BRINGING TOGETHER EARTH AND SKY

project vehicle - gymnasium

virginia polytechnic institute & state university
college of architecture & urban studies
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BRINGING TOGETHER EARTH AND SKY
Project Vehicle - Gymnasium

by
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Eero Saarinen often described architecture as placing something between earth and sky. This thesis seeks to define, distinguish, and bring together architectural entities representative of these two core elements – earth and sky. Throughout this investigation, I have come to define these elements as follows. The earth is hard, heavy, robust, solid, and stout. Its strength is massive, overpowering, and heroic. The sky is light, delicate, soft, gentle, dynamic, and fluid. Its strength is conveyed through its elegance and grace. The project vehicle for this architectural investigation and application is a gymnasium. The gymnasium's roof and its supporting columns are “of the sky,” and the inner core of the building beneath the roof is “of the earth.” The defining characteristics as well as the relationships between earth and sky are expressed and experienced through the architecture of the gymnasium.
With my utmost gratitude, I would like to acknowledge and thank the people that have made this wonderful experience possible.

I would like to thank my family and friends for their constant support and encouragement throughout the master of architecture program here at Virginia Tech.

I would also like to thank my classmates for the sense of community in the design studio that I have felt over the past 3 years.

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<tr>
<td>Resistance training, strength, and conditioning space</td>
<td>7,100 sq.ft.</td>
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<td>Cardiovascular exercise space</td>
<td>1,600 sq.ft.</td>
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<tr>
<td>Aerobics and group fitness studio</td>
<td>3,050 sq.ft.</td>
</tr>
<tr>
<td>Mat stretching and abdominal exercise areas</td>
<td>500 sq.ft.</td>
</tr>
<tr>
<td>Running track</td>
<td>3 lanes, 4.5 ft. wide lanes, 1/10th mile per lap</td>
</tr>
<tr>
<td>Aquatic halls</td>
<td>4,475 sq.ft.</td>
</tr>
<tr>
<td>Saunas</td>
<td>340 sq.ft.</td>
</tr>
<tr>
<td>Locker rooms and changing areas</td>
<td>2,200 sq.ft.</td>
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<td>Showers, dressing rooms, and bathrooms</td>
<td>2,700 sq.ft.</td>
</tr>
<tr>
<td>Entrance halls and reception area</td>
<td>2,800 sq.ft.</td>
</tr>
<tr>
<td>Storage space</td>
<td>1,815 sq.ft.</td>
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<tr>
<td>Maintenance closets</td>
<td>400 sq.ft.</td>
</tr>
<tr>
<td>Office space</td>
<td>690 sq.ft.</td>
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Penn Plaza - Meadville, Pennsylvania

latitude: 41.64437° N
longitude: 80.15455° W
terrain elevation: 1,082.68 ft.
Penn Plaza - Meadville, Pennsylvania

The site is a fairly open and rather remote location in the northwest corner of the city outside of the central business district. Currently on site stands a small strip mall of transient businesses attached to an abandoned grocery store, which will all be removed to accommodate the proposed new development. Being an extremely low sloping site removed from the density of the downtown seems to provide an exciting opportunity for the gymnasium to stand freely and express its monumental form in the landscape.
Study model photographs of the lenticular truss space frame roof with supporting columns

The roof is a dynamic triangulated network of steel tubes spanning one hundred twenty-six feet over the inner core of the gymnasium. Colonnades along the north and south sides of the structure cradle the roof. The twenty-four columns are forty-five feet high and are spaced at twenty feet intervals along the exterior of the building.
The exterior columns are also constructed with tubular steel connected with cylindrical sleeves. These columns almost seem to suggest an anthropomorphic gesture of a figure, a row of soldiers, standing proudly supporting the roof with outstretched arms. Two feet high concrete pedestals reach up and out of the ground to receive and wrap the steel columns at their base where they enter the ground.
Sectional perspective rendering of the east entrance halls

The lowest level of the gymnasium is a series of massive concrete ribs connected by the spines running overhead at the apex of each of the three main vaults. The foundation blocks penetrate up through the finished floor two feet to mark the entry points of the columns into ground.
Perspective drawing of the east entrance
The gymnasium is divided vertically into two main levels - an upper level containing the weight training, cardiovascular training, and aerobic training areas, all of which are open to the steel lattice work overhead, and the lower level that holds the swimming and kayaking pools as well as the service areas. The concrete ceiling of the lower level provides the necessary isolation for the showers, bathrooms, and general preparatory areas in addition to the mechanical space. Together with the external columns supporting the roof, this vertical separation allows the upper exercise arena to be free and clear of any major supports or partitions.
The concrete supports beneath the running track make another anthropomorphic gesture - one of fingers reaching out and curling up at the ends to grasp and secure the cantilevered running track.
This central stairway acts as gateway between earth and sky. At this point, the patron leaves the heavy and robust realm of preparation, ascends the stairs to encounter a dramatic spatial release, and steps up and out into the main exercise arena like a Roman gladiator emerging into the amphitheater for combat.
Perspective development drawings of the running track and steel space frame ceiling

The elevated running track wraps the perimeter and overlooks the weight training and aerobic studio platforms. As the patron ascends up through the space, his proximity to the steel trusses changes from nearly forty feet to five feet at this highest level. A ribbon of glass encloses the exterior side of the track and acts as the connection between the heavy concrete and the light steel.
1. Entrance Halls / Reception Area
2. Locker Room
3. Showers and Changing Areas
4. Bathroom
5. Sauna
6. Office / Storage Space
7. 7' x 19' Resistance Pool
8. 13' x 23' Resistance Pool
9. Maintenance Closet / Mechanical Room
1. Mat Stretching Area
2. Resistance Training, Strength, and Conditioning Space
3. Cardiovascular Exercise Area
4. Open to Aquatic Halls Below
5. Office Space
1. Storage
2. Aerobics and Group Fitness Studio
3. Cardiopulmonary Exercise Area
4. Open to Stairs Below
1. 1/10th Mile Running Track
2. Mat Stretching Area
3. Open to Aerobics Studio Below
4. Open to Resistance Training Area Below
The purpose of this study was to explore the characteristics of and the relationships between earth and sky and express them through architectural means. The primary medium of architectural expression within this project is the structure of the building. When I say this, I am not merely referring to exposing the structure or expressing the structure. Rather, I am speaking of a structural expression wherein the structural elements themselves are a passive intermediary that I am employing to express the character that I wish to convey. I am attempting to mold and refine these structural elements beyond that which is mechanically necessary until they satisfy that which is aesthetically necessary. Karl Bötticher referred to this concept as kernform and kunstform or core form and art form respectively. Now, kernform and kunstform are not inherently in opposition to each other. Kunstform is merely taking the kernform, which satisfies the most basic materialistic needs, and elevating it to a level where it becomes an art. This twofold essence is what separates architecture from so many other disciplines. Architecture is required to fulfill the objective requirements of a habitable building while at the same time speaking to the heart.
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-All images have been created by the author with the exception of the black and white photograph of Meadville, (modified and used as a base in the presented image on page 2) which was taken by the United States Geological Survey.
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