Sculpture for a pedestrian environment
by John Gregg Berryman

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of MASTER OF ART in APPLIED ART
Montana State University
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Abstract:
Extensive study of sculpture and practical experience with welded metal provide a basis for individual confrontation with a spatial problem for an existing site.

An environmental approach is developed for improving circulation and aesthetic conditions in the chosen area.

Experience gained in client communications, finances, and fabrication processes are related.

Models of the site and proposed sculpture are illustrated as are significant development steps in both finished and scale forms.
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Approved:

[Signatures]

Head, Major Department

Chairman, Examining Committee

Graduate Dean

MONTANA STATE UNIVERSITY
Bozeman, Montana
August, 1966
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I extend my sincere gratitude to the following people for their aid in this exploration of a dream.

Mr. Cyril H. Conrad

Mr. Robert K. DeWeese

The late George K. Conkey

The School of Art Staff

The Campus Development Committee

The Senior Class of 1966
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ABSTRACT

Extensive study of sculpture and practical experience with welded metal provide a basis for individual confrontation with a spatial problem for an existing site.

An environmental approach is developed for improving circulation and aesthetic conditions in the chosen area.

Experience gained in client communications, finances, and fabrication processes are related.

Models of the site and proposed sculpture are illustrated as are significant development steps in both finished and scale forms.
INTRODUCTION

The search for a thesis project began with a quest for available funds because the realization of a full scale sculpture was the primary aim of the artist. A decision was made to press for an actual sculpture, for therein would lie possibilities which could benefit both artist and client. Also, experiences gained in a sculptor-sponsor relationship would be of tremendous value, not only to the artist, but to future students at this institution. The Montana State University campus, experiencing rapid growth through new construction would provide a perfect setting for sculpture.

Financial sources within the campus community were investigated and gradually reduced to just one. Traditionally the graduating senior class has set aside funds to provide a memorial to be of some benefit to the campus. Mr. Steve Roeffler, senior class president, was approached and found to be very enthusiastic about a campus sculpture. He was instrumental, along with the artist in convincing the 1966 senior class of the potential value of the project to the campus and securing their financial endorsement. Eventually $2,900.00 was authorized for the project by past senior class presidents whose memorial funds had not been previously used.

Mr. Cyril Conrad, Director of the School of Art, was very excited about the possibilities of a campus sculpture and encouraged the artist to proceed with it as a thesis problem.

Approval for acceptance of the project was found to lie within the powers of the Campus Development Committee which necessitated its becoming
the second member of a very unusual two-client situation. Although the financial client endorsed the project, approval was never received from the Campus Development Committee to realize the final solution, thereby making the thesis a proposal.
Before selecting a site for the sculpture, many areas of the Montana State University Campus were studied. A lake-side site to the west of the Hedges living complex was surveyed but was found to be too restricted from campus and public view. Similar drawbacks existed for the area between the driveway and the sidewalk of Hannon Hall. East of Danforth Chapel a tree-filled area offered a site, but the proximity to the religious edifice virtually demanded a subjective type form and again would require an out of the way walk to view the piece.

Mr. William Johnstone, Vice-President for Administration, suggested the area between the Library and the west entrance to the Student Union Building as a possible site. After investigating the history and future of this area with regard to projected campus development, it was found that many previous attempts were made to solve the problems of this space, but none were entirely satisfactory. The challenge of these successive failures coupled with a sincere personal desire to benefit the Montana State University campus made the selection of this site irresistible. (fig.)

Ground area within the space is bordered on the north by Garfield Street which in the future will be transformed into a pedestrian mall, while still retaining its role as the campus "Main Street". East and south boundaries are defined by the Student Union Building and its forthcoming addition. The Library Building draws the border to the west. Generally the space involved forms a court opening to the future mall.

Existing paving is concrete, much of which is in desperate condition.
The paving pattern is composed of a main east-west arterial sidewalk which parallels Garfield Street, sidewalks connecting this main walk with the Library and the Student Union Building, and two secondary walks joining these two buildings. Of lesser importance is a projected concrete walk which will follow the west wall of the Student Union Addition south to a new building entrance. A slope from west to east causes unsatisfactory water drainage and severe icing problems during the cold weather. Resultant pools of water and sheets of ice are in a large measure responsible for the unsightly decomposition of concrete paving in many places throughout the site. This patchwork of concrete surrounds three grass islands and defines peripheral planting areas around the east side of the Library and the west and north sides of the Student Union. Trees, both conifer and deciduous, and shrubs abound in these plots, gently integrating the brick red walls of the Library and Student Union with the predominantly concrete ground plane. These brick walls rise to a height of from twenty-two to thirty-two feet on the Student Union. The Library walls soar twenty-six feet and are capped by a red roof which rises another twelve feet.

The climatology of the site is extremely variable. Fall quarter usually includes an Indian summer with warm sunny days and cold nights. During November, the temperature drops drastically and snow falls with regularity, often being blown by a prevailing west wind. Winter quarter finds a low average temperature of $10^\circ$ F., winds from the west, and snow constantly covering the ground. During spring quarter, ground snow begins
to melt, usually leaving for good in April to be replaced by afternoon and evening rain storms for the duration of the quarter, being blown by shifting winds. As the days lengthen, summer quarter brings hot days with an average temperature of 80°F, but cool nights. Shifting winds regularly bring afternoon and evening thunderstorms and occasionally some hail. Sunshine constantly floods all of the site save a small area directly north of the Library.

Circulation in and around the site is all pedestrian except for limited vehicle travel on Garfield Street. Future campus development calls for this street, with the exception of service traffic, to be entirely a pedestrian thoroughfare. Pedestrian traffic directly related to the chosen space may be seen in the traffic pattern survey. (fig.) From this study the inefficiencies of the paving grid are readily apparent. Much traffic flows to and from the site without regard for the existing walkways, in the process forming paths through the grass plots. This campus cutting has in turn forced the placement of unsightly warning signs. The close proximity of the site to the two most used campus buildings makes it the most circulated about position in the University complex.
SITE PLANNING

The importance of the space in relationship to the total campus, to its immediate buildings, and to the campus "Main Street", made it necessary to change the role of the site from that of a near void to that of a "place". Spaces between, around, and above individual campus structures are fully as important to the pedestrian as the buildings themselves; for within these spaces he moves and perceives. The campus plan is only as strong as these spaces. Many positions on the campus seem to generate a feeling of importance and the chosen site is one of these. Existing pedestrian activity here puts this location on stage, and the treatment of the space in turn can create a University image for both campus residents and visitors. Site planning then progressed with the concept of making this "space a place".

One factor considered during planning was the circulation problem. Virtually every student and faculty member passes by or through this space one or more times every day. The exact amount of circulation varies directly with the climatology as does the circulation time of an individual. From April through October, a pedestrian is likely to walk slowly through the site, lingering to converse or just relax. The four cold months increase the by-pass tempo and tend to decrease human activity directly in the site.

The circulation survey showed that something had to be done to the paving pattern to permit it to accommodate pedestrians successfully and at the same time improve the ground plane visually. Simplification of the sidewalk potpourri seemed a must. Fully 13% of the people moving through the space from the west slanted across the grass. The corners of all the grass islands were worn away by pedestrian traffic. Obviously the circulatory sidewalks were poorly
Pedestrian numbers on the site in the winter makes it imperative to clear snow from these walks. This job is done by farm tractors pushing revolving brooms. The sidewalk pattern causes difficulties for broom operators. Grass islands cannot be cleaned because of injury to them by the brush and by the resulting human traffic over them. Another problem is where to push the snow, for if left on the site, melting will cause puddles to form in low spots on the pavement. A solution was to regrade the site, causing water to flow toward the street where it could be consumed by an existing storm sewer system. Two grass islands paralleling Garfield Street would be completely paved after regrading.

If the space were to truly become a "place", pedestrians should be given the opportunity to examine it in a contemplative manner, over an extended time interval. Since no seating provisions exist in the area, bench locations are proposed. Five redwood and steel benches of the "sleepless" type, six feet long are planned for the site, but out of the traffic pattern. (fig.) These benches would enable pedestrians to pause in the space, study, or bask in the sun without slowing inter-campus traffic. Their placement would not hinder maintenance of peripheral grass, shrubs, and trees since this work is done by hand mowing and shearing.

Paving the grass islands on the streetward part of the site would still leave the grass rectangle sprouting a twenty-five foot high cut-leaf birch tree. This tree unless removed would at least triple its
FRAMES OF 2½" GALV. PIPE, PAINTED. SEATS AND BACKBOARDS OF RED WOOD, PLANED, BEVELED, AND TREATED WITH WOOD PRESERVATIVE. BOLTS (3½" x 4½") JOIN BOARDS TO FRAME. FRAMES REST 2'-0" ABOVE GROUND, SET IN 12" OF CONCRETE. BENCH DIM. 2' x 6'
size and seriously reduce the court size. In its place a garden of color-
ful perennials is proposed. The low level of the flower garden performs
the dual function of enlarging the size of the site and adding much-needed
color in the area. A bicycle rack to the west of the Student Union Build-
ing should also be removed.

The decision of where to place the piece of sculpture on the ground
plane of the site was an unusually difficult one because of the problem
of size and scale, both of sculpture and court. Many possibilities existed.
The grassy plot containing the tree would be suitable, as would the peri-
pheral planting area immediately north of the library loading dock. Each
of these sites was rejected because they existed strictly within the court
area, a considerable distance from maximum circulation on the site and the
projected "Main Street". A third position considered was the large grass
plot paralleling Garfield Street. If the sculpture were to be placed on
the easternmost portion of this plot, it would have several advantages.
Now available was the opportunity to permit the sculpture to affect, not
only the space of the court, but to some extent the very important arterial
space of the forthcoming campus mall. Also, pedestrian circulation across
the site could be to a great extent directed, in turn permitting greater
ease of snow removal and dispersal. The sculpture would be visible for
great distances from both east and west directions on Garfield Street,
and would confront the heavy pedestrian by-pass traffic. A possibility
also existed that the visual piece would greatly aid in defining the
existing court more clearly as a "place" by giving the space a definite
northern limit. The potential of the selected sculpture site seemed much
vaster than a position inside the court, making the resulting challenge impossible to resist. When this placement decision was reached, it became much easier to consider material form possibilities, for now one could explore size and scale relationships from a definitive point of departure.
FORM DEVELOPMENT

The development of a sculptural form for the chosen site posed two general problems. Without creating a form the artist was faced with the realization that any material object that might come from him as a source must relate to human physical space, where and when it would be encountered by the form. It was concluded that to make this meeting of man and space successful the needs of man or the viewer must be fulfilled. Because the determined sculpture site was of an island form, a decision was made to attack the form problem from a true three-dimensional direction, that is, from the position of an object in space. However, since the site was to be a "place" and people moved through it, a problem of environment was introduced. When the space was considered environmental, one overt factor emerged. This sculptural form was going to force all of the space around it to become extremely involved with the form. The space within and above the court and considerable space along the campus mall would be directly affected, while spaces tangent to the court would be influenced to a lesser degree.

Traditionally and historically, sculpture has been created in the studio by the artist either for a specific client or hopefully for some future client. Seldom has sculpture been created for a pre-determined location and been realized; and even less often for a given environment or "place". Yet, this environmental approach was concluded to offer the best hope for fulfilling pedestrian needs both within and without the site.

Scale, or the physical dimensions of the sculptural form in relation to pedestrians and surrounding buildings and plantings, was also a paramount consideration. A conclusion was that the object should be directly related to the size of the human body but be somewhat larger.
than man himself. It should relate directly to the ground plane within
the space and the greater ground plane (horizon to sculpture). A true
three-dimensional scale was a necessity for the sculpture could not appear
visually outsized or undersized from even a single viewing position or
against a single viewing ground (buildings, trees, grass, sky, pavement).
The three-dimensional piece should make a statement about the space in
the respect of marking it a "place", much as a sign would mark a definite
position or distance. If the sculpture were treated as an environmental
sign, it was decided, then, the object could mark a meeting place. Talks,
rallies, and many other activities could take place around it. Therefore,
the sculptural form would have to be envisioned to remain in scale from
touching distance to maximum visual distance. Not of lesser importance
was the realization that it also must create a vital statement with or
without pedestrians or the site. It was essential that the sculpture
contain neither too much nor too little material mass. Dominance of or
subservience to the architectural masses could not be allowed to occur —
for to achieve a harmonious environment, balance was necessary. It was
concluded that the sculptural mass must belong to the space by walking hand
in hand with the surrounding architecture.

Time would certainly be an important factor when the erection of
the physical form was considered. Daily natural light changes plus sea-
sonal snow and rain, would cause a variety of pedestrian perceptions depen-
dent directly on viewing time. The artist came to realize that the sculpt-
ture would necessarily have to be a night and day, year-around experience,
for the life of the structural material. Snow piled on the form would
certainly affect the "place" to a degree equivalent to that of a tree
sprouting its leaves in the spring. Shadows from the sculpture would extend into the environment a variable composition on the ground plane which would act much like the historical sun dial. Considerable night circulation too, from and between the Library and the Student Union Building and the lack of suitable area lighting opened the possibilities of both making the sculpture visible at night and supplementing existing lighting.

Viewing grounds often are significant in the total impact of a sculptural form on a viewer. In a museum or gallery such grounds are easily controlled, but in the chosen environment such is impossible. The outdoor setting makes these backgrounds constant architecturally, but variable in other respects. Brick reds of the Student Union, the Library, Reid Hall, Montana Hall and Hamilton Hall, form a major backdrop as do the grays of the Montana Hall Annex and existing concrete walks and paving. Greenery in the role of grass, trees, and shrubs contributes a seasonal ground that varies from massive color volumes to skeletal, wiry forms. Another backing is provided by the volatile Montana sky, which is predominantly blue but can range through infinite shades of gray. Multi-colored dawn and dusk skies permit sculptural silhouettes from several viewing positions within the environment. Harmony of the sculpture with its viewing grounds then, became a concluded desirability for the attempted form.

A general form concept began to coagulate in the mind of the artist. He realized that the three-dimensional form could not lose touch with the significant sculptural achievements of the past, and yet the uniqueness of the space and the pre-determined environmental approach placed this problem in a frontier position. It was concluded not to introduce change for the sake of change, or subjectivity for the sake of subjectivity, but to honestly
attempt to create a form that would have a life of its own and a subject that would be the sculpture itself.

Considerable preliminary work was done in the areas of both painting and sculpture to build up a body of work which would precede the thesis and provide a bank of experience with various materials from which to draw for the selected problem. Previous to the explicit development of the problem, professional experience as a sculptor was obtained during the summer months. This invaluable opportunity to participate first-hand, in the execution of a large sculpture commission, afforded the artist intimate knowledge of steel as a creative material. (fig.) It was found to have excellent characteristics for large scale work. Steel, particularly in sheet form, was found to be easily cut and formed by inexpensive tools. Joining by welding proved to be simply and quickly done. Probably the most lucrative quality of the material is its very low cost per pound per finished sculpture when compared to more traditional materials like bronze, stone, or hardwoods. Also the shaping of steel for creative purposes has a relatively brief history of about 50 years. This is an extremely short time interval to uncover much of the potential of a given material and presented further challenge.

Many small pieces of sculpture executed with the chosen problem in mind helped to pave the way for the final form. A series of sculptures executed by line drawing in space was culminated with the 18 inch high "Grayling". (fig.) Metal rod and perforated flat stock was assembled by a three-dimensional drawing method, one similar to line drawing on paper. Finish was the natural result of welding these pieces together and normal rusting.
Another approach was utilized in the "Sign" series. (fig.) Hollow metal forms derivative of the cone, sphere, tube, and box were constructed in large numbers. Selected forms were then joined by welding to complete each "sign" sculpture, with heights varying from 20 inches to 60 inches. Of great value was the resulting finishing method which was grinding, undercoating, and polychroming. Another gaping problem was uncovered, that of color in space. A painting background was helpful and contributed to the conclusion that to meaningfully use color in space the artist should create a form that requires color, one that would not be a significant human creation without color.

Environmental sculpture was attempted on a small scale with the completion of "Space Drain", three feet high. (fig.) A predetermined volume was ruled off in space by means of square stock rod, raised off the ground plane, and then filled with preassembled sheet steel boxes. The volume perimeter was then painted for emphasis. This piece afforded the artist an opportunity to work within a definite spatial environment, although it was one of his own creation. The definite bounds encountered here were a prelude to those that were to follow on the thesis site.

Direct attack on the sculptural problem was the logical step to follow this foundation building. A mass model was constructed of the site to a scale of 1" = 10' 0", and was colored to approximate existing architecture and landscaping. (site) This enabled a number of scale ideas of the proposed sculpture to be positioned on the site to explore spatial relationships. One thing became immediately clear: a single location on the ground plane which had been previously roughed out seemed to greatly outweigh in merit all other considered positions. It was concluded to
place a brick and concrete paving circle on the chosen site of the large
glass plot parallel to Garfield Street. (fig.) The circle would be com-
posed of an outer ring of paving brick and an inner circle of concrete.
As previously decided, this paving circle would be an island in a paved
plaza. The round shape was decided on for several reasons. It would help
to direct circulation on natural movement routes while at the same time
leading pedestrians around the sculpture in a true 360° manner. No viewing
position would be made subordinate to any other. The circle would allow
color to be introduced to the ground plane without giving a directional
quality to it.

Color on the ground plane was also of primary consideration. A
sea of bland concrete, if left to solve the circulation problem alone,
would tend to dull an already monotonous space. A solution was to intro-
duce a ring of bright paving bricks, five feet wide to encircle a 20 foot
diameter circle of pure white concrete containing inset paving gravel.
This gravel would have an average diameter of three inches and also be of
pure white. The red of the paving brick, similar to the brick used in
the Library would, besides raising the key of the pavement, provide a
visual relationship between the reds of surrounding architecture. Pure
white in the inner ring would crystalize the concrete grays, intensify
the red paving brick where the two met, and aid in establishing a more
precise position for the sculptural form. Black and other shades of gray
were also considered for this enclosed flush concrete inner ring, but it
was decided that they would minimize important shadow patterns the sculpture would cast on the plaza.
PAVING CIRCLE DETAIL AND SCULPTURE PLACEMENT

3" DIA. GRAVEL  SECTION  SCALE  $\frac{1}{2}'' = 1' - 0''$

- 4" PAVING BRICK
- 4" CONCRETE SLAB
- 12" GRAVEL
- EARTH BASE

STUDENT UNION  LIBRARY

SCULPTURE

GARFIELD STREET  •  •  •  FUTURE CAMPUS MALL
The site itself was observed and studied countless times to aid
evolvement of a unique sculptural form. A series of sculptural models were
constructed from paper to a scale of 3/8" = 1'-0". Three of these (fig.)
were derived in form from the "Sign" series and seemed to satisfy the re­
quirements of the space in several ways. They raised the predominant
visual mass to a height of at least 20 feet from the ground, well out of
pedestrian reach, minimizing vandalism. A sky viewing ground was intro­
duced, affording pedestrians not only normal positions, but a unique
station, that of under the sculpture. Besides providing a marker for the
site, these pieces moved into the core of the space. This permitted these
sculptures to challenge not only the court space but space bordering the
"Main Street". When these models were being executed the idea of color
in space was considered from inception. Here was a possibility of
extremely honest color usage. Besides permitting color to work truly in
the space, it, in the form of paint, would serve as a steel preservative.
The entire spectrum was thoroughly investigated and some shade of orange
seemed to be the most logical choice. Not only did this color seem to be
exactly right to intensify the red shades of nearby buildings, but offered
an opportunity to minimize the dull and dirt catching grays of the concrete
pavement by drawing pedestrian eyes upward. Orange juxtaposition of both
sky blues and natural greens also afforded exciting visual possibilities.
Not the least alluring was the fact that historically the color had pre­
servative connotations commonly associated with large steel engineering
achievements. Bridges and towers painted orange to prolong their lives
are not unfamiliar to man. These certainly provide color-in-space rela­
tionships of a gigantic scale, but similarities between such structures
and the chosen problem were undeniable,
Although these sculptural models seemed to provide some exciting possibilities, they simultaneously opened new doors. Their major drawback seemed to be that although they contributed to the environment they were not physically part of the same. Pedestrians could not really take part in the material forms of the sculptures by sitting, touching, or walking through them. Physical participation in, on, and around the form would enable the pedestrian to assimilate the sculpture in the traditional contemplative manner. But importantly, also from these new vistas.

An all-over or environmental sculpture for the chosen space, with oversights, could have been an end and not a means for improving the site. Too much visual mass could easily restrict traffic flow by consuming excessive ground area while too little would not clarify and mark it as a "place".

The paving circle presented an emphasised area of over 700 square feet, which, while not subtracting a large proportion of the total ground area of the plaza, would provide adequate space in which a pedestrian could directly react with the sculpture. Provisions would be made for pedestrian seating, conversation areas, and unique positions from which to view the form.

Traditionally sculpture has included the base as part of the human three-dimensional viewing experience. Its role has generally been that of controlling the viewing height of the primary visual mass. Also bases have been employed to offset structural deficiencies of the piece, usually by aiding the artist to defy gravity. In some cases the base has functioned as a device to ward off vandalism. Elimination of the base is possible only if the artist is able to bridge these gaps. In an environmental situation, it was concluded the base must be treated ultra carefully, so as not
to become an extraneous visual element. One possibility was to give this element such bulk that its ubiquitousness would transform it into an undeniably integral part of the sculptural whole. Another was to discard the base entirely and permit the sculpture to rise starkly from the ground plane. A compromise solution was eventually reached, one which borrowed advantages from both sides of the base or no base dilemma.

Since the ground plane, be it table, earth, or any surface related to the horizon, has such mammoth bearing on a piece of free-standing sculpture, the distance between ground plane and sculpture is not merely a void which can be ignored. This space becomes an important two-way bridge, not merely between form and ground plane but between the total physical space and the human perceiver. One means of building this bridge was to permit the ground plane to rise up and meet the sculptural form, thereby providing smooth integration between the two. Changing the site level would also permit another innovation. Color forms would be allowed to confront the pedestrian from a variety of physical heights.

These pre-discovered environmental sculptural potentials inspired another series of models which were executed from balsa and chipboard at a scale of \( \frac{1}{8}'' = 1'-0'' \). (fig.) Their compact size permitted them to be convienently juxtaposed against the actual site by holding them at arms length. Such a process enabled detailed study of elemental relationships within the environment closely approximating on-location placement. These studies, together with numerous drawings, paved the way for the final form.
FINAL FORM

A model of the final form was built to a scale of 1" = 3'-0", to further study proportions and masses of the proposed sculpture. This balsa and cardboard construction permitted accurate photography and enabled a detailed rendering to be made of the sculpture in place. (figs.)

Several methods of constructing the form were investigated. Steel beams were first considered but were found to require too great a renovation to desired form, their basic shape being skeletal, not tubular. Excessive costs also proved a negative factor. Another construction method eventually rejected was that of fabricating the forms from 14 gauge cold-rolled steel sheets. This would be done by shearing the sheets to working dimensions and then fabricating them by welding. Undesirable distortion of the steel, heat caused, was a disadvantage here, as was the structural necessity of considerable reinforcement of the sheet forms. When the sculpture was thought of as a sign, another and more successful method of fabrication was uncovered. Consultation with commercial sign erection firms revealed an extremely suitable solution. Contemporary commercial signs were discovered to closely parallel the desired sculptural form in many ways. Both would soar upward much like towers. Each would require respectful safety minimums for passing pedestrians. Sculpture and signs were color vehicles and would have to hold paint well while serving as visual markers. Utilisation of these existing fabrication processes seemed to offer the most desirable combination of economy and structural honesty for the form. The exact role of the fabricator was at first cloudy, for although he could certainly assemble the chosen form from working drawings, the value of such a process as a personal artistic effort would be subject to doubt. Yet the very size
FINAL FORM RENDERING
and scope of the project would certainly overtax the physical limits of the artist alone. Eventually it was decided that the most favorable fabrication procedure would be for the artist to physically participate in the work process and oversee every step. In this way, he would benefit from the time-saving methods of the fabricator while still pouring himself into the form.

Metal work for the form would consist of an armature of parallel lengths of five inch structural pipe covered by a fabricated rectangular tube of 24 gauge steel. (fig.) The tube would be joined to the pipe system by pop rivets at 18" intervals. Since all rectangular portions of the sculpture would be of a uniform dimension (6" x 18"), semi-mass production methods would be instituted. Two three inch thick cylindrical masses which comprise parts of the form would be constructed in a similar manner, substituting one inch angle iron for the pipe stiffener. All armature junctions would be welded and sheet steel joints would be made to correspond with the resulting angles. Tubular corners would be made with an industrial crimping machine which, besides providing a waterproof seam, keeps expensive joint-welding to a minimum.

Metal forms are anchored to the ground plane by four foot armature extensions which are set into reinforced concrete. Pre-planned concrete pillars which rise from the ground plane to accept the metal forms provide perfect anchor positions.

Finishing of the steel forms would be done by priming with galvanized metal preservative followed by spraying with Hansa orange flat automotive enamel, two coats. Predicted paint life would be about 10 years.
CONSTRUCTION DETAILS

RECTANGULAR SECTIONS

SCALE 31⁄8" = 1'-0"

5" PIPE
5" PIPE STIFFENER AT 18" O.C.
24 GA. GALVANIZED STEEL BOX COVER

POP RIVETS

CIRCULAR SECTIONS

NOT TO SCALE

1" ANGLE IRON
24 GA. GALV.
POP RIVET

RECTANGULAR SECTION

STIFFENER PLAN (1" ANGLE IRON)

ANCHORAGE DETAIL

NOT TO SCALE

24 GA. GALV.
5" PIPE
CONCRETE PILLAR
ANCHOR IN 4'-0" CONCRETE

"PAVING CIRCLE LEVEL"
Metalwork materials cost estimate:

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>370 sq. ft. 24 ga. galvanized steel @ $ .25/sq.ft.</td>
<td>$92.50</td>
</tr>
<tr>
<td>150 ft. 5&quot; structural pipe @ $1.80/ft.</td>
<td>270.00</td>
</tr>
<tr>
<td>1 gal. galvanized metal primer @ $7.00/gal.</td>
<td>7.00</td>
</tr>
<tr>
<td>2 gal. automotive enamel @ $8.00/gal.</td>
<td>16.00</td>
</tr>
<tr>
<td>Welding and erection estimate</td>
<td>150.00</td>
</tr>
<tr>
<td><strong>Metalwork Total</strong></td>
<td><strong>$535.50</strong></td>
</tr>
</tbody>
</table>

A bid for the total metal fabrication, painting, erection and labor by a local sign company totaled $800.00.

Concrete work for the site was estimated by Martin Whalen of the Montana State University Service Shop, to require 3916 square feet. This estimate also includes a 4" concrete underslab for the paving circle and a seat for the white exposed aggregate to be hand placed in the inner circle. An estimate was obtained from Lovell Clay Products in Billings, Montana, for special red fired paving brick. Approximately 1400 standard sized brick could be made available to cover the prescribed area of 316 square feet. White three inch gravel would be hand-picked from the Gallatin River bed with no charge. These would be placed in the hardening concrete by hand and then etched to clean.

Paving materials cost estimate:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>3916 sq.ft. concrete 4&quot; slab</td>
<td>$2400.00</td>
</tr>
<tr>
<td>1400 - 2&quot; x 4&quot; x 8&quot; paving brick</td>
<td>145.00</td>
</tr>
<tr>
<td>5 concrete pillars (white)</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Paving Total</strong></td>
<td><strong>$2645.00</strong></td>
</tr>
</tbody>
</table>
Five benches of the "no-sleep" type previously illustrated, were estimated by Robert Speck, Great Falls Parks Superintendent, to cost $17.60 each or a total of $88.30.

Project cost estimate, including labor:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metalwork</td>
<td>$800.00</td>
</tr>
<tr>
<td>Paving</td>
<td>$2645.00</td>
</tr>
<tr>
<td>Benches</td>
<td>$88.30</td>
</tr>
</tbody>
</table>

Total $3533.30

Labor proved a very difficult item to estimate, primarily because of the uncertain amount of man-hours required. The artist's contribution of labor would greatly decrease the total labor costs, but the exact extent is extremely difficult to determine. An elapsed job time from start to finish would be about three weeks or 15 working days. This would be possible if all phases of construction were coordinated and all building materials were pre-obtained for immediate use.
CONCLUSION

Problems encountered when the artist attacked this space were virtually identical to those which would be faced by any sculptor awarded a commission. The final solution was reached under actual conditions of client communication, finance, and elapsed time. Extremely difficult was the task of dealing with committees as clients rather than a single individual patron.

When a sculpture was thought of for a particular place and for particular people (pedestrians), a significant design approach (not a method) emerged within the artist. This environmental position served to generate new envisionments of man's relationship to artifacts and to open for the artist, an infinite frontier which has immediately required exploration.
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Berryman, J. G.
Sculpture for a pedestrian environment