

EXPLORING THE INTERACTIVE ELEMENT
IN ARCHITECTURE:
A CHILDREN'S DISCOVERY MUSEUM FOR WASHINGTON, D.C.

by

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The fresh new approach taken by today's children's museums offers great potential for an equally fresh approach to the architecture which houses these special places. Just as the "exhibits" at the children's museums invite a new relationship between the visitor and the museum collection, so too should the architecture encourage a new interaction between the individual and the built structure, between the institution and the urban environment.

The new Children's Discovery Museum proposed for Washington, D.C. takes the theme of interaction as its basis. The design aims to promote a new level of participation between the people, the building, and the city. In this way, the attitude which is central in making children's museums so special was adapted to form an architectural framework: that all children -- regardless of age -- might discover a more meaningful connectedness to the built world around them.

(ABSTRACT)

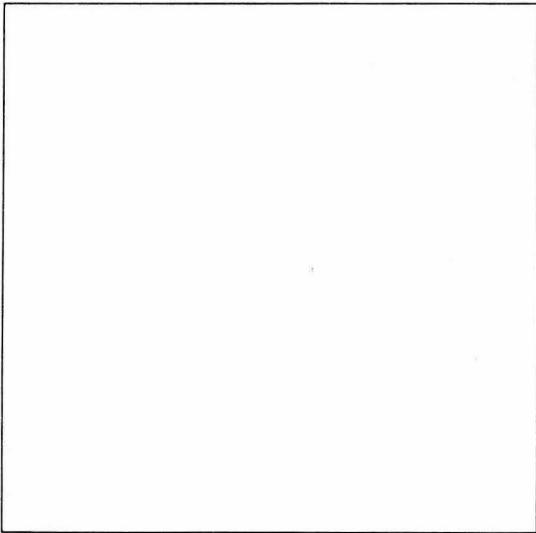
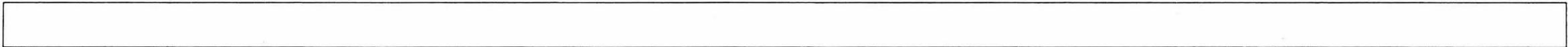
This book represents the culmination of six years of hard work and study; yet none of it would have been possible without the help of those who are dear to me. To each one of them, I would like to give my deepest thanks.

To the members of my family -- the "behind the scenes" support group who have each in their own way given so much to help make my dreams a reality;

To those professors who have given me guidance along the way, helping me to sharpen my skills and to refine my vision -- particularly Greg Hunt and the members of my thesis committee;

And especially to my classmates and close friends, whose insights, critiques, and encouragement have touched not only my work, but my life as well.

ACKNOWLEDGEMENTS



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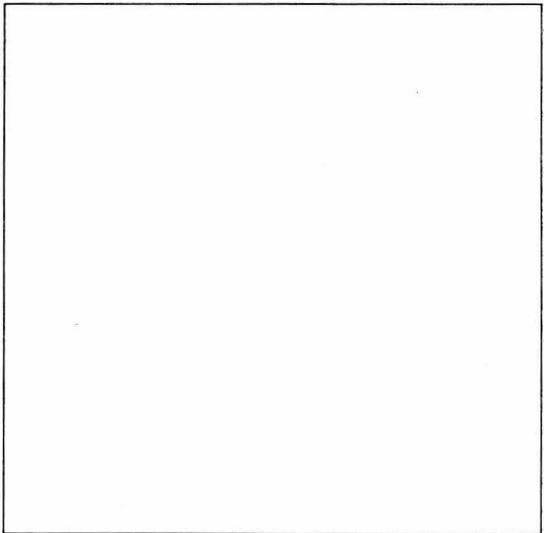


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A SPECIAL PLACE FOR CHILDREN



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Within the traditional world of the museum, a revolutionary concept is coming of age, gaining ground in numerous cities across the nation and abroad. From its origins in turn-of-the-century Brooklyn, the concept of the "Children's Museum" has spread slowly over the years, until suddenly taking off in the past decade; since 1980 alone, the number of children's museums has doubled to over 300 such institutions nationwide. This dramatic increase in numbers clearly demonstrates that the children's museum has established itself as a legitimate, autonomous institution with a very special, and very specific purpose: dedication to helping children discover the joy and the *fun* of learning.

To understand the remarkable nature

1. *A young boy tries his hand at archaeology at the Children's Museum of Indianapolis.*
2. *The logo for the San Jose Children's Discovery Museum.*
3. *Four of the most important "rules" at the Children's Museum in Boston.*

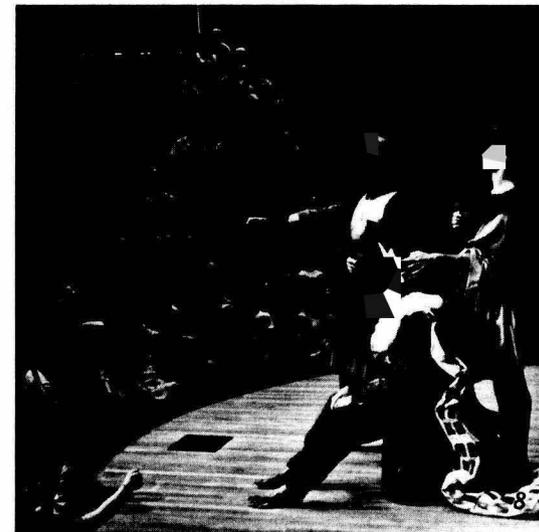
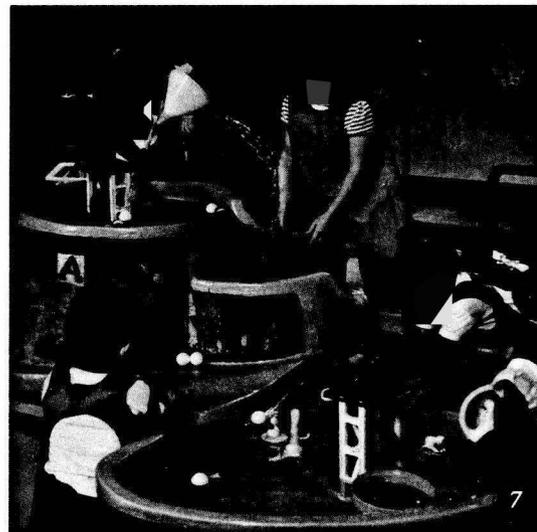
On the following page:

4. *Story time.*
- 5-8. *Some of the activities children can enjoy at the Children's Museum of Indianapolis.*



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A FRESH NEW APPROACH



A FRESH NEW APPROACH



of today's children's museum, it is necessary first to free one's mind of nearly every aspect which characterizes the concept of the traditional museum. Gone is the hushed, almost reverent silence; gone are the barriers which separate visitor from exhibit; in fact, in many cases, gone is the very notion of "artwork" or "antique" as exhibit altogether. But perhaps most importantly, gone is the role of the museum-goer as passive observer.

Drawing upon the natural curiosity and energy of their young patrons, children's museums instead encourage their visitors to keep "Hands On!" Children -- and even their adult companions -- are invited to get personally involved in the various exhibits, which are carefully designed to be not only

informative, but fun as well. Interactive exhibits and activities, therefore, form the core of the children's museum experience, bringing together entertainment, learning, and play into one simultaneous process. In stressing active participation as the foundation for all of their programming, these special museums echo the wisdom found in the Chinese proverb which states:

*I hear and I forget;
I see and I remember;
I do and I understand.*

The best and the brightest of modern children's museums share the common goal of helping the young to develop a curiosity and a delight in the complex and fascinating world in

which we all live. Rather than focus on any one particular aspect -- as traditional museums dedicated to art or science do -- children's museums are interdisciplinary in nature, stressing themes of connectedness and creativity. Therefore, the children's museum can be art museum *and* science museum, cultural *and* natural history, latest technology *and* antiquity; it is all of these and more.

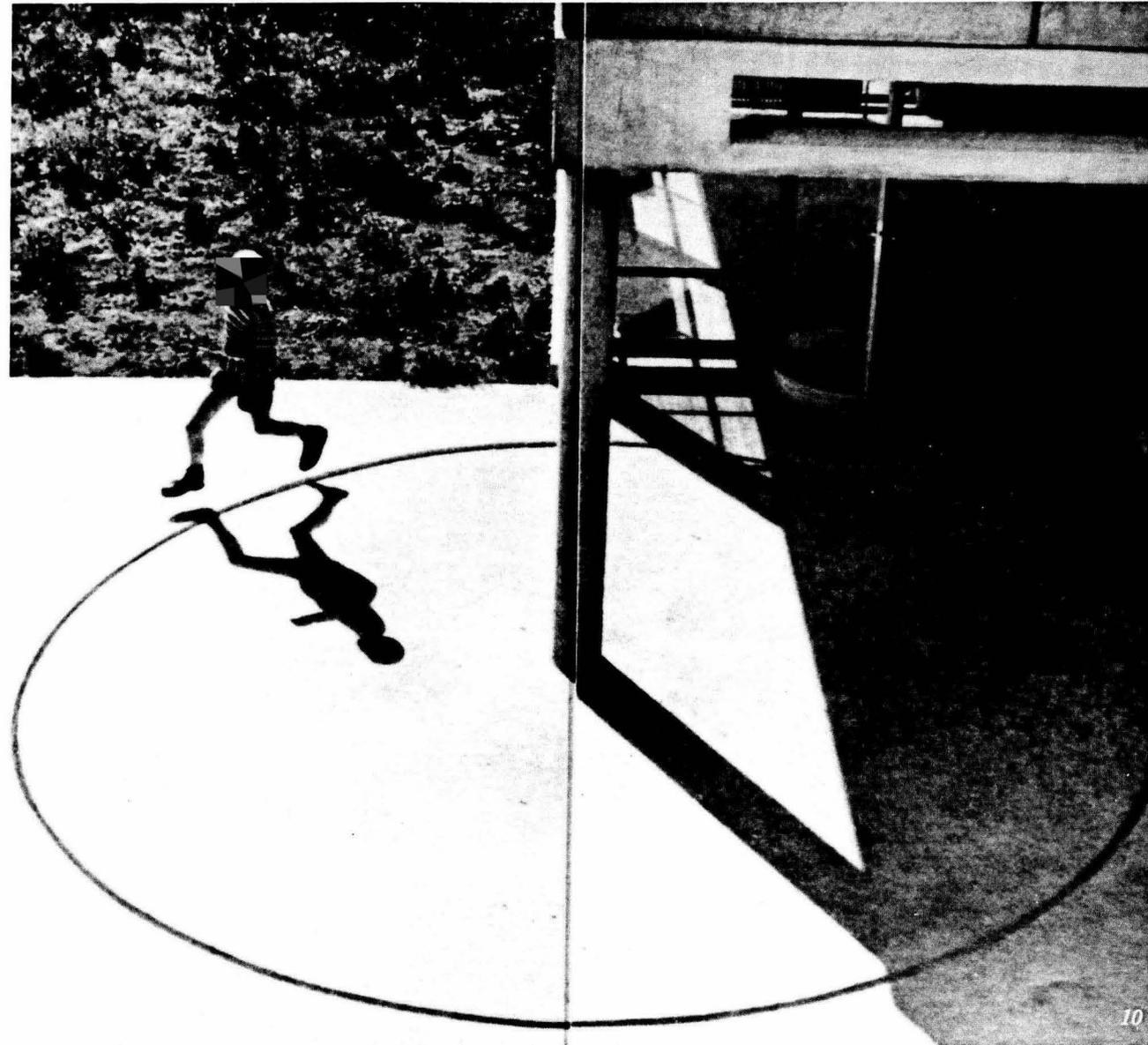
Given such an innovative approach to their mission, it would only seem fitting to find an equally innovative approach to the design of the architecture which houses the children's museums. Yet, surprisingly, this is often not the case. For any number of reasons, many children's museums find themselves in buildings which neither say anything about nor

give anything to the phenomenon of this unique institution.

The very potential of the children's museum as a new architectural building type lies in the adaption of the "Hands On!", interactive approach to every possible aspect of the building. In this way, there need be no clear distinction between building and exhibit -- the architecture becomes a permanent part of the exhibits, and so is invited to participate in the *raison d'etre* of the museum.

9. *At the Children's Museum of Indianapolis, young artists are encouraged to create their own works of art.*

A FRESH NEW APPROACH



The question of exactly how one goes about designing an architecture of interaction is anything but simple. It is not sufficient merely to dress up an otherwise ordinary structure in bright colors, bold geometric shapes, or other superficial adult-ideas of what it means to be "for children." In order to achieve a true architecture of interaction, it is necessary to step back and examine the multitude of relations which surround the project -- from the large-scale of the urban or regional context, to the minute scale of detailing -- but always at the heart of the inquiry is the fundamental relationship to the human being: the child.

"Buildings with significance are significant to someone, rather than, or in

addition to, being significant of something." (Benedict; p.38) No one seems to have intuitively understood Michael Benedict's words, as they pertain to design for children, better than the Dutch architects Aldo van Eyck and Herman Hertzberger. There is nothing "cute," nothing condescending or patronizing in the works of either of these two men. In searching for a deeper understanding of the relationship between architecture and the child, they have avoided the pitfalls of superficial easy answers. Instead, the buildings and structures they have created embrace the enthusiasm, curiosity, and imagination of the child in an open-ended dialogue.

The common theme in both van Eyck's and Hertzberger's approach is a

sensitivity which can best be summarized in the phrase "providing opportunity." Without being didactic, and without mandating a prescribed response, their designs offer opportunity for the child to interact creatively, to have active participation in the reality of the architecture. The thoughtful placement and size of a column, the space beneath a stair, a place for the collection of rainwater -- the simplest of gestures take on the most profound significance when seen through the eyes and imagination of a child. Through such personal interaction, architecture is rendered meaningful, and a new relationship is opened up between the individual and the built environment: a relationship based on "I do and I understand."

10. *A simple architectural gesture: a column in Aldo van Eyck's orphanage.*

*On the following page:
11-15. A sampling of works by Dutch architects Herman Hertzberger and Aldo van Eyck.*



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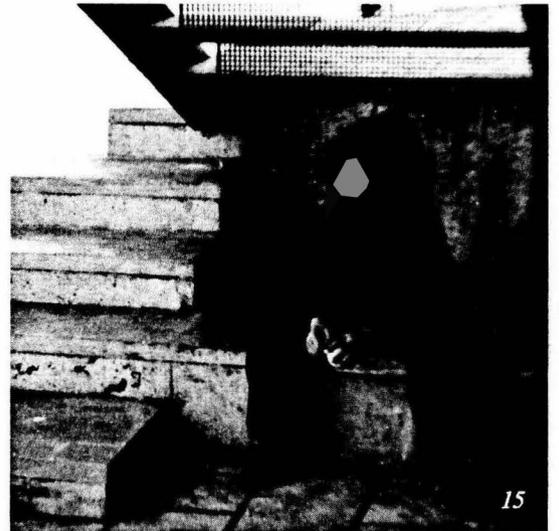
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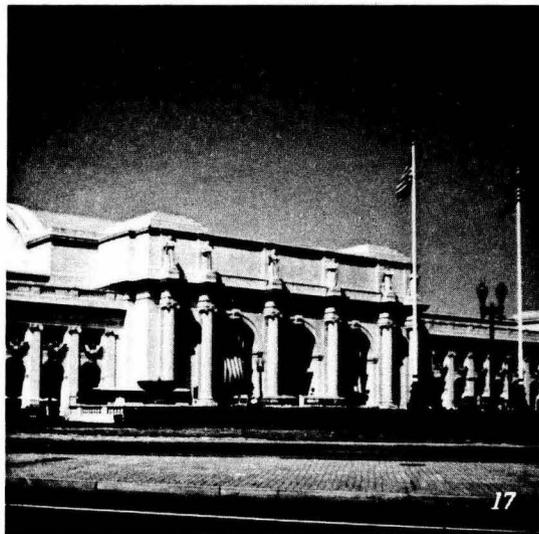
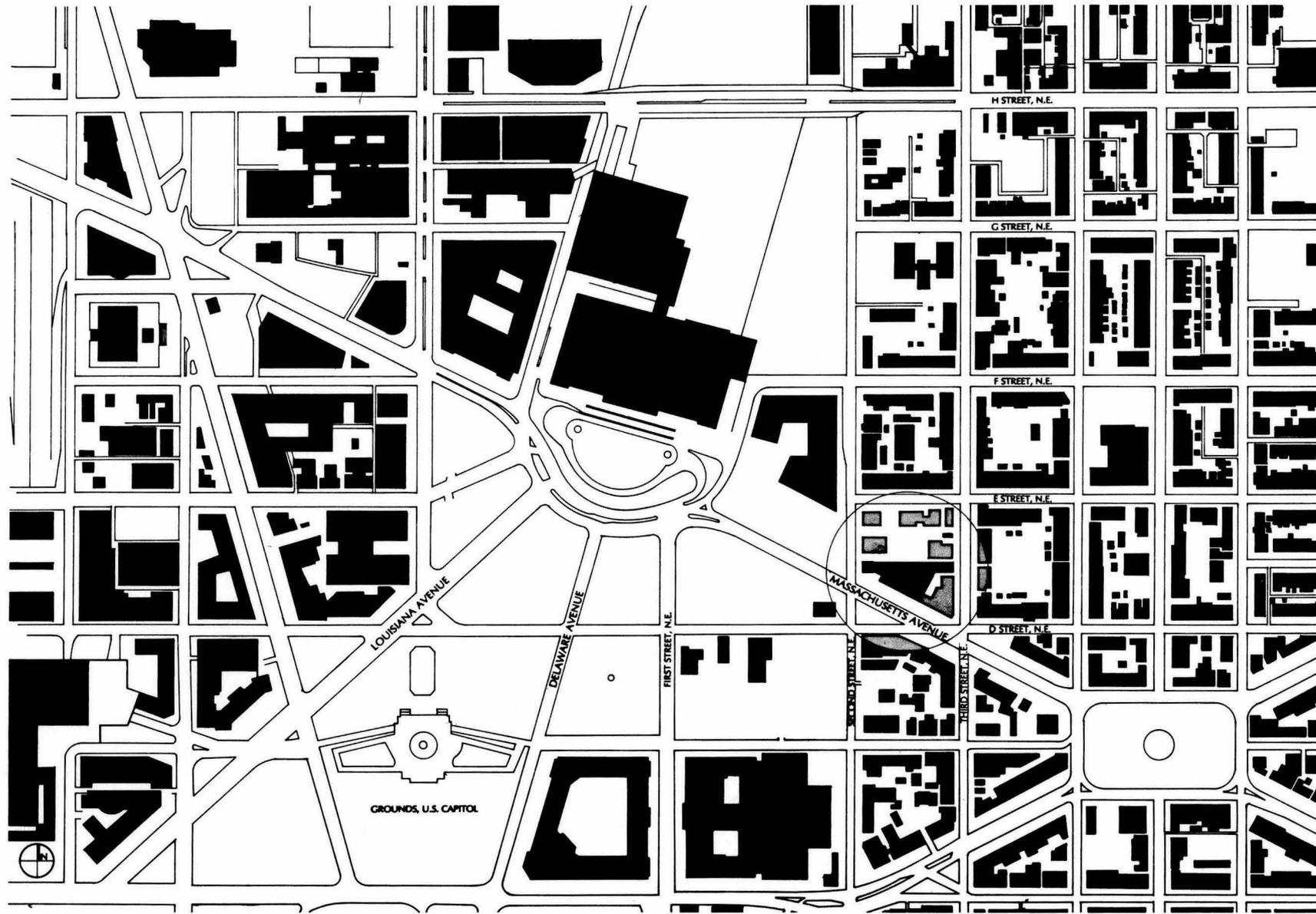
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DESIGN FOR CHILDREN

**THE CHILDREN'S MUSEUM WITHIN THE CITY:
WASHINGTON, D.C.**

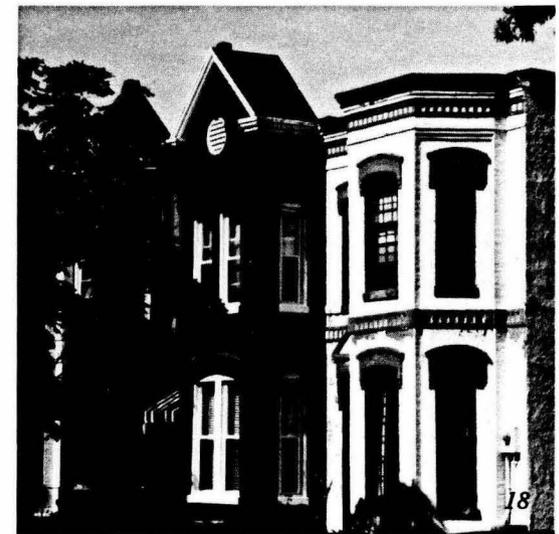


The city of Washington, D.C. has a dual nature: on the one hand, it is the capitol of the United States, with all of the pomp and ceremony which such a title implies, while at the same time, it is a real, living city, made up of its various residents and local communities.

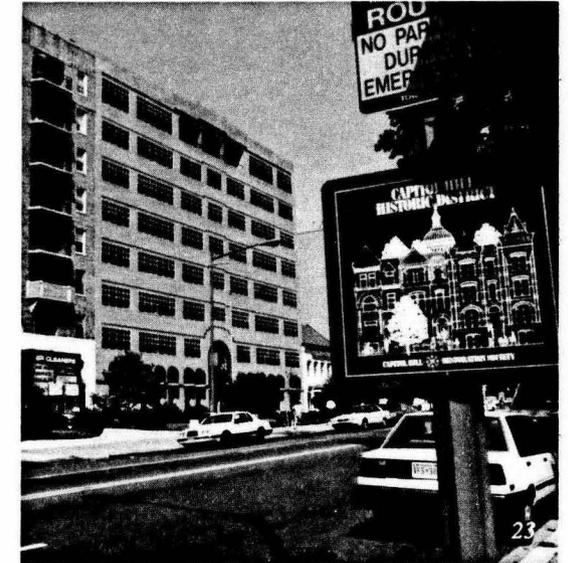
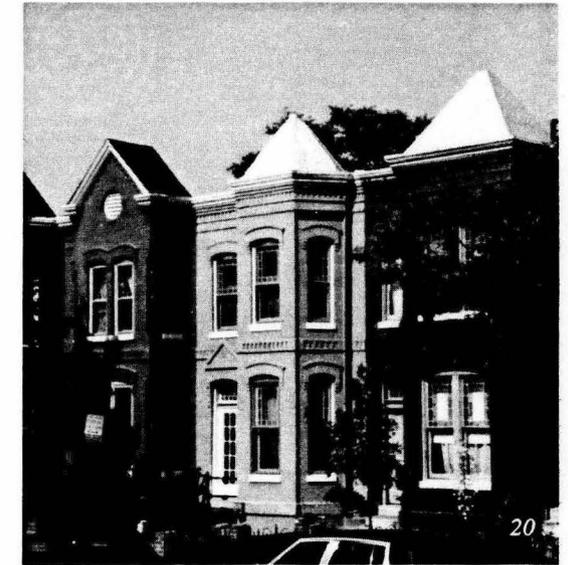
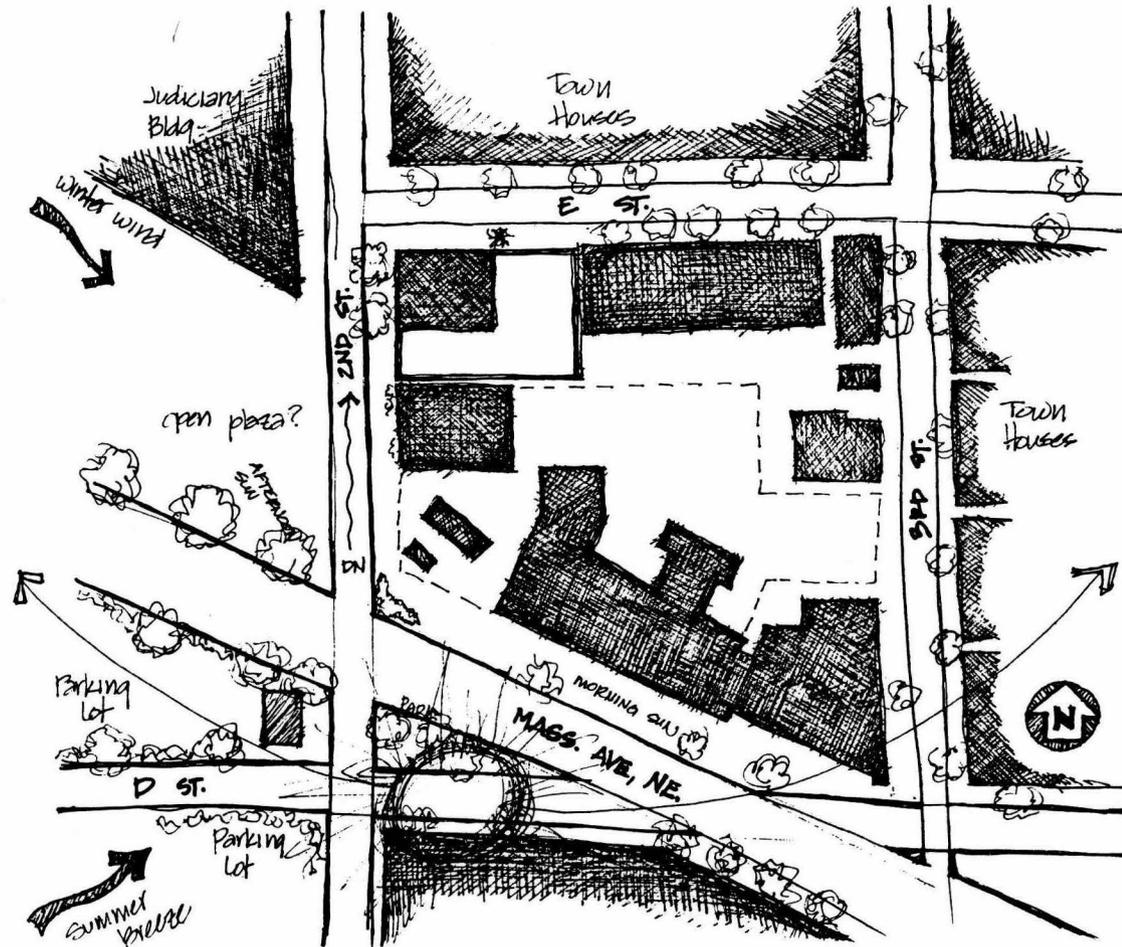
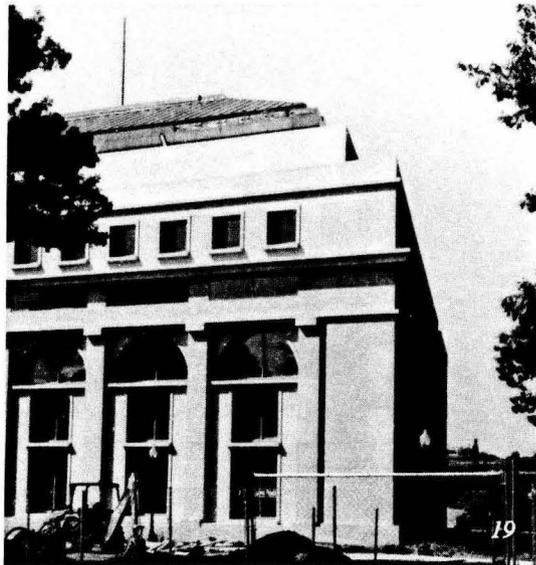
The new Children's Discovery Museum shares in the dual nature of the city. As a new museum type, it must be able to take its place amongst the other museums and institutions which make their home in Washington; yet, following the cue of the existing Capitol Children's Museum (located in an old school building at the corner of Third and H Streets, N.E.), there must be a strong commitment to the residents of the area.

Therefore, the site chosen for the

- 16. Vicinity map of the site chosen for the Children's Discovery Museum.
- 17. Historic Union Station, a neighbor to the Discovery Museum.
- 18. Townhouses typical of those found in the surrounding Capitol Hill area.



THE URBAN CONTEXT



Discovery Museum is a conscious attempt to address both aspects of this duality. The national and the local Washington come together in the Capitol Hill area, making it a perfect location for the new museum. Its proximity to the Capitol Building, the Senate, and Union Station make it accessible to the city's multitude of visitors, while its nearness to the Metro and its presence in a residential area maintains a close tie to the local community -- particularly the immediate neighborhood, who have been active in their support of the existing museum.

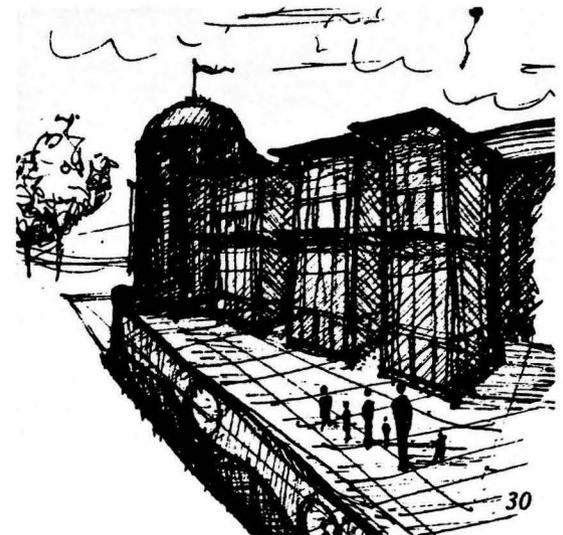
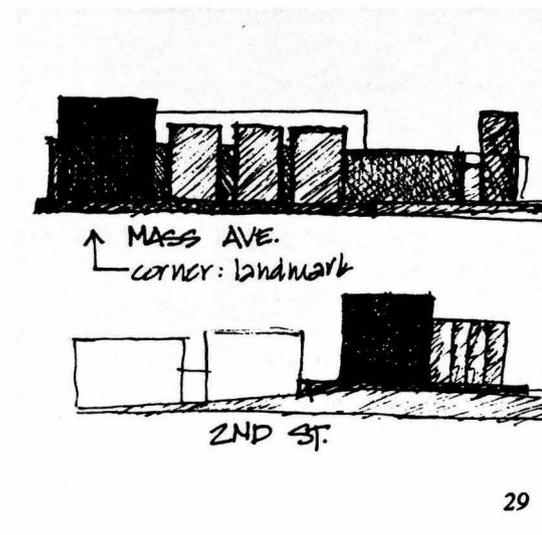
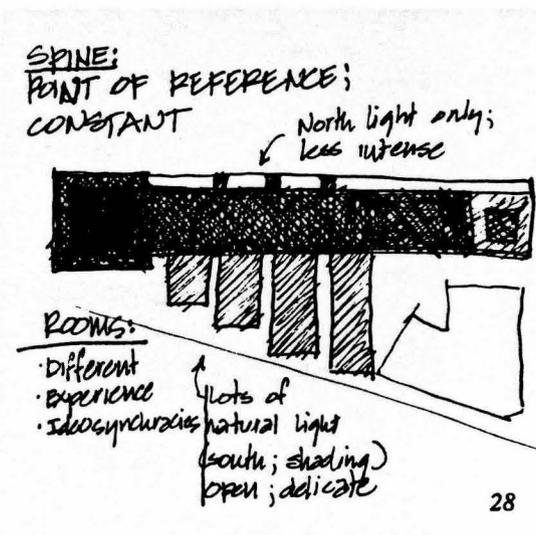
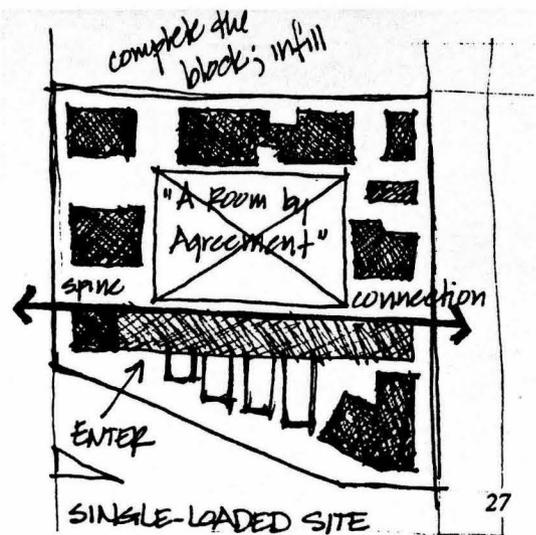
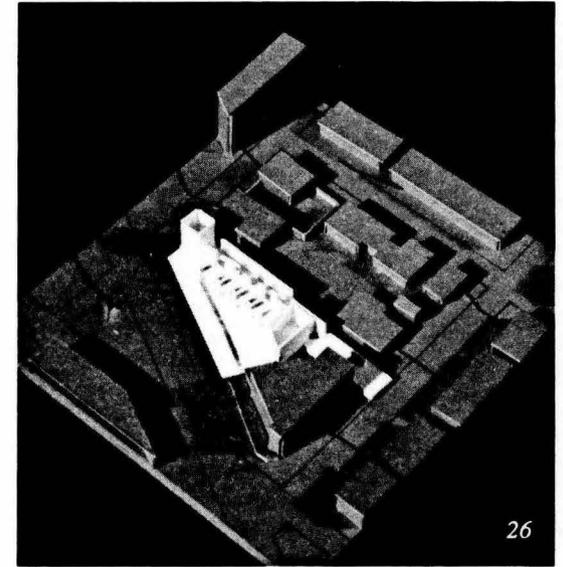
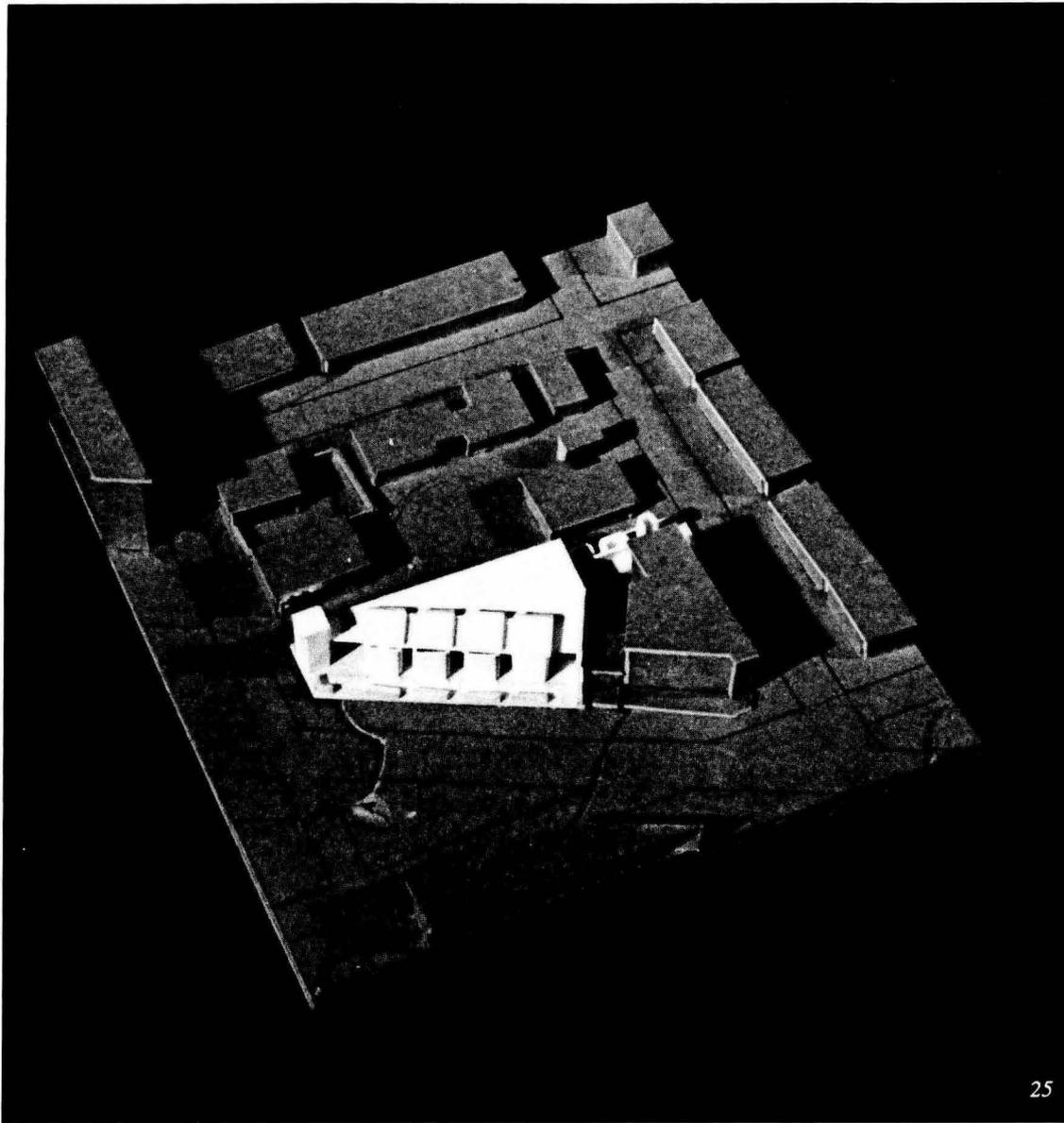
The overlap of these two worlds is most visible in the blocks between Second and Third Streets, N.E. This zone provides a transition between large-scale, institutional

Washington, and small-scale residential D.C. Cutting diagonally through the zone is Massachusetts Avenue, a major thoroughfare which connects numerous parts of the city along its route. Thus, the site for the new Children's Discovery Museum, at the corner of Massachusetts Avenue and Second Street, N.E. becomes a bridge symbolically linking together the dual aspects of Washington, D.C., while reaching out to the city as a whole.

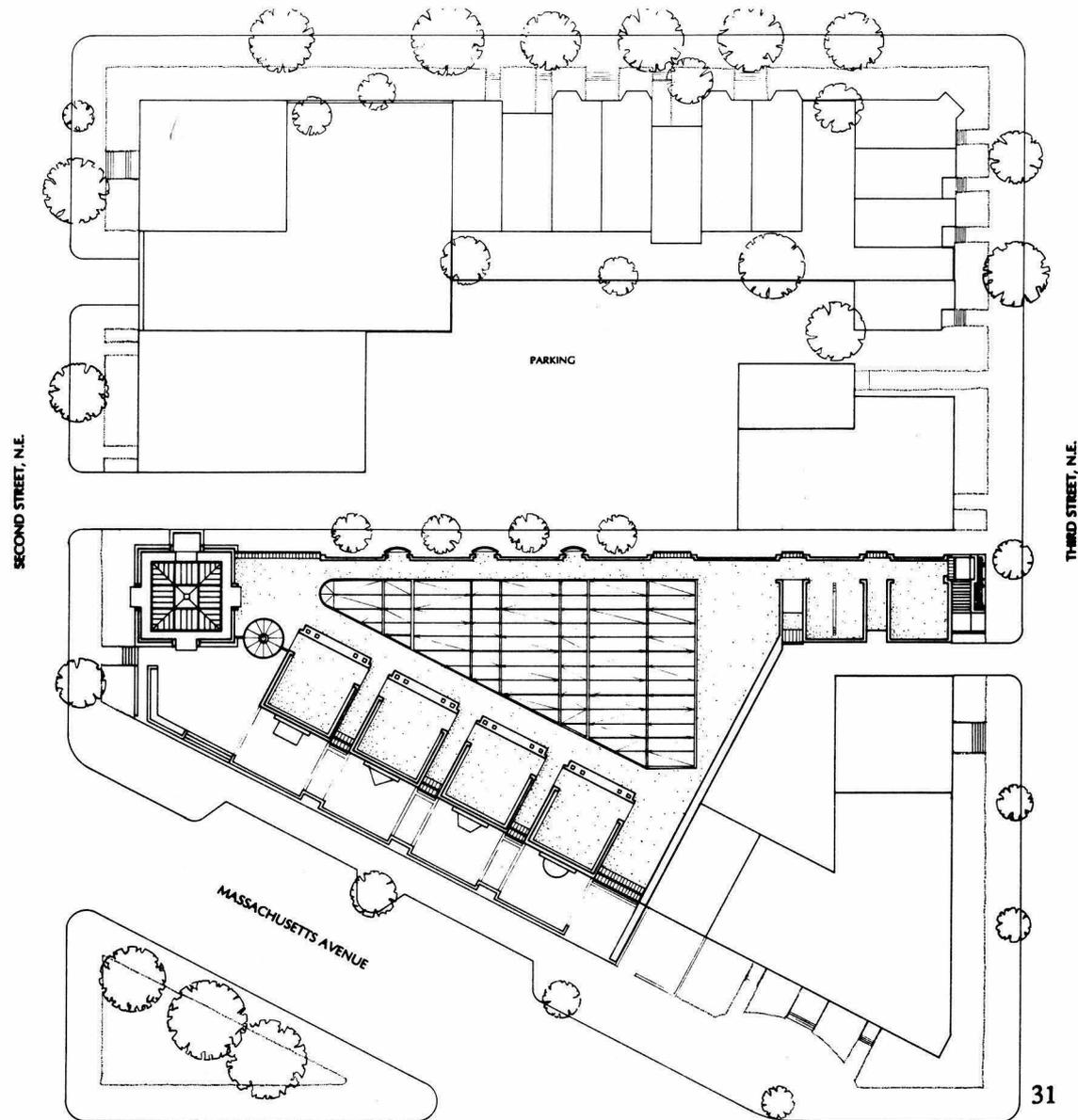
19. The new Judiciary Office Building adjacent to the site.
20. Townhouses along Third Street.
21. The corner of the site at Massachusetts and Second Street, NE.
22. Preliminary site sketch.
23. Desired image versus reality for the Capitol Hill site.

- On the following page:
- 24-26. Three "micromodels" used to consider the appropriate form for the project.
 27. Early sketch concerning connection through the block.
 - 28-29. Early ideas about plan and elevation.
 30. A sketch exploring massing, and the need to "anchor" the corner of the site.

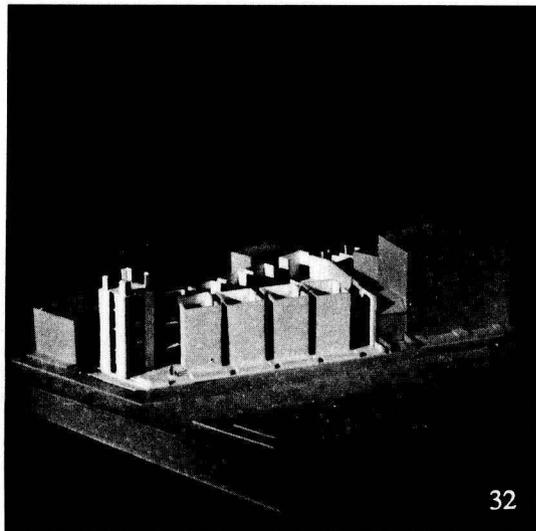
SITE ISSUES



SITE RESPONSES



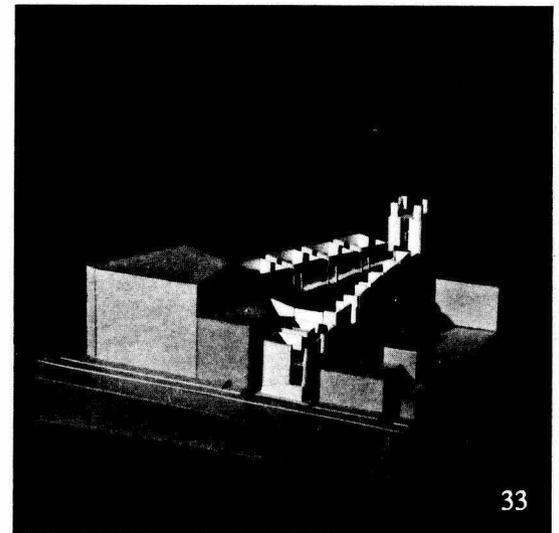
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The form taken by the building must respond both to the museum's role as an urban institution, as well as to its position within the local community. Therefore, the large mass of the museum program was broken down into a series of smaller, individual "buildings" grouped around an enclosed courtyard. The first of these "buildings" takes the form of a tower, to anchor the Second Street corner of the site, while at the opposite end, two lower bays form a wing which extends all the way through the block to Third Street. In between these two very different extremes is a series of four bays, which respect the setbacks and other "rules of the block" established along Massachusetts Avenue, and relate to the rhythm of the townhouses nearby.

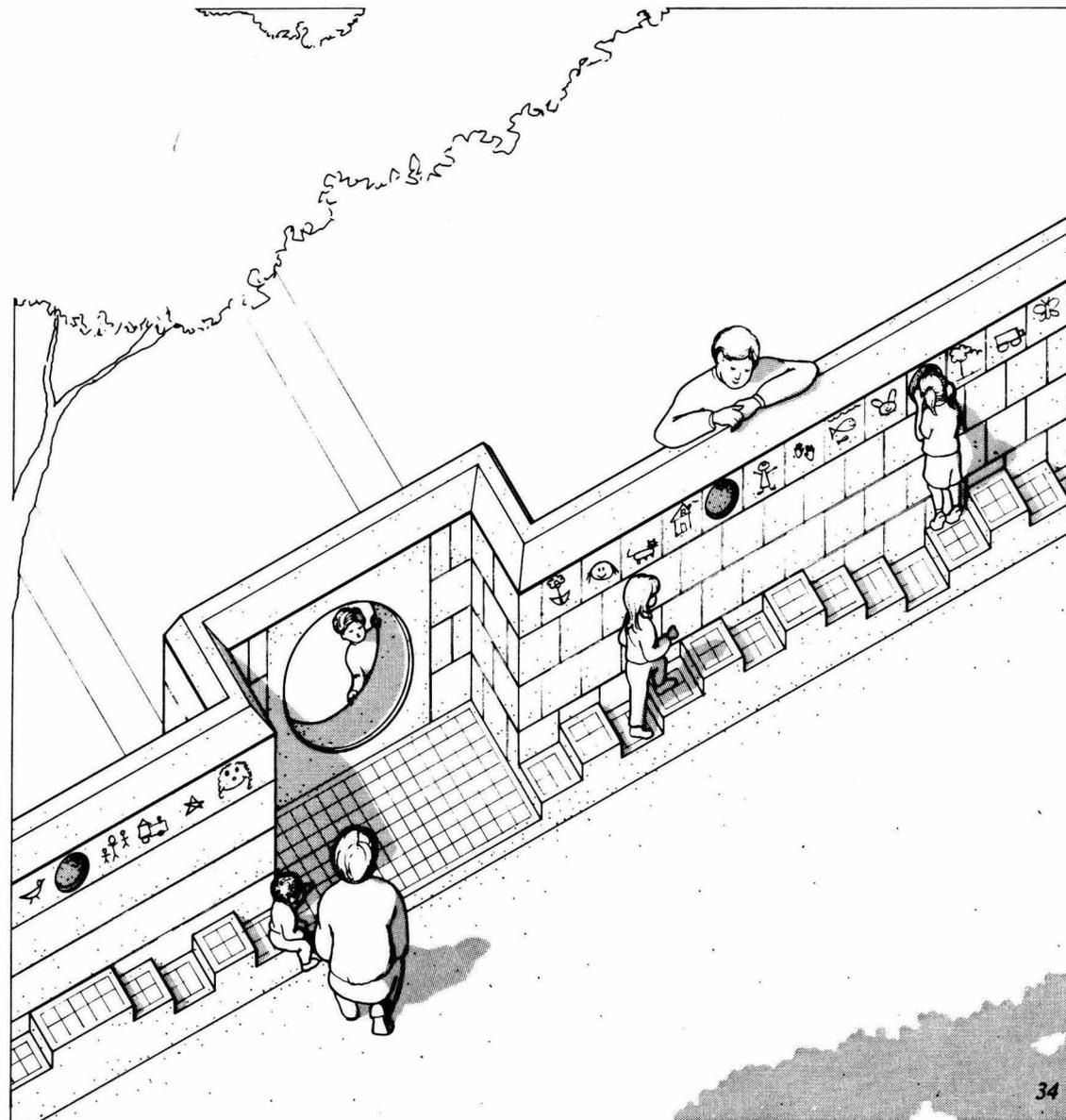
- 31. *Site plan.*
- 32. *Site model, Massachusetts Avenue view.*
- 33. *Site model, Third Street view.*



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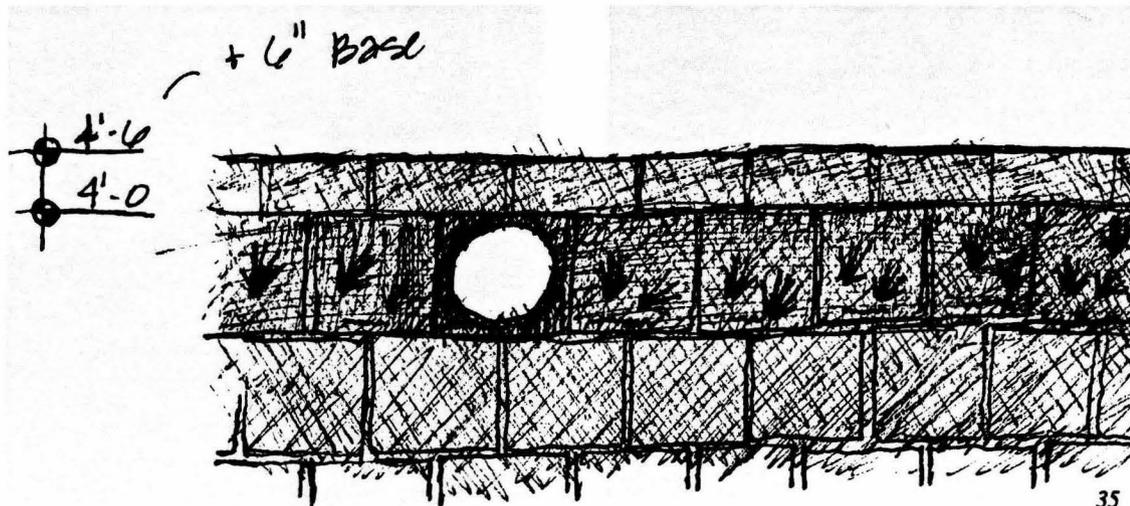
SITE PLAN

**THE ARCHITECTURAL ELEMENTS OF INTERACTION:
A JOURNEY THROUGH THE CHILDREN'S
DISCOVERY MUSEUM**



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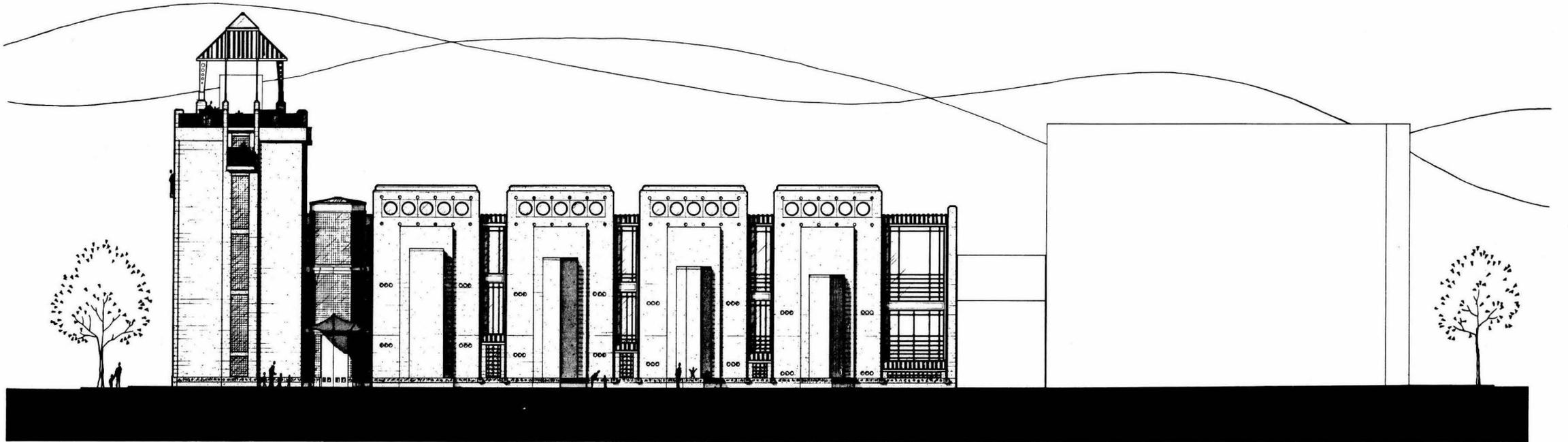
Advertisement, enticement, and opening statement -- the garden wall which runs along the sidewalk at Massachusetts Avenue greets the incoming visitor and the passerby alike, offering a microcosm of what is to be found in the museum as a whole. The architecture of the Wall engages the senses and the imagination, inviting the curious-minded to touch, look, climb over, under, around -- making use of a vocabulary of concrete blocks, colored tiles, and precast circular openings which is to be the foundation for the syntax of the entire project.



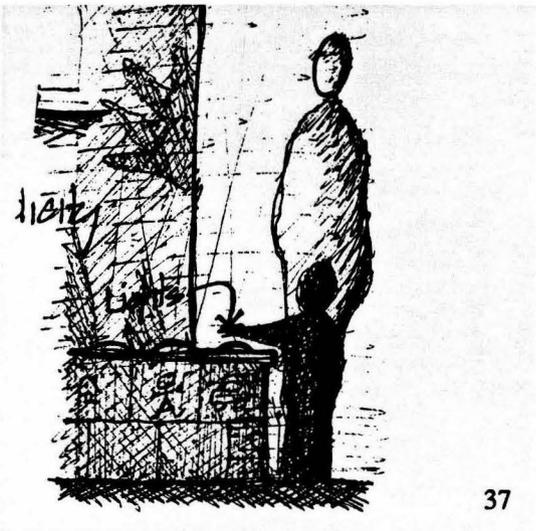
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- 34. Axonometric view of the Greeting Wall.
- 35. Detail of "peephole" and special concrete blocks for the Wall.

THE GREETING WALL



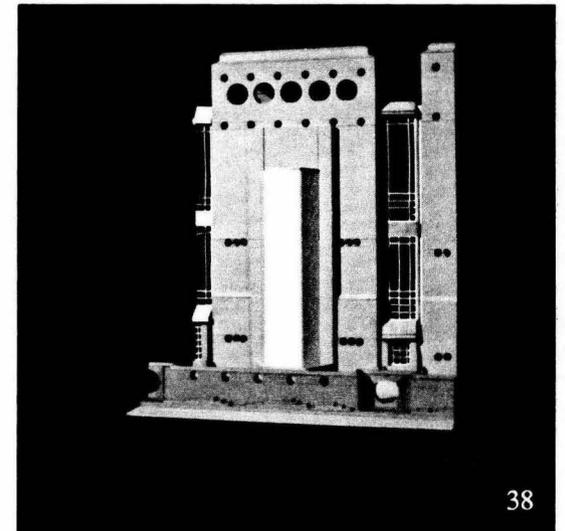
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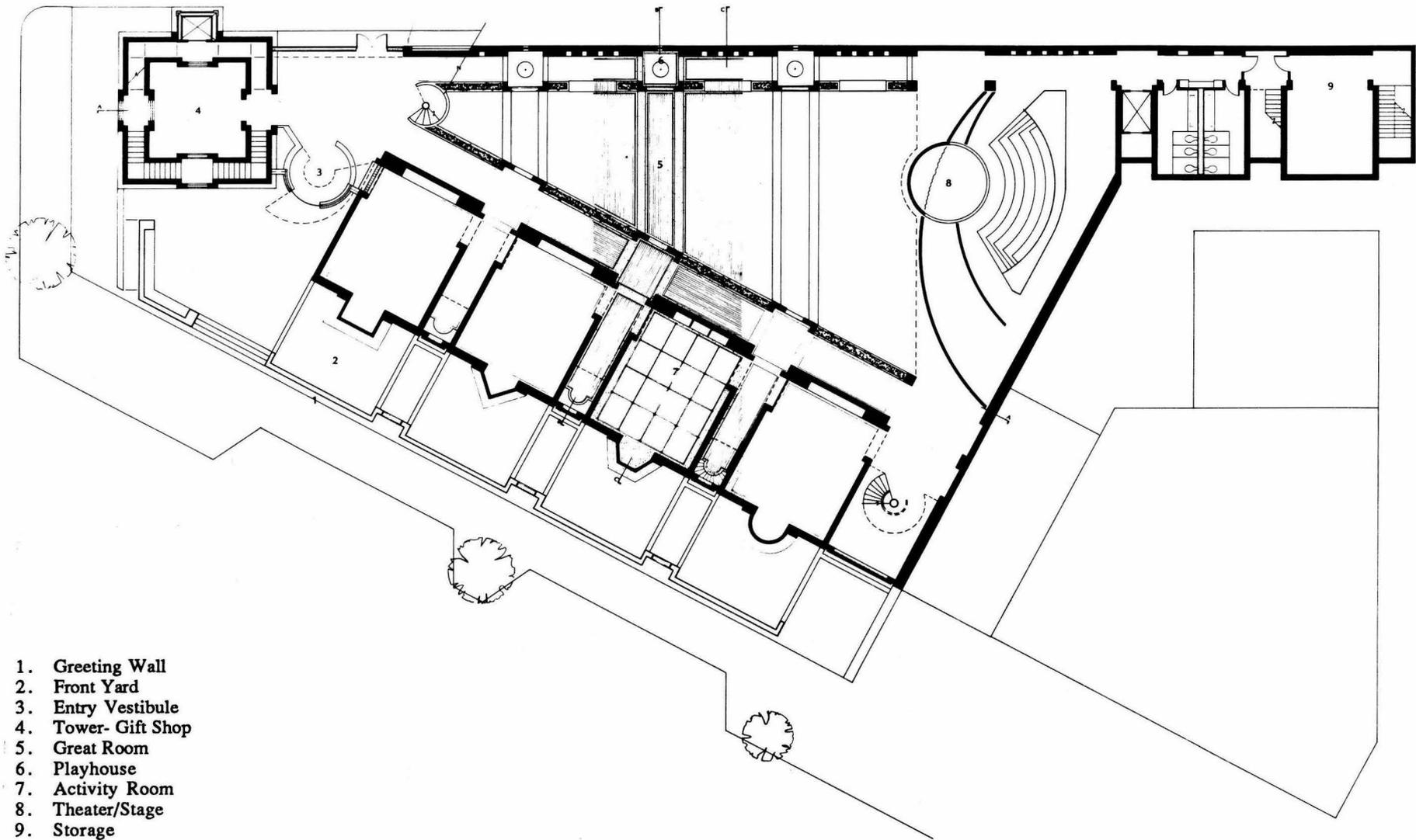
The front elevation of the museum is made up of a series of bays, in a pattern of solid and void, open and closed, opaque masonry and transparent glass. In this way, one is given a preview of the general organization of the museum which can be read before even passing through the door, and can be easily recalled as one walks around inside. Such a clear correspondence between inside and outside is the first step in trying to foster in children a sense that they can know where they are within this, their very own building.

- 36. *Massachusetts Avenue Elevation (South).*
- 37. *Playing with light and shadow along the front elevation.*
- 38. *One "typical" bay of the front elevation.*

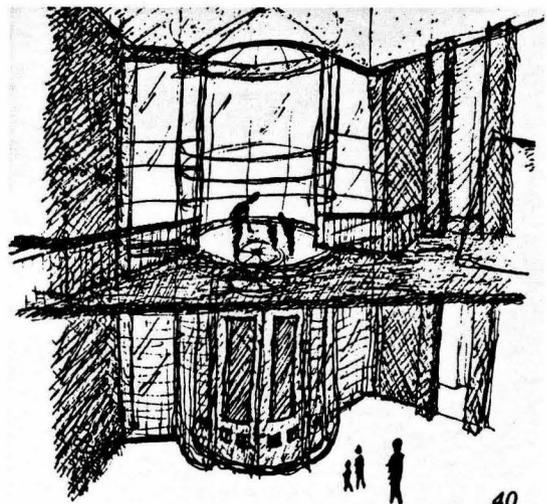


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MASSACHUSETTS AVENUE ELEVATION



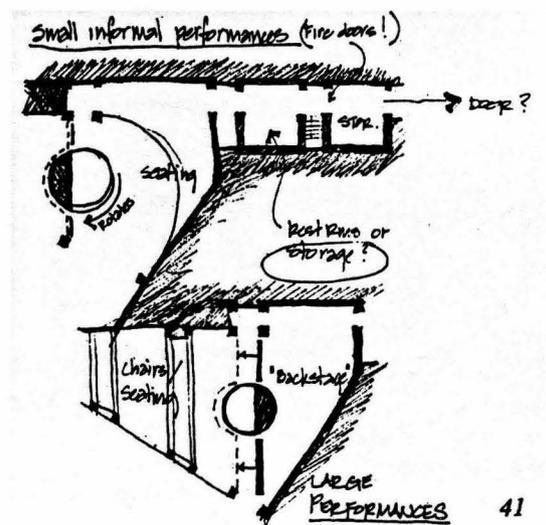
1. Greeting Wall
2. Front Yard
3. Entry Vestibule
4. Tower- Gift Shop
5. Great Room
6. Playhouse
7. Activity Room
8. Theater/Stage
9. Storage



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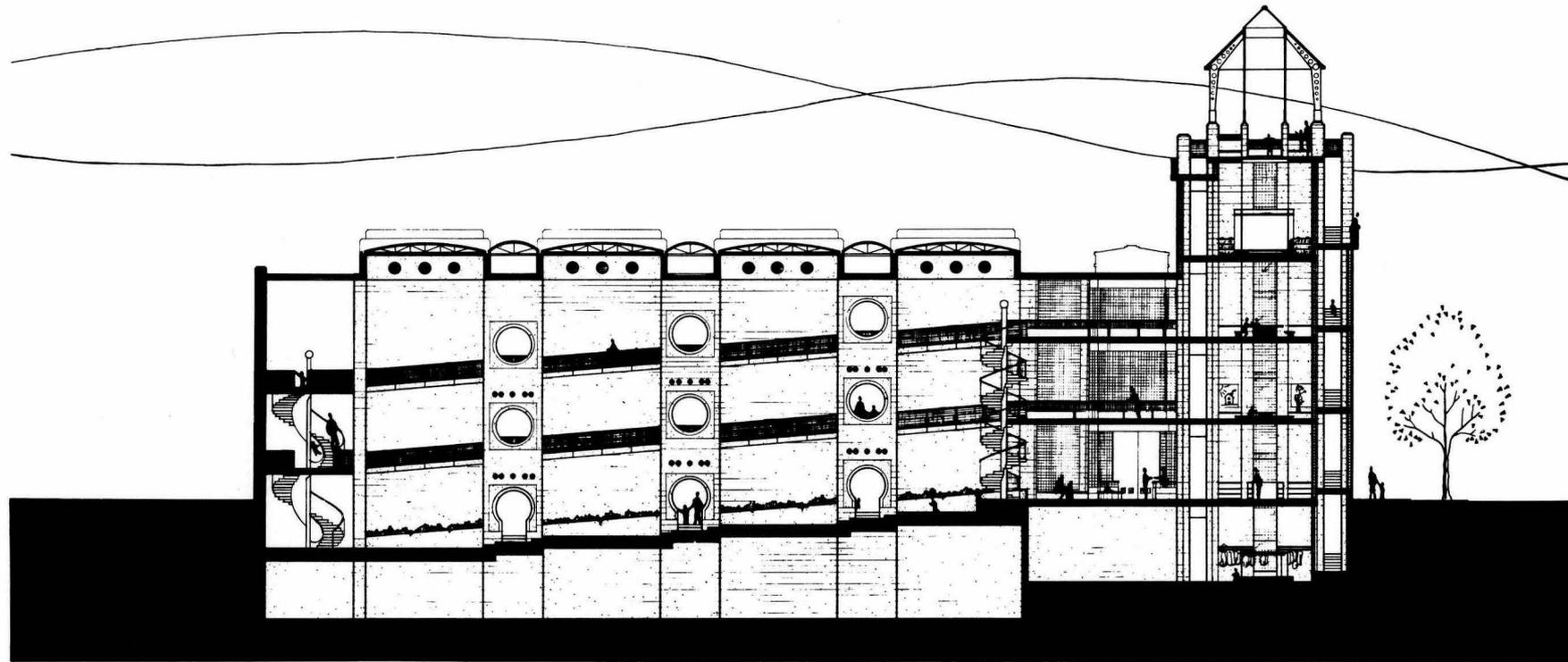
The layout of the first floor establishes the pattern which the upper levels of the museum follow. The Tower Room, just inside the entry, contains a book and toy store, with a coatroom one level below. Along Massachusetts Avenue are four Activity Rooms -- the rooms which contain the majority of the "exhibits" of the museum. At the end of this row is a small theater for 150 people; for larger performances, the stage revolves to face out into the Great Room, the central three-story space around which all the other spaces and rooms gather themselves. And finally, even the area beneath the ramp is utilized: a perfect place for a series of small Playhouses for children to explore.

39. Ground level floor plan.
40. Curious minds can examine the inner workings of the mechanical doors at the entry vestibule.
41. A versatile revolving stage accommodates performances large and small.

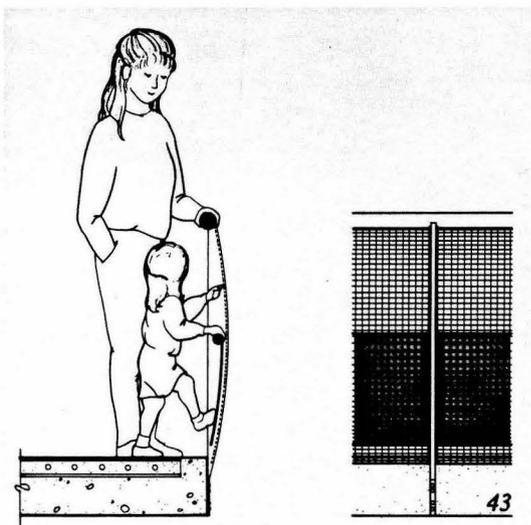


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GROUND FLOOR



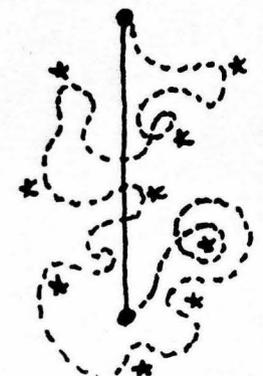
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The main path for circulation through the museum takes its cue from the natural curiosity which abounds in children, and from their tendency therefore to take not the straight path, but a meandering one -- stopping here and there to examine some new discovery along the way. A leisurely ramp makes its way up and around the enclosed courtyard of the Great Room, pausing here and there to tempt the visitor with something new to experience: a "Treehouse," a cafe, a story room, an Activity Room full of interesting and fun exhibits. But for the person with a specific destination in mind, elevators and numerous stairs -- one even incorporating a spiral slide -- offer ways of getting from here to there more quickly.

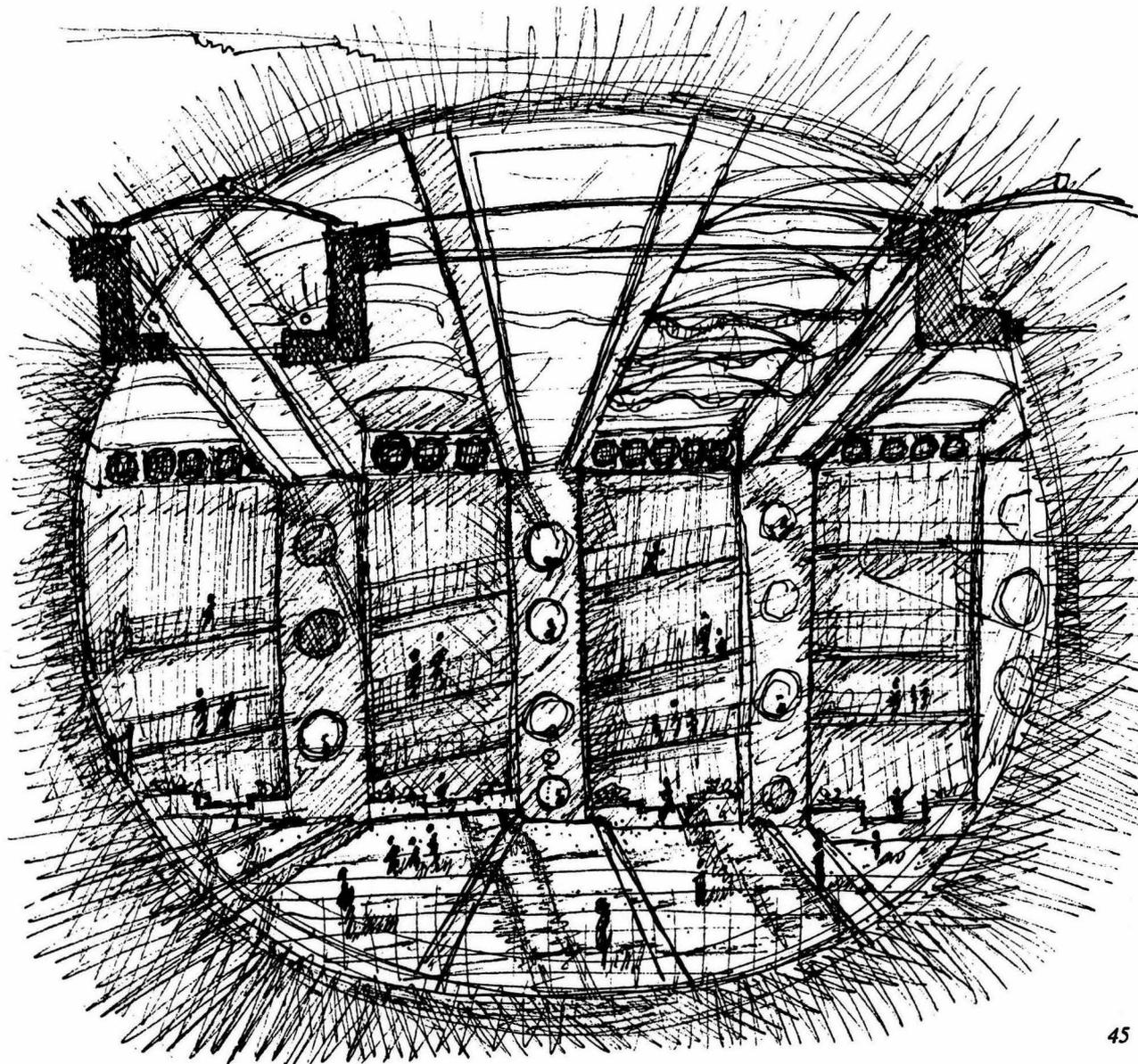
- 42. *Longitudinal section through the Great Room and the Tower.*
- 43. *The railing detail acknowledges the differing scales of the visitors to this museum.*
- 44. *A schematic diagram of the circulation system in the museum.*

CIRCULATION
DIAGRAM

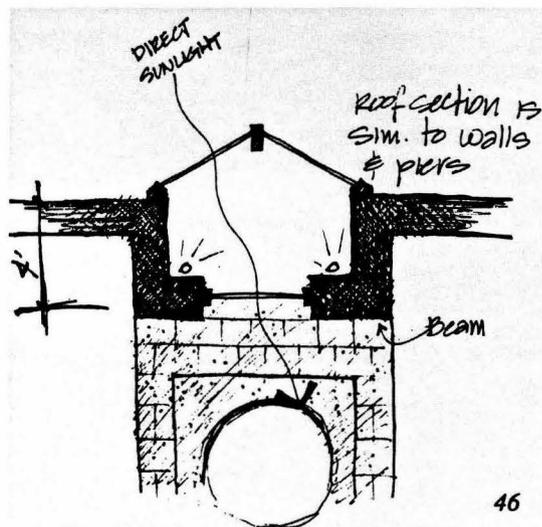


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LONGITUDINAL SECTION



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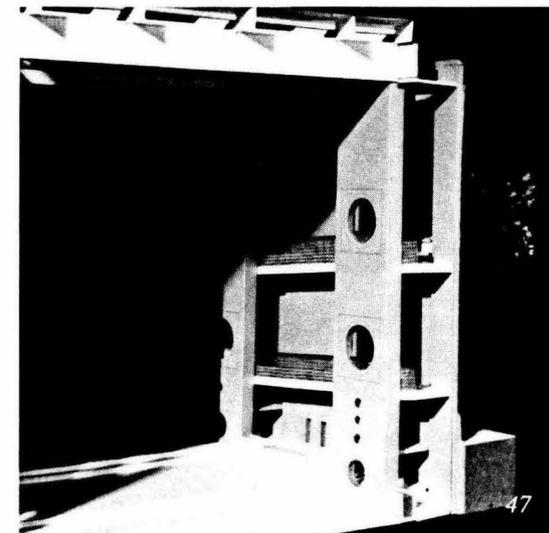
All of the spaces of the museum gather themselves around an enclosed central courtyard. As one moves through the building, one is always conscious of one's location relative to this Great Room; when going from one room to the next, it is necessary always to return out to the ramp, and therefore to the Great Room as well. The central space thus becomes a means for orientation and way-finding within the building -- a constant point of reference along the meandering path.

A large, open space filled with sunlight through a glazed roof above, the Great Room can accommodate large exhibit pieces, play equipment, or seating for large performances in the theater.

45. View across the Great Room through one of the large circular openings along the walkway.

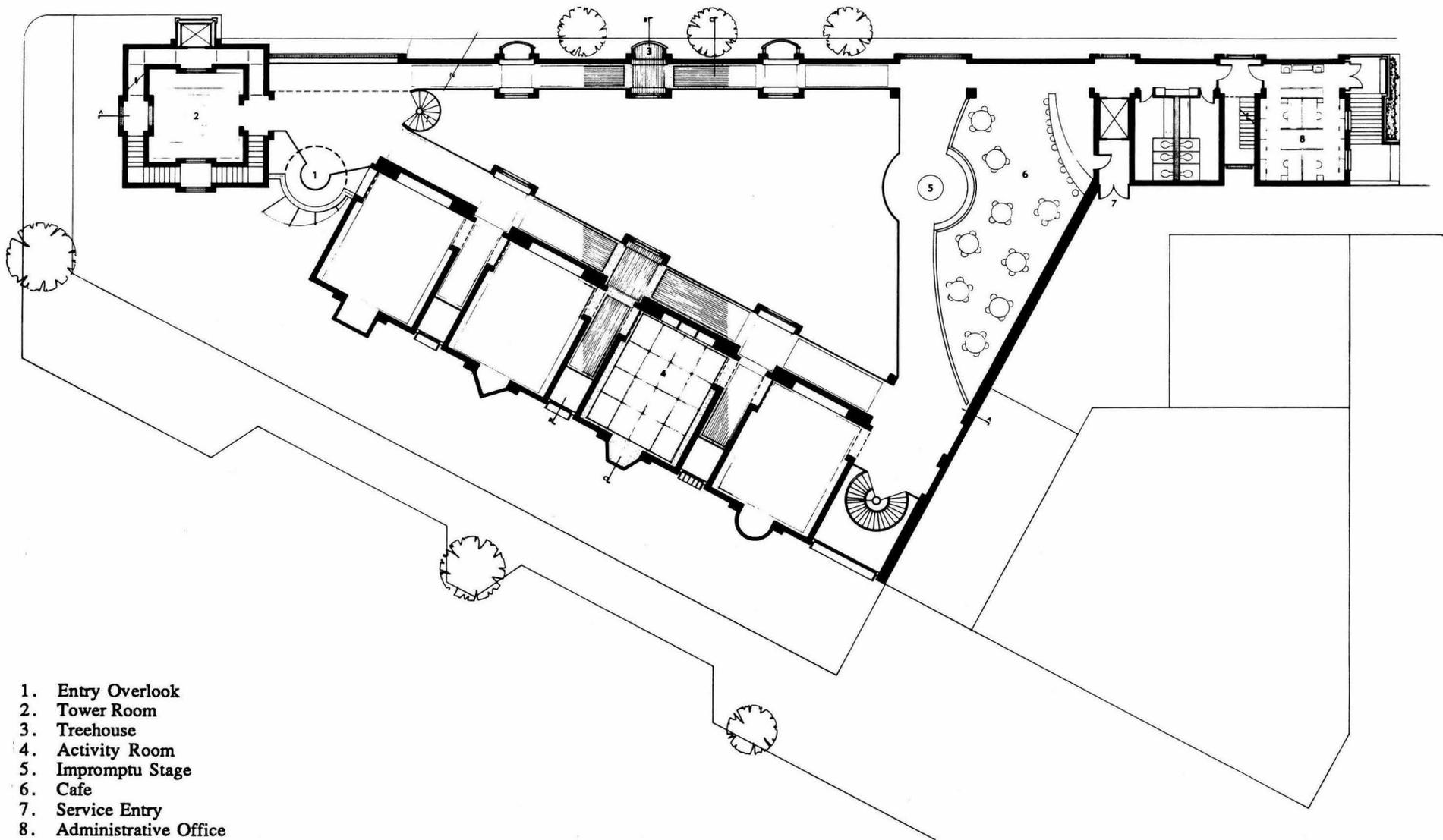
46. Section detail where piers meet precast roof slabs.

47. The north wall of the Great Room, containing Playhouses and Treehouses.

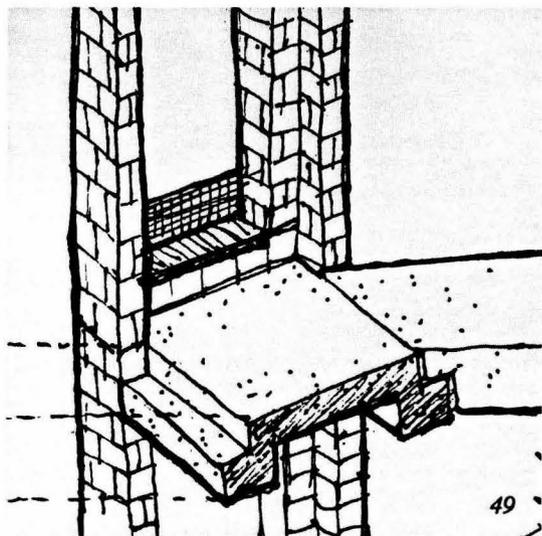


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THE GREAT ROOM



- 1. Entry Overlook
- 2. Tower Room
- 3. Treehouse
- 4. Activity Room
- 5. Impromptu Stage
- 6. Cafe
- 7. Service Entry
- 8. Administrative Office



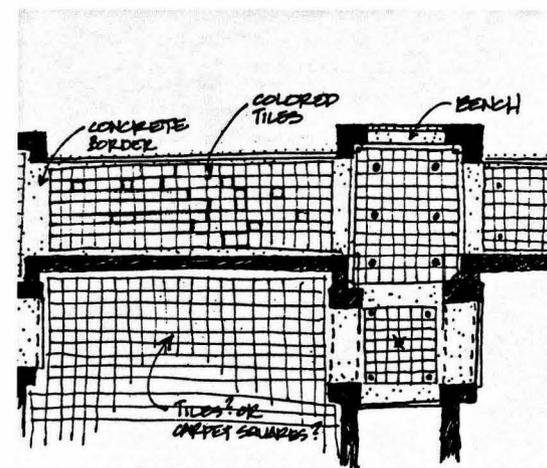
The landings along the ramp become points of decision: at these nodes, one can choose to continue along, to rest on a bench, or to enter one of the Activity Rooms. A change in floor material, in addition to the change in the slope of the ramp, indicates that the point of decision has been reached.

Stepping off the ramp, one enters onto a balcony which serves as the intermediate space between ramp and Activity Room. The balcony overlooks the adjacent Activity Room on one side, with the threshold and entry to the present Activity Room opposite; furthermore, the balcony offers a filtered view out to the street through a three-story window directly ahead.

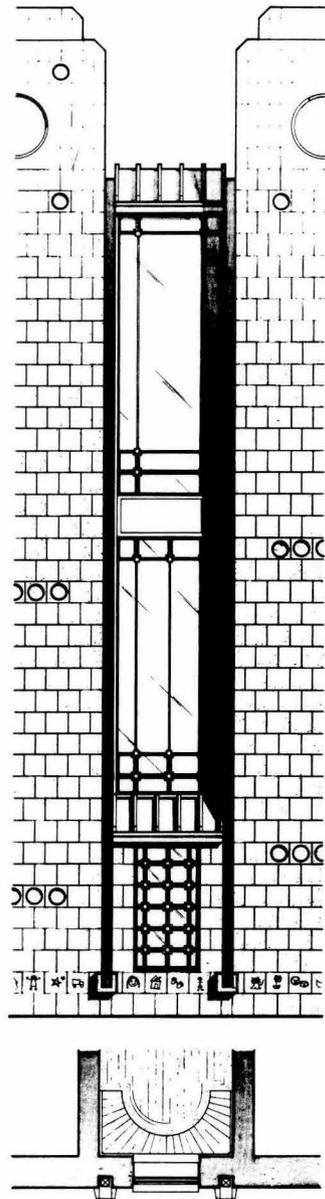
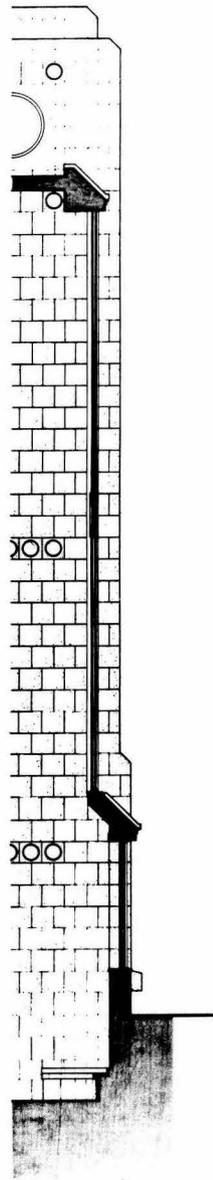
48. Typical upper floor plan -- second and third levels.

49. Construction detail at piers along the upper level walkway.

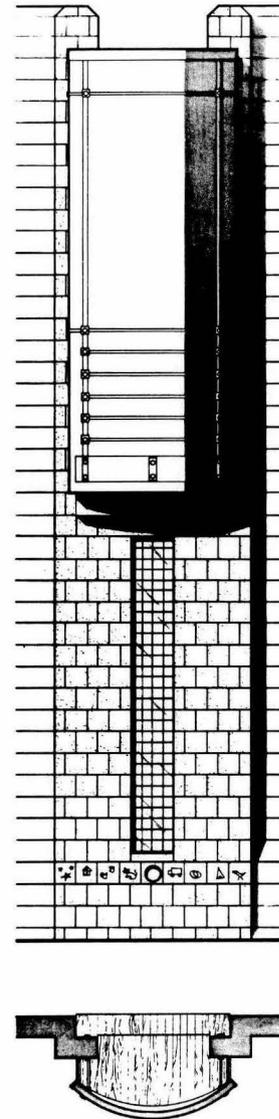
50. A series of spaces are woven together along the walkways and leading into each of the Activity Rooms.



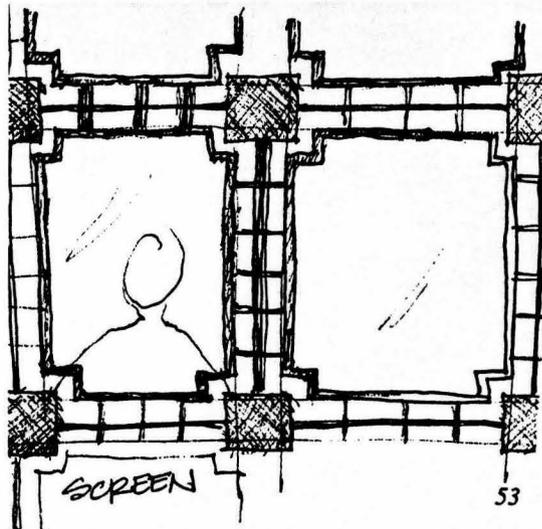
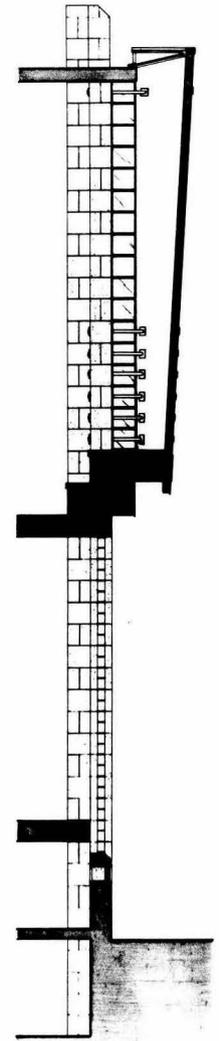
UPPER FLOORS



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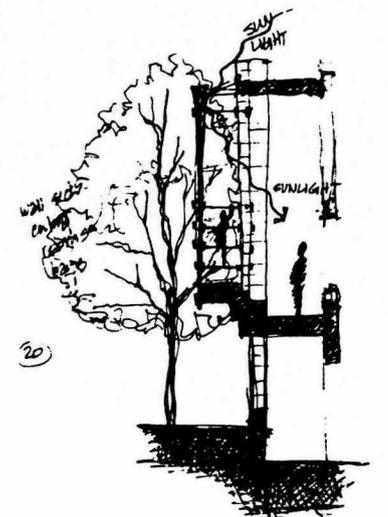


53

The space which separates one Room from another is more than mere circulation space. Each becomes a place of pausing along the path, marking a separation of one room from the next, of inside and outside, while at the same time, providing a crucial link between each of these dualities. Thus, the in-between spaces are permitted to take on a personality of their own, becoming vital elements in the overall composition.

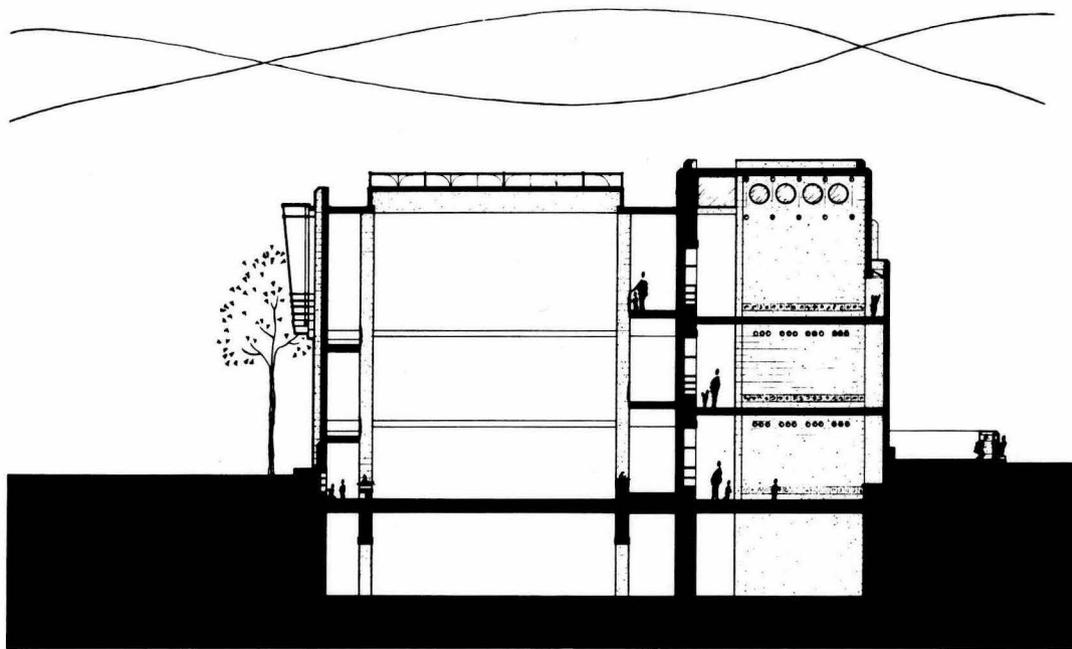
Along the south wall, the in-between space manifests itself as a three-story screen window, which allows a filtered view out to the city street beyond. At the north elevation, children can climb in the "branches" of the Treehouse, in a space which is simultaneously inside and outside of the building.

- 51. Plan, section, and elevation at the Screen Windows of the front elevation.
- 52. Plan, section, and elevation at the Playhouses and Treehouses of the north elevation.
- 53. Sketch of metal window screen pattern.
- 54. Section sketch of Treehouse.

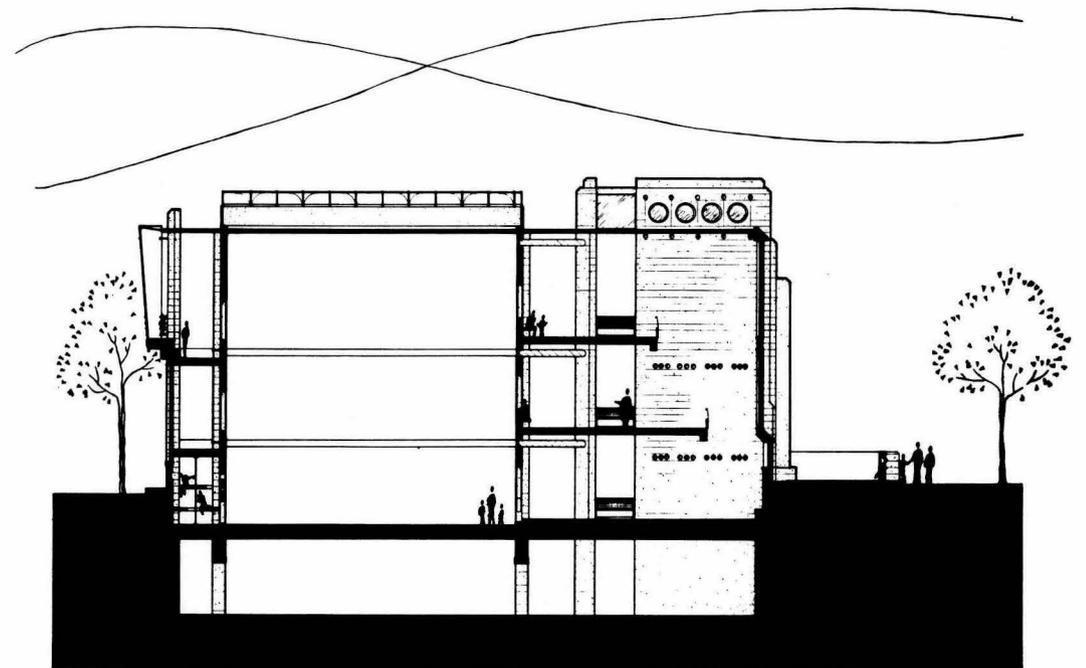


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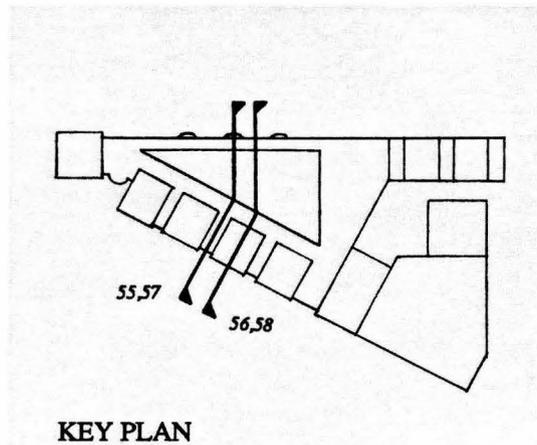
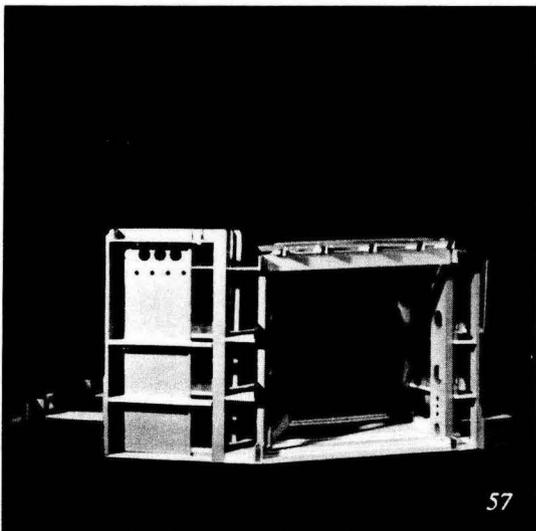
"IN-BETWEEN SPACES"



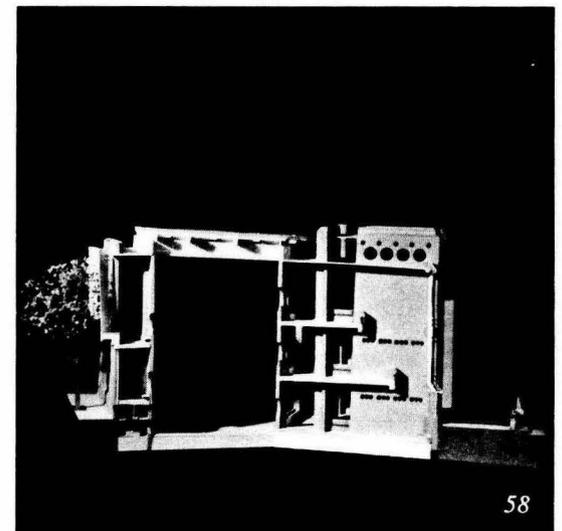
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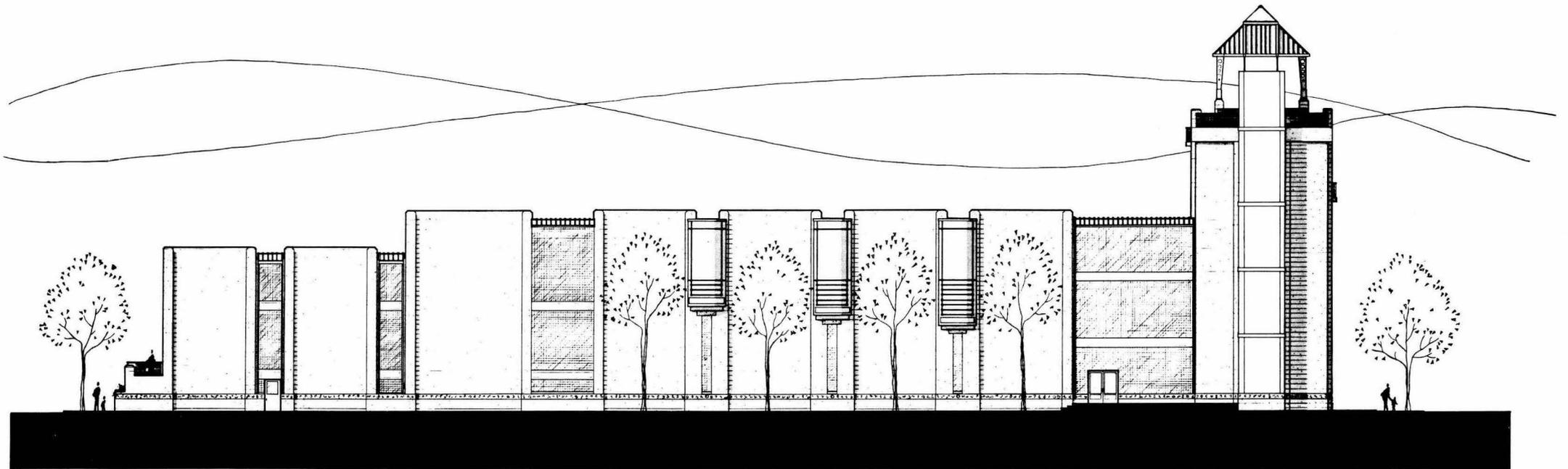
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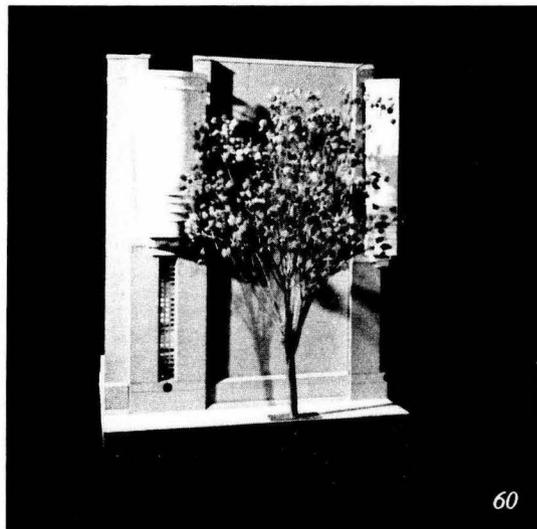
- 55. *Cross-section cut through the Activity Rooms.*
- 56. *Cross-section cut through the "In-Between space" and Treehouses.*
- 57. *Three-dimensional view cutting through the Activity Rooms.*
- 58. *Three-dimensional view cutting through Treehouses.*



CROSS-SECTIONS



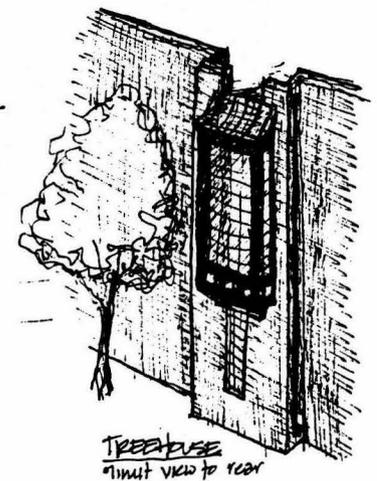
59



60

The North Elevation reveals the changes which occur to the building as it makes its way through the block from Second to Third Street. The lowest bays, towards Third Street, relate this portion of the museum to the scale of the neighboring residential area, and house the administrative wing. The next, taller, series of bays forms the north wall of the Great Room, with the Treehouse projections adding a sculptural element to the composition. Finally, the tower marks the intersection of Massachusetts Avenue at Second Street, and signals the transition to the larger-scale government and commercial structures beyond.

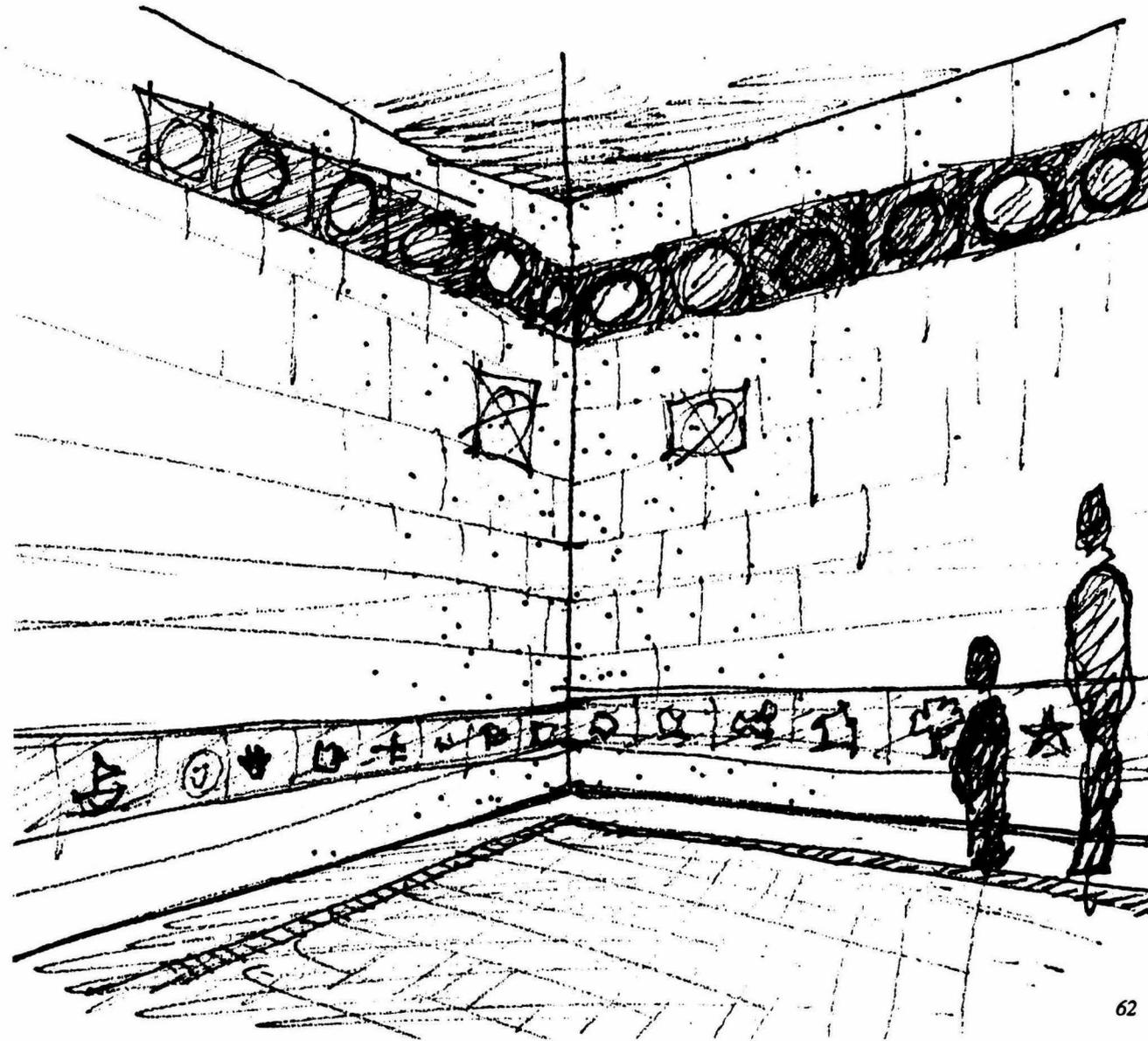
- 59. *Rear (North)Elevation.*
- 60. *The Treehouses as seen from the exterior.*
- 61. *Early sketch of the Treehouses.*



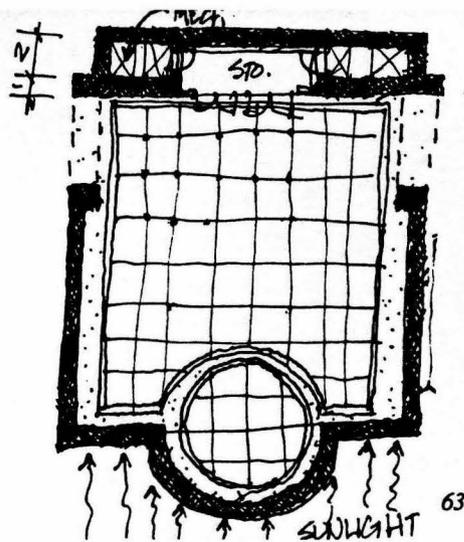
TREEHOUSE
 #111111 VIEW TO REAR

61

NORTH ELEVATION



62

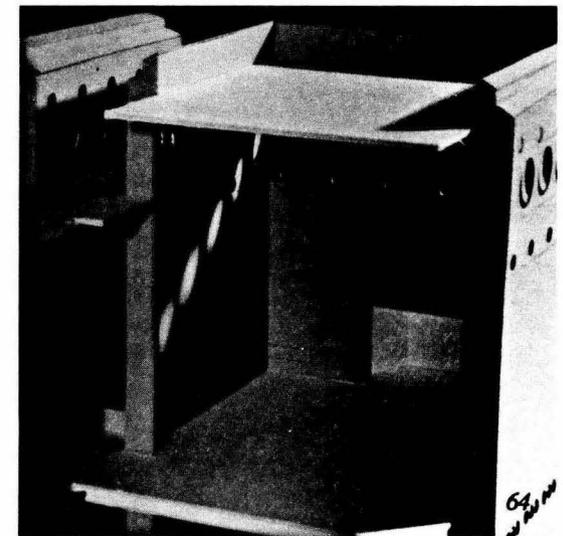


63

Today it may be experiments with weights and measures; next week it may be dress-up in traditional costumes of children from around the world. The activities and exhibits which fall into the realm of the Discovery Museum are so varied, that the rooms which house them must be flexible enough to gracefully accommodate the changing variety, and neutral enough not to detract or distract.

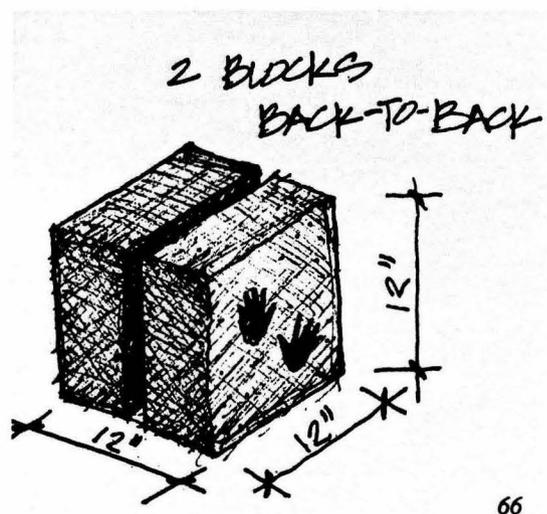
The walls are therefore free of all ornament, with the exception of two decorative friezes. Along the top, small circular openings allow indirect light to enter, while still keeping attention contained within the room. At the base of the wall are special masonry blocks featuring images drawn by children.

- 62. View of one of the Activity Rooms.
- 63. Plan sketch of the Activity Rooms.
- 64. A three-dimensional view into one of the Rooms on the third level.



64

ACTIVITY ROOMS

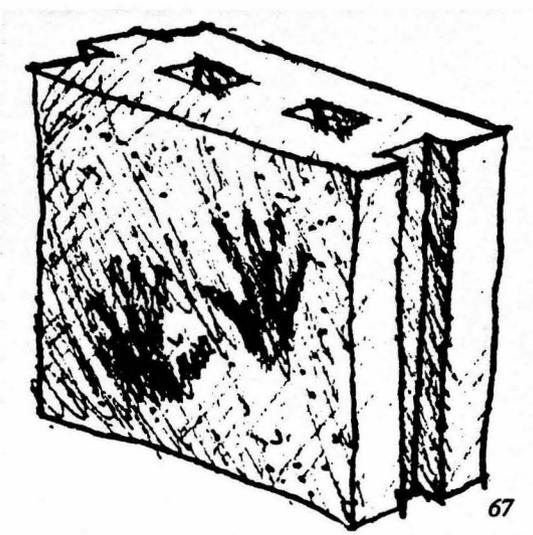


Children can easily relate to the familiar images drawn into the concrete blocks of the decorative frieze. And yet, each of the special blocks which make up the frieze is absolutely unique -- each image was drawn in the wet concrete by a different child.

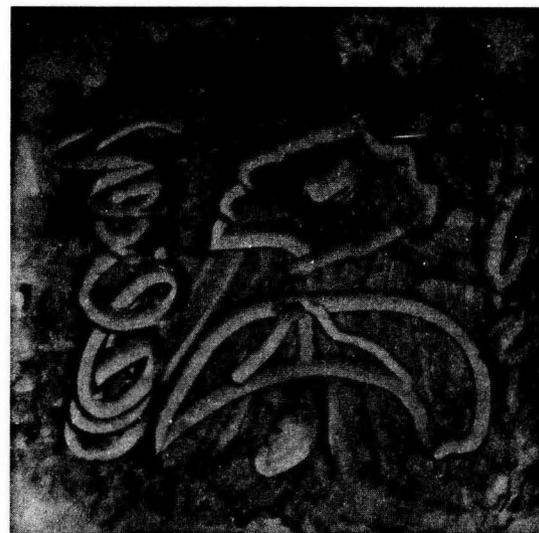
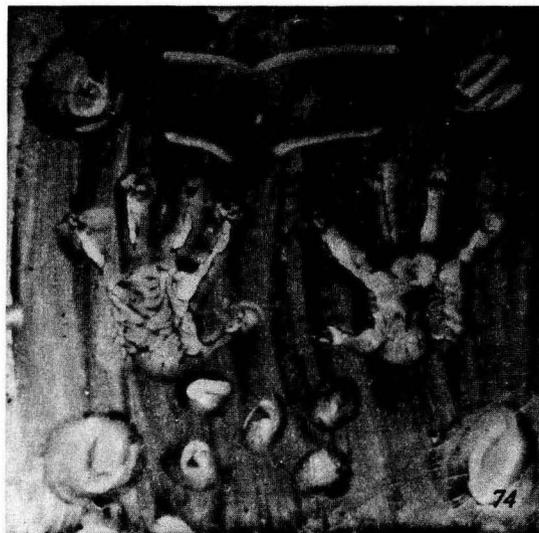
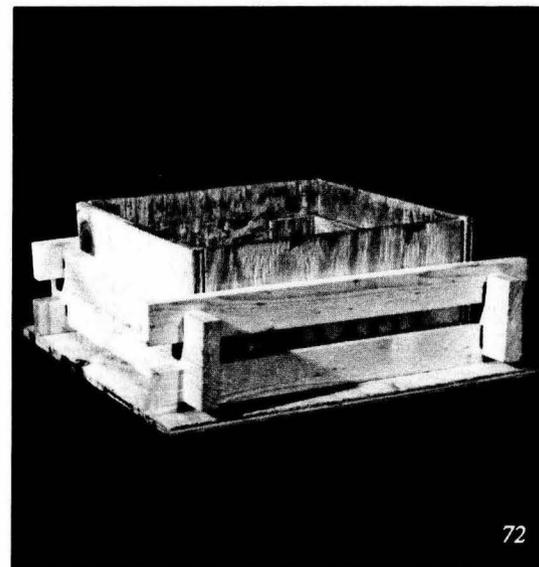
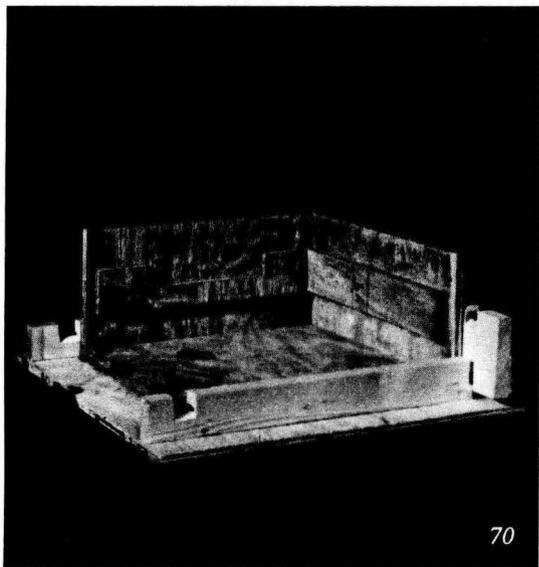
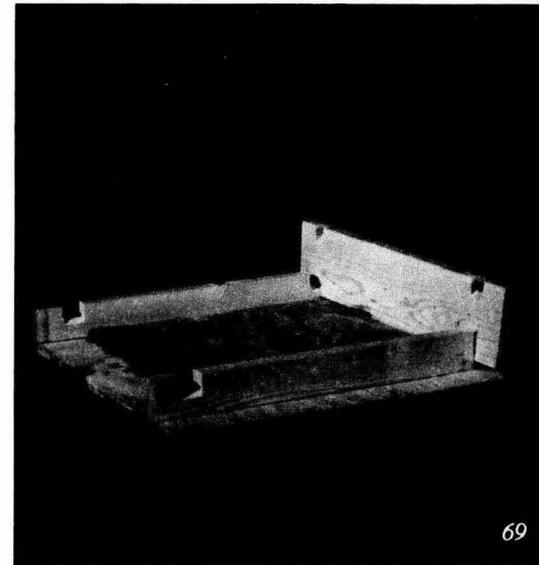
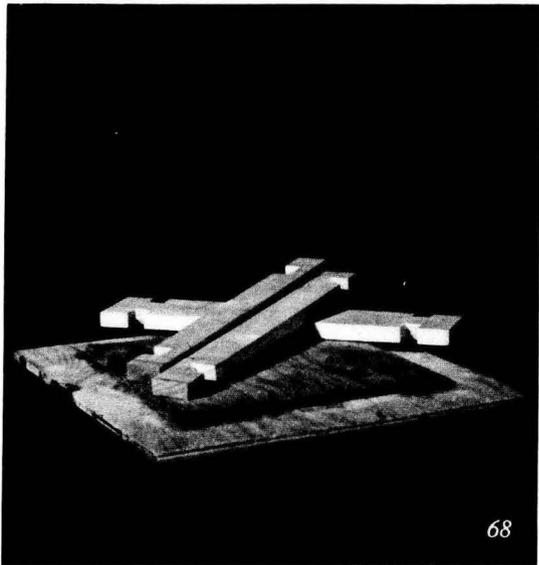
During the construction phase, area children would be invited to create the blocks, under supervision. Specially designed formwork fits together like a three-dimensional puzzle, with no nailing or other mechanical fastening required. Therefore, the block-making process, from start to finish, embodies the goals of the museum: the activity is fun, creative, educational, and gives children a deeper sense of ownership in the building.

65. The special blocks of the decorative frieze.
66-67. Details of the building blocks.

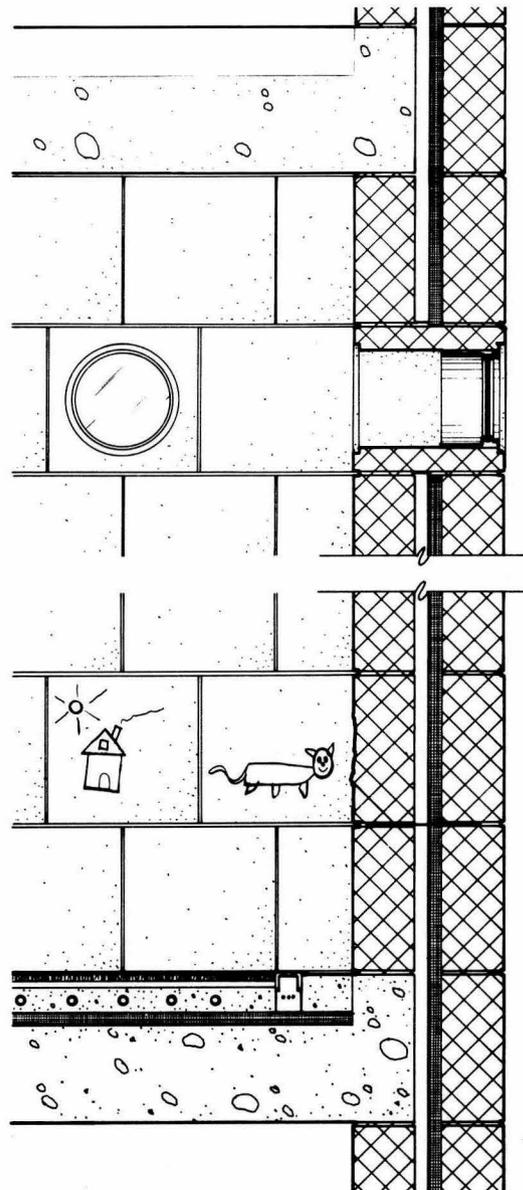
On the following page:
68-72. Assembling the formwork, leading to the final product.
73-76. Actual block designs by actual children.



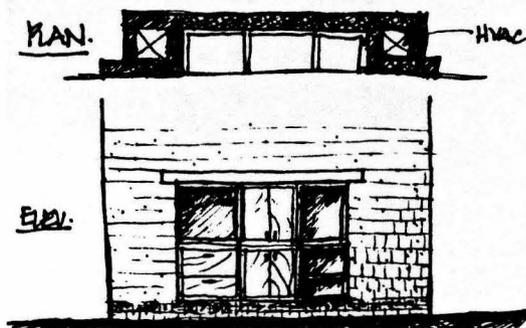
CHILDREN'S BLOCKS



CHILDREN'S BLOCKS



77



(6) 3'x3' MODULES FOR STORAGE UNITS - INTERCHANGEABLE... VARIETY OF CUPBOARDS, SHELVES, DRAWERS, CLOSETS, TABLETOPS, ETC. STACK LIKE LEGOS.

78

The Activity Rooms explore what it is to be a flexible exhibit/activity space. First, the floor system has become very sophisticated, housing all of the electrical and HVAC, freeing the walls from such obligations. Electrical wiring runs in a grid of concealed chases with a child-proof access plate at each intersection; electrical power is thus available at any location in the room. Heating is supplied by a radiant floor system laid into the concrete slab, and covered over with carpet. AC is piped in via exposed ducts at the ceiling.

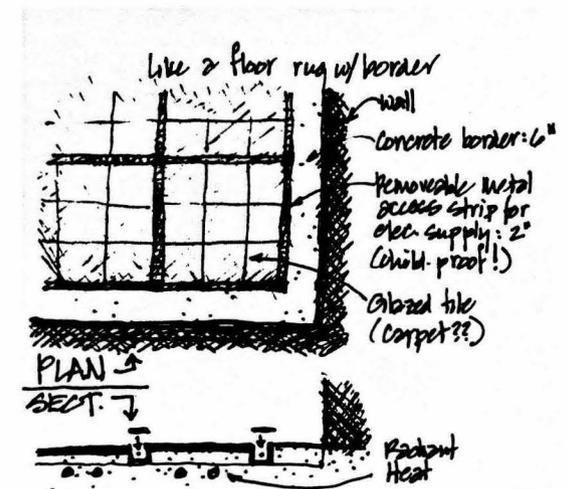
Secondly, a niche has been created in the north wall for the placement of interchangeable, modular storage units. Up to six units can be installed, and the configuration or types of storage can be changed as often as

necessary to meet the needs of any exhibit: cupboards for supplies; shelves for books or toys; drawers for paper; hooks for costumes, etc.

77. Section detail revealing the construction of the walls and Rooms.

78. Plan and elevation sketch of the storage wall in each of the Activity Rooms.

79. Plan detail of the floor pattern showing the concrete border, metal access strips, and colored tiles.

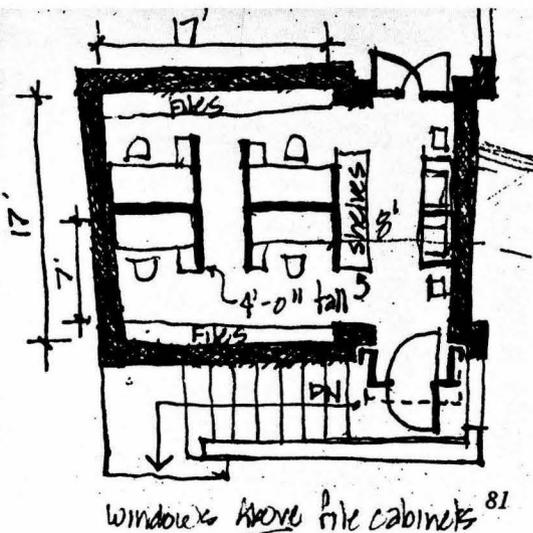


79

INHABITING THE ROOMS



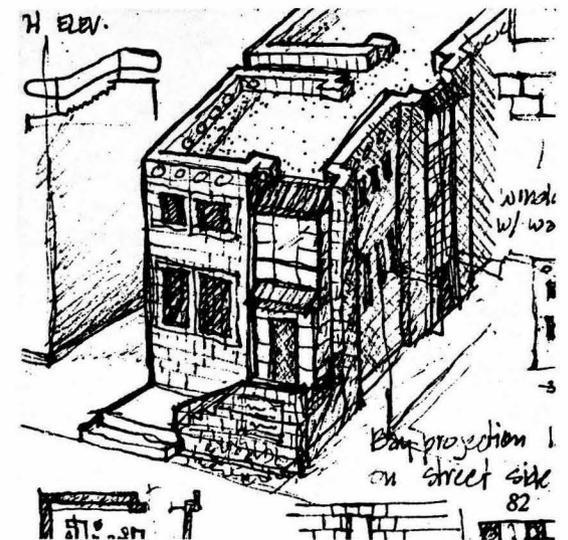
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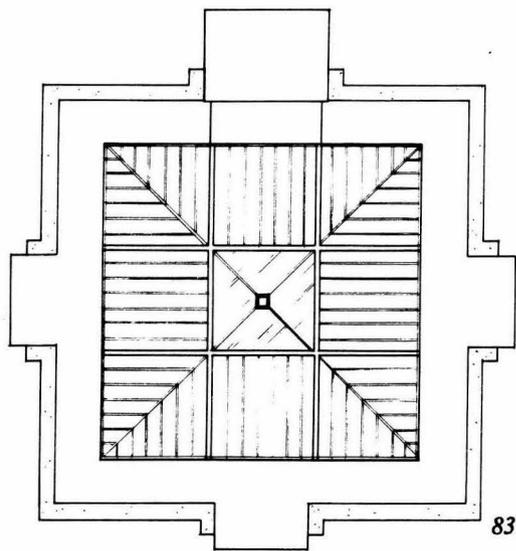
With its administrative wing, the museum makes a conscious effort to reach all the way through the block to Third Street. As the primary entrance for museum staff and administrators, this extension provides an active presence -- days, evenings, and weekends -- along this primarily residential street.

In recognition of the scale of buildings on Third Street, the height of the administrative wing has been reduced to two and a half stories, allowing a smooth transition from the taller apartment buildings at the corner of Massachusetts and Third, down to the two-story buildings closer to E Street.

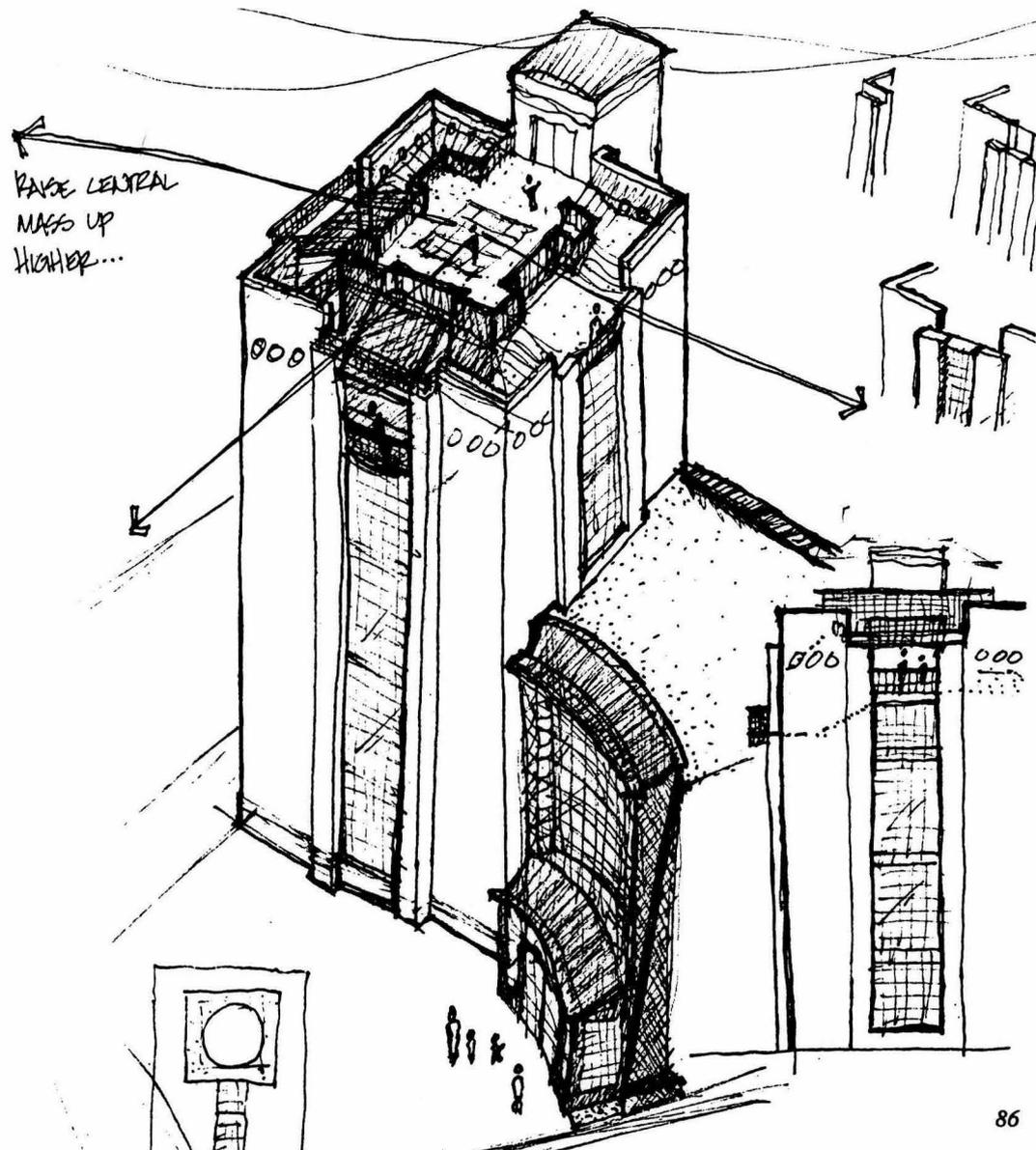
- 80. *Third Street (East) Elevation.*
- 81. *Plan sketch of administrative office, entry level.*
- 82. *Axonometric view of administrative wing.*



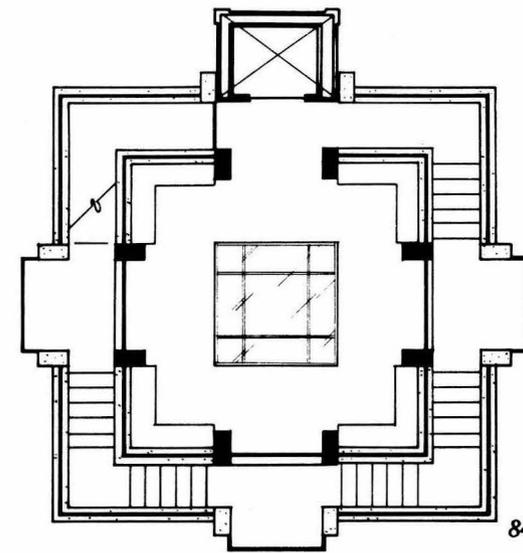
THIRD STREET ELEVATION



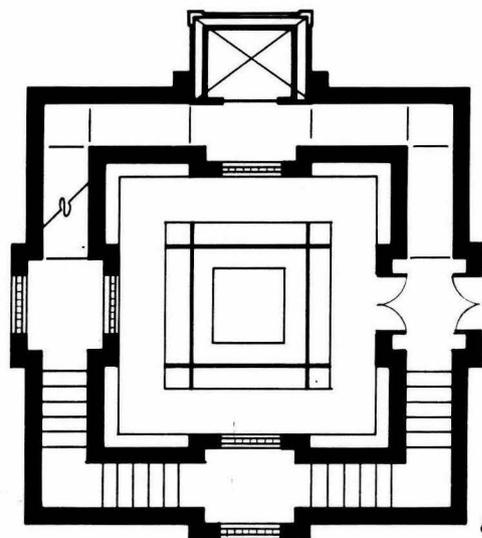
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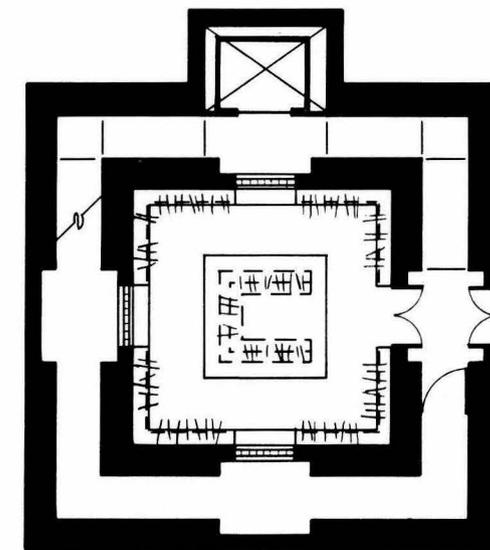
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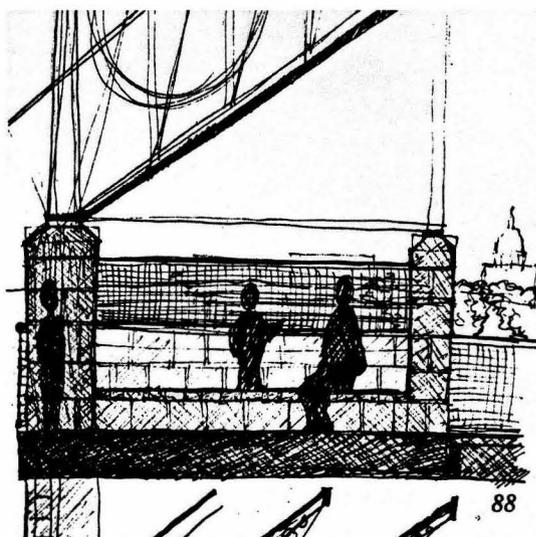
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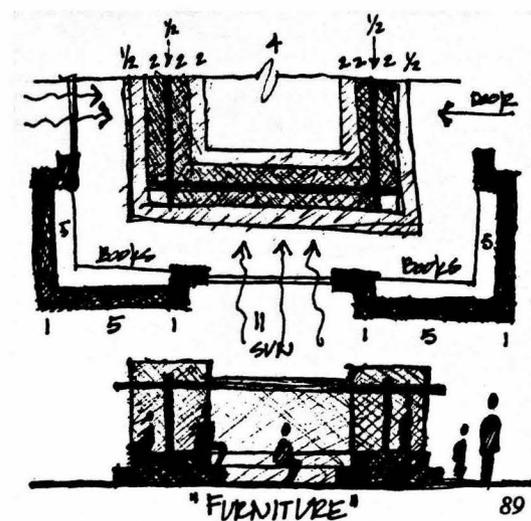
88

The journey through the Discovery Museum culminates in the tower. Tower rooms house certain "permanent exhibits" which require a specific architectural response; fixed furniture elements in each room address the particular needs of each activity. In the art room, for instance, visitors can color at the giant art table, or leave an illustration on the slate chalkboards set into the walls. In the sculpture room, children can mold figures of clay, or make their own plaster version of the children's masonry blocks. And a special piece of furniture in the story room allows for group stories, as well as for individual reading.

Finally, at the top of the tower is the look-out level. From here, one can look back out over the city, armed with the many new

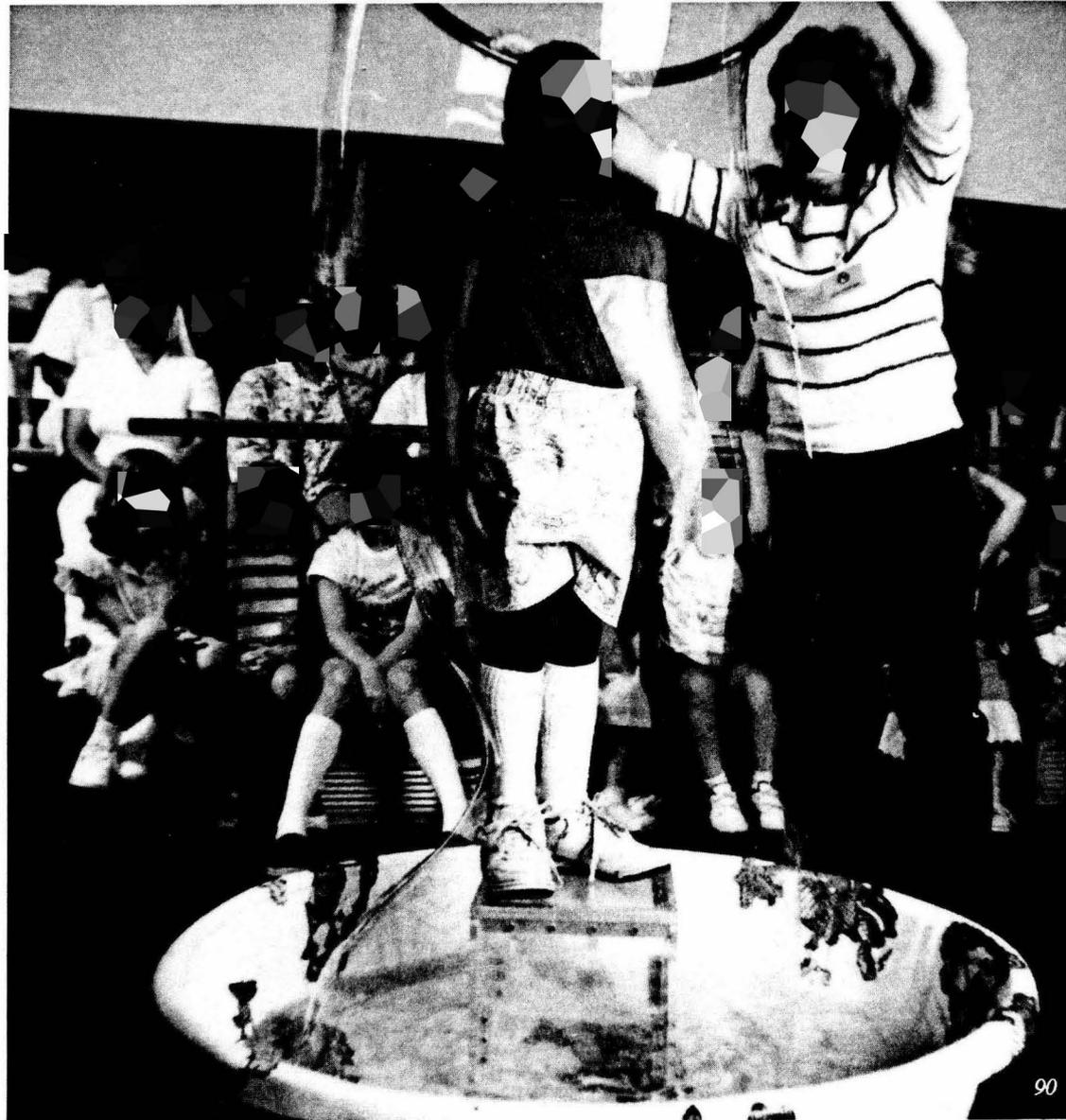
experiences of the Discovery Museum. The journey has thus come full circle: the museum visitor looks out to the world outside with fresh eyes.

- 83. Roof plan of the Tower.
- 84. Plan of Lookout level.
- 85. Plan of one of the intermediate levels.
- 86. Axonometric sketch of the Tower in relation to the entrance.
- 87. Basement/coatroom level plan.
- 88. From the Look-out Tower, children can visually connect their experiences from inside the museum with the city beyond.
- 89. Sketch of the "furniture" for the story-room.



89

THE TOWER



I HEAR AND I FORGET;
I SEE AND I REMEMBER;
I DO AND I UNDERSTAND.

All of the illustrations in this book are the original work of the author, with the following exceptions:

1. Children's Museum of Indianapolis. "Sample the Future, Savor the Past." Indianapolis, IN: The Children's Museum, 1990; p.9.
2. Children's Discovery Museum of San Jose. Letterhead Stationery.
3. The Children's Museum of Boston. "What's News?" Boston, MA: The Children's Museum, Fall 1991; p.4.

4. Nakamura, Toshio, ed. A + U. "Herman Hertzberger: 1959-1990." April, 1991; p.24.
5. The Children's Museum of Boston. "The Children's Museum, Boston, Mass." Boston, MA: The Children's Museum, 1990; p.1
6. Children's Museum of Indianapolis; p.12.
7. Ibid.; p.8.
8. Ibid.; p.6.
9. Ibid.; p.13.

10. Van de Beek, Johan. Aldo van Eyck: Projekten 1948-1961; Groningen: Akademie van Bauwkunst, 1983; p.50-51.
11. Ibid.; p.17.
12. Ibid.; p.67.
13. Luchinger, Arnulf, ed. HERMAN HERTZBERGER: BUILDINGS AND PROJECTS, 1959-1986. Den Haag: Arnulf, 1987; p.167.
14. Van de Beek; p.83.
15. Luchinger; p.102.

73-76. Original finger-paintings by Caitlin Saniga, age 5.

90. Children's Museum of Indianapolis. "A Five-Story Hands-On Gallery of Natural and Manmade Wonders." Indianapolis, IN: The Children's Museum, 1989; p.2.

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