

AN INDOOR SPORTS AND TRAINING FACILITY

FOR

FAIRFAX, VIRGINIA

by

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Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree

MASTER OF ARCHITECTURE

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December 1992
Alexandria, Virginia

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FOR

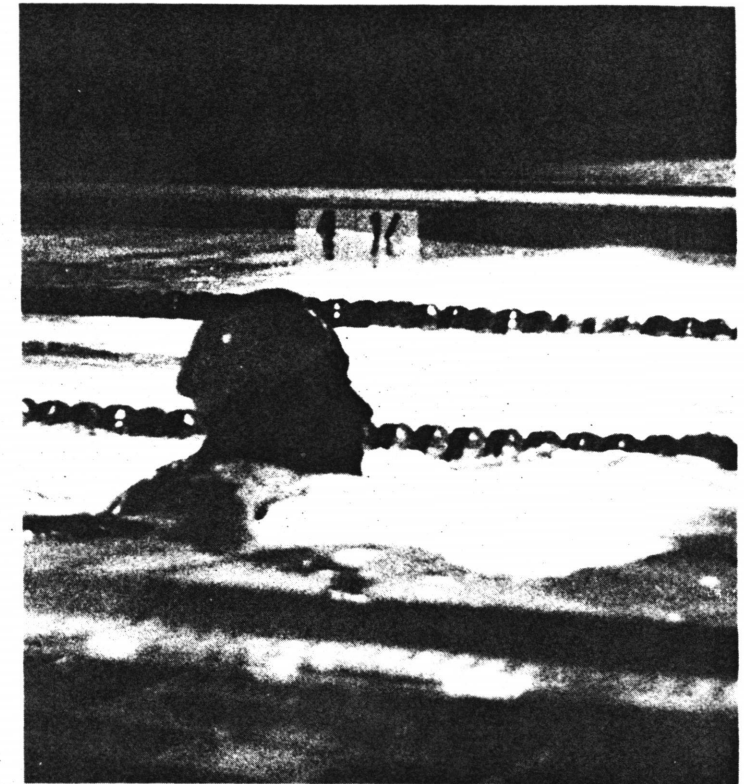
FAIRFAX, VIRGINIA

(ABSTRACT)

"The spaces where life occurs are places. A place is a space which has a distinct character. Since ancient times the *genius loci*, or "spirit of place", has been recognized as the concrete reality man has to face and come to terms with in his daily life. Architecture means to visualize the *genius loci*, and the task of the architect is to create meaningful places, whereby he helps man to dwell."

"...a totality made up of concrete things having material substance, shape, texture and colour. Together these things determine an "environmental character", which is the essence of place."

-C. Norberg-Schulz



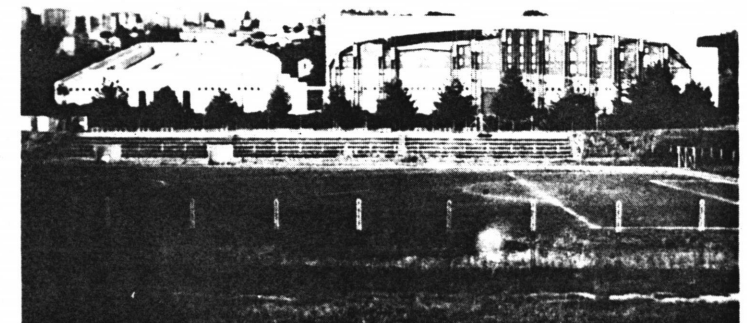
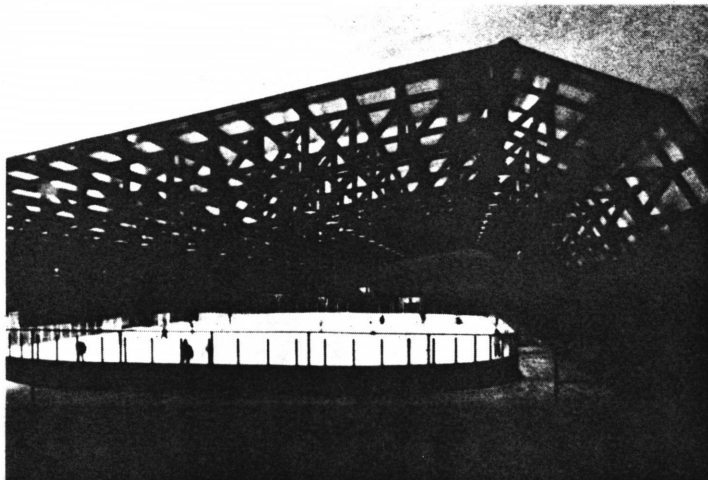
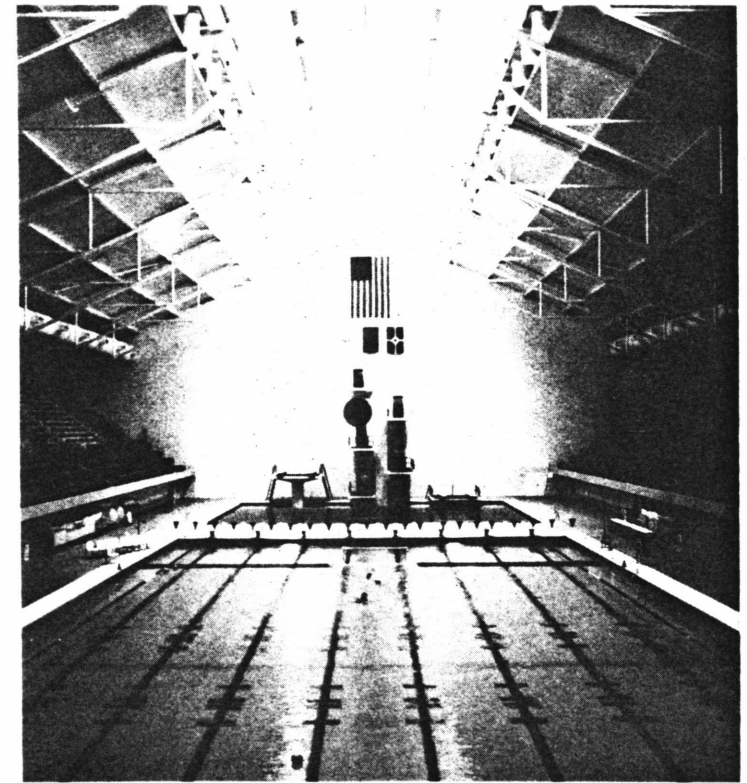
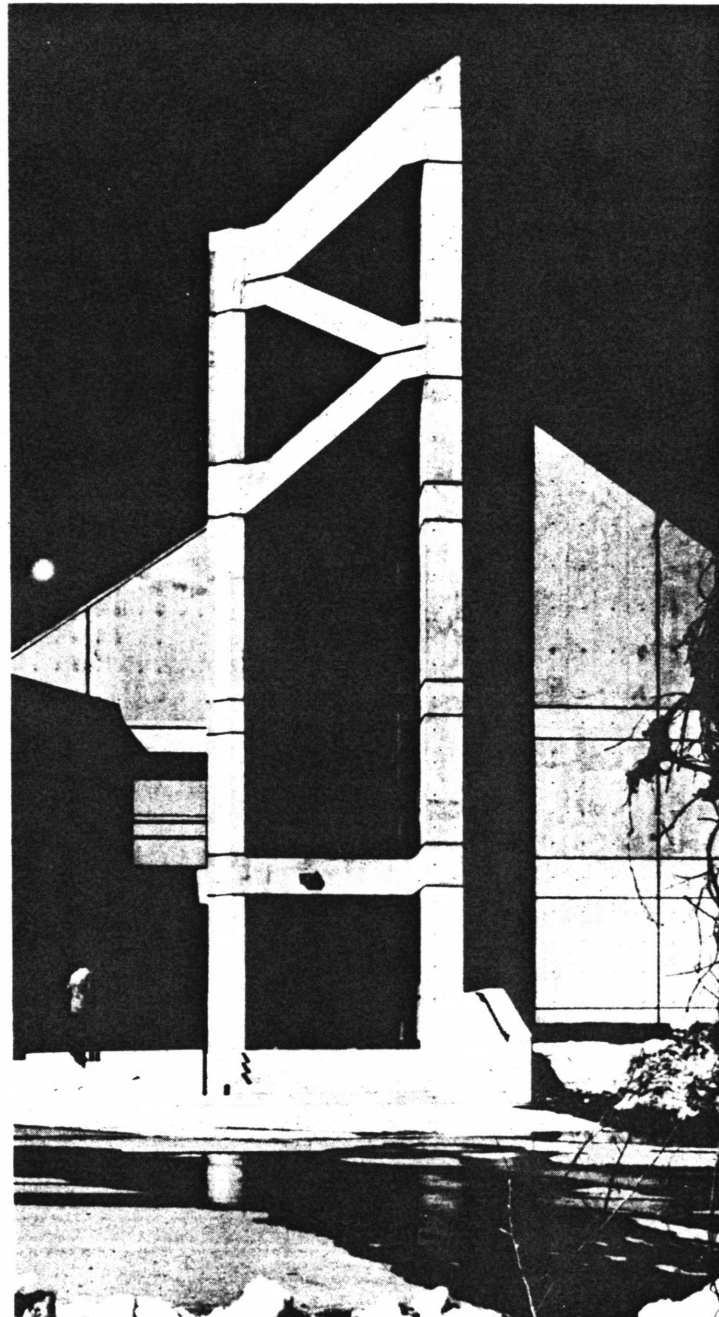
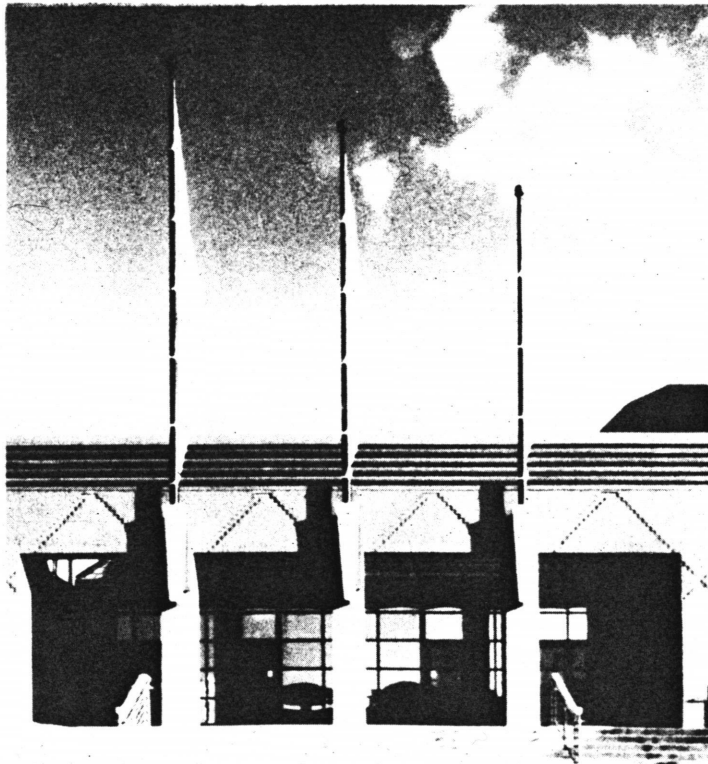
To my Dad,
for introducing me to the world of Architecture.

A very special thanks...

...to my husband for his love, understanding and patience. For always being there to encourage and keep me going, even through the toughest of times.

...to my friend "Z" for constantly peering over my shoulder, especially during those last few weeks, asking Why? How?

...to my teachers and friends for their guidance and support.



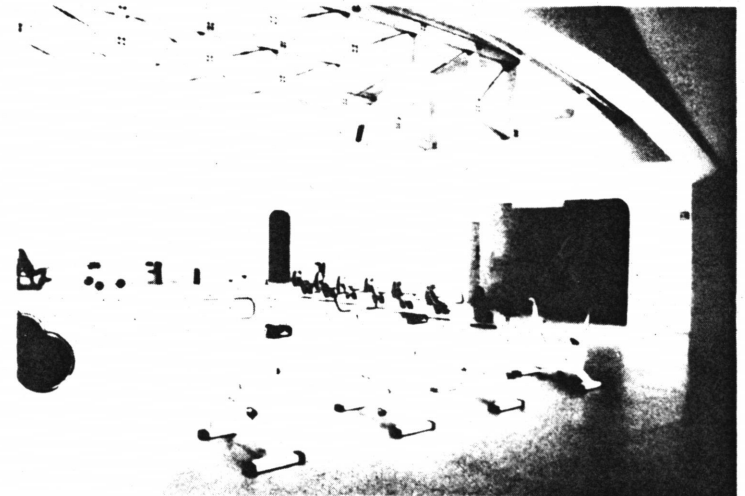
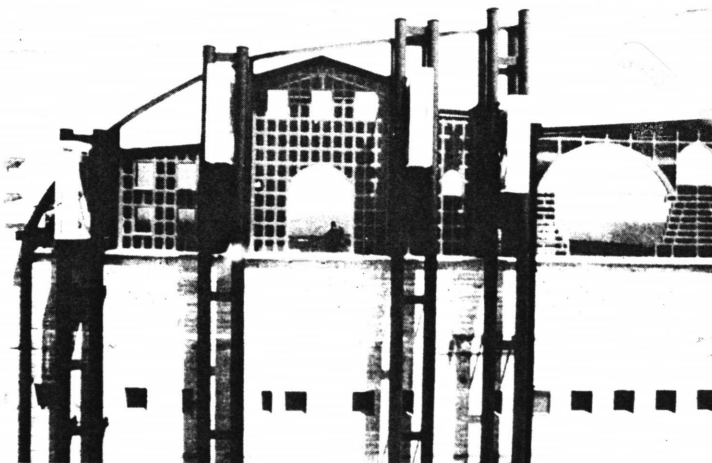
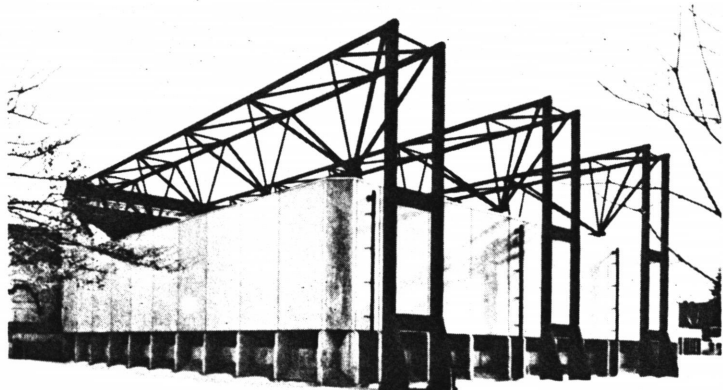
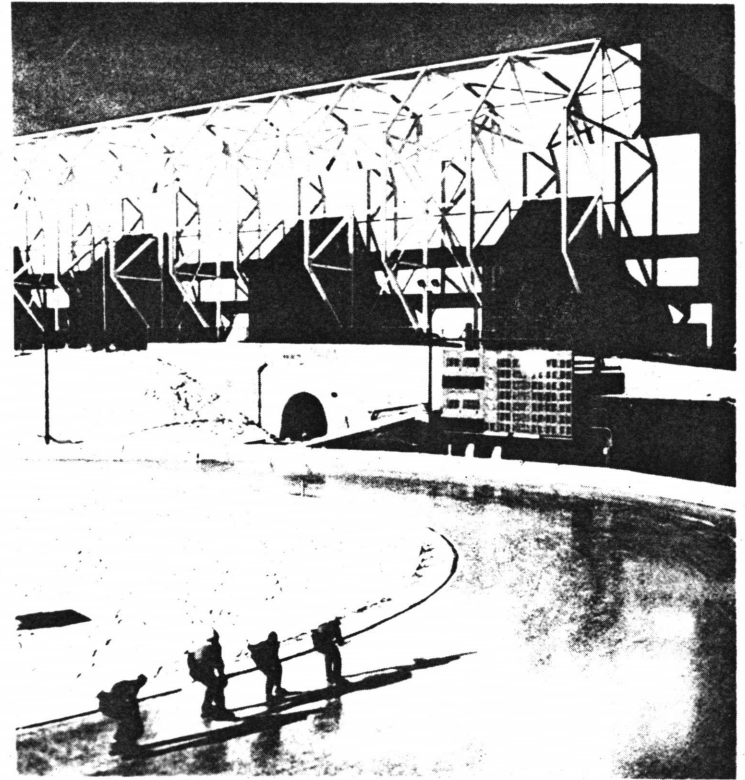
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FOR

FAIRFAX, VIRGINIA

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INTRODUCTION: THE IDEA

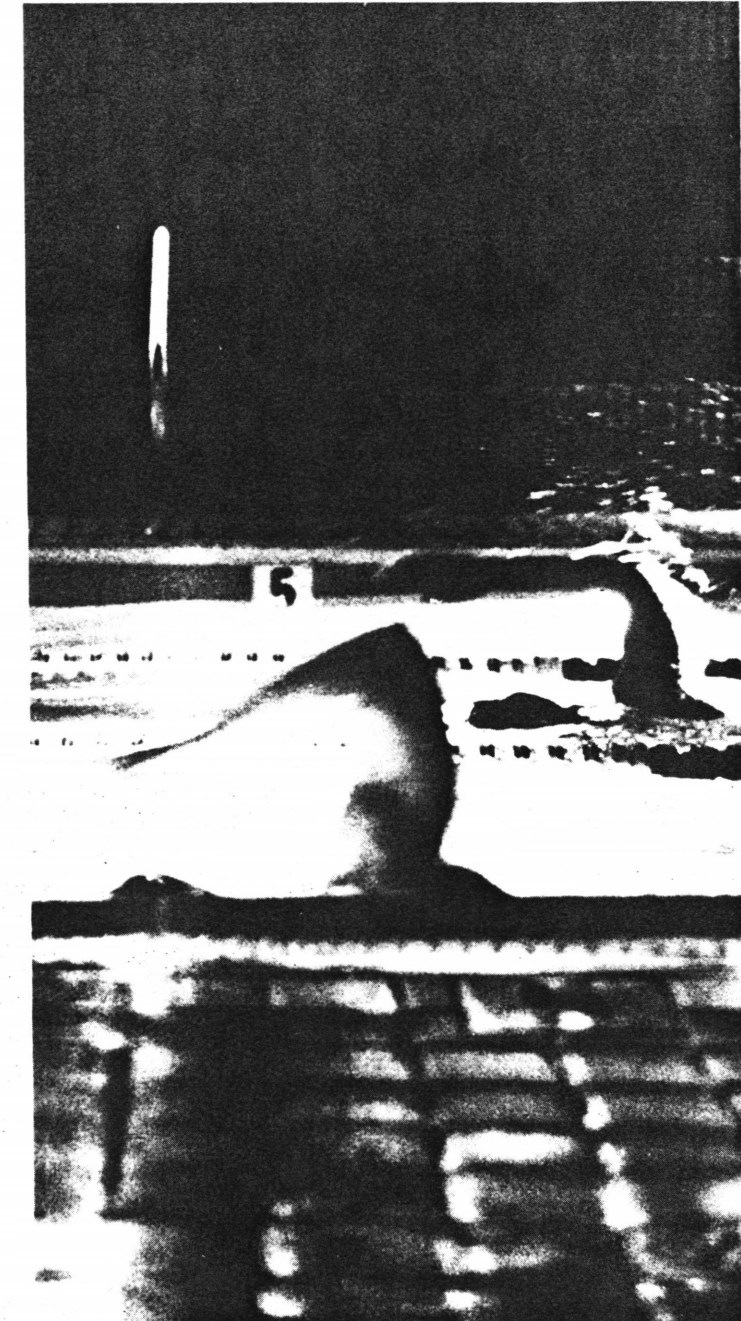
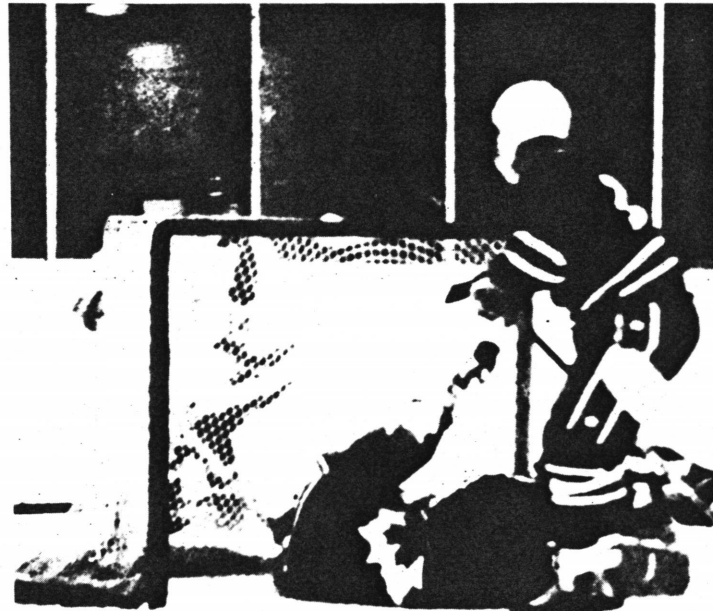
Over the past several decades America's dedication to physical well-being and self-fulfillment has reached new heights. For many, the "gym" has gained new importance as a center for community life.

Through this thesis project, an Indoor Sports and Training Facility, one of the most important challenges I chose to address was to provide for a variety of users: professional athlete, amateur, and spectator. I enjoyed the opportunity to combine art and science brought about by the building type. By this I mean the utilization of my creative abilities as a student of architecture, as well as investigating the latest in technological advances in structure, energy efficiency, etc.

- to free the space of columns and other obstacles; creating long, clear spans
- to conserve energy; heat exchange from ice chillers to pool heaters
- to reduce the anonymous box associated with the building type
- to bring to the project a sense of scale and sensitivity to its surroundings
- to integrate various size spaces within a homogeneous structural system
- to be sensitive to the cultural context of place; nature, history, local customs

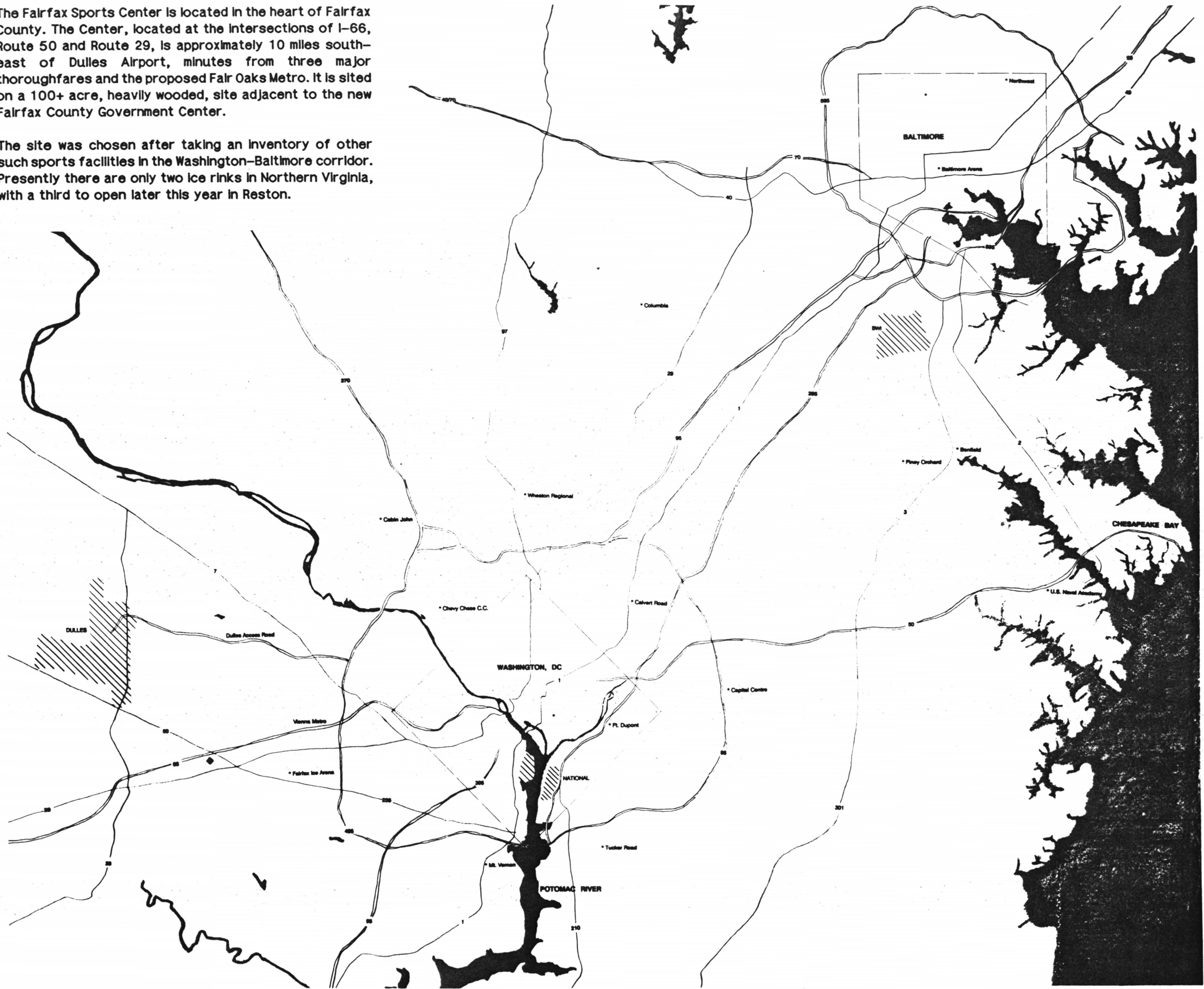
I attempted to investigate the material expression of the building; how light, color, size, shape and texture add to, enhance or detract from the quality of the place created; how they aid, encourage or direct the design. I explored the spatial relationships and organizations of the parts to the whole, along with circulation (movement to and through the building) and the separation of public and private domains. My design is intended to provide a variety of physical and intellectual challenges for the user, as well as lift the spirit.

According to Hugh Hardy, of Hardy Holzman Associates, the design of a recreation facility is similar to that of a theater, both require the same separation of spectator and performer. The disparity between the size and character of the spaces required compound the usual problems of circulation, HVAC, and program. More importantly, Robert Frasca, of the Zimmer Gunsul Frasca Partnership, believes you have to be familiar enough with the demands of the building type so you don't get lost in the program and forget the architecture.



The Fairfax Sports Center is located in the heart of Fairfax County. The Center, located at the intersections of I-66, Route 50 and Route 29, is approximately 10 miles southeast of Dulles Airport, minutes from three major thoroughfares and the proposed Fair Oaks Metro. It is sited on a 100+ acre, heavily wooded, site adjacent to the new Fairfax County Government Center.

The site was chosen after taking an inventory of other such sports facilities in the Washington-Baltimore corridor. Presently there are only two ice rinks in Northern Virginia, with a third to open later this year in Reston.



INTRODUCTION: THE PROJECT

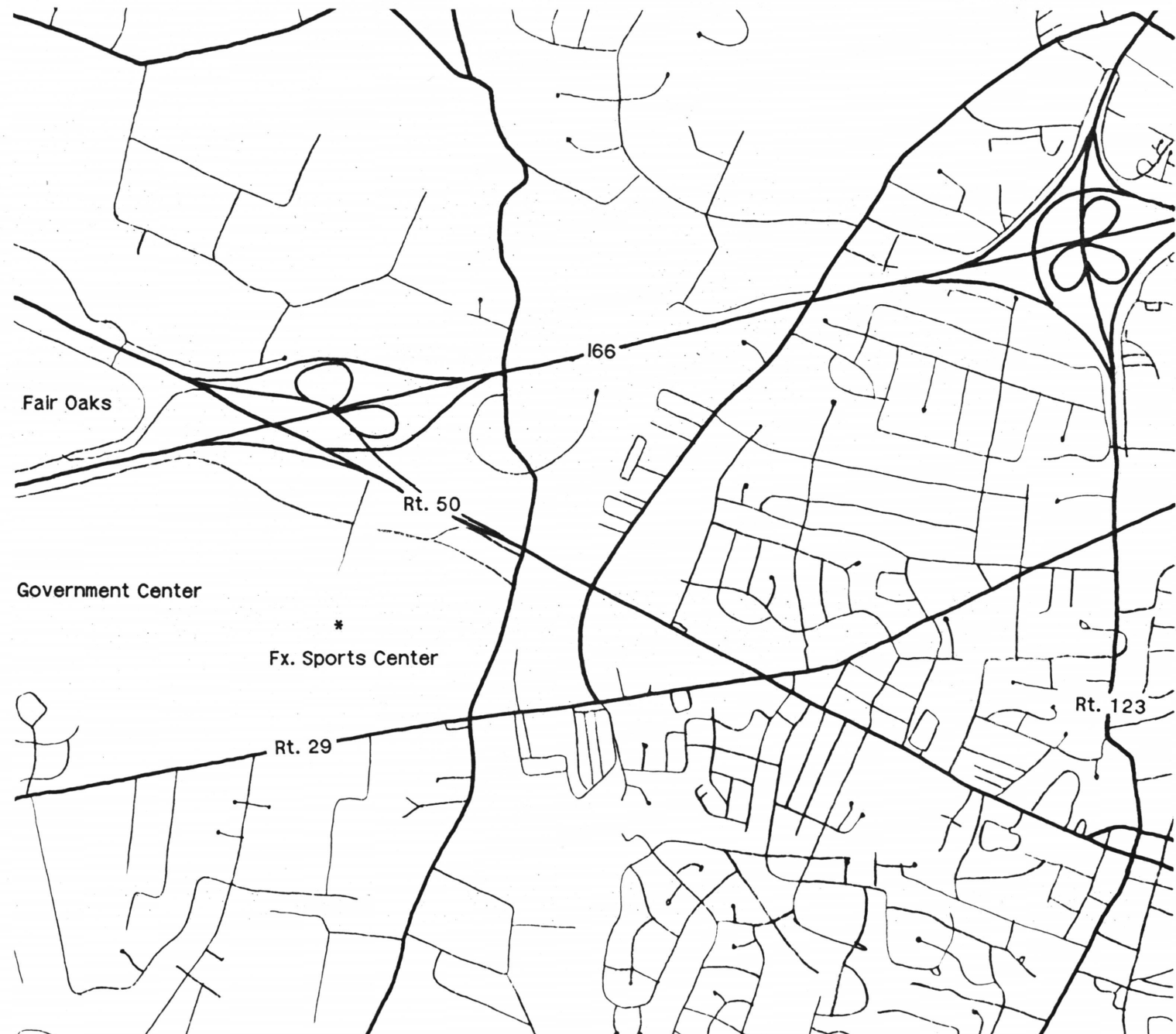
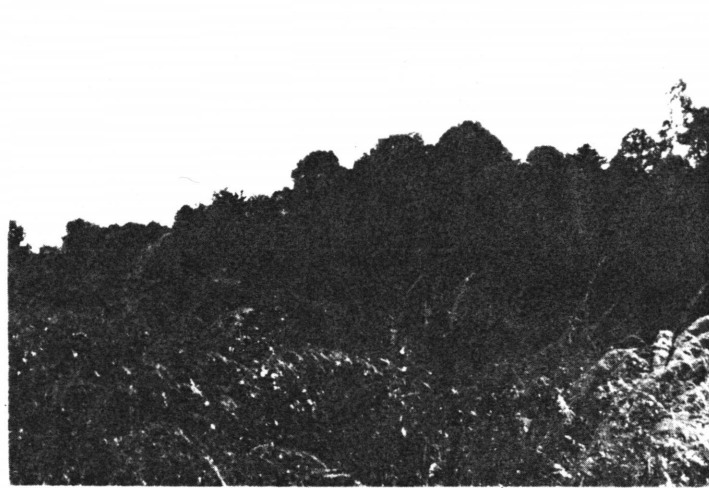
The Fairfax Sports Center is an indoor sports and training facility for ice hockey, figure skating, swimming and diving. It is designed with the intent to provide state-of-the-art facilities for both daily recreation and international competition. There are twelve apartments for visiting athletes, with plans for expansion to a total of thirty-six.

There are three identical volumes, each housing a different activity. The southern most arena houses a 50m lap pool, 10m diving pool, seating for approximately 2000 and a stepped terrace, linking both inside and out. The central arena houses an Olympic-size ice surface (30m x 60m) with seating for about 6000. The northern most arena consists of an American-size ice surface (85' x 200') with seating for 2000 to 3000, along with a running track, weight training and exercise facilities. In addition to the arenas, there are support facilities that include six locker rooms with toilets and showers, offices, rehabilitation and physical therapy, laundry facilities, workshop and meeting rooms.

The concourse level has a exhibition gallery and pro shop, with access to the Cafe at mezzanine level; both overlook the Olympic ice surface. The lower level has a skate rental counter and small concession stand. It is the main link to the locker rooms and training areas.

As a departure point for the fabric of the building, I studied the larger context of the surrounding territory. This appeared to be very disjointed with little or no connection between zones. The task was to create my own order for the site and its buildings, and:

- to design three identical volumes to house different activities.
- to design three different volumes to reflect the activity within.
- to incorporate the housing into the larger fabric of the facility or give it a very distinct language of its own.
- to determine the main structural elements and materials of the facility.
- to extend this structure beyond the volumes, anchoring it in the site.
- to create an outdoor entry space at each node.
- to incorporate natural light and ventilation, not only into the arenas, but into the lockers and other support areas.



Fairfax Sports Center
(Program)

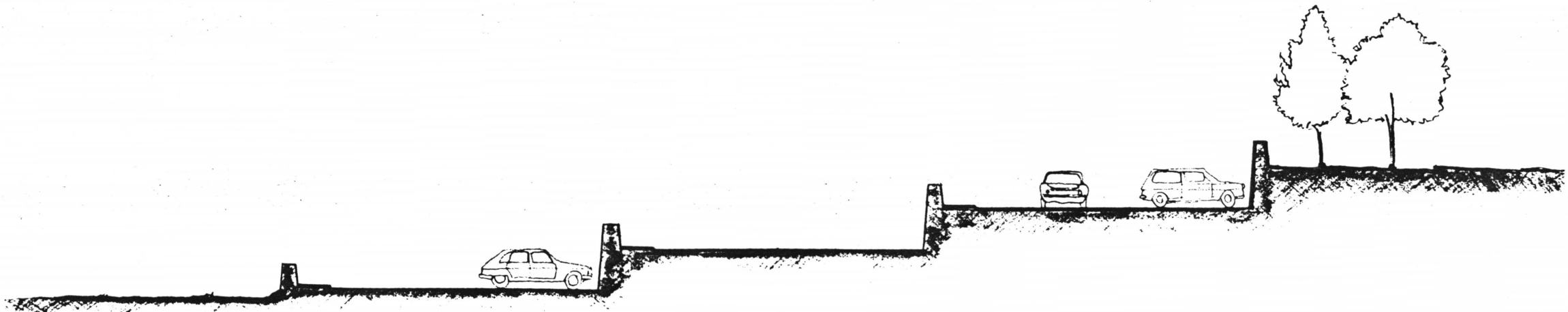
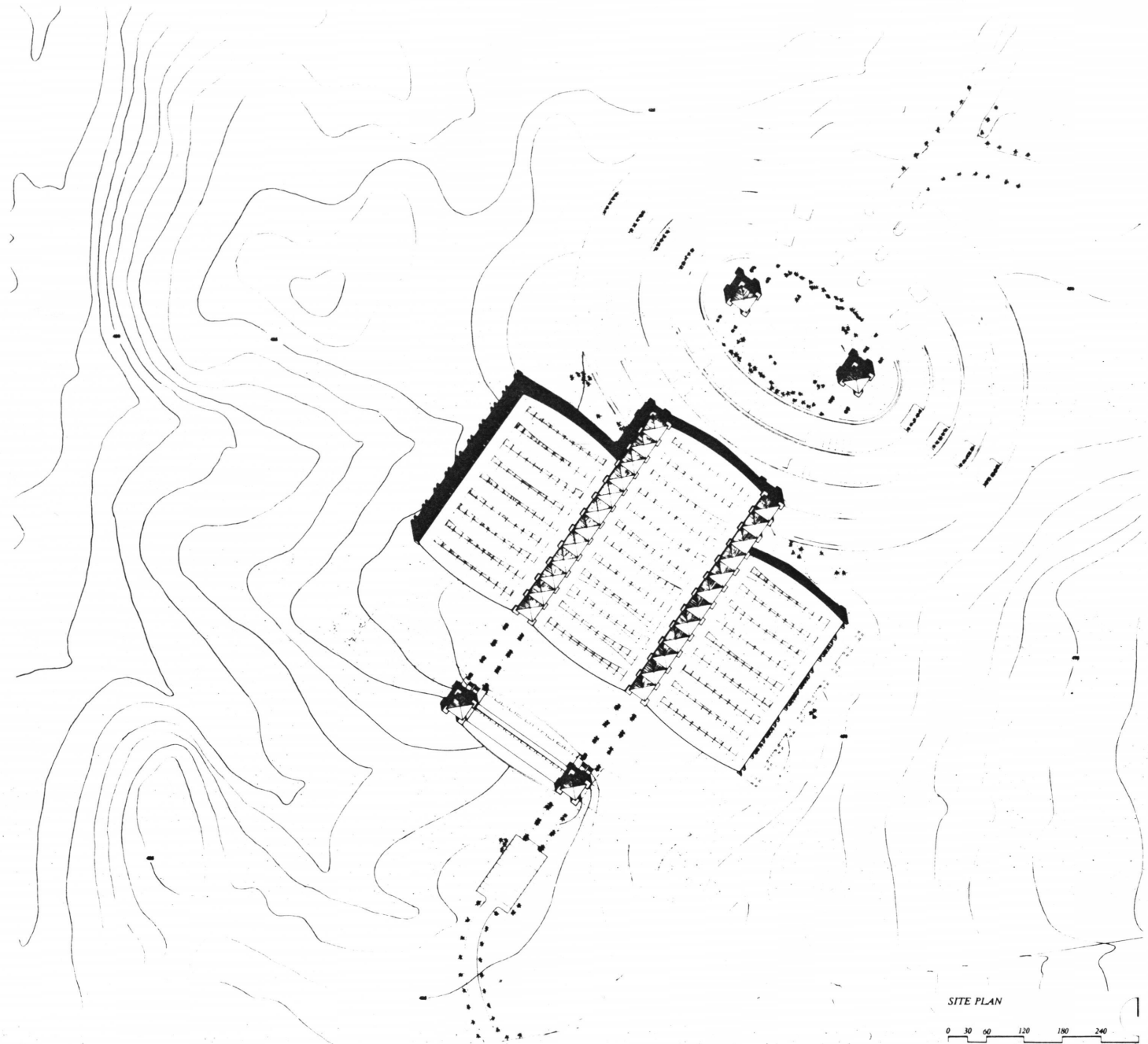
- * Competition Rink
International Surface (30m x 60m)
Seating Capacity 6000
- * Practice Rink
American Surface (85ft x 200ft)
Seating Capacity 2000-3000
- * Competition Pools
Swimming (50m)
Diving (1m, & 3m spring board)
(5m, 7.5m, & 10m platform)
Seating Capacity 2000
- * Training Facilities
Lockers
Toilets/Showers
Steam Room
Weight Room
Physical Therapy/Rehabilitation
Medical Treatment
- * Support Facilities
Office
Meeting Rooms
Concession/Food Court
Pro Shop
Skate Rental
Lounge/Warming Room
Mechanical/Heat Exchange
- * Housing
Two-bedroom Apartments for 50 athletes
(w/planned expansion to 150)



THE APPROACH

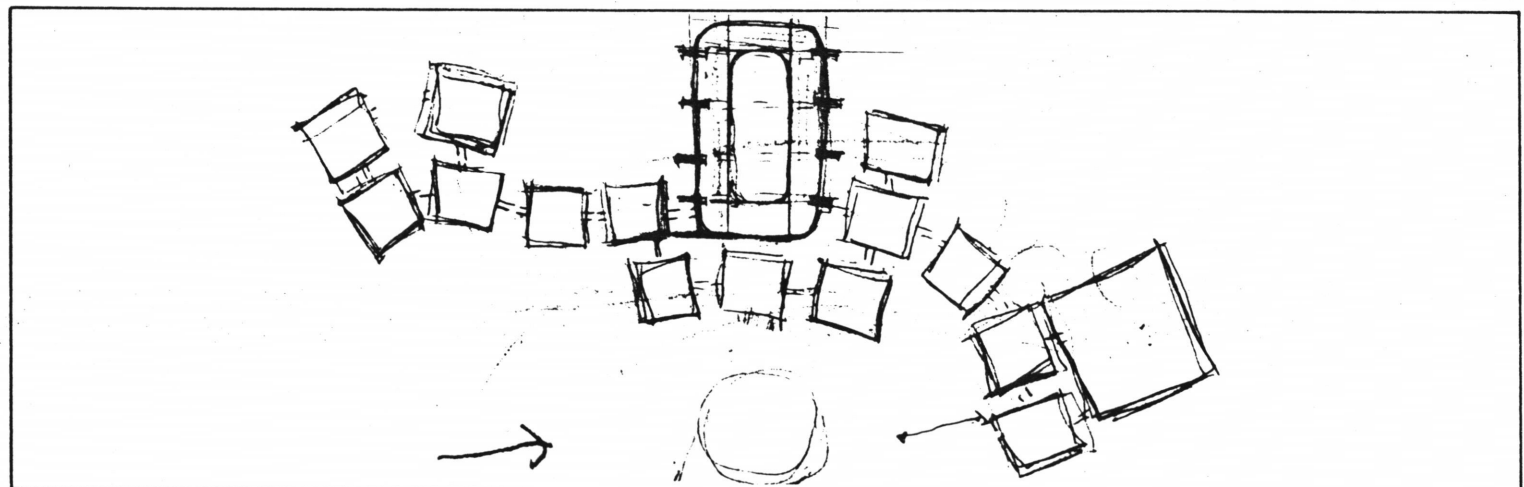
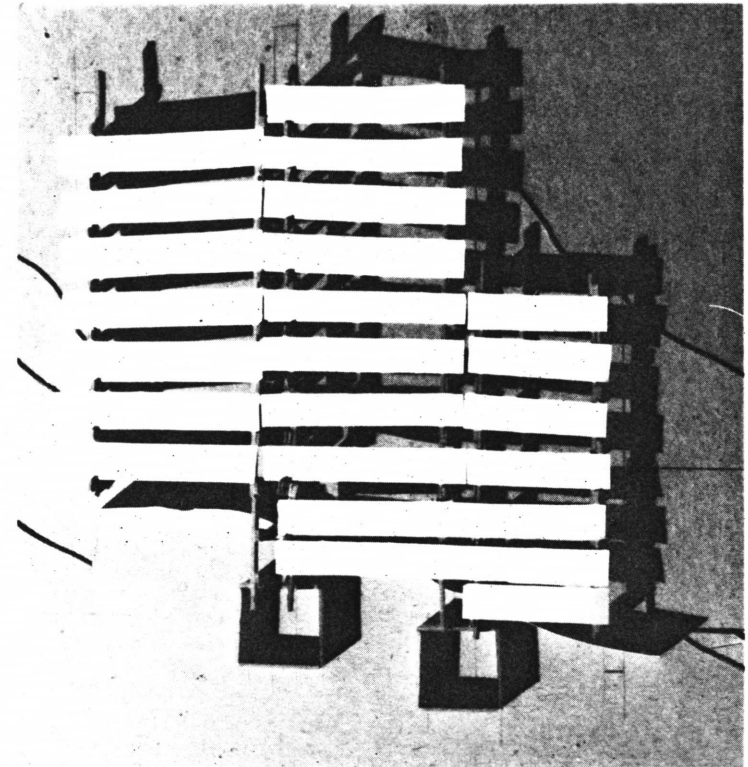
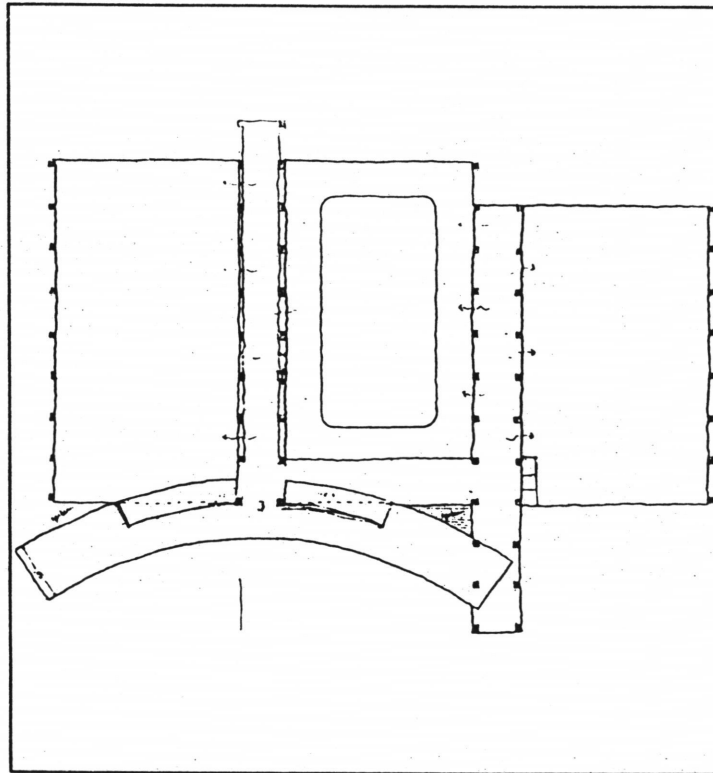
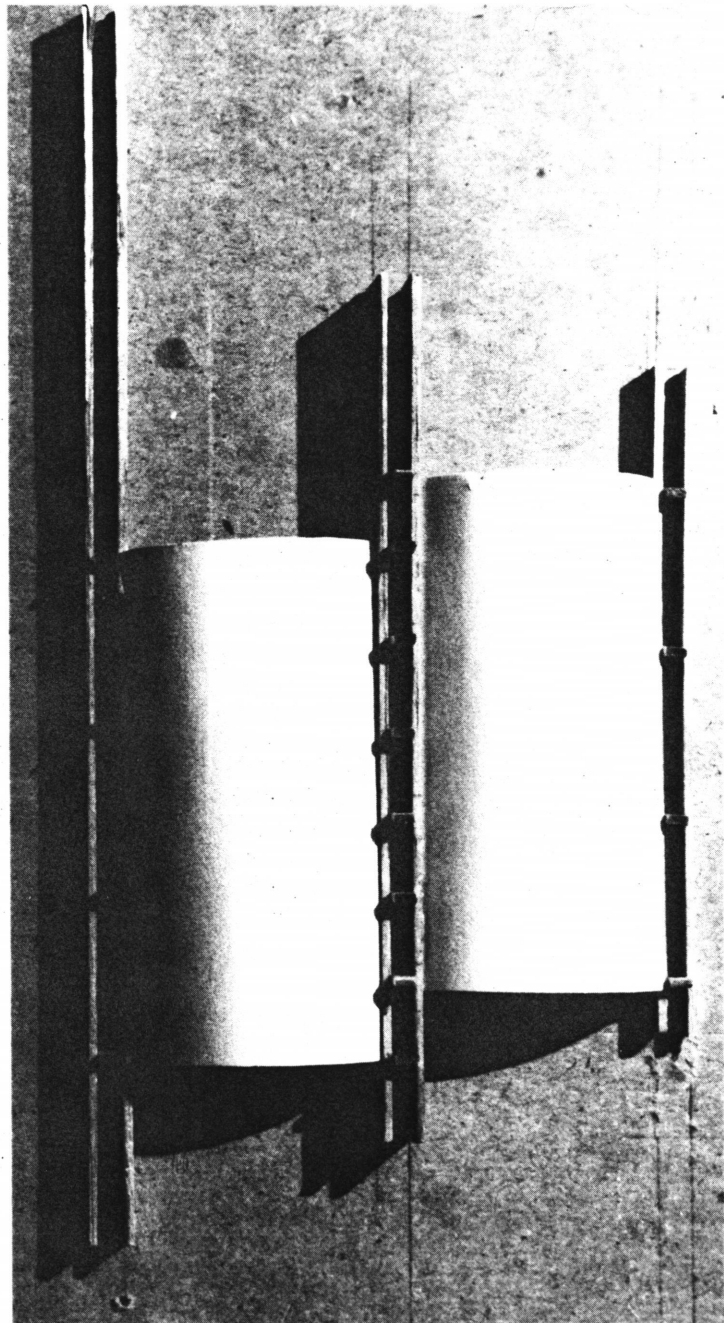
Using the topography as the departure point, the parking area was molded into a series of concentric, terraced ellipses. The inner most ring occurs at the highest point on the site. The two towers form a symbolic gate or entry to the facility and set up a visual link with the circulation spines beyond. Atop the central terrace is a fountain, which, in winter becomes an outdoor ice rink.

The approach to the Sports Center from the main road is on axis with the building. The central terrace denies access directly to the facility. You must travel around one of the terraced rings to the two entrances located on either side of the main arena. The outer most ring brings you to the lower level entrance, where there is a drop off area along the front face of the building.



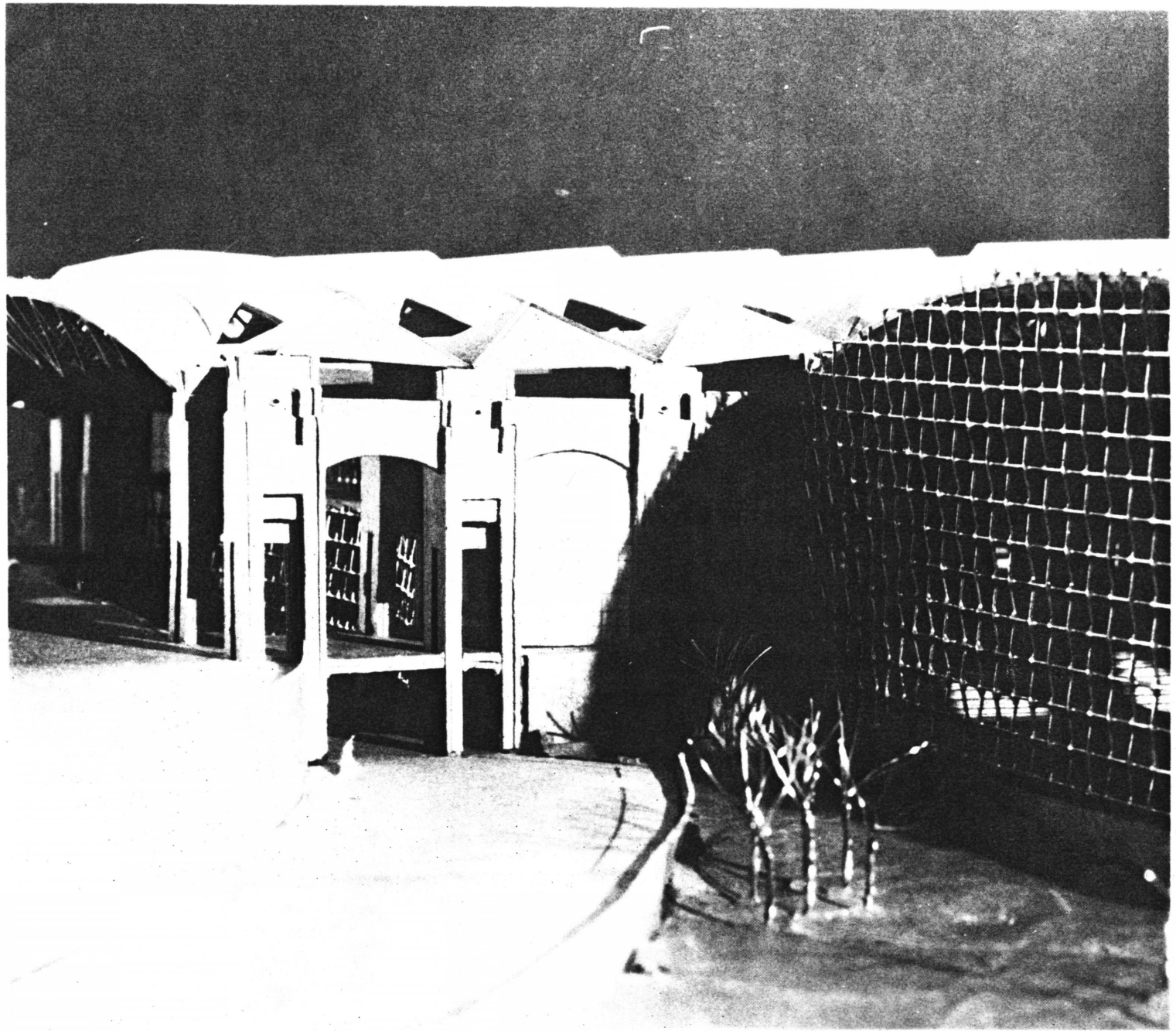
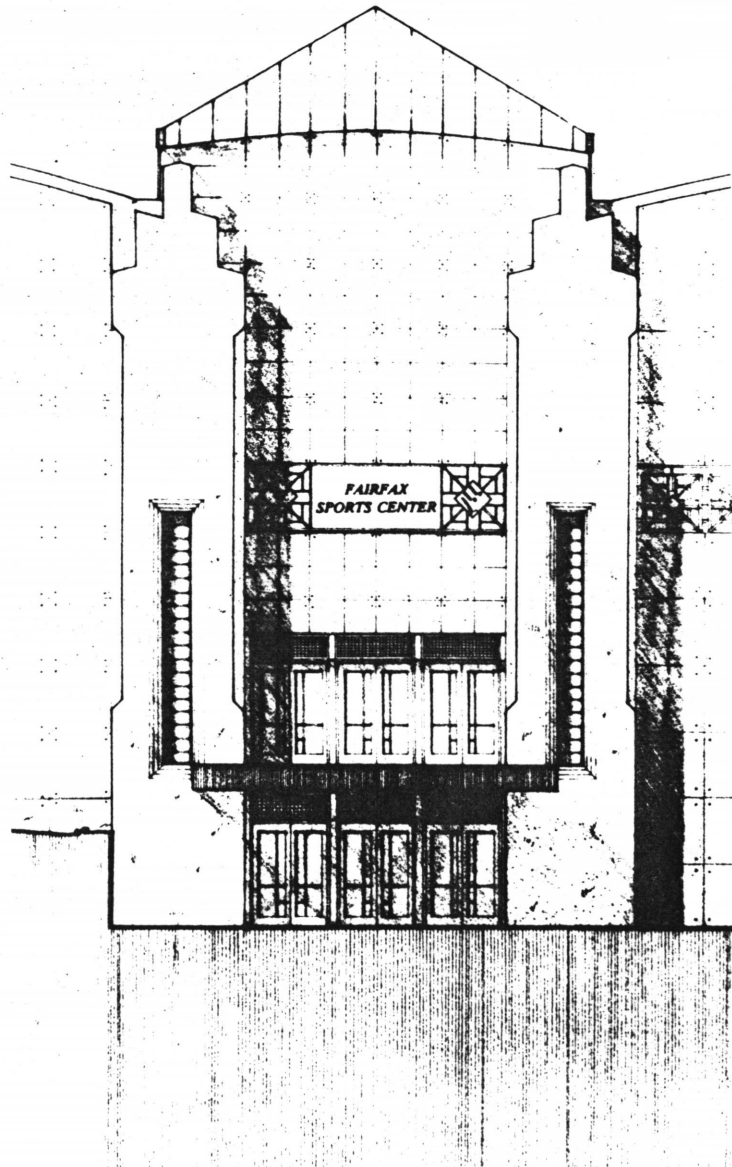
The sketch at the bottom right was the very first 'idea' for the Sports Center. It was generated by a desire to create a spine, or regulating element. The spine, located along the ridge, connects the various events of the complex with the main competition rink as the focus.

To create order and give the complex more substance, the scheme was tightened up and regularized. What resulted were three arenas separated by two circulation spines, with a major spine (lobby) across the front of the building connecting the arenas. The main competition rink remains the focus, not by a variation in size or form, but by location at the center of the complex.



THE ENTRANCE

A major concern in any such facility is the separation of athlete and spectator. This was accomplished with a separation in section. The main public access and circulation is at the concourse level, via the two bridges from the parking area. Once inside, you have the option of milling around in the lobby or proceeding directly to your seat. From this level the spectators descend into any one of the three arenas and to their seats. The athletes have corresponding entry and circulation routes at ice and pool deck level.



"...the inside-outside relationship which constitutes the very essence of architecture."

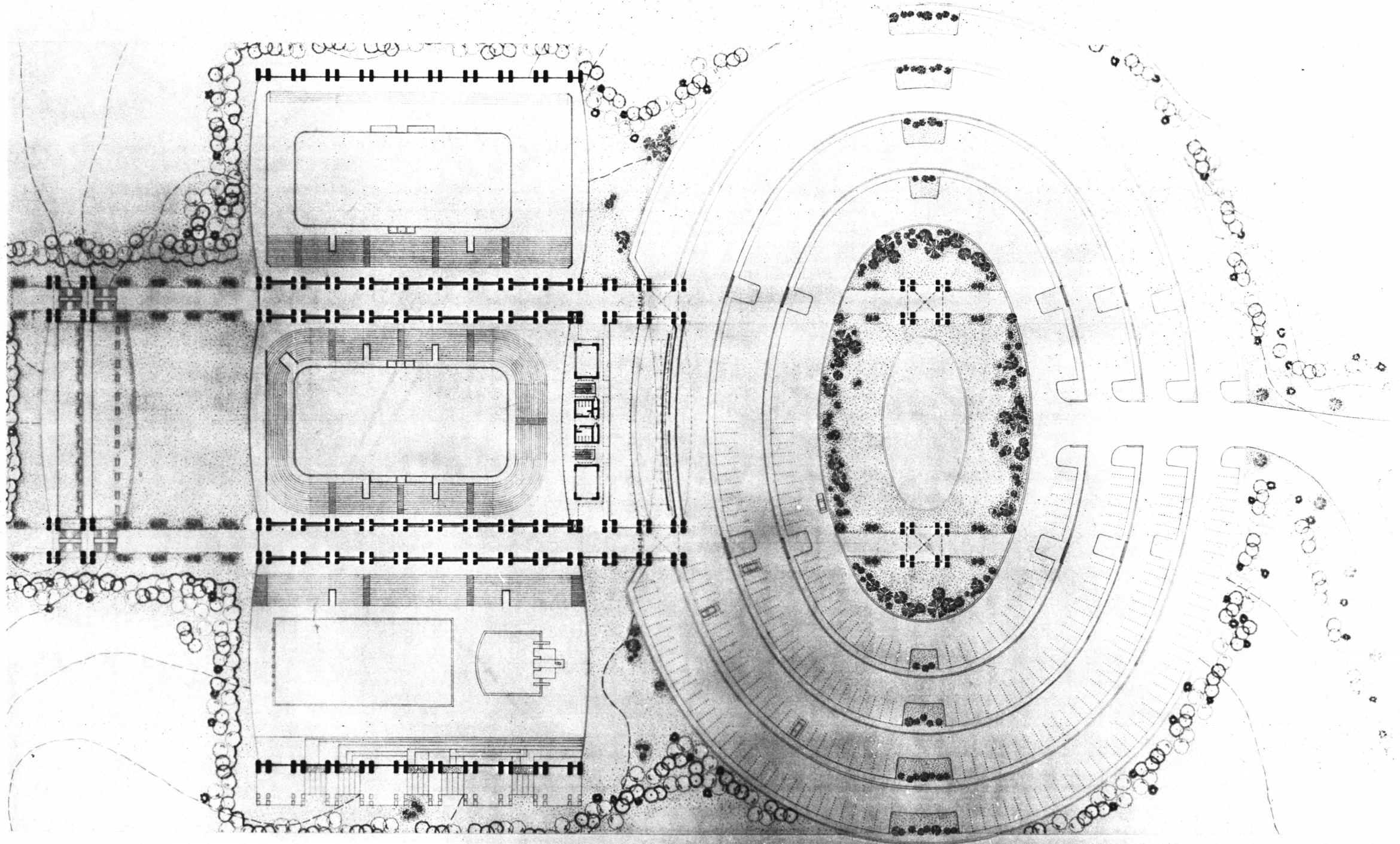
C. Norberg-Schulz

"Architecture brings new energy and life through constant dialogue and collision with contextual elements. I employ geometric form in order to give to the whole, because geometry, I believe, is architectural reason. Furthermore, I want to capture geometry in true three-dimensional form. Moreover, in my architecture, I seek to create situations where man and nature can commune. I want to realize spaces within my buildings which promote conversation with natural materials where one can feel light, air and rain.

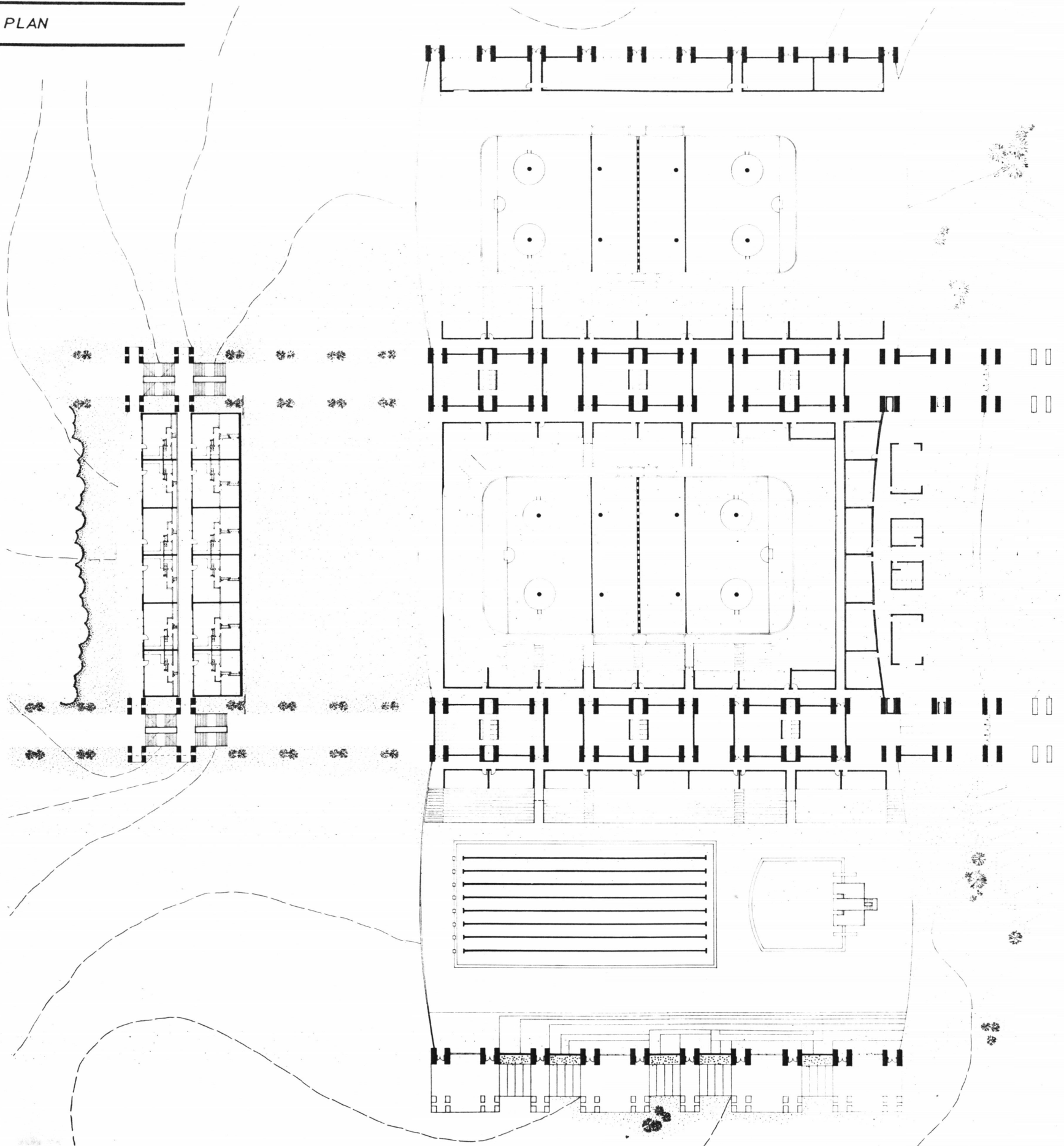
Architecture makes possible the consideration of intimate relation between material form and between volume and light."

-Tadao Ando

CONCOURSE LEVEL PLAN



LOWER LEVEL PLAN

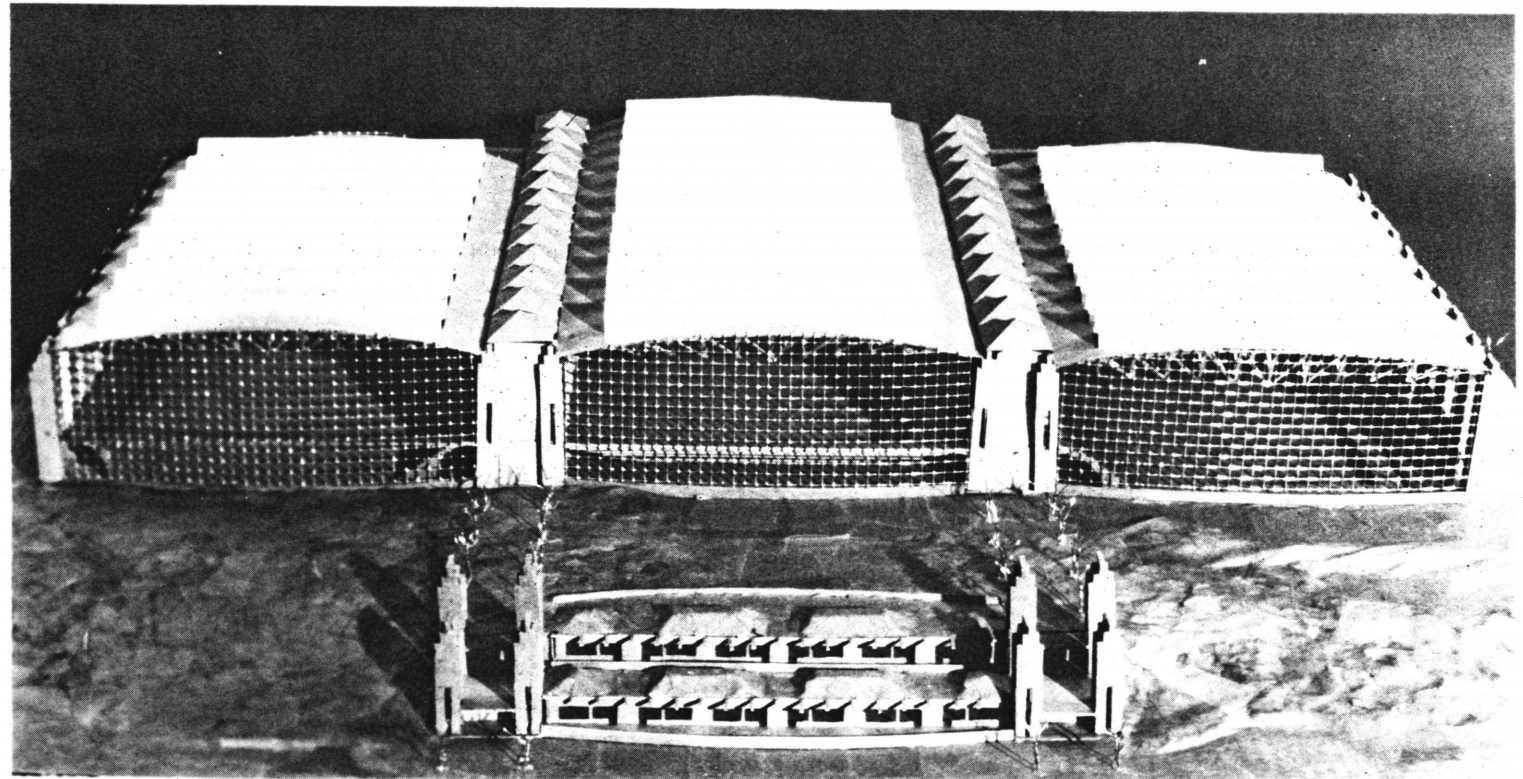


Each arena measures 180' x 280'. The roofs are spanned along the narrower dimension with curved tri-chord trusses, the bottom chord being a tension cable. The trusses not only curve in profile, but also in plan creating hourglass shaped openings where pitched skylights occur. The front and rear walls utilize a 5' x 5' Pilkington glazing system, with treated glass which allows in natural light without harsh glare or shadows. These glazed walls follow the curve of the truss. The sides are made up of the supports for the roof, which are structurally tied to the grandstands. Each concrete pier is made up of a grouping of four that are then joined near the top. The infill between consists of a 4' high stack bond oversized brick wall with wood lattice above, along the interior "streets". The exterior wall of the pool and American ice rink arenas are a combination of stack bond oversized bricks and a 2.5' x 2.5' Pilkington glazing system. The walls are treated in this manner so it is clear, upon observation, which portions do the work of carrying the structure and which are merely for enclosure.

The housing portion of the complex was treated very differently from the main body. Being of a much smaller scale, it needed to be separated from the arenas, not only with respect to location on the site, but also in structural makeup.

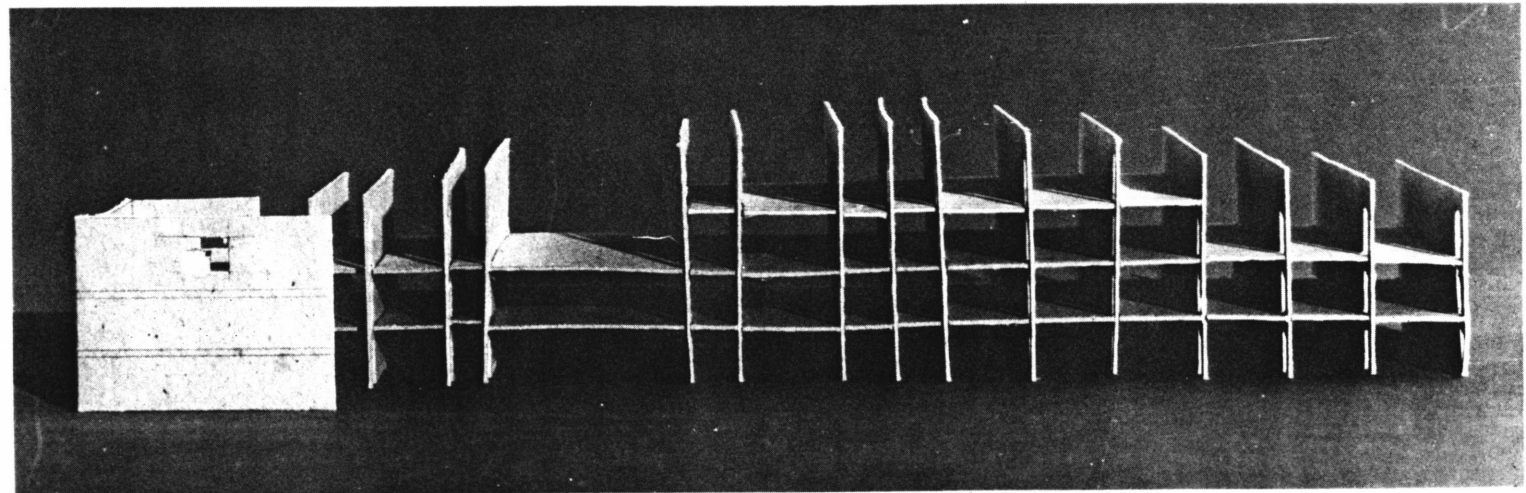
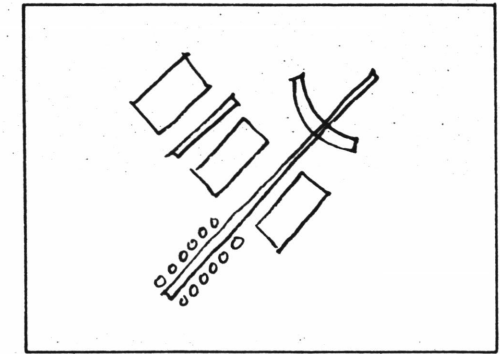
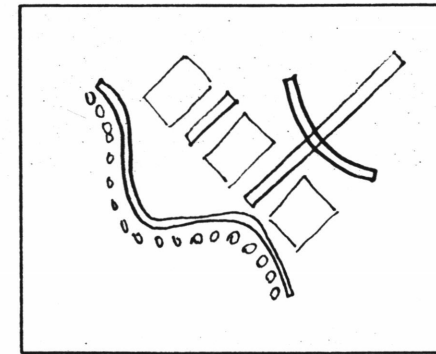
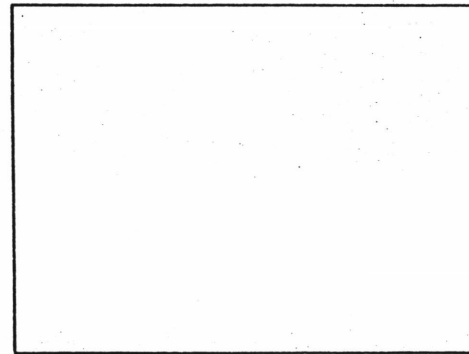
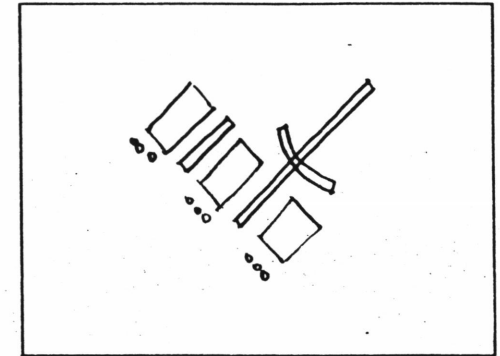
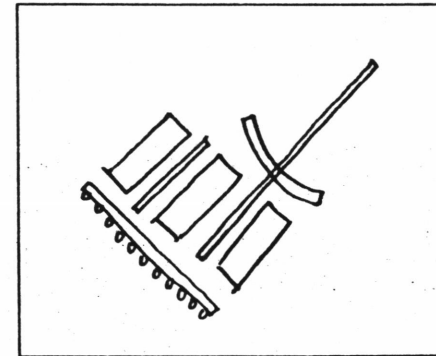
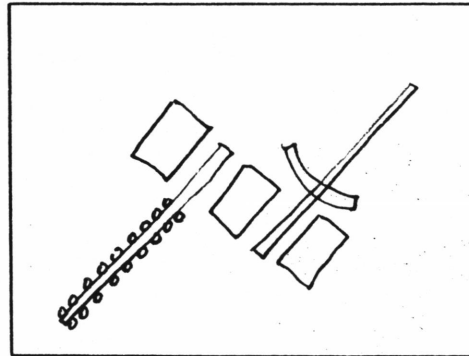
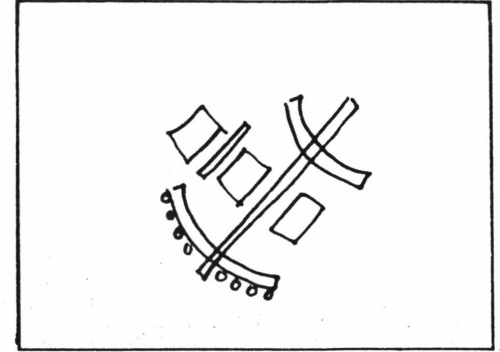
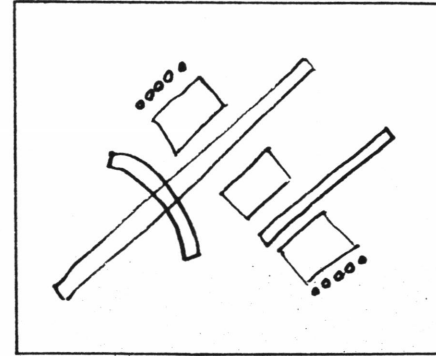
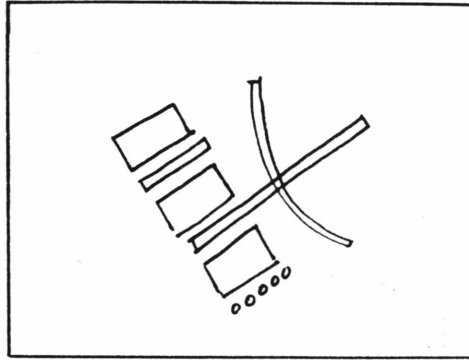
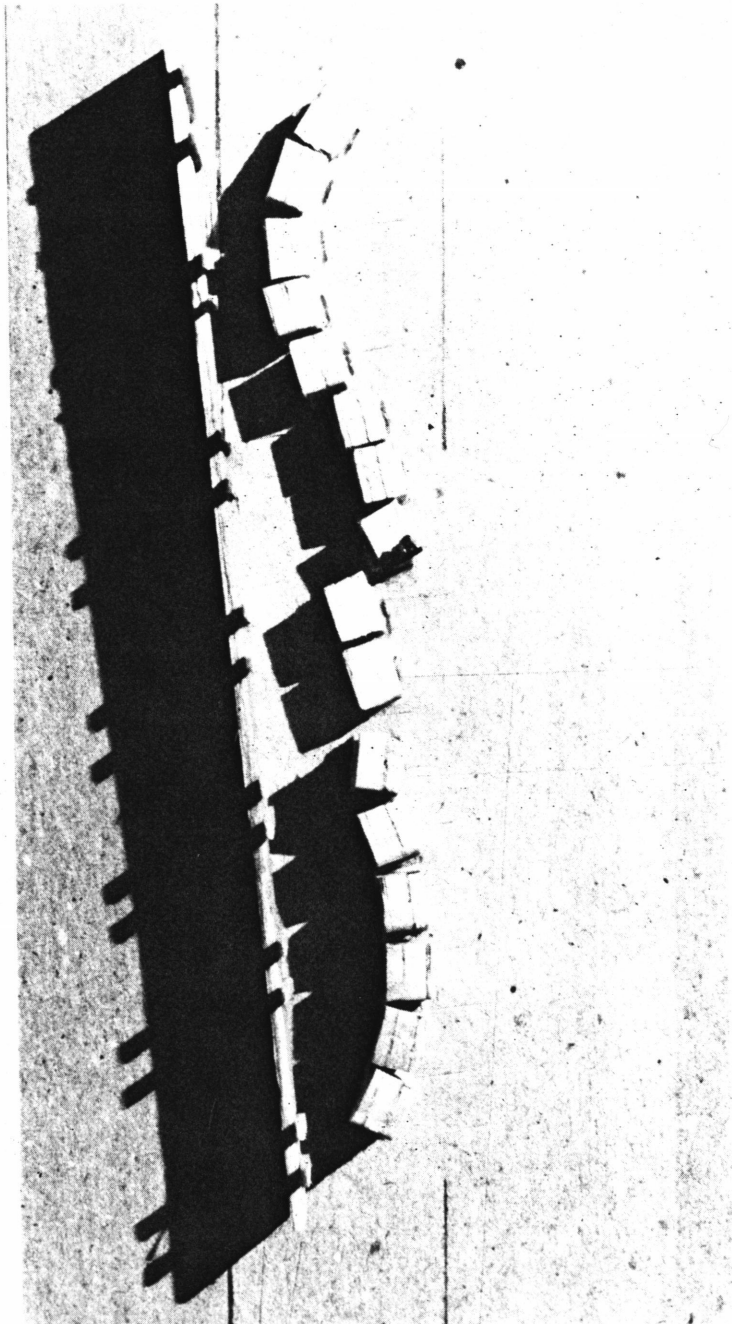
To the rear of the arenas, separated by a large open courtyard, are the apartments for the athletes, trainers and coaches. They are of load bearing construction, buried in the terraced earth. In essence, they turn their backs on the competition and open up to the trees, fulfilling the athletes need to break away from the rigor of the sport.

Each unit has two bedrooms, bath, kitchen and living room with vaulted ceiling. The rooms to the rear have clerestory windows or skylights to let in natural light and ventilation. The block of twelve units is bordered by and anchored to the site by two towers. Although these towers are smaller than their counter parts of the spine, they create the "back gate" to the complex, while tying the private realm of the program to the public realm.

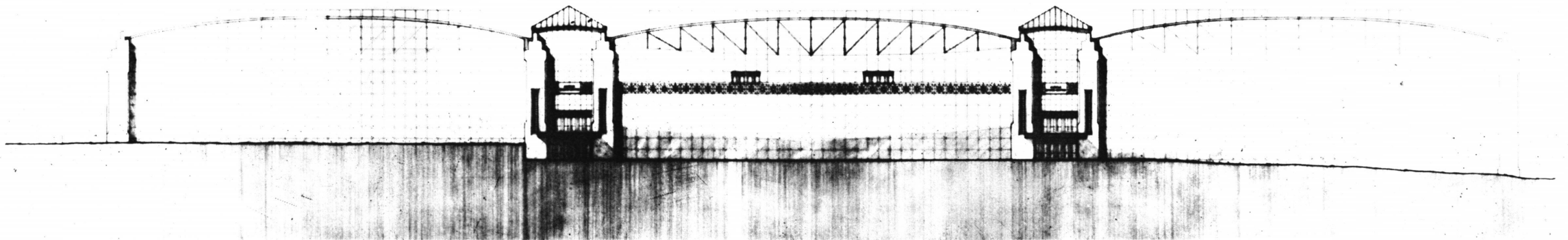
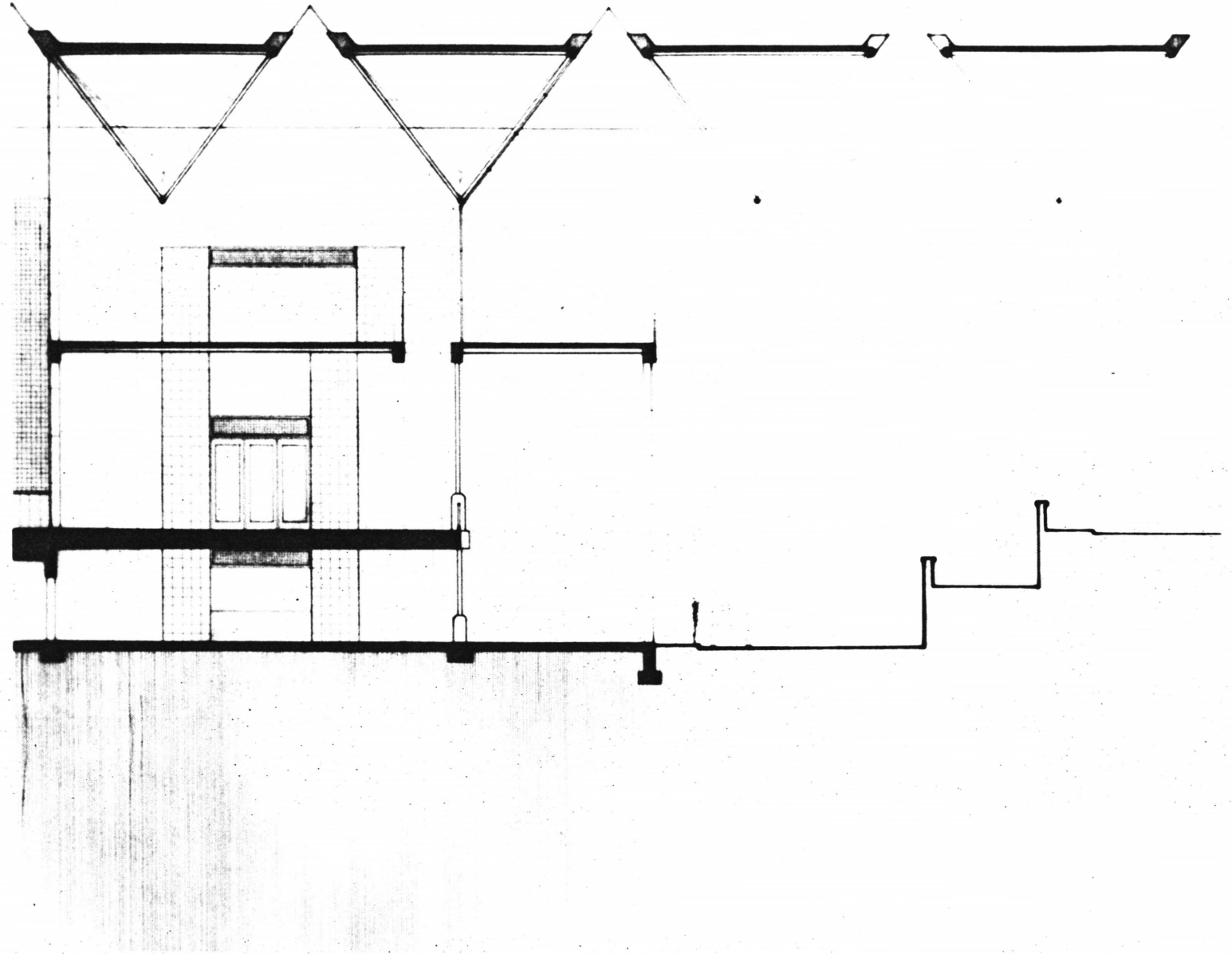
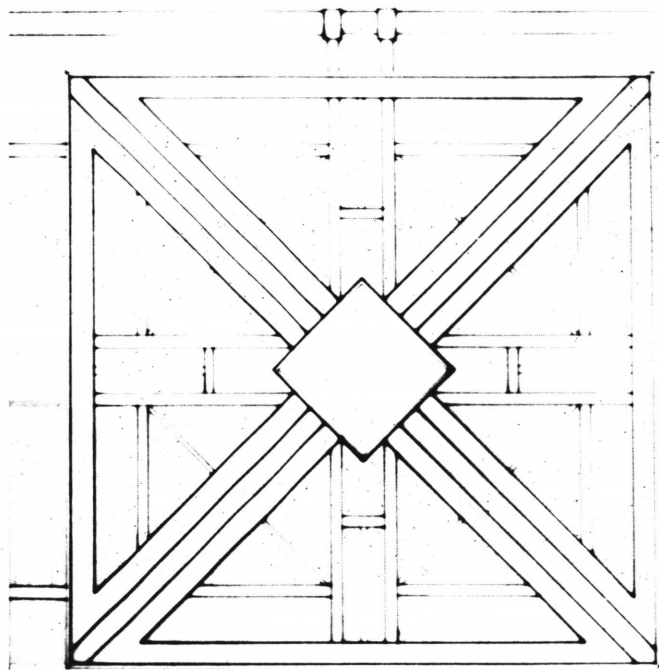


THE HOUSING

The housing was one of the more complex issues in this project. Several key decisions were to be made during the design process concerning its makeup. The key concerns centered around what materials, form and location the housing should take; as well as whether or not it should be integrated with the arenas or be physically separated. After investigation of many options, it was determined that the housing should be a separate entity, both in location and design. This was decided after the desire for privacy and variation was made clear.



FRONT ELEVATION

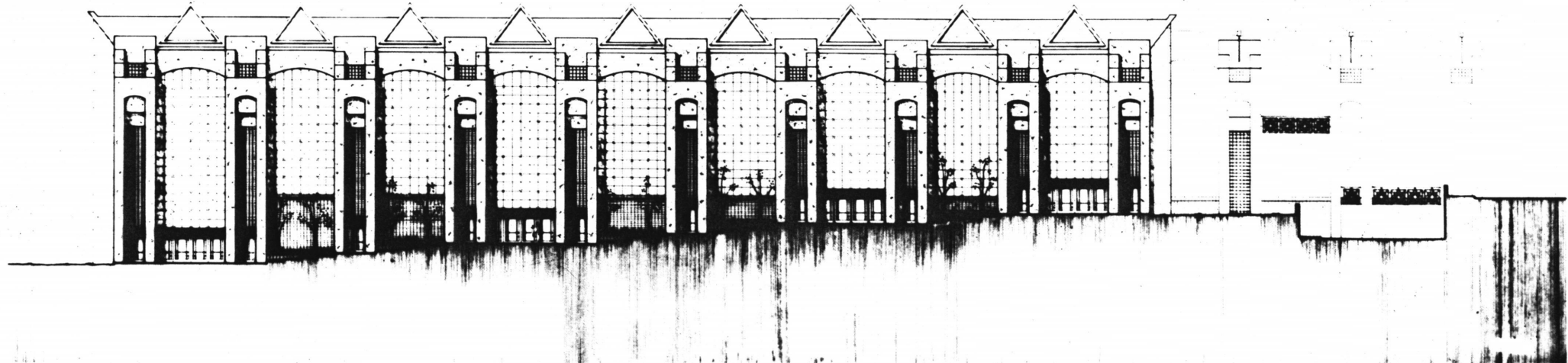
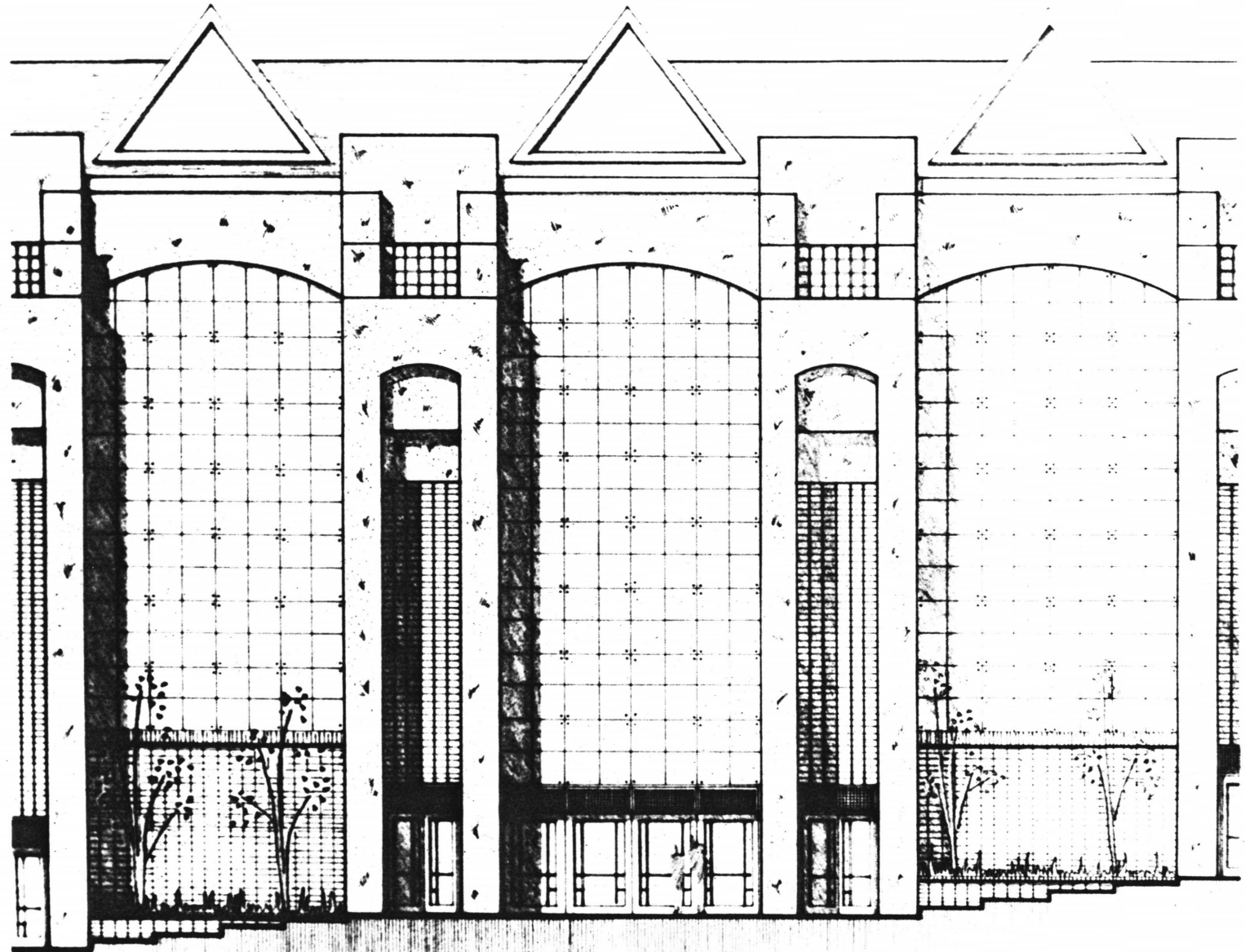
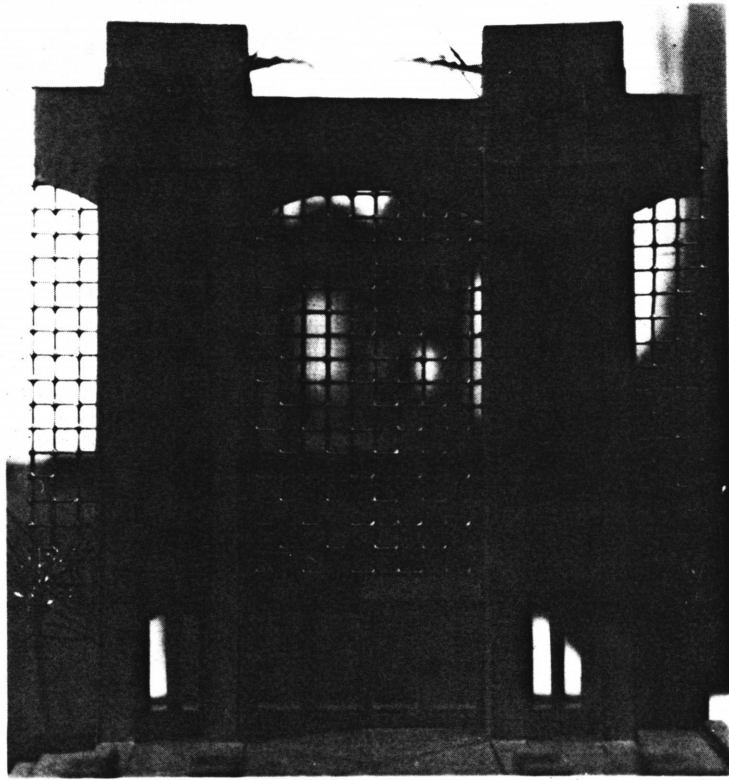


SOUTH SIDE ELEVATION

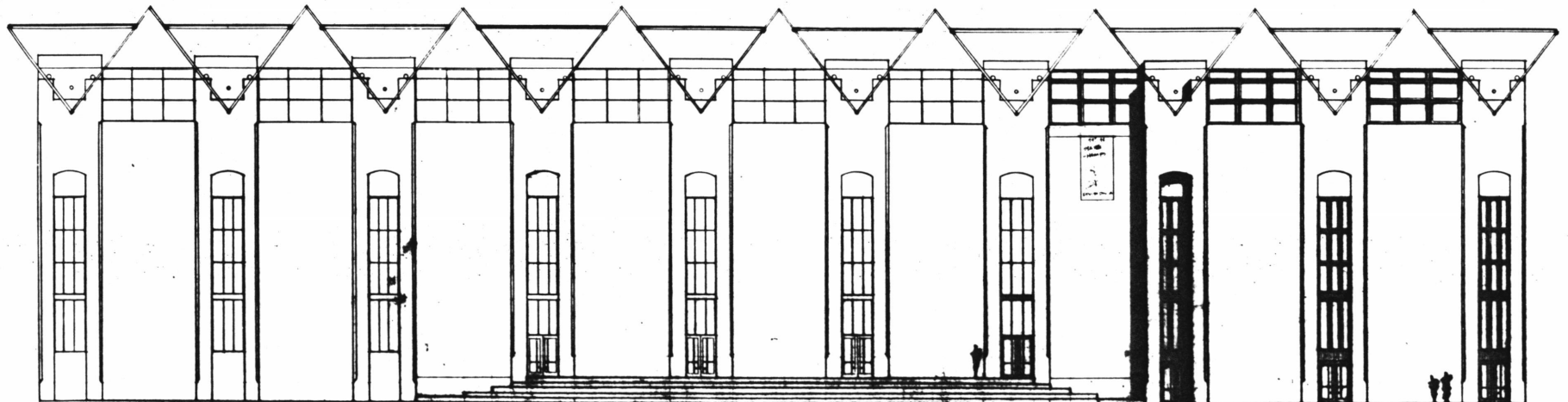
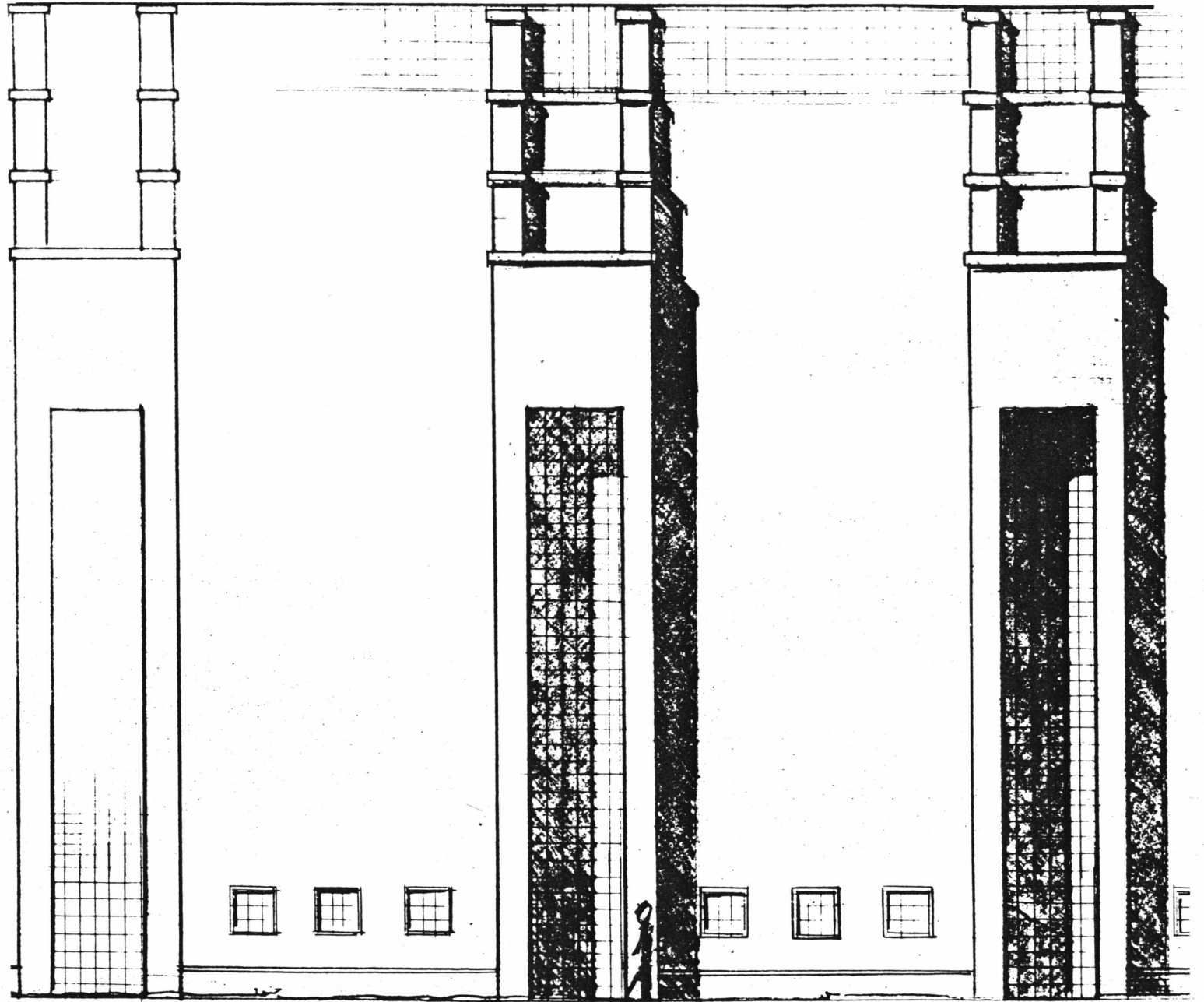
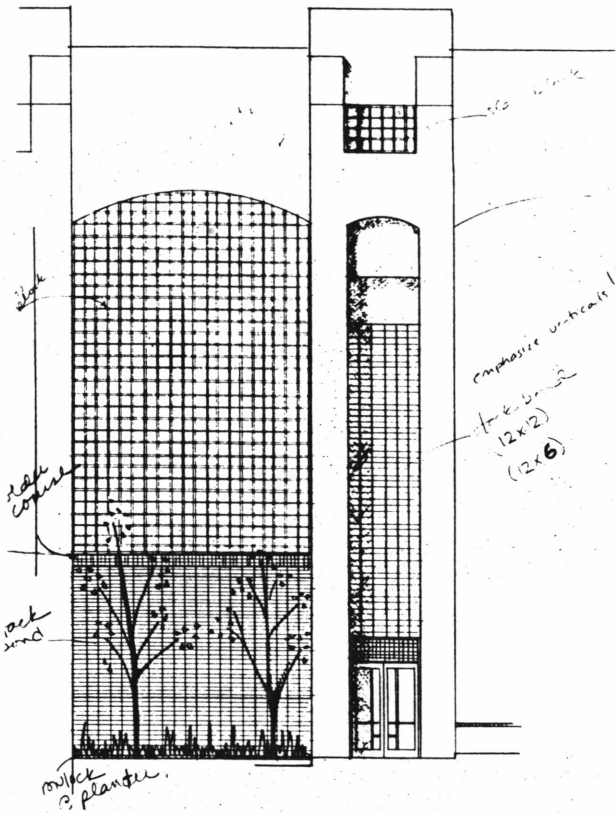
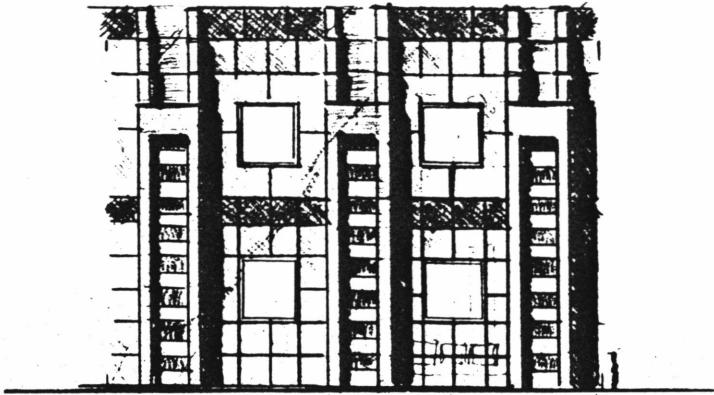
"Distinctive quality of any man-made place is enclosure, and its character and spatial properties are determined by how it is enclosed."

"...expressed in the wall and in particular in the openings which connect the two domains."

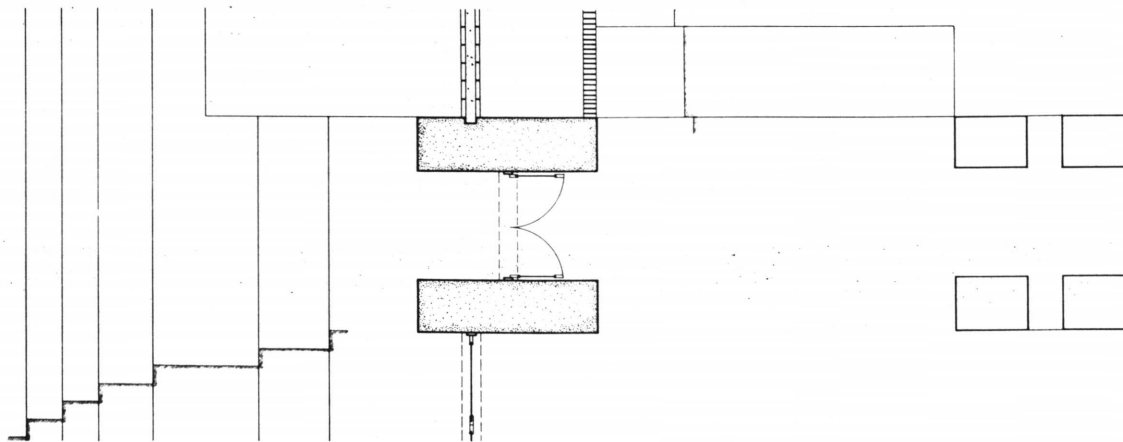
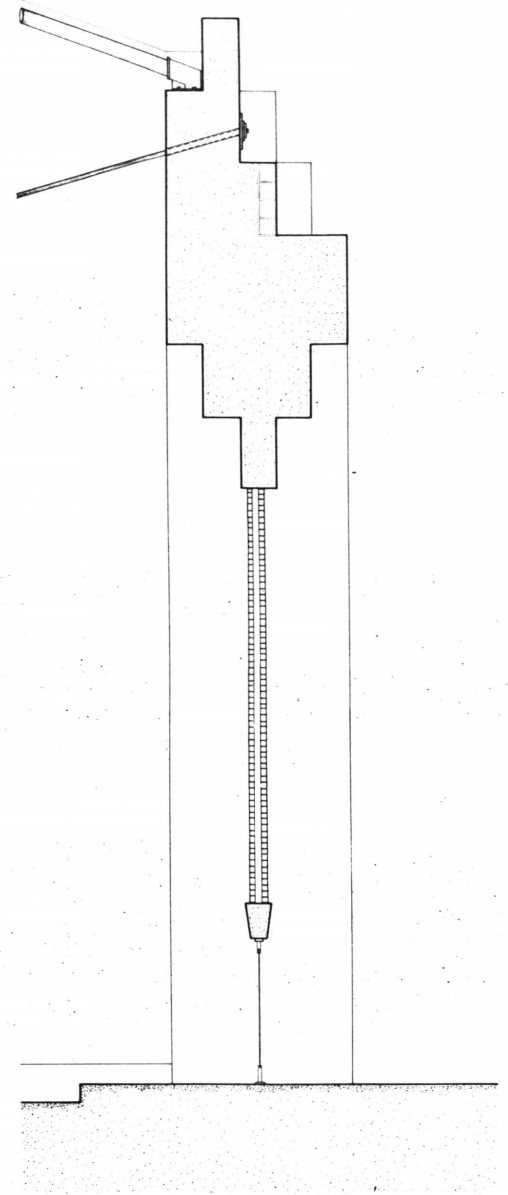
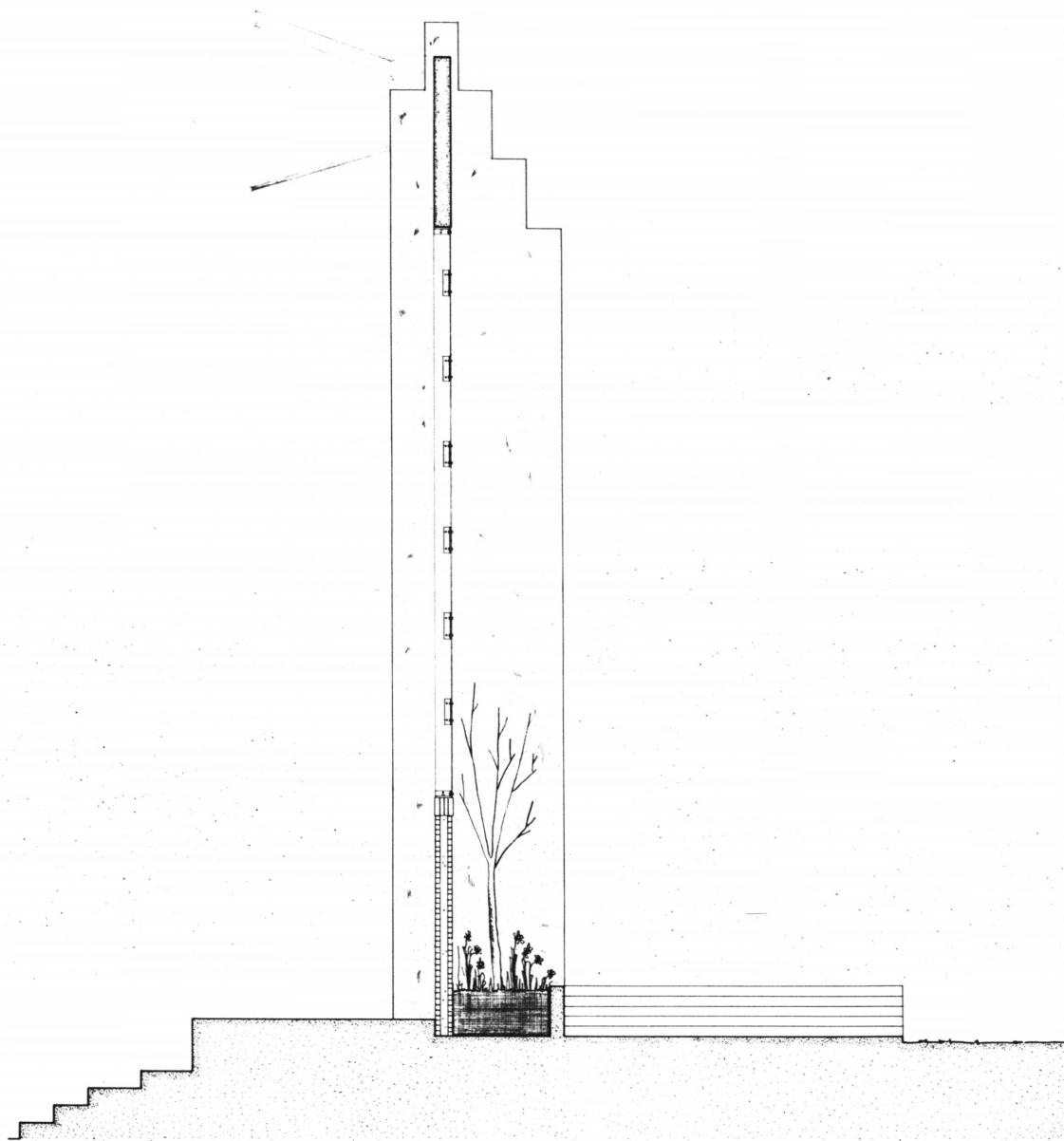
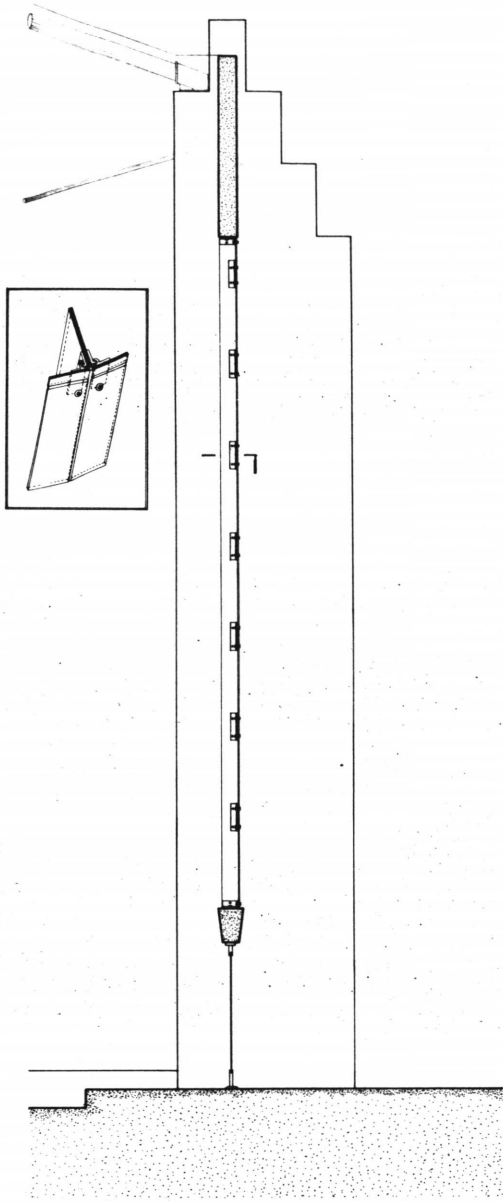
-C. Norberg-Schulz



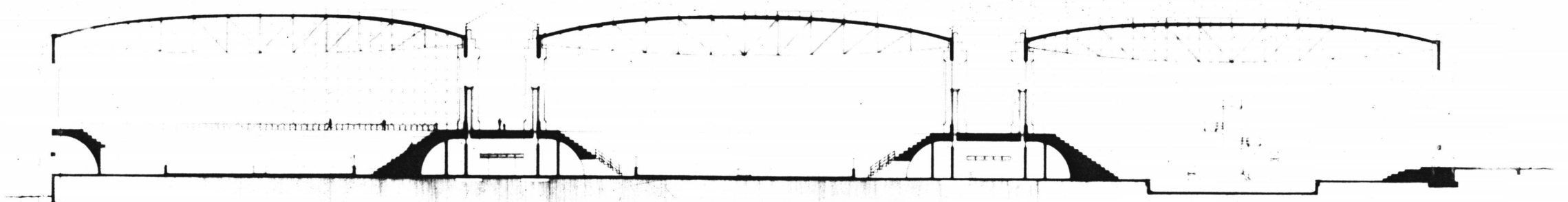
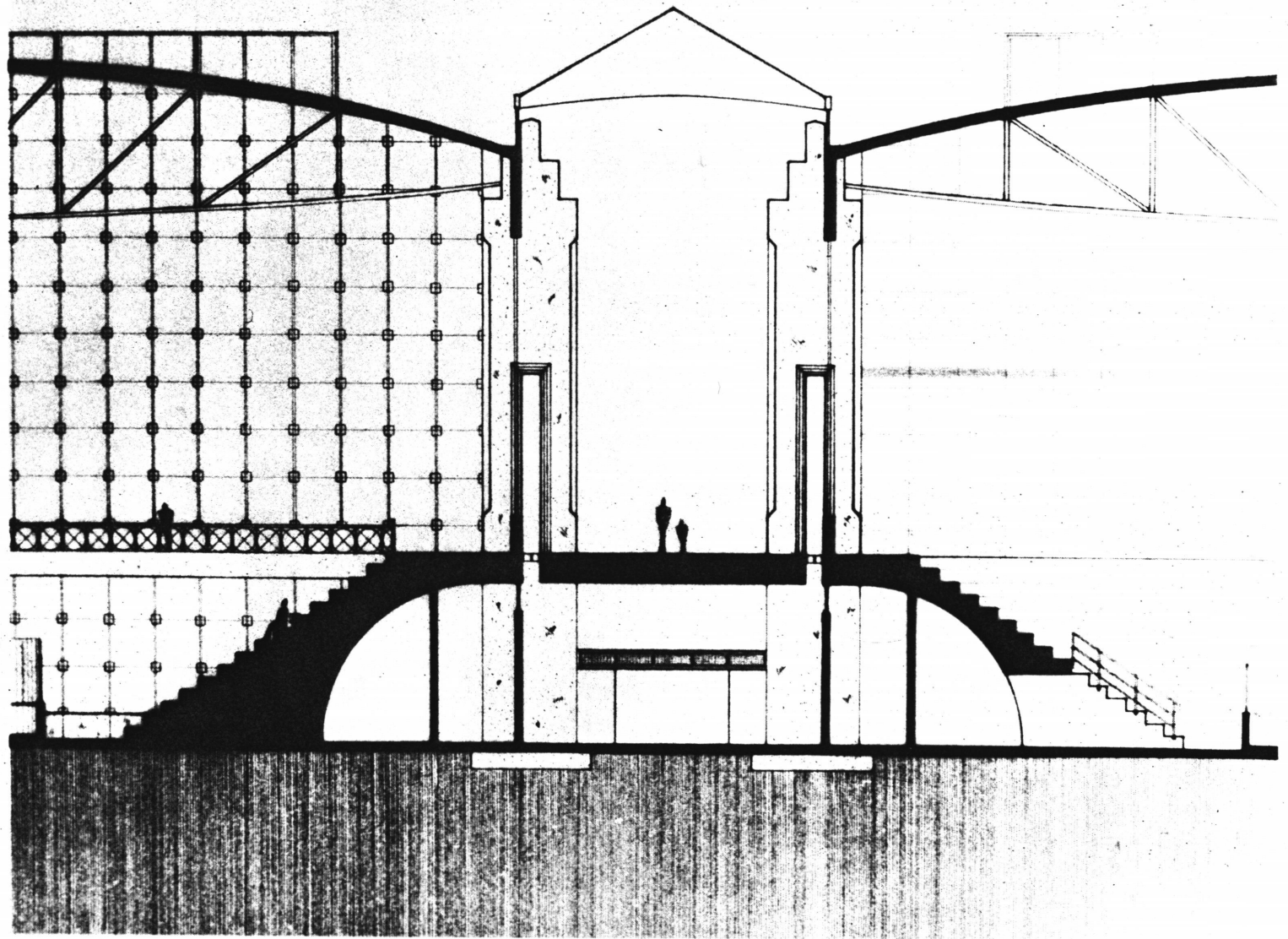
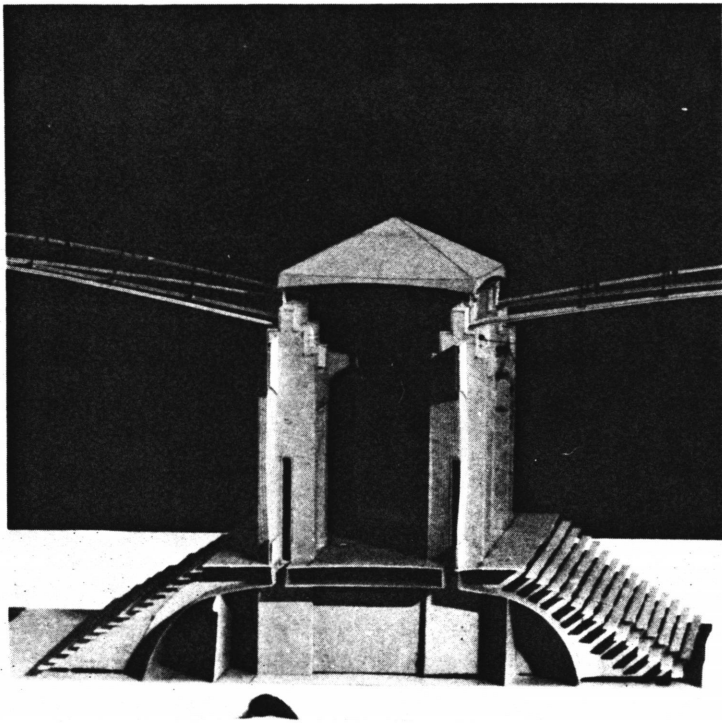
ELEVATION STUDIES



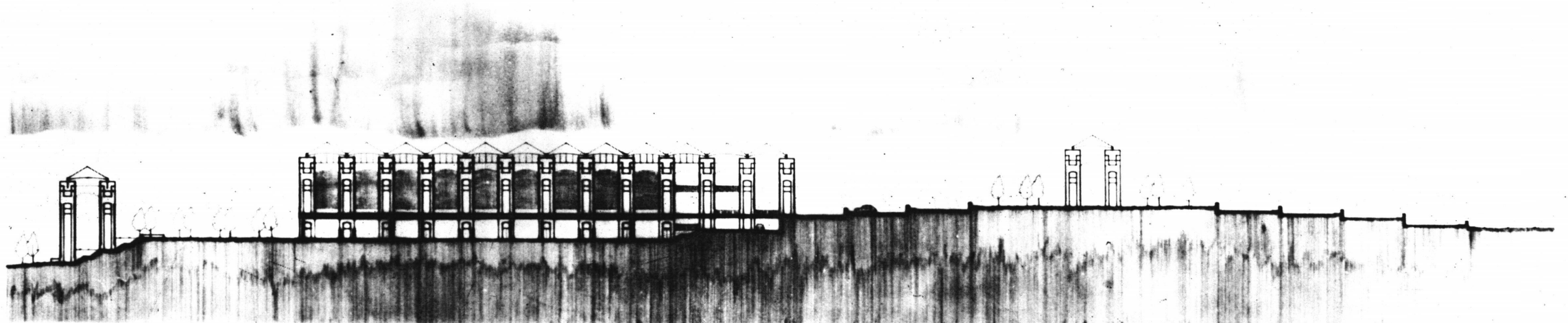
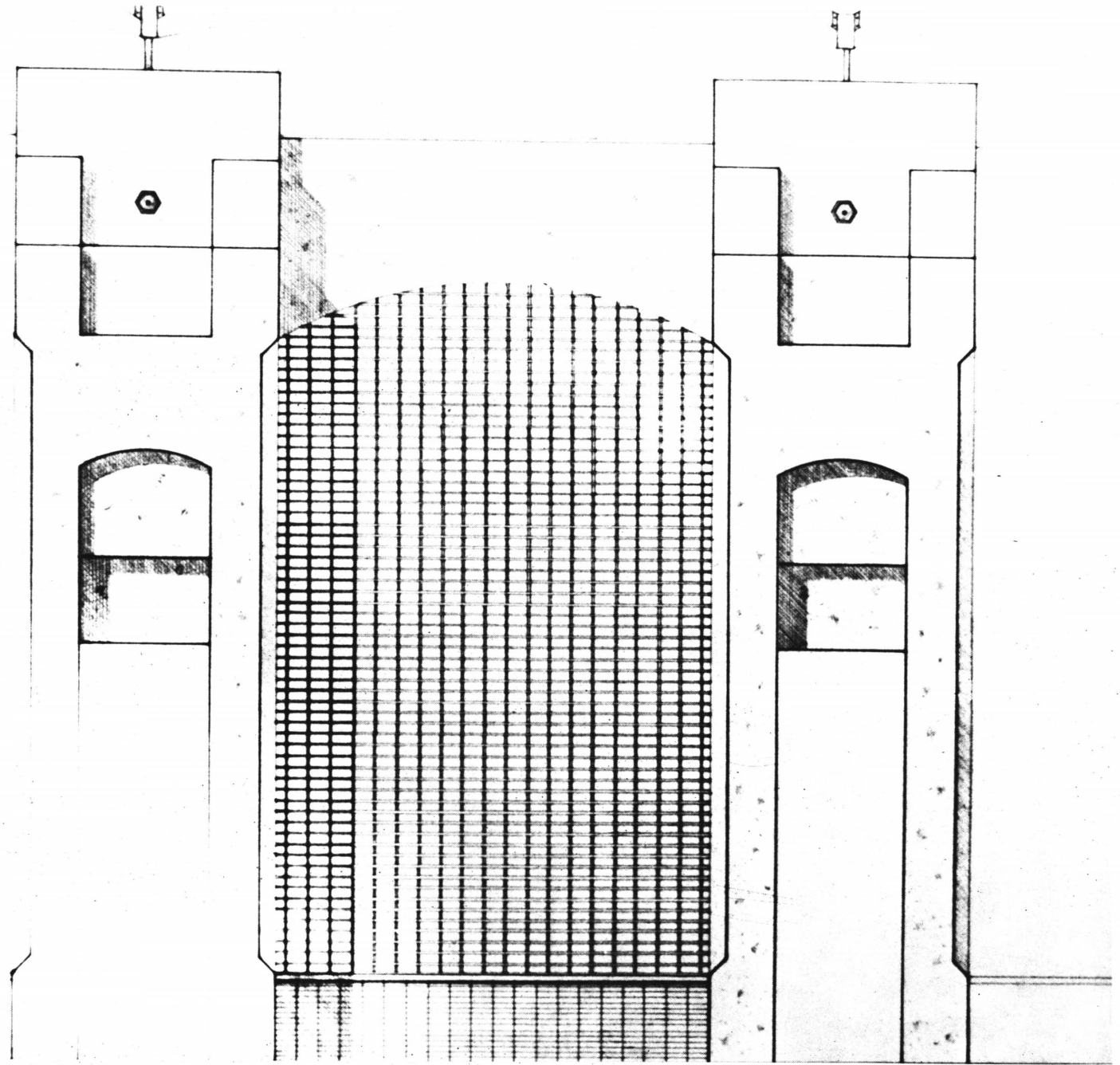
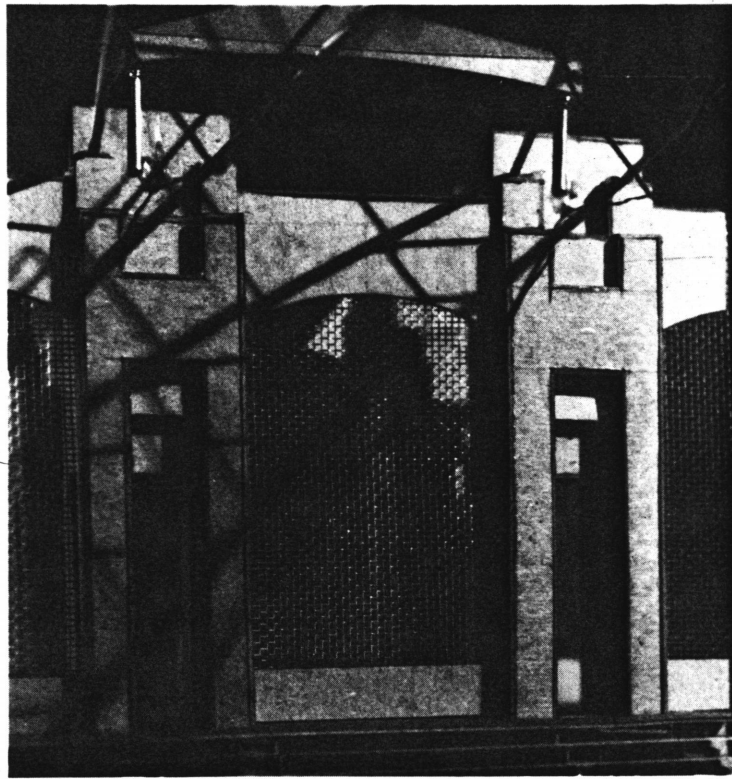
SECTIONS/DETAILS

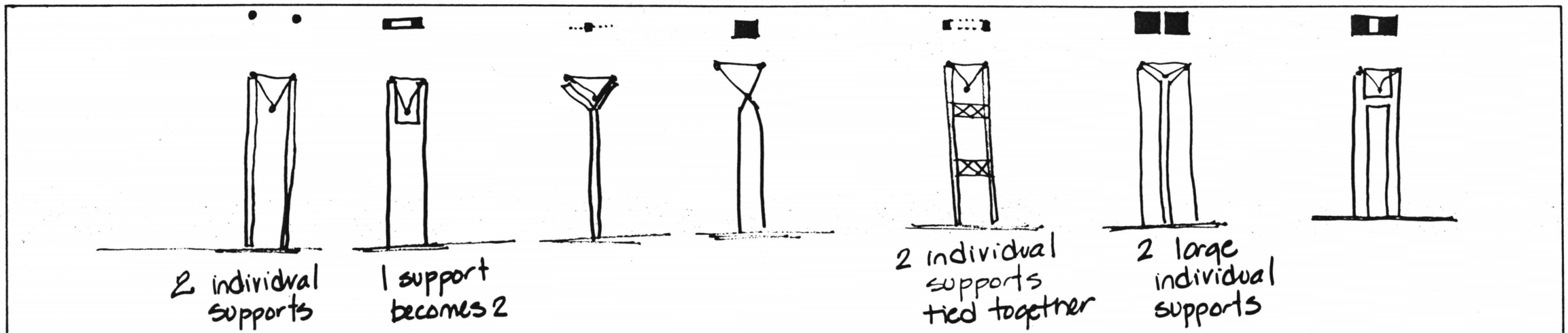
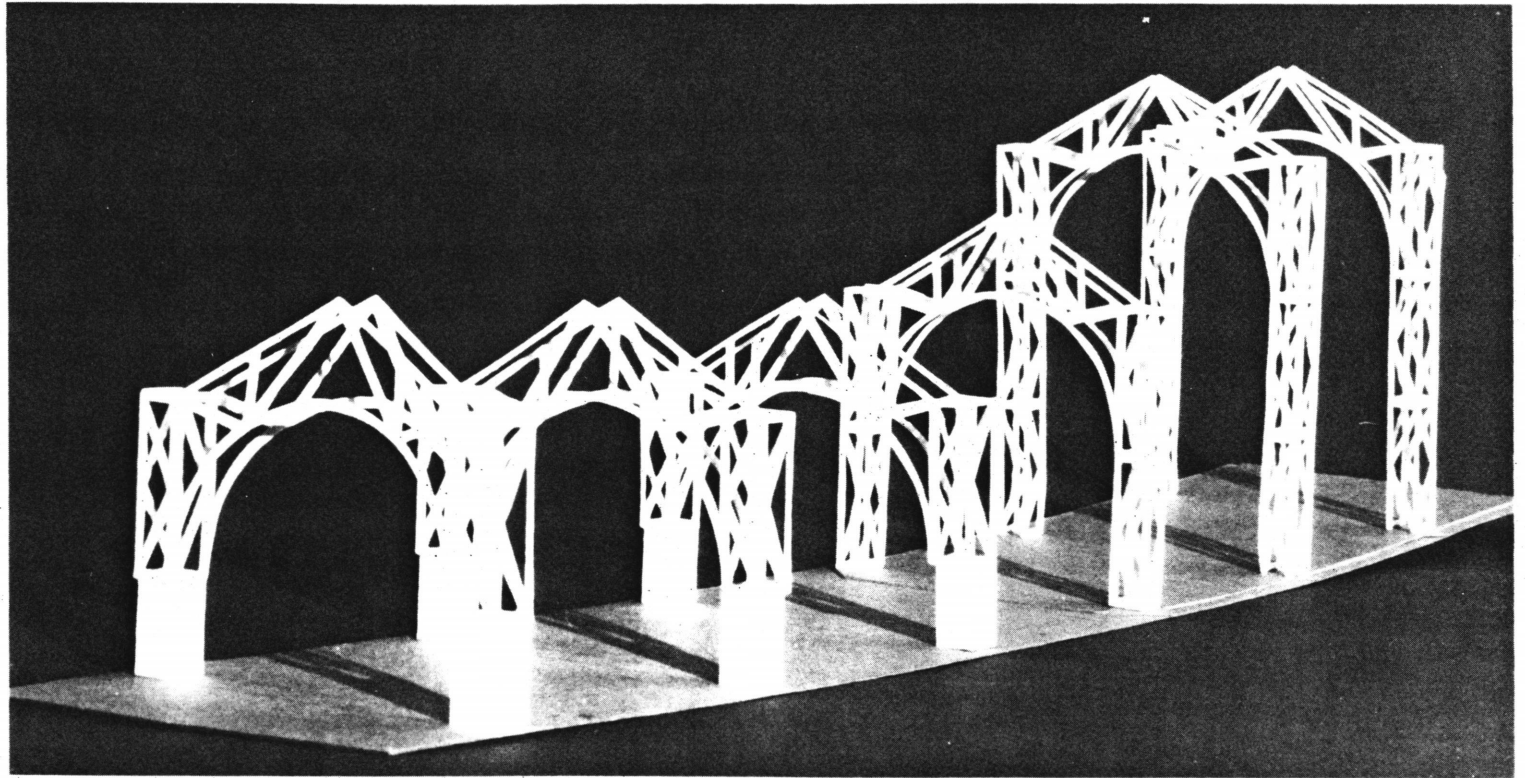
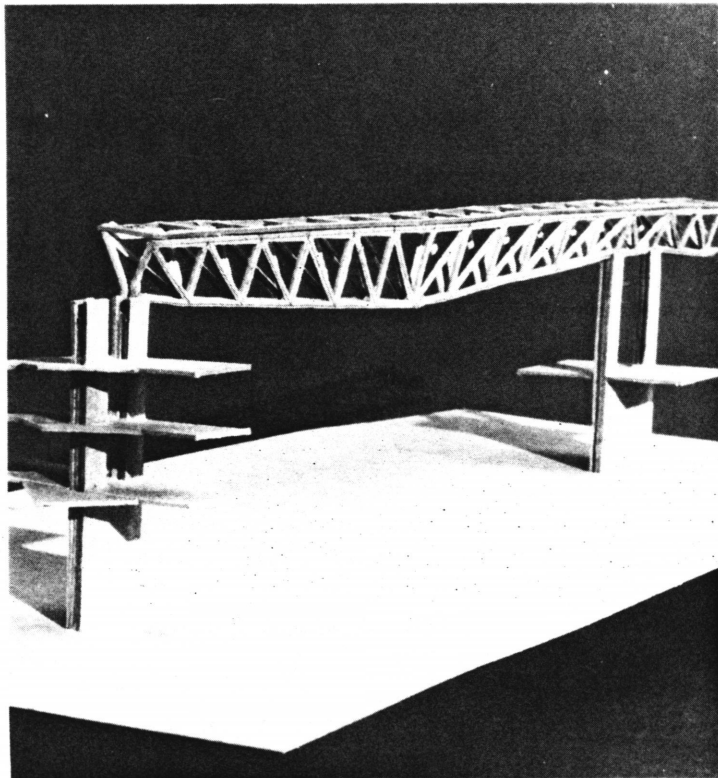


SECTION THROUGH ARENAS

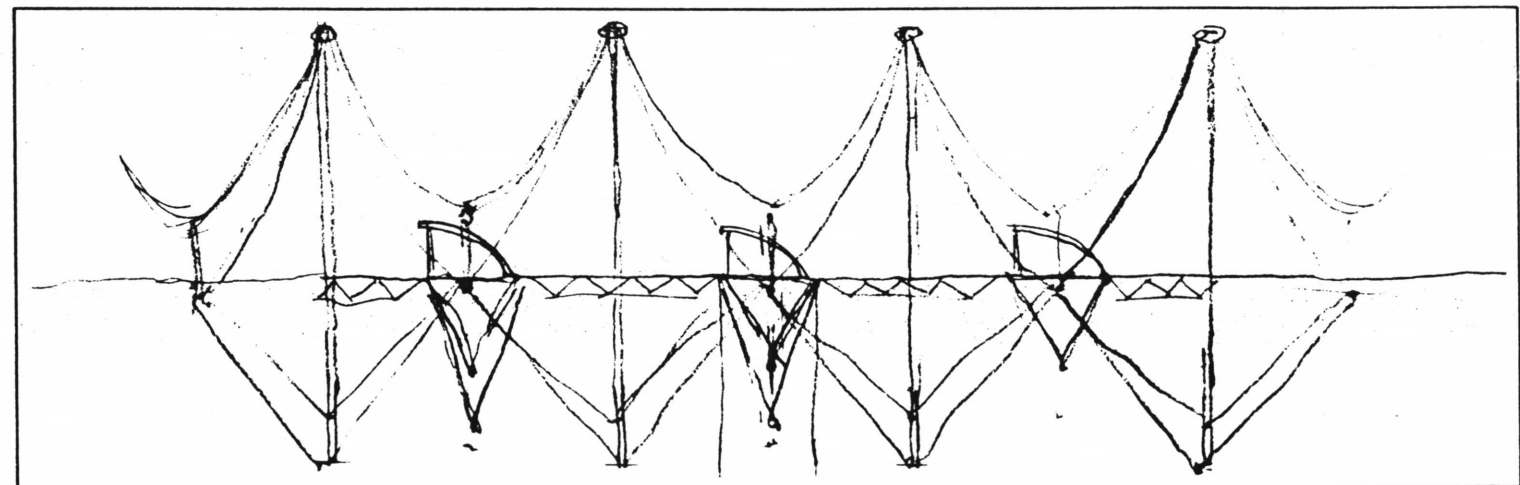
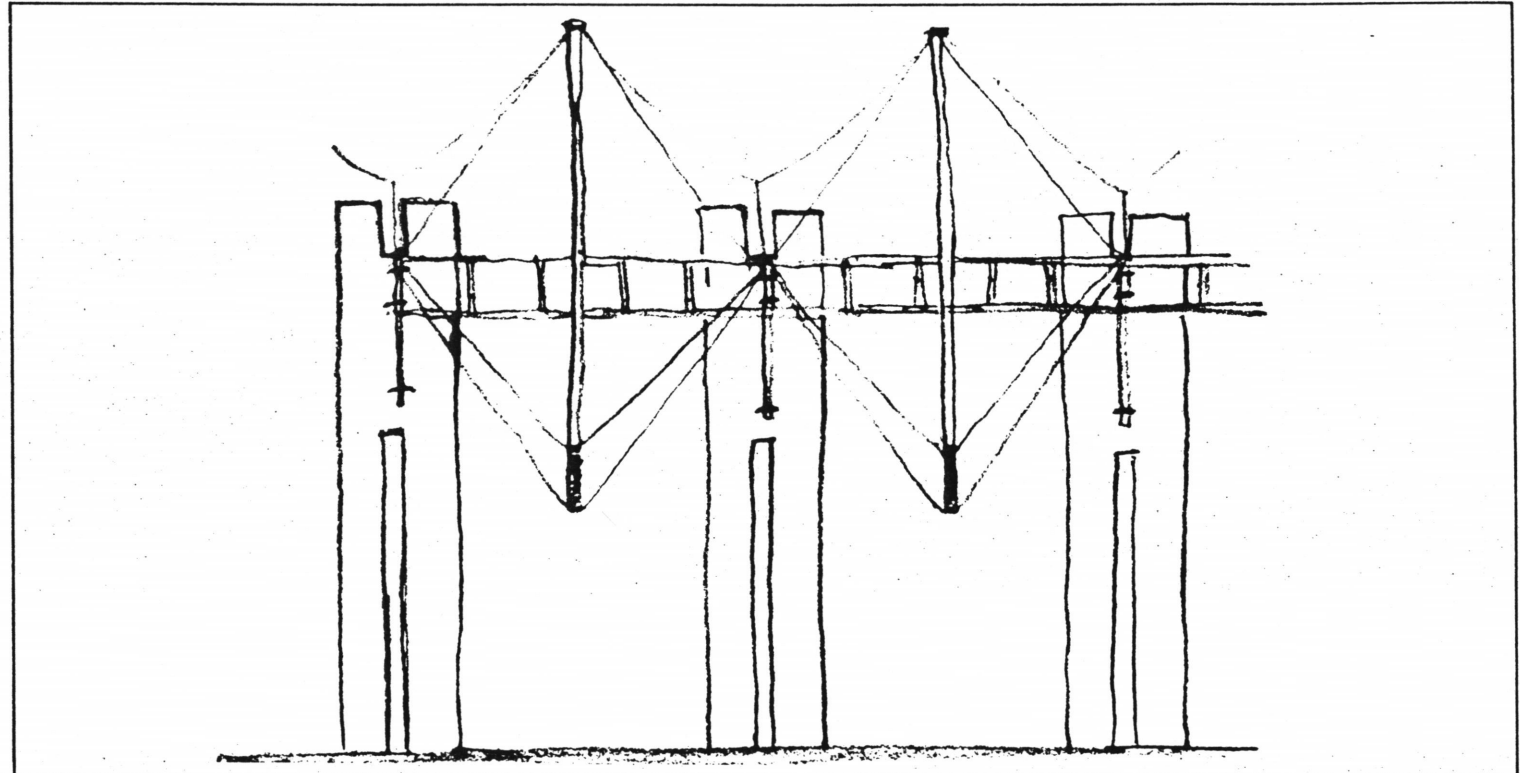
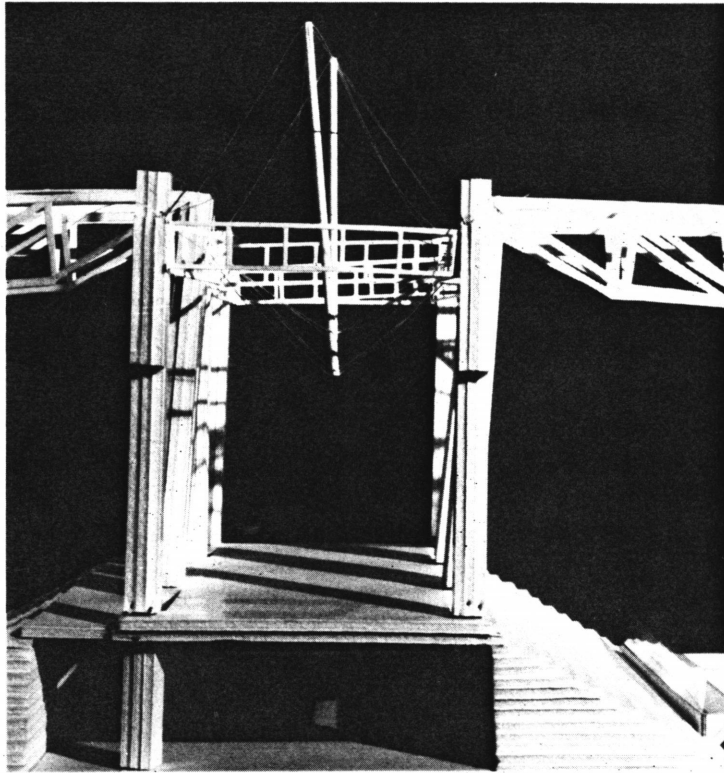
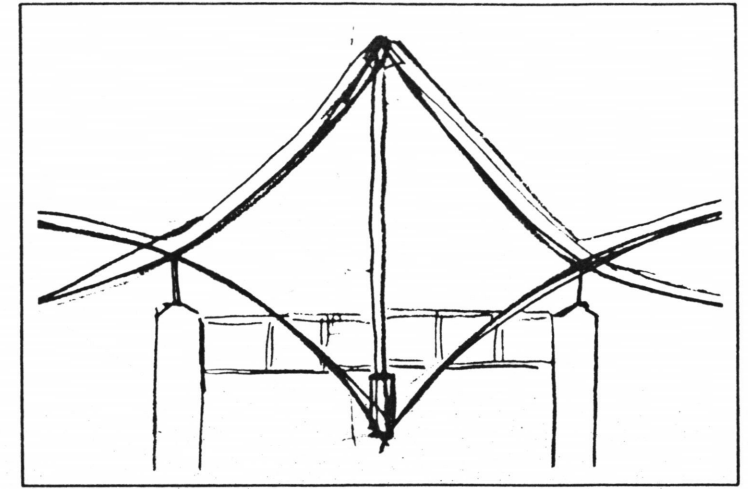
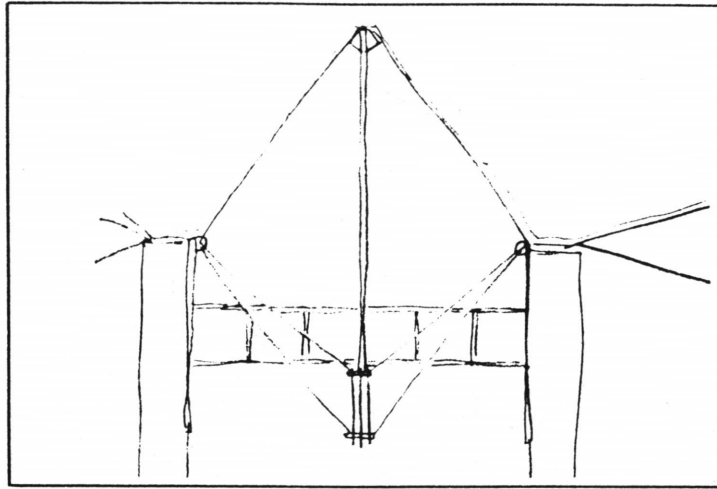


SECTION THROUGH SPINE





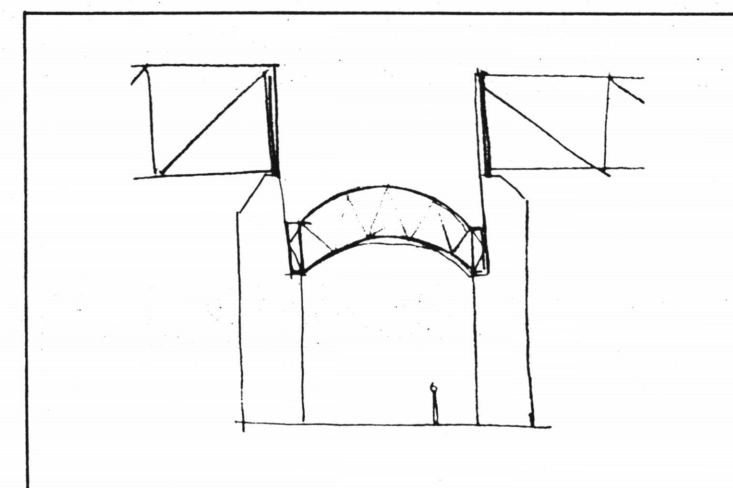
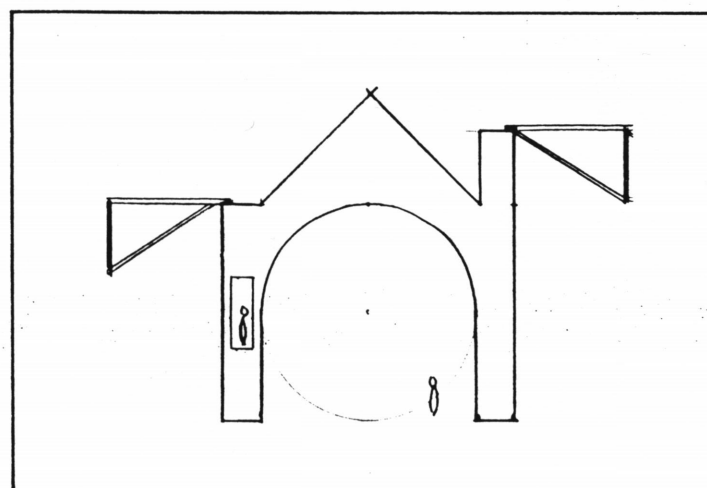
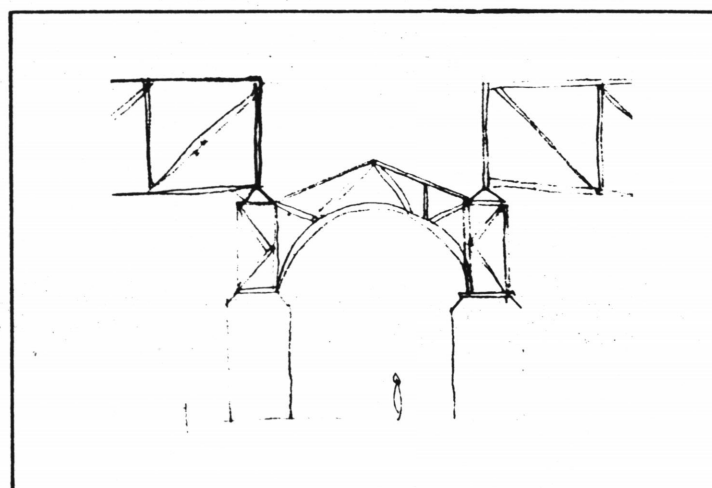
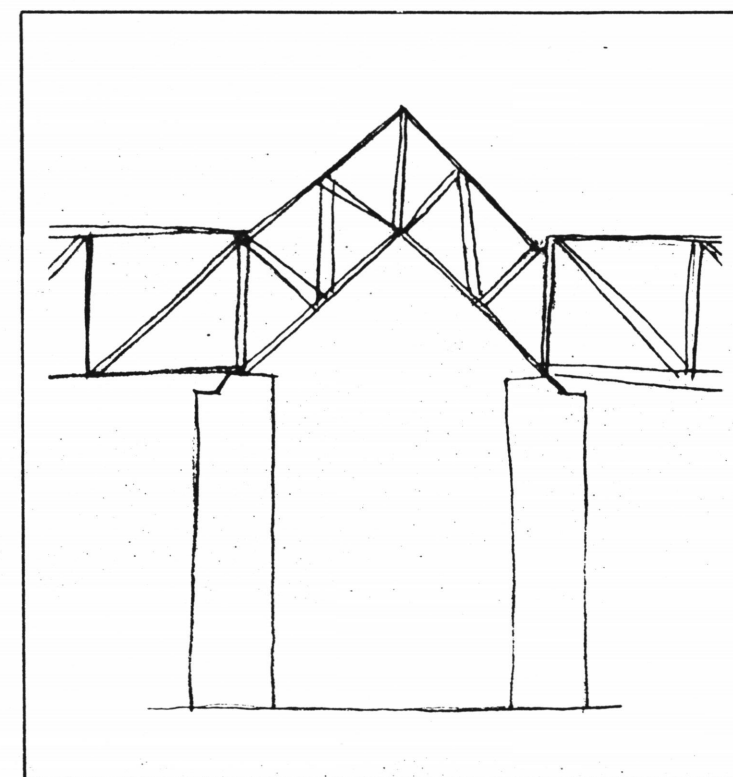
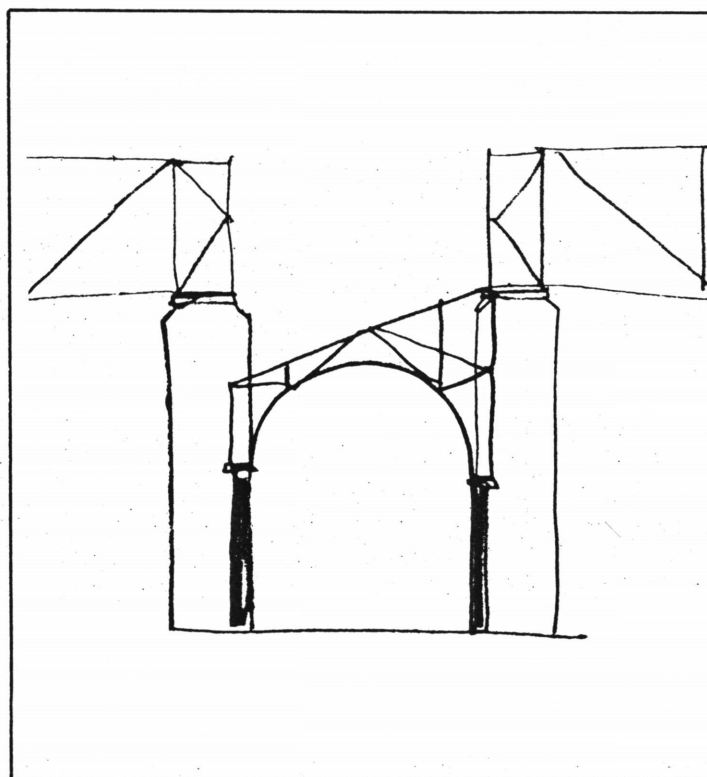
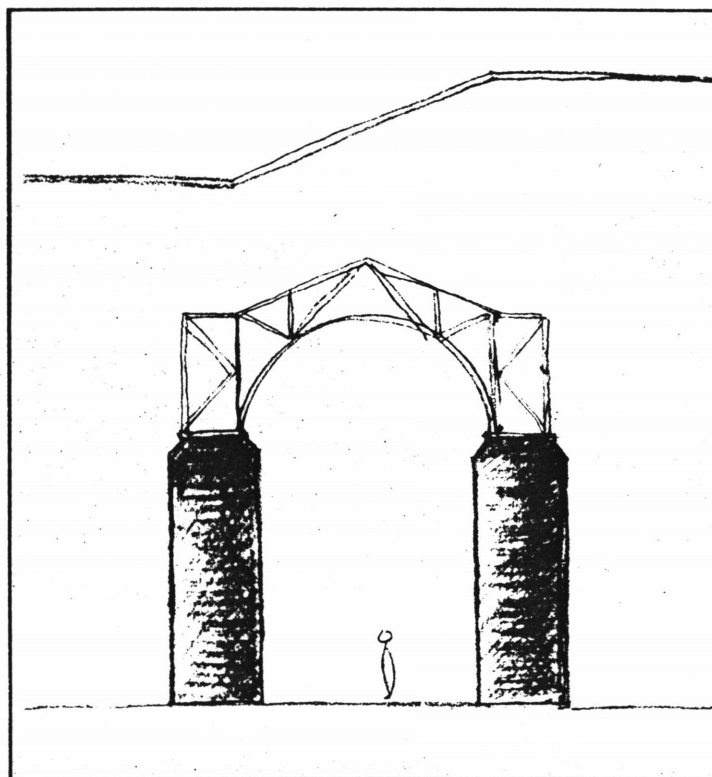
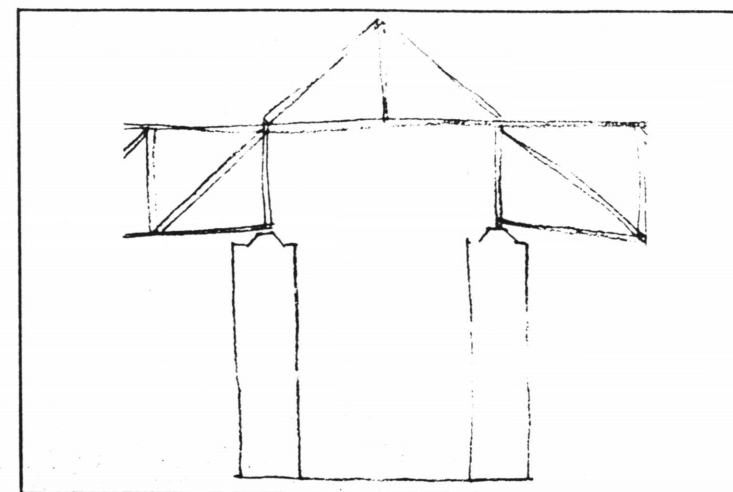
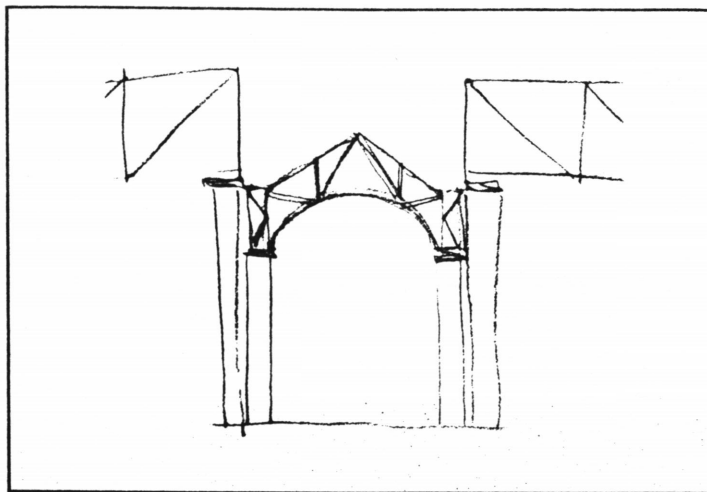
THE SPINE



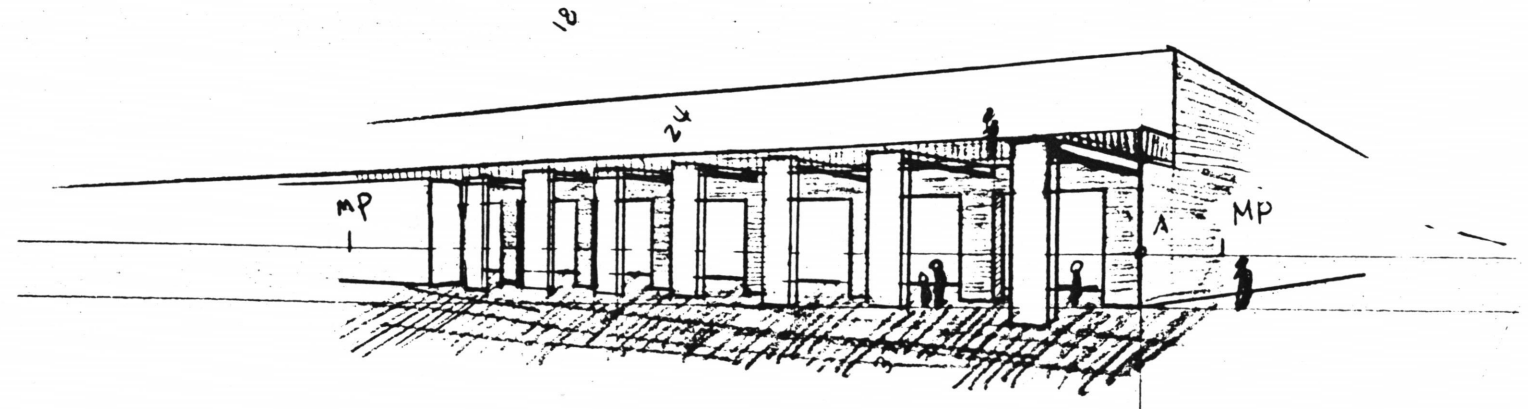
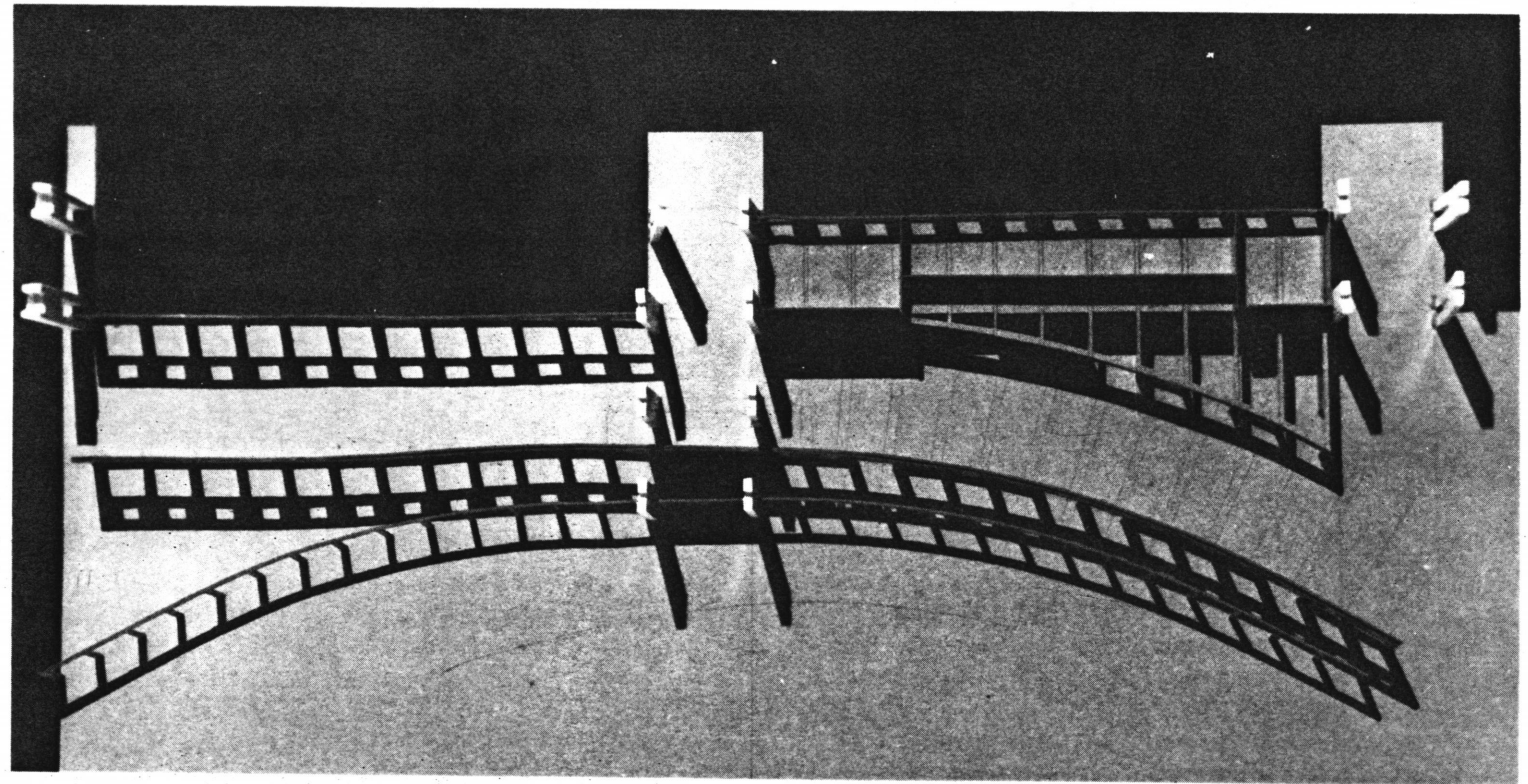
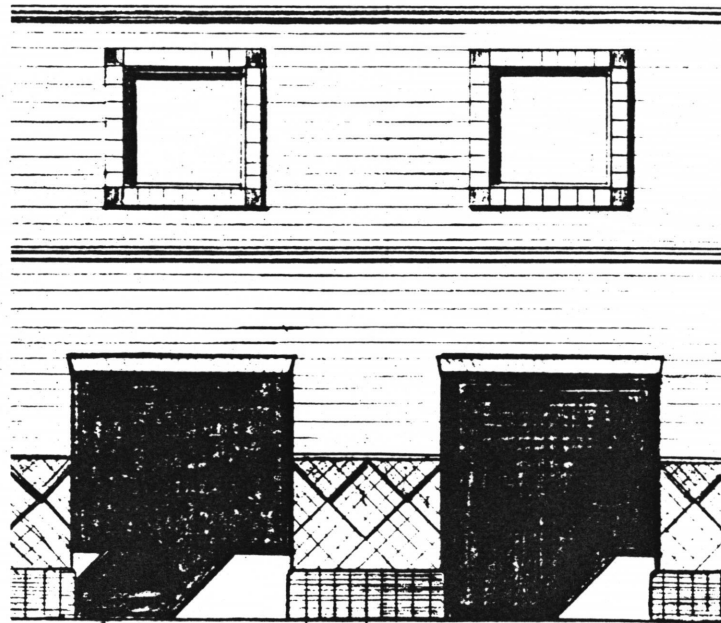
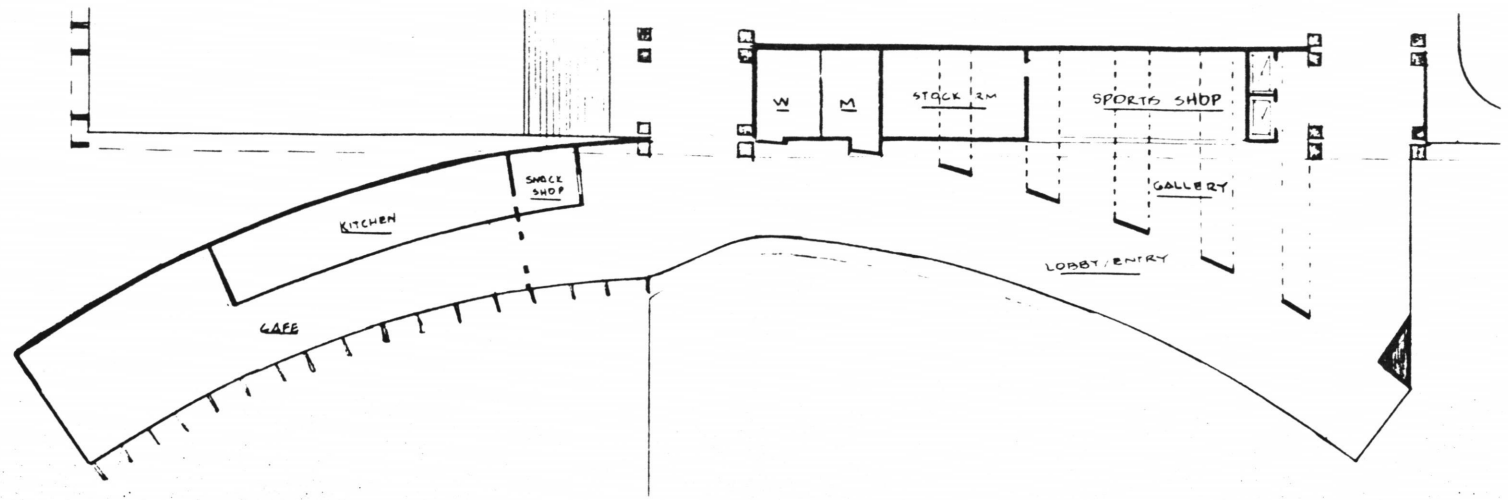
The spine, or 'space for movement', is the major circulation and structure for the complex. When designing the spine, several thoughts came to mind concerning the following:

- to have two separate structures to carry the spine roof and the main arena roof.
- to have a common structure carry both roofing systems.
- to have the columns act as more than just mere support for the roof, or give them more importance as the threshold to the arenas.

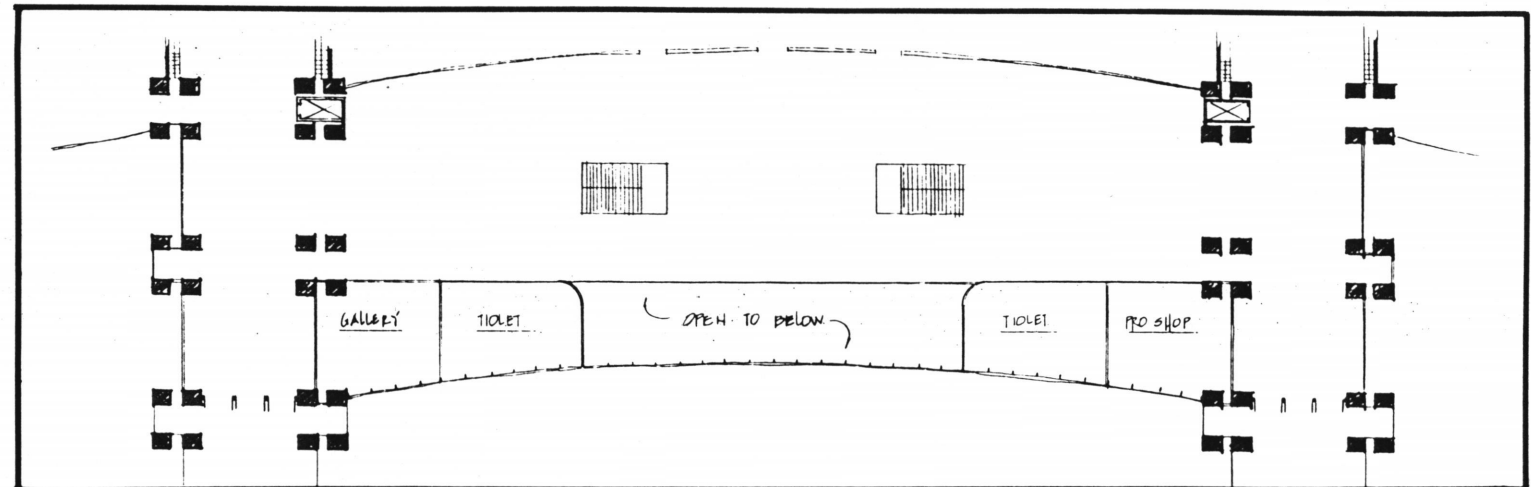
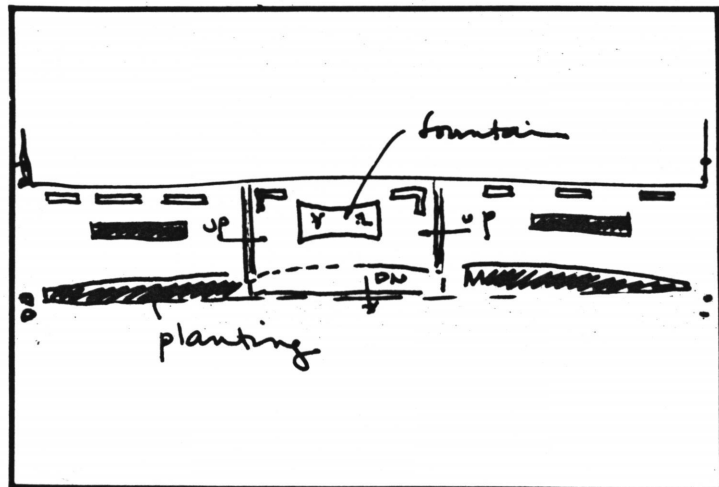
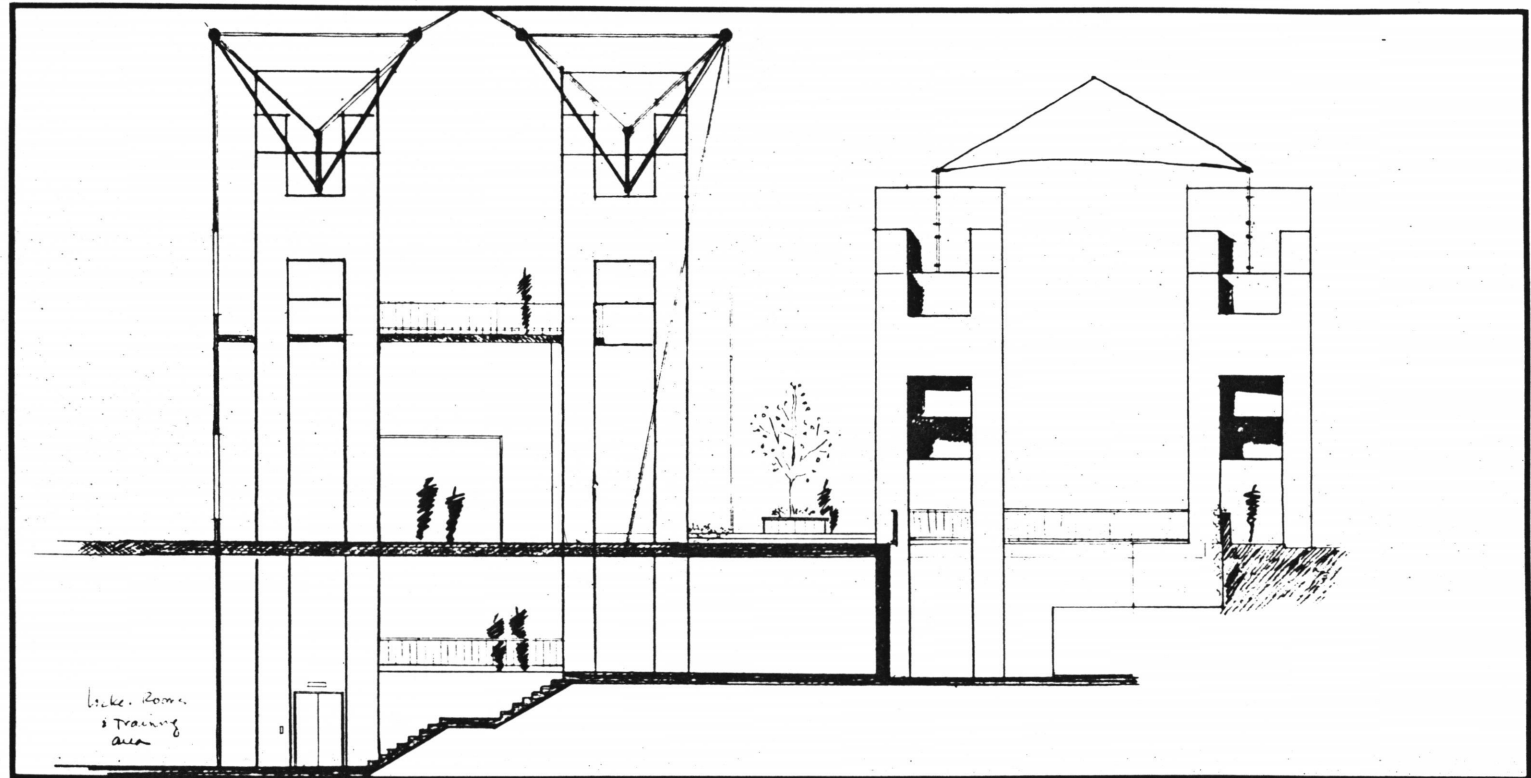
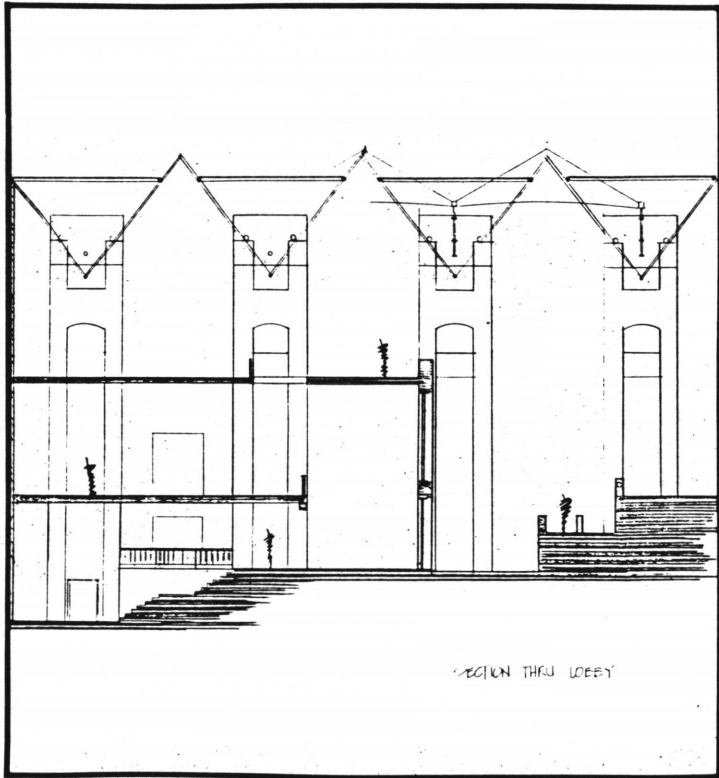
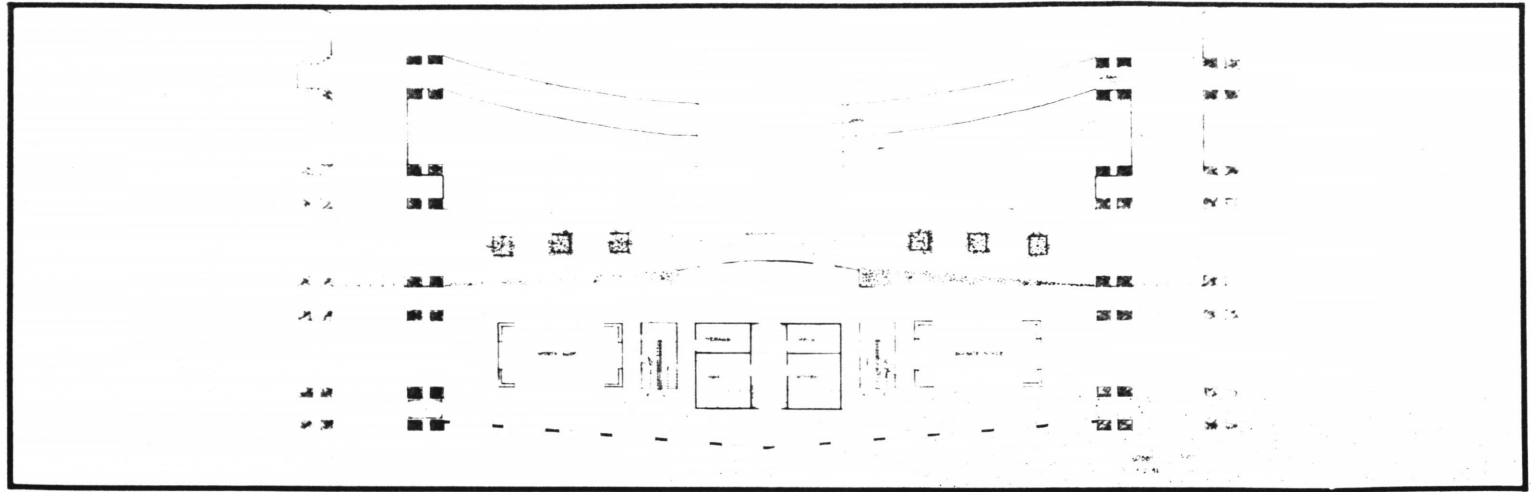
The following sketches are among the many variations on a theme; the investigation into material, form and function.

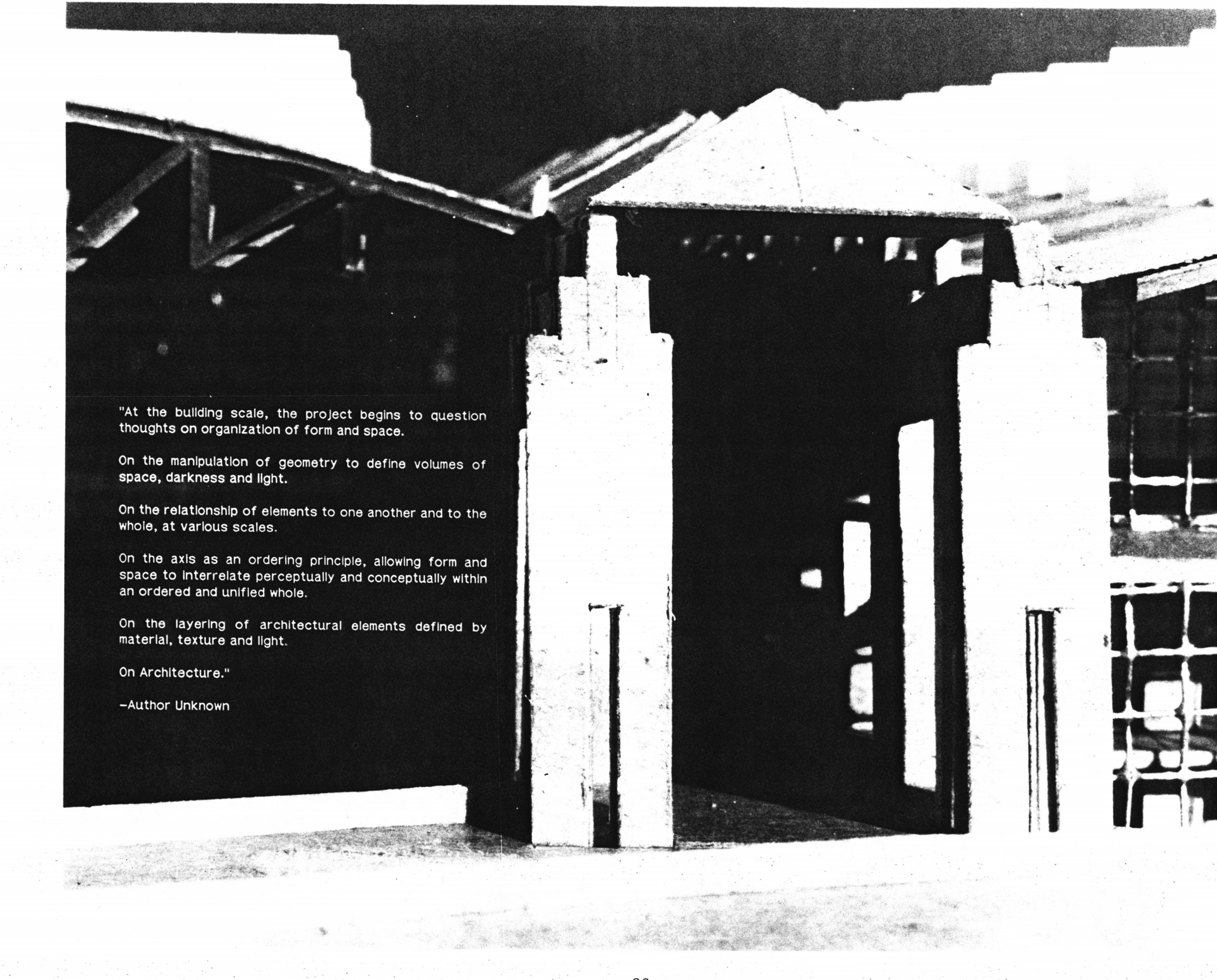


One of the first entry schemes to be tried and tested was of masonry, whose front face followed the curve of the parking area. It was of low, heavy, load bearing walls, in sharp contrast to the high, light, airy feel of the arenas themselves. A major fault with this approach, in addition to the contrast of form and material, was the junction between curved and orthogonal forms, and the awkward spaces they created; thus forcing functions into inappropriate spaces.



The next approach was to be more in harmony with the main body of the complex. This was accomplished by extending the structure of the central arena by three bays, two of which are enclosed to become the 'lobby', the other bay was left open to the air as the 'front porch'. Within the lobby space, various program functions were scattered throughout as if they were individual pieces of furniture. Another area that this approach opened up, was to create the desired separation of spectator and athlete, as previously discussed, with the introduction of two levels from which to enter.





"At the building scale, the project begins to question thoughts on organization of form and space.

On the manipulation of geometry to define volumes of space, darkness and light.

On the relationship of elements to one another and to the whole, at various scales.

On the axis as an ordering principle, allowing form and space to interrelate perceptually and conceptually within an ordered and unified whole.

On the layering of architectural elements defined by material, texture and light.

On Architecture."

-Author Unknown

AN INDOOR SPORTS AND TRAINING FACILITY

FOR

FAIRFAX, VIRGINIA

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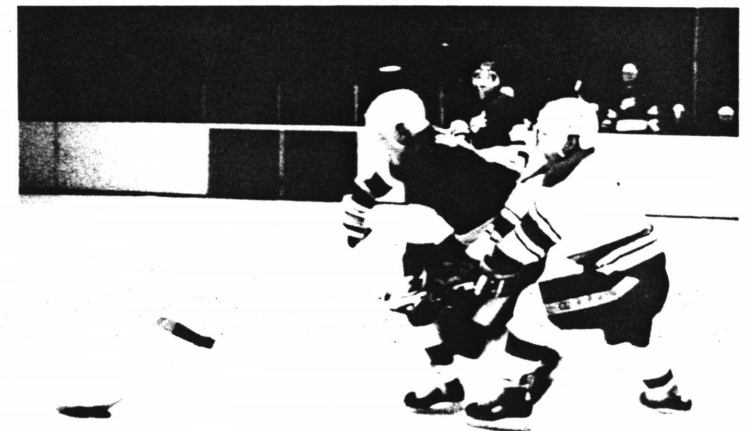
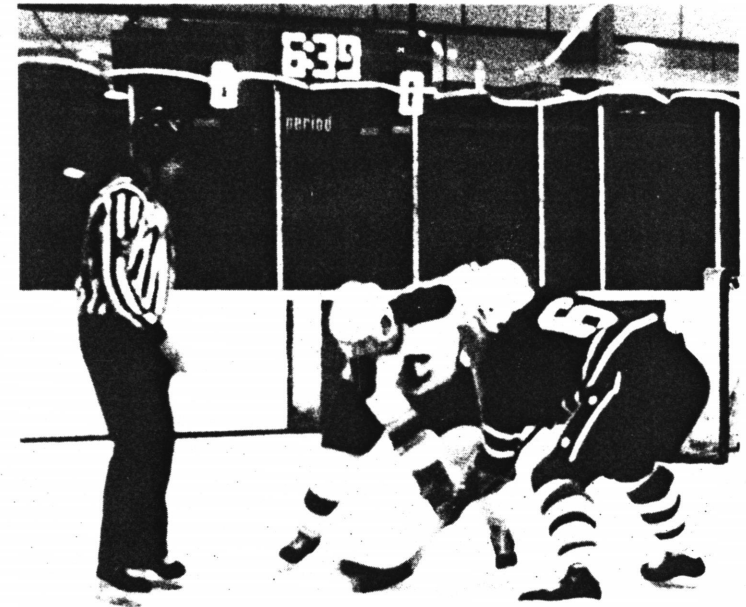
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