The Search For a Sculptural Paradigm: The Design of a Pedestrian Bridge
by
Jon F. Husebo

Thesis submitted to the Faculty of the Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

MASTER
of
ARCHITECTURE

APPROVED:

Wolfgang Schueller, Chairman

Michael O'Brien       Heinrich Schnoedt

April 1992
Blacksburg, Virginia
This thesis is dedicated to Trang, whose unyielding love and encouragement has gotten me through the hard times and made the good times great; and to my family, who have always been there for me.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Sculptural Paradigm</td>
</tr>
<tr>
<td>2</td>
<td>On the Scale of the Landscape</td>
</tr>
<tr>
<td>3</td>
<td>On the Scale of Man</td>
</tr>
<tr>
<td>4</td>
<td>On the Scale of the Element</td>
</tr>
</tbody>
</table>
When you sometimes hear the wiser artists say how problematic it is to paint a legitimate painting, one may also imagine how difficult it is to carry out a work that is generally agreed to be called "sculpture." 

Walter Pichler / Sculptor

It is not only the sculpture which concerns the Austrian artist, but also where the piece will ultimately rest. This concern for place is expressed in Pichler's own words as the creation of "quasi ideal settings" for his pieces to exist in. And indeed, over the last twenty years or so Pichler's farm in Saint Martin, located in a remote corner of Austria near the Hungarian and Yugoslav border, has served as the site for several small "houses." Each building was constructed around specific pieces in order to provide them with a "experiential space with a sacral quality." Because many of the pieces are so integrated into the series of buildings at the farm, Walter Pichler is faced with somewhat of a dilemma when he must remove them from their "homes" and exhibit them abroad.

In the fall of 1990, Pichler held an exhibition in Vienna from October 1 - December 31. In the words of Peter Noever, the Director of the Austrian Museum of Applied Arts: "The exhibition which may very well be the most comprehensive show Pichler had had so far will, however, not be compiled as a mere retrospective show. The intention of the artist is rather to take hold of existing space and see it as a challenge for spatial and mental penetration." And indeed, the most successful works in that space are those that interact with their environment, being specifically designed for the gallery itself. One very large piece, entitled "The Gate to the Garden", goes so far as to become part of the building; the large steel door and accompanying concrete stair becoming a permanent document of the exhibit. Perhaps the most interactive piece is "The Cross in the Corner". This piece, more than any other in the exhibit, must exist in its particular location in the gallery. The "site" of the corner becomes vital to its success as being viewed as a truly complete work. The piece consists of two distinct parts, the first being two elegantly joined steel tubes which cross each other at an angle of 90 degrees. The tubes form a "plus sign" which rests upon four steel legs which in turn are firmly planted into two intersecting "arms" which extend from the two walls of the corner. These "arms", which constitute the second part of the piece, appear to have been extruded from their respective walls, leaving behind two openings from which the tubes emerge. These openings...
penetrate the entire thickness of the wall, and observed from the opposite side serve to frame each tube individually. In this piece, there is no real stand/sculpture duality. Rather, what would appear to be a stand at first glance, is as sculptural as the tubes that rest upon it, leading one to believe that the whole corner (tubes, "arms" and walls included) is the piece. Through stages of differentiation, the sculpture has totally integrated itself into the gallery. While it is problematic to separate the work along the lines of stand/sculpture, it is possible to divide the piece into what will eventually leave the gallery and what will be left behind, or what is temporary and what is permanent.

Hans Hollein, an exact contemporary of Walter Pichler, held a joint exhibition with Pichler in 1963 and knows Pichler's work well. Upon viewing a Pichler exhibit in 1987, Hollein described that he had "...the feeling of tension between mobility and fixity, between art object and nature, between permanence and transience. This hidden dualism between the static and the dynamic...pervades the entire exhibition in Frankfurt." Three years later in Vienna, Pichler continues in the same vein. The "arms" will remain in the gallery when the steel tubes have moved on. Thus, they seemingly sense their fate and strive to blend into their surroundings, becoming one with the existing walls of the gallery through conformity of color, geometry, structure and material. This conformity leads to an ambiguity of perception: Are the "arms" a separate entity joined to the walls or is it all one thing? The steel tubes, on the other hand, are but a temporary manifestation in the gallery, lasting only the three month duration of the exhibit. This "temporal" part of the sculpture has no obligation to conform like its armed counterpart; quite the contrary, it exists through deliberate opposition to its environment in the form of contrasting color, geometry, structure and material. The key to this duality's success is how these two parts interact; what it is that holds them together. The simple answer is theme, a theme which can be articulated in each part's respective language. While the language of color, geometry, structure and material drastically change from one part to the other, the essential theme of "crossing" remains unchanged. In this way, the two parts complement each other, actually becoming mirror images in a sense, except it isn't the "image" that's being reversed, it is the language in which the image is expressed. Subsequently, subtractive extrusion becomes additive construction, where the idea of a "one" becomes the idea of a carefully joined "many". Rectilinear becomes curvilinear, wood becomes steel and white becomes black. In the end, an ambiguous line between surroundings and object gives way to a clear-cut separation. This "mirroring" of a theme is very important, because when the steel tubes have gone the "arm" will remain as traces of what once was. In architectural terms, the temporal manifestation of a project, mainly that which is susceptible to the ravages of time, will crumble to dust long before its permanent counterpart. Thus a trace is left, one which blends into the environment yet still expresses the intent of the original whole. The essence of my thesis was to translate this idea of reflective dualities into such an architectural context, where they could serve to articulate the spirit of the given environment. The use of such a sculptural paradigm as the basis for a work of architecture inherently leads to a greater concentration on syntactic issues rather than pragmatic ones, thus a simple program was deemed more appropriate rather than a complex one.
"I think a sense of place is the origin of all art."  

Eduardo Chillida / Sculptor

Indeed, the sense of place is the ultimate inspiration for a creative work. Eduardo Chillida, another contemporary of Pichler’s, lives and works in the Basque country of southern Spain. Over the years, he has created many site-specific pieces, each striving to gather and articulate their given environment. And so, both Chillida and Pichler share a similar concern for the context within which their work is viewed. On the scale of the landscape, I wanted a project which would similarly express this sense of place. As Christian Norberg-Schulz expresses, "The existential purpose of building architecture is to make a site become a place; that is, to uncover the meanings potentially present in the given environment." Several early sites were developed in an attempt to formulate an articulation of the place. Eventually the proper site and program were found which would not only clearly articulate the site, but also express the essence of a reflective duality. The site is located where an interstate highway slices through the surrounding hillside creating a void. This made chasm affords the opportunity in which man can make a gesture towards the natural environment, in this case an environment which has been disrupted. Many such sites can easily be found anywhere in the country; as Nathaniel Owens of S.O.M. has stated, "Just as one can see its beauties from the air, one can also see its mutilation. Marks of natural erosion lie shaped in forms of sheer beauty, but other scars, carved by the press of an oversweeping population, remain as silent accusations against us." With this type of site, the act of articulating the sense of place seems especially relevant. The design of a pedestrian bridge which would span the void and bring together two halves of a shattered whole therefore seemed appropriate. Inherent in its design is the idea of reflective duality, where a subtractive-skeleton of concrete retaining walls and light slots is reflected in the additive-skeleton of a steel truss and cables. It was imperative that the cable formation create a developed volume which could strike a balance with the mass of the concrete walls. It is this change in language that Chillida describes in his own work as trying to create "symmetry between two separate entities such as between an aroma and weight or mass." Examples of developed linear volumes can be seen in much of Naum Gabo’s early work. Gabo, one of the founders of the constructivist school of thought, was striving to create a "pure" art form, free of the conventions of the day. The volume defined by a hyperbolic parabola was eventually found to strike the proper balance with the mass of the adjacent wall system. The wall and cable system are interdependent on more pragmatic levels as well, the wall depth of 36 feet being determined by the combination of the 200 foot truss span and the minimum cable angle of 15 degrees. In one sense, the bridge is very much like a horizontal tree, its trunk and canopy springing forth to reach towards the sky, while its earthbound anchor goes virtually unseen, blending into the land itself.
Early Cable Formation Study
Plan 1" = 64' Spanning The Void in an Attempt to Gather The Landscape
Section / Side Elevation  1" = 64'  Exposed Canopies Give Way to Hidden Roots
This is the goal of the intersecting slots of the retaining walls; to create a layered structure which would "grow" into the surrounding earth much like the roots of a tree. The walls are layered in six-foot increments so that the pour-lines serve to give some sense of man's scale to the interior. The greatest force acting on the wall system is lateral earth pressure, therefore as it descends into the ground and the pressure increases, the walls gradually widen. Pichler held a similar fascination with entering the earth in his early work. "His early drawings and sculpted pieces are of deep-cut chambers and a ready symbiosis of crafted metal and its surrounding earth." When the primary walls of the stair slot reach the edge of the cliff, there exists an opportunity to not only express there hidden mass and geometry, but also to create a transitional area. As with Pichler's studies, this transitional area is an attempt to integrate two disparate entities, mainly the narrow and highly constricted space of the stair slot with the much more open and airy space of the truss itself. A similar transition can be seen in Aurelio Galfetti's access tunnel connection for his additions to the Castelgrande in Bellinzona, Switzerland. As one moves from its entrance towards the stair/elevator shaft, the deep-cut tunnel gradually tapers in height, allowing one to adjust to the new environment. This idea is also central to design of the stair entrance from the bridge. Thus as the hillside recedes, the wall thickness and height decrease while the space between them gradually increases, creating a "room" at the bottom of the stair where the transition can occur. The creation of this room allows the total thickness of both walls and footing to be revealed in front elevation, exposing what is buried in the earth. Just as the front elevation serves to reveal hidden mass, this mass is alluded to at ground level by a slight sloping of the earth as the walls run towards the edge of the cliff. Additionally, light slots angled at 45 degrees to ground level and running perpendicular to the main slot serve to gauge the increasing depth of the hidden walls. When these walls reach the face of the cliff and begin their divergence from each other, the rain slots to either side of the stair gradually widen and deepen, forming a "tongue" of concrete which eventually protrudes from the hillside. It is this "tongue" with engages the end of the truss geometrically and structurally, the tip squaring to conform to the truss's rectilinear plan. Past the point of anchorage, the truss in turn tapers and rises as it continues towards the stair to end at a single point, conforming to the space between the angled retaining walls. This symbiotic relationship of spaces and geometries allows for a completely gradual transition, where the recession of one element (the walls) is countered by the gradual enclosure of the second element (the truss).
Developing Walls to Resist Lateral Earth Pressure And Allow Water to Drain
The Layered Structure of The Wall Leaves Pour Lines at The Scale of Man
Within The Transition Area
"Older sculpture was created in terms of solids; the new departure was to create in terms of space.

Naum Gabo / Sculptor

The creation of sculpture in terms of space is what Gabo achieved in many of his pieces, including the previously mentioned "linear constructions". A radically different approach from the "linear constructions" can be seen in his work with planes. This work dealt with the intersection of plastic sheets, where empty spaces would be left to define a three-dimensional form. The intersection of separate pieces thus becomes a vital component in the sculpture. As with Gabo, Pichler is likewise extremely concerned with the act of joining individual pieces to create a whole. In Pichler's case, "The materials are transformed into a ritualistic whole by virtue of the great detail in which they are worked." Thus, both artists are very conscious of the joint. On the scale of the element, I attempted to express this same level of concern. The design of the joints of the steel frame thus became the primary focus of my attention, and serve as an exercise in formal integration of geometry. I found myself in a struggle to find a language for the joints, and found the language of the plate. Much like Gabo's early work with plastic sheets, I attempted to transfer the three dimensions of the tube into the two dimensions of the plate. Three directions were explored within this language. Initially, an attempt was made to create a transition piece which would allow cables to attach to the top cord of the truss at progressively changing angles of inclination. This joint was designed not only as a transition piece in angle, but also in comparative size. The small diameter cable attaches to an elongated series of plates, which gradually flare out as they approach the much larger diameter cord. The connection of the tubes of the truss to each other posed a different problem, mainly bringing three tubes together at one well-articulated point. The first approach was towards flexibility, where the plates of the joint could move to mesh like fingers of a hand. The final design leaves this flexibility for the simplicity of a one pin joint, one which would reinforce the clear geometry of the truss. The cables are also incorporated into the full geometry of the truss, held in place by openings and reveals in the tubes themselves, where they serve as cross-bracing. Thus the truss and cables become fully integrated, but at the same time each is allowed to retain a clear sense of their own geometry. (The linear thrust of the truss is unobstructed and the cables are continuous.)
The Language of the Plate: Translating the Three Dimensions of the Tube into the Two Dimensions of the Plate.

Gabo "Bust" 1916
Angular Transition: Cable Joint Study
Flexibility: Dynamic Joint Study
Simplicity: One-Pin Joint Study
Angular Transition: Cable Joint Study in Series
Integration of Cable into Geometry of the Truss: Side Elevation and Front Section
The search for a sculptural paradigm for architecture can be viewed as simply a quest for a dynamic equilibrium between disparate entities. This equilibrium is attained because each entity expresses the same theme, in this case the theme of "path". This theme is translated into each entities respective mode of expression, or language. On the scale of the landscape, a skeletal structure of steel tubes becomes a shell structure of intersecting walls. On the scale of man, an open airy space becomes a closed dark space. And on the scale of the element, an additive structure of many steel pieces becomes a layered structure of one continuous wall. Beyond these obvious examples, a dynamic equilibrium can also be struck between an expression of the "zeitgeist" of the day and a more timeless expression. The spirit of the day can be expressed through current technology in the form of high-strength steel and cable, while a certain timelessness can be expressed through ancient technology such as heavy concrete walls. In this way, one component could look towards the variables of the present while one component looked towards the stasis of the past. Also, the eventual decay and dissolution of the steel and cables would leave the walls as a trace in the landscape, a trace which sinks into its surroundings, blending into the environment. Thus, Pichler's "Cross in the Cornet" can be viewed as a microcosm of this concept. It is this concept which I will strive to elaborate on in the future, to make this sculptural paradigm a reality.
Footnotes

Bibliography


The vita has been removed from the scanned document