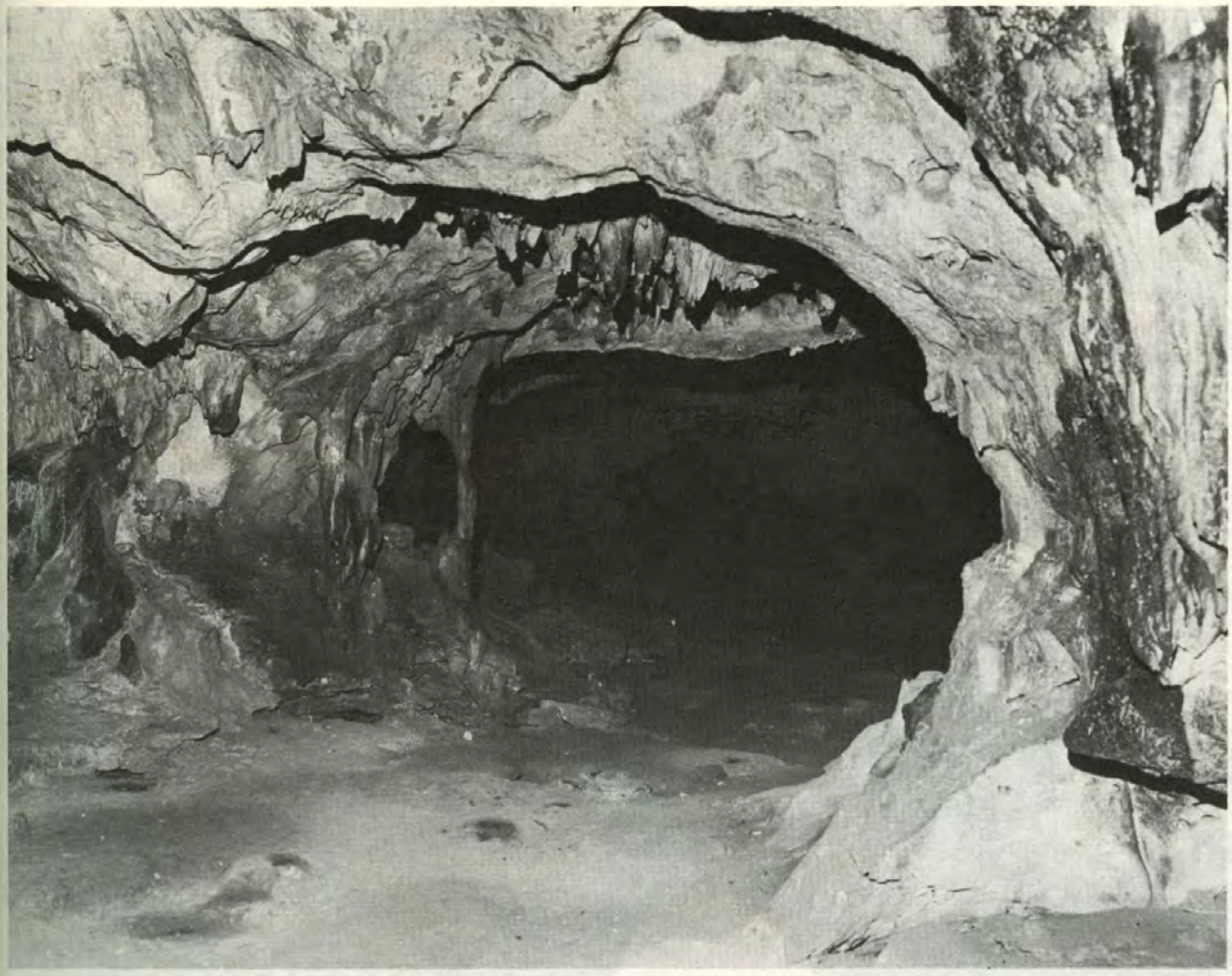

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Aruba [4], so it seemed natural that these two thoughts should revive an interest in caves . . . .* You know, if I'd had to make all those small components myself, I wouldn't have done it—there are thousands of pieces in that form and unless the pieces were stamped out, as they were by the Container Corporation, I would certainly never have done it on my own.

Over the July 4 weekend, Pete Clarke, a structural engineer for CCA in Los Angeles, and JL went to Hawaii to see Tony Smith. Smith had several partial models, formed with tetrahedra and octahedra, which served to demonstrate the fundamental principle of the structure. Clarke indicated that these units could be easily die-cut in flat corrugated board and then assembled individually and built with no lock joints or tabs (Tony was adamant about avoiding the use of lock joints) by gluing the units together. Tony stressed that the feeling he wanted in the cave was of softness—he often made the analogy to the texture and color of a wasp's nest (and indeed presented Jane Livingston with a gift of one months later). [5] He

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*At one time, Smith considered titling the piece *Guadirikiri,* the name of a specific bat cave in Aruba. The work was never, however, definitely titled.

felt strongly that the natural brown color of the board should remain untreated, and that the surfaces should retain the quality of slight rippling imparted by the subsurface corrugation. Smith later described, from a technical point of view, his original intentions for the Container Corporation project:

> In my work I use small cardboard maquettes, actual little tetrahedra and octahedra, and I paste them together with tape in order to arrive at the forms of the work . . . . When I had worked on a small scale in the past, [the original model] would be made into a model with smooth sides from which the steel fabricator works; that way individual components are actually absorbed in the final work. But it seemed that in making something with actual cardboard boxes, I was doing exactly what I do on the small scale and I felt it might be interesting to get the effect of a soft sculpture—that is, soft in the sense of using a material that isn't durable or which is relatively weightless.
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> Space frames of the sort that I use have been used in architectural structures. It's just that they've been fabricated by using struts which are joined at the corners—at the meeting of the edges of the elements. My intention was to use the complete component and simply glue it—glue the surfaces in the way that I had been in the habit of doing with my [maquette] units. This actually is a different type of structure than a structure which is based on lineal elements or struts which are fastened at the joints. In other words, *there isn't any structure except the components from which the form has been made.*

During the Hawaiian visit, Tony talked of introducing light, in shafts, into the cave, and gradually came to emphasize the importance of special illumination in the work. He characterized the effect he visualized by drawing an analogy to nineteenth century stage lighting:

> Sometimes one sees an effect—in caves, actually, if there's a crevice between rocks and light comes in—of the light entering in the form of a sheet rather than as a beam. It's broad . . . . Sometimes [this effect] is used in the stage. There was a great stage designer at the end of the nineteenth century by the name of Adolphe Appia who did some sets for Wagner. He used some sets which were made up almost entirely of light—that is, there were no other elements used very much, and his lighting had somewhat the effect of sheets of light. [6, Set for *Mime's Cave,* in *Siegfried,* 1896] I've seen it on the German stage also—they'll block out a certain part of the stage by a kind of curtain of light . . . . [This technique] usually has been used in order to create space—create planes of space, receding planes of space.

Smith at one point had thought of introducing sound into the work but said in later conversation that he was not concerned with sound or tones *per se,* but with the sensations of hearing produced by vibrations in the air. He was interested in the phenomenon encountered in bat caves, when a person's entrance can prompt mysterious sonic waves and fleeting air displacements as the bats are disturbed. Smith investigated the state of scientific knowledge regarding this phenomenon, and located an expert in La Jolla, California.

It was agreed in Honolulu that Pete Clarke would have some small, die-cut units made (four inches on a side) of thin, white paperboard, for Tony to use in constructing a mock-up in Los Angeles. We were at this point thinking definitely of the work for display at Expo, and on July 17, sent Tony plans of the New Arts Section of the U.S. Pavilion.

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Smith in the meantime sent us some rather obscure polaroid shots of details of modules fitted together, to show us in a general way what he was after. These snapshots proved to be very revealing of Smith's primary intention for the sense of the work.

In a letter dated August 11, from Tokyo, Smith said,

> This is about the polaroid photographs. What is shown is not intended as the piece. It is what a piece of it might be like. It is made up of about 120 modular units in the ratio of about three tetrahedra to two octahedra. I think the final sculpture should have more than four times that number of units—at least 500 in all. [The Expo sculpture finally comprised 2500 units.]
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> . . . The girl who made the components also took the pictures, and, although she has no idea of what the piece is about, she insisted upon including several photographs which she thought were good. She thought she had failed completely in the close-ups taken the next day, but they are very close to what I really want . . . .

A funny thing happened. While my assistant was making the [small modules], I decided that it might be better to use an altogether different modular unit—that of *New Piece* (shown at Philadelphia in 1966 and 1967). I thought that this might be an opportunity to try out, on a large scale, a system which has intrigued me for many years . . . . Then I showed the drawing for the [U.S.] pavilion and the photograph of the model to an architect in Honolulu who had worked for Wright just after I did. He remarked on how fortunate it was that the pavilion had been designed on my own triangular module. This made me realize that the other scheme [the 14-sided design] would have been impossible!

In August, 1969, the artist toured the Container Corporation corrugated plant in Los Angeles. CCA had made for him two full-size corrugated mock-ups of single units—one tetra- and one octahedron, two feet on a side, with no lock joints, which Smith felt were precisely right. Container Corporation agreed to produce about 500 full-scale units at their Los Angeles corrugated plant, for Tony to use in making a model, as well as making several hundred four-inch, carton-material modules. The former commitment was never fulfilled, and thus Smith never actually worked with the full-sized units. Moreover, when the corrugated modules were made en masse, they had lock joints. This was in violation of the understanding reached between Smith and Pete Clarke in Honolulu, and displeased the artist considerably.

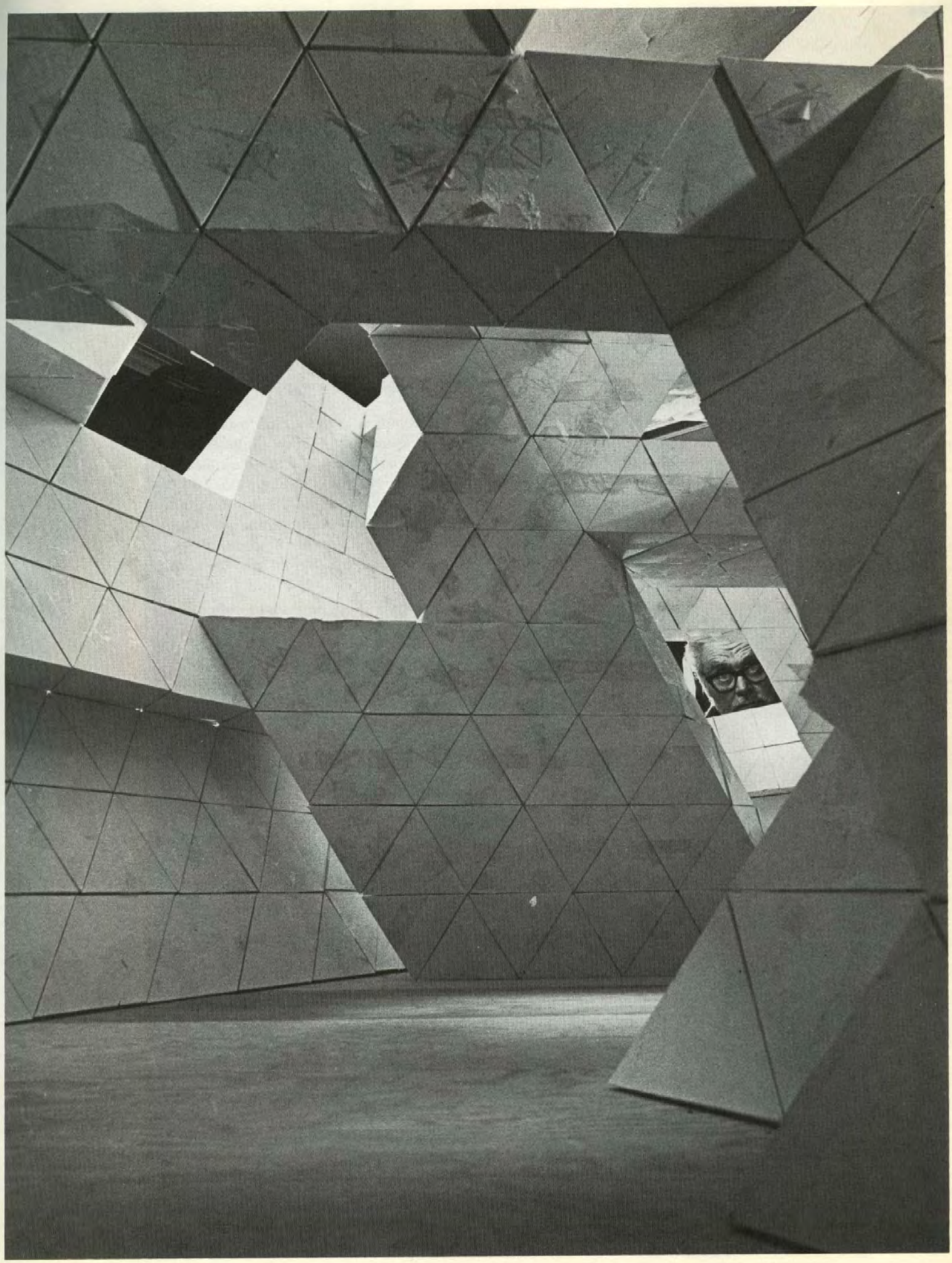
Tony remained in Los Angeles for about three weeks to make a small-scale maquette for the work. This was erected on a ping-pong table he set up in his suite at the Chateau Marmont. Several local kids were pressed into service folding modules and taping them together. Somehow there were never enough modules. Two rush deliveries were made during the course of Tony's stay here, as he used up cardboard units—they were rapidly swallowed up into the model and a temporary dead-end would be reached—but the five by seven foot model was finally completed and brought to the Museum.

Tony returned to New York in September to resume teaching at Hunter College; he had missed several classes on our account.

In September, 1969, Smith, JL and MT met for most of one day with the Expo designers at their New York headquarters. We were able at length to decide on a space for the work, after several alternative plans were considered and abandoned, and it became clear that a new model would have to be made. It also transpired that the ceiling height was considerably lower than we and the artist had thought—thirteen rather than sixteen feet.

During our session at the Design Team Headquarters in New York, Tony was adamant in characterizing the work as sculpture, as opposed to architecture. It was clear at this point that he had resolved in his own mind the essential nature of the work though it still existed only conceptually. We were all extremely concerned about the problem of handling the enormous traffic flow through the U.S. Pavilion, but Tony seemed to feel he could design the work to accommodate the expected 10,000 visitors per hour. However, he did have to make important sacrifices. He was to say later,

My intention was to make a piece of sculpture which emphasized the negative space rather than the positive form. The other pieces I've done have been placed usually out of doors or even if they're indoors, they tend to be compact: I think that even though the negative space has been used in some of them, the main effect is one of massiveness. I have always been interested in the volumes made by the pieces, and I felt that in this case it would give me an opportunity to deal with these negative spaces as the main element of the sculpture itself. So I set out to do a piece where I was defining the negative spaces as much as possible. Of course, when I began, I didn't realize that



such crowds would be involved, and so in the end I wound up getting a space that's much more architectural than what I had hoped for. I had hoped to mold much more sculptural space than has actually resulted; but when I began to learn about some of the problems of just moving the people through the pavilion, I had to open the space so as to make what is almost a passageway now—which wasn't my intention in the first place. I had intended to do something much more labyrinthine, something which would have many choices of movement rather than a guided movement. So I think the piece probably loses a good deal because it had to be smoothed out to such an extent—I couldn't have any projections or indentations on the lower part of the space, because people could fall or be pushed into places, and then the actual ceiling height of the pavilion was lower than we had originally hoped, and again we lost some of the possibility of molding the space above peoples' heads simply because the ceiling wasn't tall enough to allow for it. So in that sense, I think that the space is closer to the space of buildings, perhaps than was my intention originally.

In November, 1969, Tony received the modules necessary to build his second, incredibly complex model for Expo. By the end of the month he began work on the model, accomplishing it in a matter of days. [7] At this point, through the offices of Marcin in Chicago, William Lloyd, Chicago-based manager of design for Container Corporation of America, was brought into the project. Lloyd visited Tony at his home for one day just before the model was crated for shipment to Expo, and on the basis of that meeting he was able to direct the immensely laborious construction of the work at Expo 70. Lloyd and Smith seem to have quickly established a sense of mutual trust, and Lloyd thus made a series of decisions later for which the final work owed its existence.

The shipment of components to Expo consisted of the model, several palletized flats of precut cardboard and three fifty gallon drums of glue. Part of the cardboard units were made in Los Angeles—amounting to 3000 tetrahedra and 1500 octahedra; the rest—another 100 cubic feet and some 3000 pounds of cardboard—were made at the last minute in Container Corporation of America's Cincinnati plant and shipped from there to Expo.

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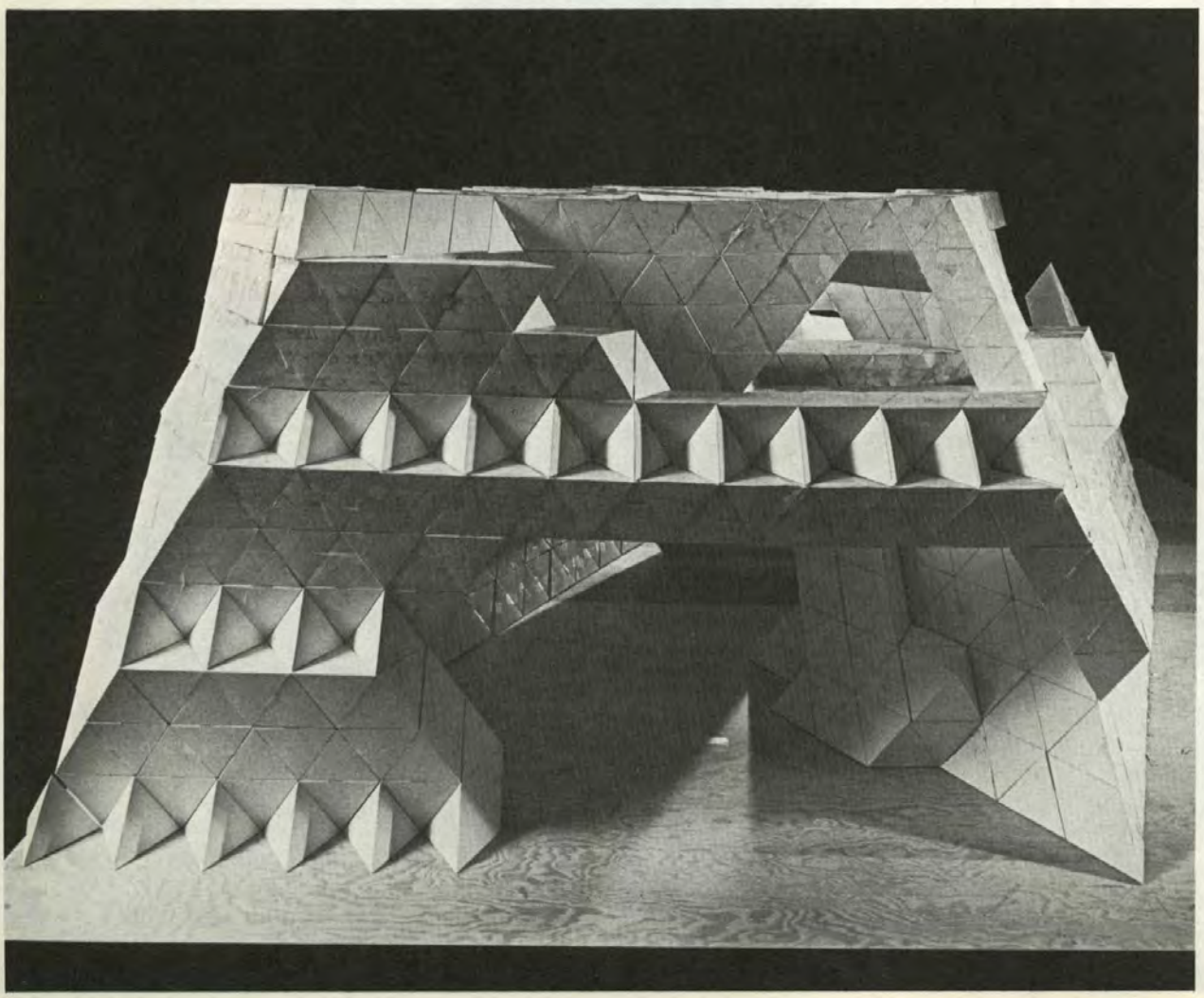

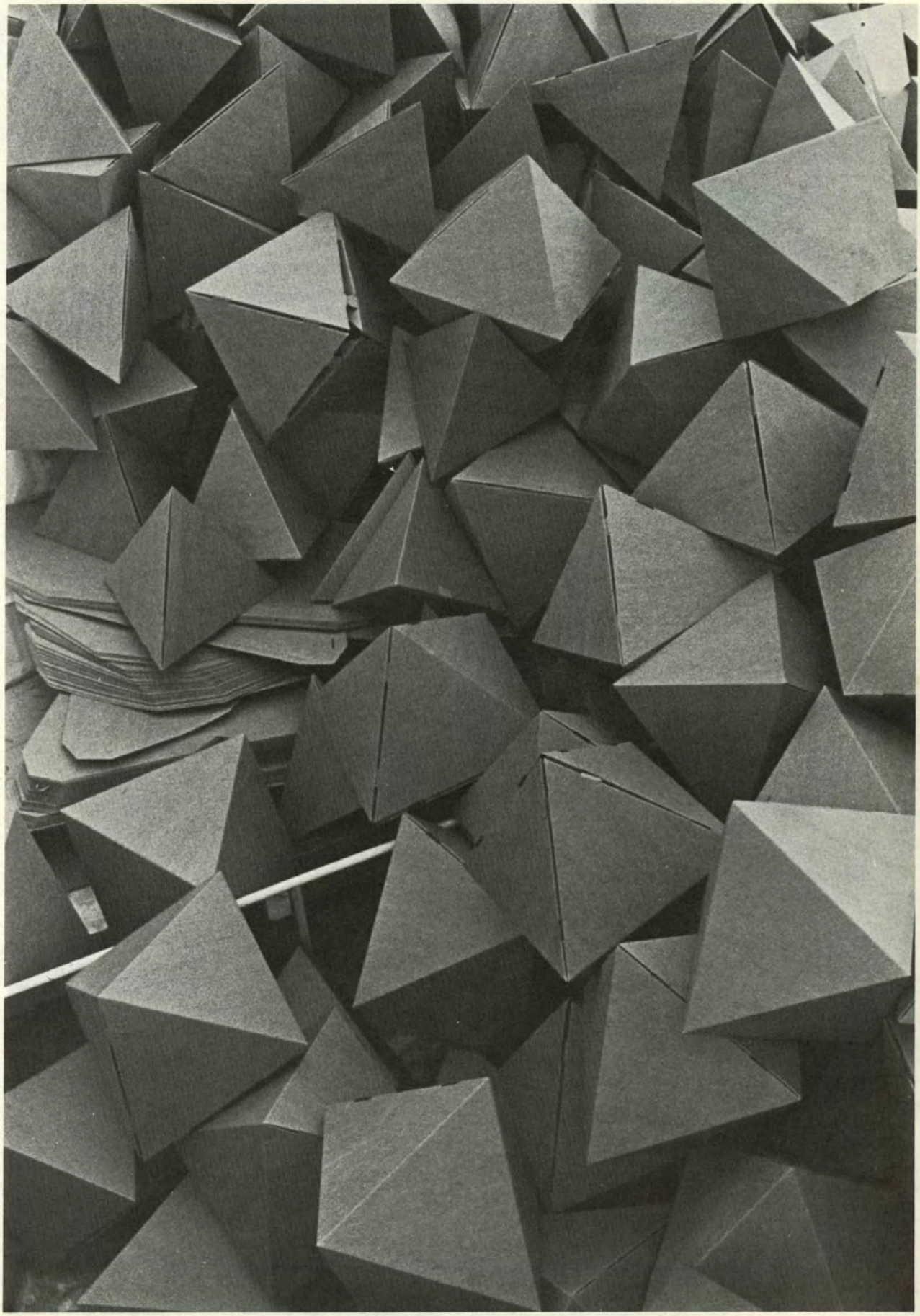

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Bill Lloyd and his wife arrived in Osaka February 16 to begin the five-week process of constructing the work. [8] (We had originally allowed two to three weeks for this task.) Several days and scores of laborers were required simply to fold and secure each module, before the units could be taped together and mounted. The work was half completed by the first week in March, but it had become increasingly apparent that the effect was not at all satisfactory. The interior surfaces were uneven at best, and the overall structure was precarious. It was decided to tear it down and begin again, using an improvised system whereby the previously insoluble engineering difficulties were overcome. Smith feels that many of the problems resulted from the way in which the modules were made to fit together. He said,

> . . . When the [Container Corporation] engineer came from Los Angeles to Honolulu last summer, we established in about five minutes that the pieces were going to be glued, not put together with lock joints, and when he showed me the mock-ups in Los Angeles later, they were as we had decided to do them—they were glued. And even the shop drawings which they gave me were made in order to be assembled by gluing; but when Bill Lloyd went there to put the piece together, they were made with lock joints rather than glued. That's why they had to tape them . . . . I feel that [the lock joints] mar the piece, because you see the spaces where the lock joints occur, and in the end they had to put tape over those joints too. So I think the whole piece loses a good deal by being put together that way . . . . I think the reason that the structure actually sagged or collapsed, whatever happened to it in the course of making it, was because . . . the components weren't made as they were intended to be made.

The lighting of the piece was achieved under the supervision of Lloyd and the USIA's lighting contractor, with a view to approximating Smith's stated effects as closely as possible. It was not totally successful. Smith stated, "I think I wasn't able to convey to the engineer [Bill Lloyd] the type of lighting I wanted. I wanted a rather sheetlike light, whereas from the photographs [of the Expo work], it seemed as though they used . . . two spots, just two rather conical shaped lights." (Actually, there were four spots used.) When the lighting had been completed, it began to appear that the cardboard surface was simply too vulnerable, in the sense that one was psychologically drawn to *touch* the walls as one walked through; obviously, under the circumstances, the work could not long withstand such handling. It was one of the Design Team members' suggestion to paint the entire interior of the cave with red or blue phosphorescent pigments and introduce ultra-violet light in place of incandescent light, with the notion that the spectators would then focus on the effects of illumination as such, rather than on the raw cardboard surfaces. A call was

made from Bill Lloyd in Osaka to Smith in New Jersey to consult with him on this possibility, and—rather to everyone's surprise—Smith was agreeable. We felt that this alternative might well be esthetically calamitous suggesting as it could have the multi-media, electric-circus ambience rampant at Expo 70. The work remained unpainted, though in the course of the Fair its interior was to become densely covered with multi-colored international graffiti. [9] The artist was so delighted with this fact that he requested that all of the graffiti-embellished modules that could be retrieved be returned to him after the closing of Expo.

Whether the completed Expo work truly represented the intentions the artist originally had in mind is necessarily questionable, since Smith did not supervise its construction or even see it in Japan. In rebuilding the structure, Smith's design was altered somewhat to strengthen certain spans which had previously sagged, and to create broader passageways. Nevertheless, despite these changes and despite the impossibility, for reasons of safety, of darkening the interior as much as the artist might have liked, the fundamental feeling of the piece remained remarkably close to that conveyed in the early Polaroid detail photos Smith had sent us, and to the look and feel of both maquettes.

Bill Lloyd, when asked to comment later about the construction of the work at Expo, said to JL,

> The structure Smith had conceived was extremely challenging. His model was architecturally sound; it fit the space perfectly. And it would have been stronger than the Pavilion building had we used cement rather than glue to build it.
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> Tony was right about the disadvantages of the lock joints. I have no explanation for the fact that the components were made that way . . . .
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> The changes we made were necessary because of the problems of traffic. I would say the original model was revised about thirty per cent. The entryway was all but eliminated, there were structural changes at the exit, and the passageways were widened. It was difficult . . . . To make one little change, you had to alter as many as thirty pieces. Each piece acts as a keystone. To widen one passageway took three or four hours of mathematical figuring—it had to support an overhead beam, etc.

Despite the artist's reservations about the lighting of the work, based on photographs he saw of it, Lloyd felt it worked quite well. He said,

> I think the work did finally accomplish what Smith wanted it to. This was really due to the lighting. Originally, we had one bank of light—that wasn't good. We tore it out and re-lit it, with shafts. Tony's

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plan for lighting would have been too dim. People would have barged into walls. Sure, we made compromises, but it worked.

The primary discrepancy which Smith felt existed between his initial conception of the work and its manifestation at Expo is expressed, aptly, in his words:

> I feel that it's a weakness in the piece that it appears so much like a building. I would rather have had . . . a greater diversity of spaces within, than the place actually has; and in that sense [more like] the way we think of a cave as hollowed out rather than something constructed as we would construct something with stones or other masonry elements. I don't think of it as masonry, although I know that most people do associate it with masonry.

In planning for the Los Angeles exhibition of the Expo works, we decided in April, 1970, to give over an entire plaza level gallery of the Special Exhibitions area for Smith's work. This comprises a larger area than allotted for any other work. Jane Livingston met with Smith, Lloyd and Marcin in New York in April, 1970, to discuss the sculpture for the Museum exhibition. It was understood by all of us that the work would be substantially different from the Expo structure. Tony was pleased at the prospect of having an extended space within which to work, chiefly because he wanted to design the structure as a freestanding entity, with several points of access. To demonstrate the kind of configuration the overall sculpture would have, he formed his hand into a crabbed, or grappling position, fingers down and bent, wrist high. He commented that given a larger, freer, space, he could accomplish a piece that would be much closer to his original cave idea than what was done at Expo. Smith and Bill Lloyd discussed the desirability of using a lighter and firmer material than corrugated cardboard, probably solid fibre board, and avoiding lock joints. Thus it was agreed that both Tony and CCA would virtually begin again in designing and fabricating the piece for Los Angeles. We requested that Lloyd supervise the work's construction. As we prepare the catalog for press, Smith is working on his new model.

Jane Livingston