Sentinel: Monumental sculpture

Charles Jerome Washburn

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SENTINEL:
MONUMENTAL SCULPTURE
By
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August, 1994
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To Dale and my family
I. INTRODUCTION

There are four experiences that determined the sculpture created for my thesis and the ideas behind it.

I was born and raised in Mill Valley, California. I remember "groovy vibes," my mom contorting herself for the sake of Yoga, and the gospel of "free love." My relatives, who were very religious, did not approve of this lifestyle. I spent summers with my cousin in Carmel and had to go to church with her family. I was fascinated over why so many people would come to church and listen to things I could not understand, and then, to top it off, give money! These two perspectives may seem quite different: the hip, self-aware, back-to-nature, free love ethos versus the church's conservative, traditional rituals and ideology. However, they have in common an interest in spirituality, although expressed very differently in the two. This paradox has fascinated me ever since.

After high school I traveled alone in Europe. I was able to discover for myself the rich art, cultures, and architecture of that part of the world, including St. Peters in Italy, the Cathedral of Notre Dame in France, and Delphi in Greece. These especially interested me because they were built in the name of a God and the idea of spirituality was at the heart of their inspiration. Cathedrals were the starting point of my architectural investigation into infusing a structure with spirituality.

The cathedral of Notre Dame in Paris, France, was built from 1163 to 1250 (see figure 1). It was one of the first cathedrals I had a chance to explore. From the
Fig. 1. Cathedral Notre Dame.
front I could see three portals with ornate carvings surrounding them. Above the portals was a huge round stained glass window, resembling a wagon wheel. On the top were two rectangular towers on the left and right side. The front of Notre Dame was therefore block-like and gave the feeling of being well anchored to the ground. Then I entered the structure. I walked in about twenty feet and the ceiling disappeared; I was confronted with a huge vaulted chamber. The top of the arches seemed to be hundreds of feet high. Multicolored light filled the space from the stained glass windows. At the end of this great space were three levels of stained glass that gave off a stronger glow than in the rest of the space. The cathedral of Notre Dame was an inspiring place for me. The architecture created a space that made me feel insignificant but also intrigued me by its effect on the viewer. The Christian religion’s doctrine permeated the architecture, not only in the Biblical stories that it represented, but also in its glorification of God and its sense of the inconsequential nature of the individual. I was impressed by the structure of the cathedral but I did not feel a sense of personal spirituality, maybe because I have studied European history and Christianity’s role in it during the period in which the cathedral was constructed.

During my junior year in college I went on an overseas program to Indonesia to study its art, dance, music, and culture. Religion in Indonesia permeates everything. All art, music, and temples are devoted to religion. I went to an ancient monument in an isolated part of the jungle called Borobudur (see figure 2). This temple resembled a huge, stepped pyramid, but on each level there were carvings depicting the path to enlightenment. Each level was less ornate as one ascended, until one reached the top, where there were many plain carved stone bells with Buddhas inside. The bells were fashioned with holes in their sides in such a way that one could glimpse (but not reach) the Buddhas. As one made
Fig. 2. Borobudur.
the ascent to these sculptures, the carvings became less and less ornate, and there was less that was external to focus upon; the viewer had to use his/her imagination to derive understanding of the experience. Since the top of the temple had no ornamentation and all of the Buddhas were very simply carved, one was forced to look inside him or herself to find meaning.

Five years later, in a totally different environment, while camping at the Grass Roots festival near Ithaca, New York, I saw a riverbed that brought together my thoughts on spirituality and how to communicate this idea in ceramics. The rocks at the bottom of the river were unusually symmetrical for a natural geological formation (see figure 3). Their rectangular shapes reminded me of a wall built with close-fitting blocks that allowed the possibility of a passageway or portal. The water that lay over the rocks gave me a sense that I could approach the wall, but only with my mind.

In this thesis project I have tried to capture the feeling of spirituality, a place of contemplation. The Sentinel is supposed to represent a focal point to help the individual break from/through reality and experience spirituality or non-reality. The Sentinel could be thought of as a boundary marker between reality and spirituality.
Fig. 3. Riverbed.
II. HISTORICAL BACKGROUND

After my experiences in Europe, Indonesia and the river bed, I had a vision of a form that I wanted to express. This form was my first prototype for the Sentinel (see figure 4). It was made of stacked ceramic blocks with a cube of glass fitted into the blocks near the top. Once I built this form, I realized that it did not express exactly my thoughts behind the piece. The clarity that I wanted to achieve was not in this form. I proceeded to do more research into different cultures and the different ways that their religions manifested themselves through architecture. At Rochester Institute of Technology I scoured the library in search of books on temples, old cultures, and gardens.

Monolithic structures, such as Stonehenge (see figure 5) and the stones at Avery, England had certain characteristics that appealed to me: simple construction methods, rough-hewn stone, and the portal-like post and lintel structures. In about the same time period but three thousand miles away the Egyptian Obelisks were being erected (see figure 6). The obelisks were not connected to religion as Stonehenge or cathedrals were, but the form of a tapered column intrigued me. It gives the viewer a sense that the obelisk is taller than it really is. I continued my research.

I became fascinated with the temples of the Incas in South America. The stone work of the Incas particularly interested me (see figure 7). The Incas carved huge stone boulders so that they fitted together without any mortar. These stone blocks were not perfect rectangles or squares; each had notches and
Fig. 4. Prototype One, Sentinel.
Fig. 5. Stonehenge.
Fig. 6. Obelisk.
Fig. 7. Inca Stonework.
looked like pieces of a jigsaw puzzle. The joinery of Incan walls and buildings had a quality about it that I knew I wanted to capture. At this point I created a second sculpture (see figure 8) that tried to incorporate these new ideas. This piece was more successful but was missing something. During a critique one of my peers suggested I consider having a second piece, like a pedestal or kneeling rock. Including a second piece to the sculpture would create a new dynamic, a tension, with the space between the two objects. This suggestion also brought up the issue of location.

I realized that I had been thinking only of a structure and not a space. All of the different architecture I had examined had a certain space created for it. I turned to the gardens of Japan to give me inspiration. I have been to only two Japanese gardens — one in San Francisco and one in Portland, Oregon. The books that I found on the subject helped by reminding me of how the gardens had made me feel. The simple, clean, and orderly atmosphere gave rise to feelings of calm and contemplation. The location of the sculpture I wanted to create had to be considered.

The Japanese gardens created a space conducive to inner thoughts. I found that I was drawn to the space and height of the cathedrals of Europe, but they were too ornate. Borobudur and the Inca temples used exquisite stone working and interlocking joints, but were also too ornate, except for the top level of Borobudur. The less ornate structures let the mind fill in the blanks. The Egyptian Obelisk had a form that appealed to me, but needed a focal point. The river bed tied it altogether.
Fig. 8. Second Prototype, Sentinel.
III. PERSONAL VISION

My vision of what this sculpture would look like finally formed in my mind. It would be two sculptures located on a lawn in a large plaza or quadrangle. I wanted them to rise thirty feet into the air, topped with a block of glass that would be notched into the block below. Both would taper from thirty inches at the base to three inches at the top of the glass. The structures would consist of twelve interlocking stacked ceramic blocks. The surface would be dry and rough. The bases would rest on a mound of dirt that would be about two feet high. One of these structures would be dark in color, in contrast to its counterpart, which would stand about seventy feet away and would be identical, except that it would be light in color. I wanted to create a tension in the space between the two sculptures and yet also have a dialogue between the two similar forms. Issues of opposites — such as good versus bad, man and woman, reality and non-reality — were all part of my vision. The sentinels could represent different pathways to spiritual awareness, and the tensions between the two would represent the moral, ethical and philosophical decisions that one makes during life's journey. Like Borobudur, which sets up tensions among its four different entrances and seven levels, viewers would be forced to look into themselves and contemplate their own spiritual choices.
IV. PERMISSION

When I knew what I wanted to create, I needed to find the place to put it. The plaza on Rochester Institute of Technology’s campus was perfect. It was located between the School for American Crafts and the administration building and between the photography school and the Liberal Arts building. The plaza was a huge rectangle (120 feet by 60 feet) of lawn with a path around the edges and another path running from one corner to another, cutting the rectangle into two triangles. I imagined each sculpture occupying one of the triangles. Now that I had the space for the sculptures, I needed to obtain permission from the powers that be.

I first made an inquiry to Betsy Murkett, the gallery coordinator of Bevier Gallery where all MFA graduate students exhibit their MFA projects. She sent me to Candy Fishbach, who was in charge of the institute’s insurance policy. Candy Fishbach asked to see a proposal focusing on safety and liability issues, which I put together within a week (see appendix 1).

While writing this proposal, I realized that my plans for setting up my sculptures were a bit fuzzy, and I tried to cover all the issues that I thought were important. After submitting it, however, it was returned with many questions that I had not addressed, such as, how strong a wind would it take to topple the structure? Could somebody climb it and fall off or make it fall down? What would the impact on the lawn and surrounding area be? I began to revise my proposal.

I had no answers for many of the questions. The underlying question seemed
to be this: how sound was my structure? I realized that I needed help from someone in civil engineering. When I contacted the Civil Engineering Department at RIT, I was put in touch with Professor Robert E. McGrath. He listened to my concerns about the project and suggested that I write up the problem and he would submit it to two of his best students. I put together the problem and submitted it (see appendix 2). A week later I received a phone call from Professor McGrath's two best students, Jeff Marx and Chris Weed. I met with them and discussed what I would need to do to make my sculptures satisfy the engineering codes of Rochester, New York.

Chris Weed and Jeff Marx suggested that I would need a concrete foundation to support my sculpture. This foundation would have to be eight inches thick and measure eight feet by eight feet. The foundation would weigh 6400 pounds, which I saw immediately to be a problem. How could I move a 6400-pound foundation? I asked them how we could trim off some weight and make the foundation easier to move. I explained that this was not a permanent installation and that I did not have the machinery necessary to move extremely heavy objects. It had to be capable of being taken apart and moved by human labor. A short time later, Chris, Jeff and I met and went over plan number two. If the sculptures were only eighteen feet tall, the foundation could be eight inches thick and measure four feet by four feet, weighing only 1600 pounds. However, moving a 1600-lb. block was still a problem. I asked if the foundation could be in sections that were held together by compression, using threaded rods that ran through them. They replied that, as long as the concrete blocks were not all the same size, it could be done: if the concrete sections were all the same size and if placed on soft ground such as a lawn, the uniformity of the blocks would allow them to move and shift like the surface of the ocean. If the blocks were not all the
same size, the movement would be broken. I devised a design for the foundation (see figure 9). I did not want any concrete blocks weighing more than 150 pounds. I also designed each concrete block so that it could be moved with a pallet jack (see figure 10). Now that I had solved half of the stability problem, we attacked the other: how to make the sculptures so that they would not topple over. Chris and Jeff introduced me to the concept of using threaded rods to hold together sectioned columns by compression. They thought I could apply the same principle to my structures. The plan was to run two 5/8-inch threaded rods up through the sculpture. One end of each rod would be anchored into the concrete; the other ends would connect to a steel plate located in the top ceramic block. These rods would be tightened down, putting the sculpture into compression. Chris and Jeff said each side of the sculpture needed to have a compression strength of 11,000 pounds. The next question became: how much compression could my clay body take? I needed to find more help.

I turned to a material testing laboratory called Imperial Testing. I brought fired clay cubes of the clay body I was using to the testing lab and Imperial Testing put each of them under a huge cylinder which pushed down at an ever-increasing pressure until the blocks shattered. After six blocks had been tested, the average tolerance was 3200 psi (see appendix 3).

In order to figure out the compression strength of my blocks, I had to calculate how many square inches were in a cross section of the smallest block. This is done by taking the wall thickness and multiplying it by the circumference of the block, and dividing the answer by two (the wind would hit the structure on only one side, or one-half of the area of the structure). The walls were a quarter of an inch thick; the circumference was 30 inches. I came up with 3.75 square inches of half of the cross-section of the smallest block. Then I multiplied my compression
Fig. 9. Design for Foundation.

Fig. 10. Design for Concrete Blocks.
strength, 3200, by 3.75, which equaled 12,000 psi for each side of the sculpture. I had the answer to all of my technical questions except for one: would this sculpture really stand? I submitted a second proposal to the institute (see appendix 4).
V. CONSTRUCTION AND SET-UP

The form of the sculpture I wanted to construct was a tapered column from the front view but it was not tapered from the side view. The sculpture would consist of ten stacked, interlocking blocks, nine of them ceramic and the tenth and top block of cast glass. The sculpture would taper from thirty inches to three inches. I had to devise a system to help me keep a consistent taper, while building each ceramic block.

The construction of the ceramic blocks was done by the use of wood forms. These forms consisted of two, two-inch by eighteen-inch by three-foot boards and two, two-inch by eighteen-inch by two-foot boards. These boards were assembled so that they formed a box with a maximum interior size of twenty-four inches by thirty-two inches by eighteen inches. The two three-foot boards were hinged to one of the two-foot boards, so that the box could swing open like a jaw. The second two-foot board was a moveable wall (see figure 11). This box was then laid down on a piece of plywood that measured four feet by three feet. Then, using angle brackets, I secured the box to the plywood. At this point I had an open, topped box with an inside dimension of twenty-four inches by thirty-two inches by eighteen inches. To create a taper, I used blue insulation foam. I cut two rectangles of foam that measured twenty-five inches by eighteen inches. I attached a one-inch thick strip of foam to one end of each of these. Then I placed them in the wood box against the faces of the two foot boards. Last, I cut out of foam the negative shapes to give me the interlocking part of the ceramic
Fig. 11. Design for Wood Form.
block. Once this was done, I lined the whole box with newspaper so that the clay would not stick to the foam or wood.

At this point I was ready to start building the blocks. I started with the largest, which I have just described. I would roll out huge clay slabs and then cut out the sizes I needed to cover each face of the interior of the wood box. Then I would apply my gravel mixture of silicon carbide and porcelain grog. I would then press this grog into the clay with a rolling pin and cover it with the black slip. These slabs would have to set up for several hours, after which I would begin placing them in the interior of the wood box against the wall face that they were cut to size for. Once the interior of the form was lined with clay slabs, the black slipped face facing out against the form walls, I would then build inner supports to keep the clay walls from collapsing. At this point I had a clay box with no top, being held up by the wood form. I then put on the last clay slab, closing the clay box. Next, I put newspaper over the top slab and laid another four-foot by three-foot plywood board over the wood box, enclosing the clay inside. At this point I would tighten this last piece of plywood to the wood form using a ratcheting packing strap that is used for securing cargo. Then I would stand on top of the wood form and jump up and down, pressing the top clay slab down onto the rest of the clay slabs. The trapped air would keep the clay walls from collapsing. I then flipped the whole wood form over and broke it apart, leaving a ceramic block that measured thirty inches by eighteen inches at the bottom, tapering twenty-four inches up to the top, which measured twenty-eight inches by eighteen inches (see figure 12).

I then started all over. This time I would make the interior of the form measure twenty-eight inches by twenty-four inches by eighteen inches, by moving the two-foot board that was not hinged inward by two inches. This process
Fig. 12. Design for Ceramic Blocks.
would give me a form that would taper because the bottom of each successive block fit into the top of the preceding block.

After I had made all of the ceramic blocks and they had become completely dry, I fired them to cone 04. At this point I ground down all of the surfaces to expose the silicon carbide, the porcelain, the clay body, and some of the black slip in the lower depressions. Then I would apply a dark cone 3 reduction glaze and fire them.

The glass block could not be made until all of the ceramic blocks had been completed because it had to fit perfectly into the very top ceramic block. The ten percent shrinkage that occurs during the ceramic process made matching the two impossible before the last ceramic block was completed. Once the top ceramic block was completed, I created a full-sized wax model of the glass block, leaving one of the narrow faces exposed. The wax was then steamed out of the mold. The mold was then placed into a glass oven and packed with glass. Next, I fired the oven to sixteen hundred degrees and melted the glass down. I had to add more glass to fill up the mold; this was done by simply opening the oven and dumping more glass into the mold until full. Once it was full, I let the glass sit at sixteen hundred degrees for ten hours. I then annealed it for two weeks. (Please refer to the technical chapter for the annealing schedule.) Once annealed and cooled to room temperature, the mold with the glass block could be removed from the oven and carefully released from the mold casing. It fitted into its ceramic counter-part perfectly.

The construction of the concrete foundation occurred during the period in which I was creating the ceramic blocks. The concrete foundation consisted of eight blocks that measured eight inches by six inches by twenty-four inches and nine blocks that measured twelve inches by twenty inches. When put together,
they would form a foundation sixty inches by sixty inches by eight inches. These blocks were cast concrete. The molds were made of plywood held together with clamps. Each block had PVC tubing running through it. These channels would line up with each other when the blocks were placed to form the sixty-inch square foundation. Through these channels I ran threaded rod, which, when tightened, compressed all of the concrete blocks together to form a monolithic foundation (see figure 10). The center block of this foundation had two female couplers that would receive the five-eighths inch threaded rod that would run up through the sculpture. Each of the concrete blocks was shaped on the underside in such a way that I could move it with a pallet jack.

The last phase of the sculpture’s development came about by necessity. Two problems had arisen which resulted in changing a major part of my vision. The first problem was how to cover the concrete foundation. I initially thought I could cover it with rammed earth; the problem was that all of the top soil in New York state was frozen and would not be thawed until a week after I was supposed to set up the sculptures. The second problem was that I was running out of time to make the second sculpture. Because of the experimental nature of this enterprise, it seemed most practical to complete one of the obelisks at a time, so that if I made an error on the first, I could correct it on the second one. However, in order to complete the second sculpture, after finishing the first, I had to make all of the ceramic blocks before I could cast the glass block and anneal it, which would take three weeks.

I realized that there was not enough time for this entire process by the time I had almost completed the first one. I talked with my major committee member, Rick Hirsch, about what I should do. It was obvious that I could not complete the second sculpture and that I would not fulfill the vision I had set out to create.
The reality of the time frame versus my original vision created a dichotomy. I had to rethink my original goals for the sculpture within the framework of the time constraints. After Professor Hirsch and I discussed incorporating a new element into the sculpture that would develop the necessary tension that I had wanted to create with the original two sculptures, he agreed that I should drop the second sculpture and finish the first. There were now different aesthetic and visual problems that I had to overcome since I was creating only one sculpture. The problem of the topsoil was another matter. We considered the issue, but not much came of it.

The answer came to me at Christmas in my mother's newly built home. A portion of the house was made of stucco. I had never really looked at stucco before, but observing it closely gave me an idea. I could build a wood frame over the concrete foundation of the sculpture. This frame could then be covered with stucco, which could be colored and textured. When I got back to Rochester I set to work. Tom Parker, the wood shop technician, helped me build a wood frame over the concrete foundation. This frame could be disassembled into four parts. I then applied an inch of stucco, which I had colored a dark brown. My plan was to apply a final coat of stucco on site after the sculpture had been set up.

The second problem was an aesthetic one. The tension I was hoping to create by using two sculptures would be lost with the elimination of one of the sculptures. I decided to add a vantage point from which people could view the sculpture. I was also hoping that it would help create a sense of space and privacy. The vantage point consisted of three large ceramic blocks that interlocked to form an trapezoidal seat. This seat was situated in the right-angled corner of the grass triangle, seventeen feet from the sculpture and three feet from either concrete
walk. The location of the seat helped block out part of the busy pedestrian activity that occurred next to the student union. When one looked at the sculpture, it was framed between two of the four buildings that surrounded it. I felt that this made for a private spot that encouraged contemplation in an otherwise non-conducive environment.

Mid-way through February Rochester Institute of Technology granted me permission to set up my sculpture. The organization and preparation for the set-up of the sculpture took a long time but was worth the effort. I needed at least five people to help me with the assembly of the sculpture. I asked for volunteers from the ceramic department and was awarded with more than enough willing hands. Every aspect of the set-up had to be planned for, from work gloves, duct tape, to photographers and lunch. I knew that I would only have one shot at this and there would not be enough time to make any new components or adjustments. I did not have any replacement ceramic blocks or glass block, so transporting and handling them was very nerve-racking. The week preceding the day of the set-up I assembled all of the tools, reconfirmed the scaffolding rental date, and loaded all of the ceramic and concrete blocks onto pallets. The plan was to meet early on a Friday morning and start. This would give me Saturday and Sunday to finish the set-up if things did not go as planned.

The first job on Friday morning was to move all of the blocks, supplies, and equipment down to the site. After this was done, we laid out a black plastic tarp that was cut to the size of the area of the base of the sculpture (see figure 13). The tarp was placed thirty feet from the northwest corner of the quadrangle and equally distanced from either side. On top of the tarp, sand and gravel were spread out, leveled and compacted (see figure 14). Once this was accomplished the concrete blocks were moved into position. The center concrete block of the
foundation was the first to be placed, then the others placed around it. When the foundation was about half assembled we pushed the threaded rods through the channels in the concrete blocks, locking them together. The last block was slid into position, and two metal plates were put into place on opposite sides of the concrete foundation, sliding over the ends of the threaded rods and acting like large washers. Then nuts were twisted onto the ends of the threaded rods and tightened against the metal plates. The foundation was now solidly in place (see figure 15).

It was now time for the assembling of the sculpture itself. Three concrete blocks were stacked over the center concrete block in the foundation. These three blocks had two channels running through them that lined up with the female couplers in the center of the foundation; two threaded tension rods were inserted through the channels in order to connect with the foundation (see figure 16). These three stacked concrete blocks would be the starting point for the sculpture and they would later be hidden by the stucco panels. Before the first ceramic block was placed, the scaffolding was set up straddling the foundation, lined up with the side of the sculpture. The first three ceramic blocks were placed on the stacked concrete blocks, then two more threaded tension rods were connected to the two that were already connected to the foundation by couplers. Now, three more ceramic blocks were put into place, and the process was repeated (see figure 17). Once we got to the last ceramic block, which contained a metal plate to receive the tension rod, the threaded tension rods had to be cut to the proper length. Before the glass block was placed into this final ceramic block, we put the sculpture into tension using a ratchet with an extension, so that we could reach down into the top ceramic block. We tightened the nuts against the metal plate until the point when it passed our test for stability: the sculpture would not move
Fig. 15. Assembly of Concrete Blocks.
Fig. 16. Center Blocks and Insertion of Threaded Rod.
Fig. 17. Stacking Ceramic Blocks.
more than a quarter of an inch when it was pushed from the side of the top block. Finally the glass block was glued into place with clear silicone (see figure 18). The scaffolding was disassembled and we quit for lunch.

After lunch, we moved the stucco panels into place and attached them to the foundation (see figures 19 and 20). The corners of the panels were taped over with fiber glass wall tape. Then we broke into three teams. One team would mix the final layer of dark brown stucco, the second group would trowel on the stucco to the panels (see figure 21), then the third group would follow the second, smoothing and forming the final stucco coat (see figure 22). Once the stucco was applied, I dusted the wet surface with black iron oxide in order to give the final surface a more complex visual texture (see figure 23). The main part of the sculpture was done; all we had to do was place ceramic blocks for the viewpoint and plaque.

We measured in about six feet from the corner and marked the place where the ceramic blocks would sit. We then assembled the blocks and secured metal spikes to the bottom of them. The assembled blocks were then positioned in the correct spot and pushed into the ground (see figure 24). A ceramic plaque was then placed midway between the seat and the corner. The plaque gave the name of the piece, artist, and the graduate degree it was constructed for:

SENTINEL
Charles Jerome Washburn
MFA Thesis 1994

We finally finished, and it took only twelve hours (see figures 25 and 26).
Fig. 18. Placement of Glass Block.
Fig. 19. Placement of Stucco Panels.
Fig. 23. Applying Black Iron Oxide.
Fig. 24. Placement of Seat (View Point).
Fig. 25. The Completed Sentinel.
Fig. 26. The Completed Sentinel.
VI. CONCLUSION

This thesis project was the largest artistic endeavor that I have ever attempted. Originally, I had a vision of two, thirty-foot tall sculptures, facing each other across a large quadrangle. One sculpture would be of a dark color, the other of a light color. Both of these sculptures would be on top of rammed earth mounds. However, as with any sculpture I have started, I had to make alternations to my vision, answering questions that I had not foreseen, surmounting problems that arose during the building of the sculpture.

The final sculpture, Sentinel, captured many of the feelings I had wanted to include in this thesis project even though it diverged from the original concept. The Sentinel was located in the northwest corner of a large grassy quadrangle at Rochester Institute of Technology. It consisted of a thirteen-foot tall tapered column resting on a four-foot pyramid-like base. The base, made of stucco, had a textured black and brown surface. The stacked ceramic blocks showed a brown and black satin matte surface.

To put a closure to the sculpture and a focus point, the Sentinel was topped with a large glass block that fitted into the topmost ceramic block. A little distance away, in the northwest corner of the quadrangle, was a viewing point. This ceramic seat gave a person approaching the sculpture something that was at a more human scale by which to experience and view the larger part of the sculpture. I hoped that the viewpoint would help make this sculpture more “user-friendly,” providing a place to sit and contemplate or just to eat lunch while viewing the Sentinel.
This project was different from any other sculpture I have created in that actual artistic creativity utilized only 10% of the time it took me to build and erect the Sentinel. I have always worked very fast, creating two or three ceramic sculptures a week, but this time I put all of my energy into one sculpture for seven months. What happened to the time? Another 10% of my effort went to constructing the concrete foundation and stucco panels. The other 80% of the time I worked on this project I was dealing with getting permission from the Rochester Institute of Technology to erect the sculpture and satisfying all of the requirements, such as safety and site preparation and repair, that were required by officials. During the creation of the Sentinel, nearly every day I needed to phone someone within the bureaucratic structure of RIT and push a little further my request for permission to set up the Sentinel. The frustration that I felt during this time caused me to have many negative feelings toward the administrative structure of the institution. No progress was made until Dr. Peter Giopolus, head of Graduate Studies at RIT, inquired about the delay in receiving a response to my request. Within a couple of days, I had an answer.

Once the bureaucratic and technical issues are dealt with when dealing with large monumental sculptures in a public place, one must return to address aesthetic issues. The primary question left for me to answer was this: did I meet the goals that I set out to accomplish with this artistic project?

I feel that I not only met my goals but exceeded them. The reason I feel this way is that the Sentinel represents several lessons that I learned. In a practical sense, this project has affected my art in several ways. I will think carefully about attempting any monumental public sculptures in the future, considering all of the bureaucratic, safety, technical and aesthetic issues involved. In addition, the physical size and weight of the Sentinel and the studio that would be
required to construct large-scale sculptures have made me reconsider the parameters that I want to set for the creation of future sculptures. However, I feel that the Sentinel was a success, and in that respect, my goals were achieved. In spite of the changes that had to be made, it worked aesthetically for me. The tall, tapered column with its gleaming glass cap set up a tension with its surroundings; it did not need another sculpture to provide that tension. The buildings of RIT consist of red brick and are very block-like and heavy in contrast to the Sentinel, which also consists of blocks but ones that are dynamic in shape, with a visually active surface. The Sentinel gave the quadrangle a purpose other than an open area between buildings. In the beginning I wanted two monumental sculptures opposing each other, but with the realization of my time constraints I had to compromise. I feel that this decision was the most important one I made during this project. It showed me that I could dynamically utilize the constraints of reality to achieve my vision and my artistic goals.

Having achieved my aesthetic goals, did I also achieve the goal of inspiring the sense of spirituality that I had originally intended when I set out to develop this project? I believe so. I did not need another Sentinel to represent different pathways to spirituality because RIT's buildings themselves represented an alternative focus. By providing a sitting place near the sculpture, I allowed the viewer's perspective of the RIT buildings in relation to the Sentinel to give the sculpture prominence. The shape of the sculpture encouraged the viewer's eye to move upward and focus on the glass block, which captured and radiated light, framed by the blue sky. I feel that this gave the viewer a focal point for contemplation, hopefully, freeing the person to cross the boundary between reality and spirituality, if only for a moment.
Because of the building system used and the placement of the sculpture out of doors, I needed a clay body that had 3200 psi compression strength with 8% to 15% water absorption. I formulated and tested several clay bodies. For the compression testing, I sent my tests to a materials testing lab. The recipe was:

**Hair of the Dog**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hawthorne Fireclay</td>
<td>25</td>
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<tr>
<td>Coarse Grog</td>
<td>25</td>
</tr>
<tr>
<td>Silica</td>
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<td>Foundry Hill Creme</td>
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<td>OM4 Ball Clay</td>
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<tr>
<td>Kyanite</td>
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<tr>
<td>Nylon Fiber</td>
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</table>

This clay body can fire to cone 10, but firing to cone 3 gave me 3200 psi compression and 9% water absorption. The total shrinkage was 10%: 5% from wet to dry and 5% from dry to cone 3.

The ceramic blocks were covered with a cone 3 black slip. The recipe was:

**Dark Rocky Road**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawthorne Fireclay</td>
<td>25</td>
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<tr>
<td>Coarse Grog</td>
<td>25</td>
</tr>
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<td>Custer Feldspar</td>
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<tr>
<td>Red Iron Oxide</td>
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<tr>
<td>Chrome</td>
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<tr>
<td>Chunky Porcelain Grog</td>
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<tr>
<td>Foundry Hill Creme</td>
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<td>Nickel Oxide</td>
<td>5</td>
</tr>
<tr>
<td>Chunky Silicon</td>
<td></td>
</tr>
<tr>
<td>Carbide Grog</td>
<td>12.5</td>
</tr>
</tbody>
</table>

The slip was applied in a thick coat so that the chunks of porcelain and silicon carbide would not fall off. Once the ceramic blocks had been coated with the
black slip and bisqued to cone 04, I ground down the surfaces to expose the porcelain, silicon carbide, and part of the clay body. I then applied a cone 3 glaze that I had developed. It was a dark brown satin glaze. The recipe was:

\[
\begin{array}{ccc}
\text{Nepheline Syenite} & 69.5 & \text{Ferro Frit 3134} & 10 \\
\text{Whiting} & 20.5 & \text{Titanium Dioxide} & 5.5 \\
\text{Bentonite} & 2 & \text{Chrome} & 4 \\
\text{Manganese Dioxide} & 4 & \text{Red Iron Oxide} & 2 \\
\end{array}
\]

The casting of the glass block utilized two important technical pieces of information: (1) the recipe for the plaster mold in which the glass is cast, and (2) the annealing schedule. The recipe for the plaster mold was:

\[
\text{Mold Mix} \\
\begin{array}{ccc}
\text{Pottery Plaster #1} & 1/3 \\
\text{Silica} & 1/3 \\
\text{T-40 Dental Plaster} & 1/3 \\
\end{array}
\]

This mix was poured around a wax positive of the glass block. After the plaster set, the wax was steamed out. I applied a on-inch thick layer of KS-4 Plus Refractory Cement to the outside. The mold was placed in the annealing oven packed with glass and brought up to 1600 degrees Fahrenheit. I had to add more glass at this point. Once the mold was filled I used this schedule for annealing the glass:

\[
\text{Annealing Schedule} \\
1) \text{Soak for 10 hours at 1600 degrees} \\
2) \text{5 hour cool down to 964 degrees} \\
3) \text{Soak for 20 hours at 964 degrees} \\
4) \text{40 hour cool down to 899 degrees} \\
5) \text{Soak for 10 hours at 899 degrees} \\
6) \text{10 hour cool down to 799 degrees} \\
7) \text{20 hour cool down to 100 degrees}
\]

I then let mold cool to room temperature in the annealing oven for two days.
APPENDIX ONE
PROPOSAL ONE
To Whom It May Concern,

My name is Charles Washburn, and I am a second year graduate student in ceramics department at the School for American Crafts. I am currently working on my thesis project, which will be finished the last three weeks of our spring term (April 22-May 14). This project consists of two large ceramic sculptures. After conferring with Professor Hirsch, it was felt that the most appropriate setting for them would be out doors and perhaps site specific. We, therefore, are asking for permission to install these sculptures temporarily on a specific location here at Rochester Institute of Technology’s campus. This would be a wonderful experience for me because I hope to create site specific sculptures as a full time business. I also think this would be an excellent opportunity for the R.I.T. community to see what a representative from the School for American Crafts is doing.

These sculptures consist of stacked ceramic blocks with a metal interior frame. Both will be approximately twenty feet tall and cover a rectangle shaped area that is seven and a half feet by eight and a half feet. Each of these will have a small counter part that will sit approximately twenty feet in front of them. These counter parts will be three feet tall, four feet wide, and eighteen inches thick. Please refer to attached diagrams.

Much thought has gone into the safety installation aspects of this endeavor. The interior metal frame will secure the ceramic blocks from falling.

The installation will take two days. The sculptures will be set up with the use of scaffolding. The removal of the sculptures will take two days. The impact on the site would be minimal, if any. A good grade top soil will be used to level the base of the sculptures. This soil will be removed after the sculptures are taken down, what remnants remain will be beneficial to the lawn. The grass will be compressed and matted where the sculptures stood.

Thank you for taking the time to consider my request. I hope you can see the educational merits of this proposal and will give your support and cooperation.

Sincerely,

[Signature]
Specifications for Ceramic Sculptures

Height: 20 feet

Weight: 2000 lb each

Top sections: Ceramic section: 400 lb each
Interior metal frame: 200 lb each

Bases: Ceramic section: 600 lb each
Interior metal frame: 600 lb each

Area covered by base: 7 1/2 feet X 8 1/2 feet

Estimated value: $5000 each
APPENDIX TWO
STRUCTURAL ENGINEERING PROBLEM
STRUCTURAL ENGINEERING PROBLEM

Description:
Structure consists of nine hollow ceramic blocks. These blocks are stacked on top of one another to form a column. Each block is tapered inward 1" on each side. Each block is two feet tall and 11" thick. When stacked the column measures 27.5" wide by 11" thick by 18' tall. The width of the top block is 3.75". There is a shaft that runs from the top block to the bottom block. The shaft has a dimension of 2.5" wide by 5" long. Refer to the attached diagram for further information about the structure.

Problem:
What support system could be employed to stabilize this structure? The structure will be displayed in a public place with the elements to contend with, especially the wind. The foundation which will hold the structure has not been designed yet. Its form will depend on the anchoring requirements of the support system for the structure.

The Constraints:
1) Must be able to disassemble the support system and the foundation (anchoring system).
2) Each section of the support system cannot be longer than four feet.
3) The area of the foundation cannot exceed 8'X9'.
Fig. 27. Structural Design.
APPENDIX THREE
MATERIAL TESTING DATA
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APPENDIX FOUR
FINAL PROPOSAL
Proposal for MFA Thesis
Sculpture Display

Charles Washburn
Ceramic Graduate
School for American Crafts

February 22, 1994

Address:
1088 Quaker Road
Scottsville, NY 14546

Phone:
889-1380
Proposal for MFA Thesis Exhibition

I am asking for permission temporarily to install one sculpture at a specific location here at Rochester Institute of Technology's campus. The sculpture would be on display from April 22 to May 23. This time period would span commencement week. The location I would like to use is one of the triangle shaped lawns between buildings 7A, 7B, 1, and the liberal arts building. The sculpture consist of two pieces. The main piece is made of stacked ceramic blocks secured to a concrete foundation covered with top soil. The sculpture will be approximately twenty feet tall and cover a rectangle shaped area that is six feet by six feet. The companion piece is five feet tall covering an area three feet by two feet.

Much thought has gone into the safety aspects of this sculpture. RIT's Civil Engineering Department helped to design a secure anchoring system. This system uses tension for stabilizing the sculpture. Two threaded rods connected to a 1/2" steel plate in the top ceramic block thread into two Dowel-Ins cast into a concrete pad which measures five feet by five feet by eight inches thick. A total of 11,000 psi of pressure will occur down the walls of the sculpture if there are 70 mph winds. The minimum compression strength of the clay and concrete needs to be 3,200 psi. Quickcrete 5000 with a psi rating of 5,000 was used for the pad. The clay I used is being tested at a local materials testing lab. From research I have done I have found that terra cotta and red brick have a compression strength of 8000 psi. I am confident that the psi rating for my clay will meet the requirements. But if it does not I will not set up the sculpture outside.

The installation will take two days. The removal of the sculptures will take two days. The impact on the site would be minimal. Please refer to the Set Up and Take Down procedure outline for specific information.

Thank you for taking the time to consider my request. I hope you can see the educational merits of this proposal and will give your support and cooperation.
Set Up Of
Sentinel Sculpture

A. Layout:
1. Measure from corner.
2. Stretch line from point to point. Line center block up.
3. Mark for tarp.

B. Foundation:
1. Place Plastic Tarp (10'x10').
2. Gravel spread out and compacted. (Green Roller, Rack Flat)
3. Place concrete blocks. Center Block First.
4. Fasten blocks with threaded rod.
5. Stack concrete center base blocks.
6. Thread rod through center base blocks.

C. Scaffolding:
1. Place scaffolding (16' tall) straddling the concrete pad.

D. Stacking Sculpture:
1. Place the first ceramic block over the two threaded rods.
2. Keep stacking until rod ends are almost covered.
3. Connect next rod sections.
4. Repeat process.
5. When last ceramic block (steel plate inside) is placed, put washers, nuts and tighten. Make sure locking nut is in place.
6. Lay down silicone glue and place glass block.

E. Covering Foundation:
1. Take down scaffolding.
2. Put interior framework in place.
3. Place stucco panels and fasten.
4. Stucco seams.
5. Clean up.
Take Down of
Sentinel Sculpture

A. Uncover Foundation:
   1. Chip stucco away and expose bolts.
   2. Unbolt and pull panels back.
   3. Dismantle interior frame.

B. Scaffolding:
   1. Place scaffolding (16 feet tall) straddling the concrete pad.
   2. Move bucket truck into position.

C. Removal of the Sculpture:
   1. Cut silicone bond between glass block and the top ceramic block. Give to
      person in the bucket to bring down.
   2. Unscrew the nuts. Remove nuts and washers.
   3. Lift off ceramics blocks and pass to person in bucket.
   4. When a rod connector is reached, disconnect sections.
   5. Repeat process until all blocks are taken down.
   6. Blocks are loaded on to pallet jack and brought back to ceramic studio.
   7. Scaffolding is taken down and returned to renters in my truck.

D. Taking the Foundation Apart:
   1. Unthread the last rods.
   2. Unstack center concrete blocks.
   3. Disconnect threaded rods.
   4. Remove concrete blocks with pallet jack to ceramic studio.
   5. Remove plywood, plastic tarp, gravel, and clean area.
   6. Reseed dead patch.
Specifications for Ceramic Sculptures

Height: 20 feet

Area covered: 6'x6' and 2'x3'

Clay:
Methods of Testing
Absorption (5hr boil): 7% ASTM C67
Less than 11% absorption is required

Compression Strength: 3500psi ASTM
3200 psi or greater is required

Concrete pad: Quickcrete 5000 (5000 psi)
18 concrete blocks connected with threaded rod

Anchoring System: 5/8" A36 threaded steel rod
5/8" Dowel-Ins

Estimated value: $5000
Fig. 28. Plaza Plan: Placement of Sculpture.
Fig. 29. Companion Piece.
Fig. 30. Foundation Design. Chris Weed and Jeff Marx.
Fig. 31. Structural Design. Chris Weed and Jeff Marx.
Fig. 32. Internal, Front.
Internal Structure: Side View

Fig. 33. Internal, Side.
Fig. 34. Sentinel, Front.
BIBLIOGRAPHY


