ROCHESTER INSTITUTE OF TECHNOLOGY

A Thesis Submitted to the Faculty of

The College of Imaging Arts and Sciences

in Candidacy for the Degree of

MASTER OF FINE ARTS

Energizing the Structure by Designing the Interior With the Currents of the Space

by

Liu, Li-Chin

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Approvals

Adviser: Charles Lewis

Date: 5/5/95

Associate Adviser: Nancy Chwiecko

Date: 5/8/95

Associate Adviser: Toby Thompson

Date: 5/9/95

Department Chairperson: Toby Thompson

Date: 5/9/95

I, Li-Chin Liu, prefer to be contacted each time a request for production is made. I can be reached at the following address:

Home: #1, 3F Lane 16, Li-Shui St.,
Taipei, Taiwan, R.O.C.
Tel/Fax: 011 886 2 341 6205

States: 21Vanderveer Court
Rockville Centre, NY11570
Tel/Fax: 516 764-3067

Acknowledgement

Special thanks to my parents who have been so generous
in supporting my education
and
in love.

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Introduction

Thesis statement

As a candidate for the degree of master of fine arts I have three primary goals for this thesis project.

Introspective/investigative

First is to review and compile the knowledge I have gained in interior design and other related fields such as industrial design and computer graphic design.

Philosophical/theoretical

Second, I want to present a complete design process of my own from preliminary theory, philosophy, and configuration to the actual floor plan and its evaluation.

Experimental/conceptual

My third goal is to create a conceptual project by experimenting with several ideas for the future.

Futuristic/predictive

The documentation of this project will mostly rely on a traditional hand drawing format, and partially on computer drawings. It includes schematic diagrams, sketches, scaled orthographic drawings and color perspectives.

Application software

The thesis report is written on a computer with editing software QuarkXpress 3.0,with corresponding Adobe Photoshop 2.5.1 for scanning photos and Illustration 5.5 for partial illustrations.

Energizing the structure by Designing the interior with the currents of the space.

My philosophy for designing an interior is to energize the structure by designing the interior with the currents of the space. To energize a structure is to turn an enclosed envelope into an efficient, habitable shelter by designing the interior with the currents of the space: air, light, sound, visual movement, and the human flow. Vitality is the focal point of this philosophy.

In an ancient metaphor, to a sculptor, the ideal human body should be built as a building with proper proportion and precise measurement, instead of simply reproducing what is seen. Corresponding to that, a great architecture should be structured as a human body with sophisticated design and scientific order determined by its functional purpose, not recreation of what has been known.

Metaphor

If the exterior is the skin, the structure is the bone; the interior is the organ; and the blood will be the circulation of the currents of the space. The better the circulation, the healthier the body of the building.

Interior

The interior includes the solid elements themselves and the space they enclose. The solid elements define a space while the space utilizes the solid elements. They are interrelated with one another as well as to the currents, which include sound and light. Therefore, the space should be treated as a relative object, rather than an absolute substance.

Space/Human flow

Furthermore, the space should be treated with great concern for human flow, because a primary goal for spatial organization is the circulation of people. The space could be divided into many elements yet function as a whole. Each subdivision should have a sense of where it comes from, an expression of the activity it contains in relation to other subdivisions, and a sense of direction to a destination. A fluid

and flexible interior provides maximum utilization and higher efficiency.

Air

The quality of the air in the building plays a crucial role in the space, and heavily relies on proper design. The amount of air flow, filtration, temperature and humidity are as critical in a residence as in an antique museum. The human body is sensitive. A so-called "controlled environment" is often not so much controlled, as a merely closed environment. A tightly closed environment often results in *sick building syndrome*. A responsible designer should always be aware of the air quality throughout the design process and reserve certain possible alternative designs.

Light

Lighting is an important aspect of our life both physically and psychologically. More and more natural light, as well as different varieties of artificial light, have been, and will be, introduced into the interior. This goal affects choice of materials and the way we utilize the lighting. Beyond the illumination, natural and artificial light are great design tools to punctuate the building and create a desired rhythm of the space.

Visual movement

Visual movement is more than ornamentation and signage. The color, form, shadows and the shapes which are articulated by the light, are as important as lighting itself. It sculpts the space with lighting effects and implies visual movement. Visual movement is an achievement suggested by the designed space which successfully organizes all the interior elements as simply as fresh air flowing in the space, to lead the people through it.

Sound

Sound has two, often opposing, characteristics in space: to hear or not to hear. In general, noise control ensures the comfort level of the space. However, a pleasant sound of

water splashing or wind chimes could promote the enjoyment of the environment as well.

Professionalism

To the interior profession, complying with building codes is essential. A truly, professionally, designed interior must meet safety and functional, as well as aesthetic requirements.

Proposal Development

Interior Design combines art, science and the enthusiasm for life. My choice of project was an attempt to illuminate these characteristics.

What

A **Museum** is made of spaces which display the energy of history, art and science. It is an educational facility yet a place of leisure. In other words, this is a place that people can enjoy while learning.

Why

It would be a great **challenge** to design the interior to be the exhibition, as well as the space for the exhibition. Due to the multiple purposes of the project, a chance to utilize the diversified knowledge of space planning is also provided.

Who

Young people and their guardians are the most likely clients in a museum. In business terms, they are targeted consumers who play the major role in any design project. They are what the design is for.

Where

As a site I selected ***New England America,*** because its four distinct seasons provide a dramatic environment to interact with the interior. The location of the museum is critical, for it not only reflects the character of the museum but also impacts on the direction of the design.

When

The ***Twenty-First Century*** is the time period of this project. The very near future; it is no longer fiction. The purpose of this project is not to reproduce a museum of the present, but to create and develop a possible new concept for the future.

How

Library research, museum visitation, survey and information analysis are necessary before starting the design itself. For me, museum visitation was the most important study. Any graphic or text content can only present indirect information. Nothing compares with walking in a space to experience it with all the senses.

Goal

The goal is to create a design program for the museum. It should target a specific consumer group for the purpose of professionalism. It should illuminate the beauty of American culture, and emphasize it's location without limiting it's international view. It should be experimental in concept, yet convincing in application. It should explore all the possibilities with the concern of youth in mind.

Chapter 2. Formation

Research
Analysis
Survey
Museum Visitation
Regulation

Smithsonian Institution

In terms of museums, the Smithsonian Institution is the largest, most well-known, and established resource in American history. A brief study of the Institute makes up the foundation of my research.

There was a time when "the popular concept of a museum is a dark, dusty, vaulted edifice displaying curiosities."(1) This image still exists in some people's minds, but not in the minds of those scholars who have been working on it. There are many pictures of an ideal museum. The following are some extracts from Museums and Education, a publication collection from the Smithsonian Institution.

Education / Entertainment

"Museums should be infinitely easy, diverse, varied. There should be fun and games somewhere, perhaps outside, and concentration and indirect learning inside, but there should be no real distinction between the two."(2)

Wholeness / Departmentalization

"Yet, **the deeper connections between art and science** are ignored. A good science museum, even though it is departmentalized, somehow makes one aware of the wholeness and the unified concerns of science, technology, art, history, and people."(3)

Exposition / Interpretation

"...being exposed to possible foci of interest, without direction, and perhaps without the arousal of antagonism or fear or hostility, is an ideal one."(4)

Involvement / Participation

"The more a child or adult becomes actively involved with the wonders around him, the greater his interest,..."(5) "A study showed that the eggs were what was remembered best in the exhibit simply because the youngsters had discovered the eggs for themselves." (6)

Stimulation / Perception

"The question is, then, 'How do you arrange exhibits and labels so that a person can find out enough to feel the excitement and triumph that are the only legitimate reward for

learning, and still not prevent learning by telling the answers?' I suggest that the method lies in the direction of museum exhibits that involve handling, hearing, or smelling as well as seeing; that involve puzzlement, with its inevitable consequence: thinking."(7)

Thinking / Learning

"The most important part of a youth museum, however, is not the exhibits but the programs planned around the collections, exhibits, and facilities."(8) This quote really summarized the extracts we have listed above. All the concern is about people not the display objects. This is what this study is about; planning a proper museum program.

Program / Planning

* Footnote: Please refer to Appendix P.91

In reviewing ideas for an ideal museum, these are issues that stand out.

Entertaining Education

"Eductaining". A new vocabulary word is created by the computer game renter, which emphasizes that his other entertaining video games also have educational function. No matter what the word is, it does reflect an irresistible, prevailing current of this time; the merger of education and entertainment. To pursue the public's attention, the museum must adjust accordingly.

Daily life connection

Wholes and Individuality. Despite the different sizes of museums, there is a tacit understating of all: each piece of technology or art does not stand alone; each chain links to others in the great circle of life. The deeper connection between art, science and daily life should bring the audience back to museums.

Expose and interpret

Exposition and Interpretation are no longer display and labeling. Changed by new techniques and knowledge, exhibition has been presented in new attitudes. This awareness for both the object and the viewer stops the museum from being a warehouse. Studies show that labels limit the viewer's understanding to literal translation. Labeling should be left to a minimum so that the visitor's imagination and observations will encounter a non-hostile environment.

Interactive programming

Involvement and Participation. Interactive presentation becomes a dominant solution for getting a visitor involved. Humans are perceptional animals who have visible needs to respond to sensory stimuli. Humanistic and environmental concern is the reason for museums in the first place. Somehow on the way to distributing knowledge, this purpose becomes ambiguous and confused with its presentation, collection, display etc., This confusion was caused by the tradi-

tional distributing technique which did not consider the viewer's response as part of the intention.

Liberalize sensibility

Stimulation and perception are the focal points of interactive exhibition. Human sensibility has been suppressed by education and crowned with civilization. In fact, it is a powerful learning tool which came from our genetic inheritance for survival. This potential has been liberalized gradually by time and has become a new direction for museums.

Intellectual activities

Thinking is the purpose, process and result of learning as well as learning being the process of thinking. To develop a series of intellectual activities for the public is the ultimate responsibility for a museum.

Application

The exhibition is one of the major applications of programming. According to The Great Incorporation: The Youth Museum and Education a document written by Helmuth J. Naumer * "There are several basic categories which museum exhibits fall into:

Past

A. The permanent exhibit, or halls telling complete sequential stories;

B. the comparative exhibit, where a youngster may do his own identifying of a fossil, bird, or shell;

C. the Push button quiz boards where the challenge is to learn;

D. the changing exhibit that alters the pace of the museum and keeps visitors coming back;

E. experimental exhibits that do not always succeed;

F. exhibits outside the museum that reach the non-museum visitor;

G. the live animals that are every child's favorite;

H. and the exhibits borrowed from others that help to acquaint the youngster with the world outside his own milieu."

"Most museums have a school; it varies in scope and size, but it is the real justification for the museum's existence."

Amazingly through the years, the following categories still cover about ninety percent of present exhibition with slightly different faces.

Present

A. The permanent exhibit which remains in its place.

B. the comparative exhibit which involves more handling.

C. the push button which activates more than just a quiz board, such as lighting, sound, motion or voice messages.

* Executive Director, Fort Worth Children's Museum

D. the changing exhibit: has been demanded more to bring visitors back;

E. the experimental exhibition continually creates new ideas and successfully introduced the computer;

F. the outdoor exhibit developed a new system that matches the museum theme;

G. live animals, many of which often been replaced by indoor plantation except for fish tanks which still retain their charm;

H. the visited exhibit seems to have lost its luster.

I. the museum schools are more popular and professional than ever.

J. new exhibit format: theatrical presentation from planetarium, theater, life demonstration and work-shop.

These categories will be used as references in the following chapter; Museum Visitation.

Figure A:
A TV monitor showing the museum features in Cit'e des Science et de l'industrie, Paris, France.

Figure B:
Display of Light, Color and shape in The National Science Museum in Taiwan, ROC.

Figure C:
Display of Jungle Animals in The National Science Museum in Taiwan

Because I have enjoyed the privilege of being an international student, I have been able to visit several museums in five different countries. It was not my original plan but the opportunities were provided by trips which were arranged long before this project occurred. Therefore, the selected museums are not intentional prototypes and do not represent all the museums in each country. These are simply observations from my personal journal. I had also received a substantial amount of information on museums provided by enthusiastic friends. This information had a great impact on this project, specifically the information from the Museum of Discovery and Science in Florida and Cit'e des Sciences et del'industrie. However, visiting is a completely different experience from reading information brochures. Observations were made in a pre-arranged, single trip for each selected museum. Observations were documented by taking notes, and photographing with permission, while walking through the museum.

I was amazed, not only by the variety of museums with their different programs and interior designs, but also by many other related elements such as the industrial design of the showcase, graphic design for display units, and educational programming for the museum classes. Shown on the left are several beautiful examples. Figure C is an exhibition about jungle animals. The display set is a jungle scene made from layers of cardboard, with background drawings in black and white. The animals are in full color and three dimensional. It shows more than just a display, but also a well thought out design.

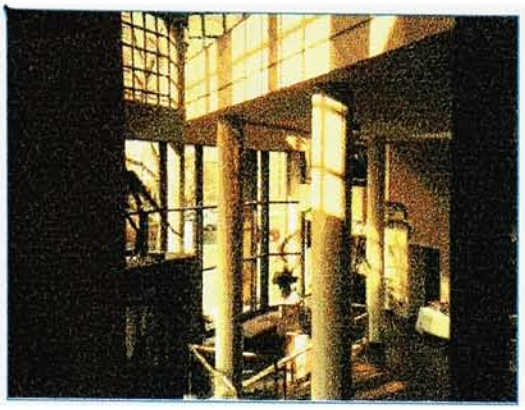


Figure 1:
The multi-level open space in the entrance lobby.

Figure 2:
Carefully designed steps to help the children climb.

Figure 3:
A low platform works as seating.

Rochester, New York, U.S.A.

A well equipped museum, it provides a proper size and facility for the small community. Beautiful multi-levels and open spaces are provided throughout the entry lobby, gift store and cafeteria.(Figure 1) Excellent display-handling details are designed to assist children, such as steps, handrails attached to showcases, and lower stair handrails for small children to climb and hold. Well thought out transition areas are provided for resting. Something as simple as a bench placed between two display rooms and a low platform among display units are really effective. In figure 3 is a low platform which functions as seating among the display units for small group study, short lecture and resting as well. Special labeling is provided for blind visitors. A life size historical street shows the impact of the city's history. Children's sections are dramatic and impressive. Instead of graphic images, most of the displays are presented in their original face. The museum also has a temporary exhibition section which changes seasonally and is mostly designed for Children. These are usually very dramatic, and attract visitors.

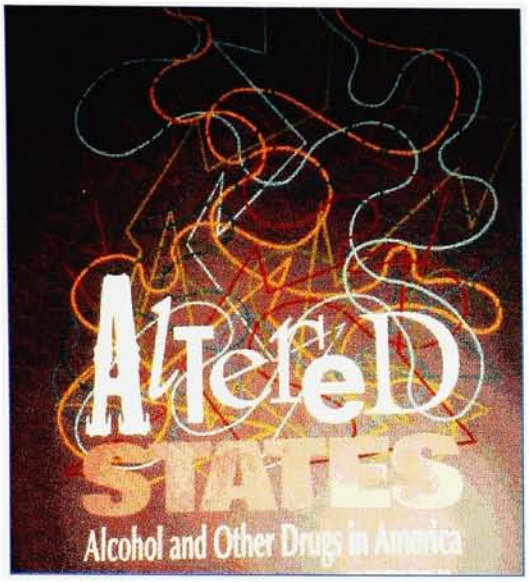


Figure 5:
The partition poster for the section of Alcohol and Drugs.

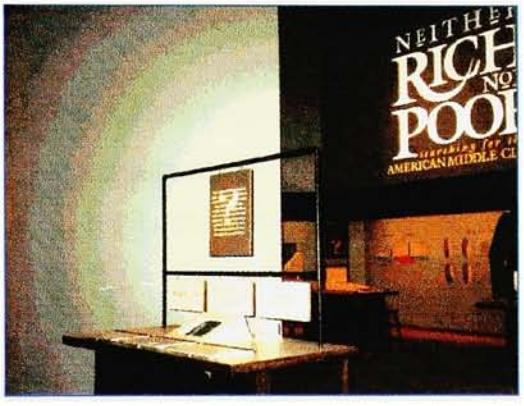


Figure 6:
The entrance for the Section of Rich and Poor.

Rochester, New York, U.S.A.

Great attempts are being made to integrate presentation with social issues, such as the drug issue. This attempt might be controversial, but it really reflects the public service role of a museum which is to reflect the social phenomenon. Many of the displays are temporary and change seasonally. They are the strength of this museum which provides a well thought out social outreach program, careful space arrangement, up-dated decorative theme and outstanding graphic design.(Figure 5) Shown on figure (6) is the section entitiled The Rich and Poor. This is an exhibit showing how the American middle class survives in the economic jungle. The area has a very low suspended ceiling, giving the impression that one can feel the pressure once one walks into the space. The intentionally unpleasant atmosphere effectively delivered the message, but might keep the visitor from coming back.

Carefully planned graphic images are provided next to the labeling. An interesting child-scale doll house section provides the children a place to play adulthood. However, the doll collection is housed in a space with a very warehouse like appearance.

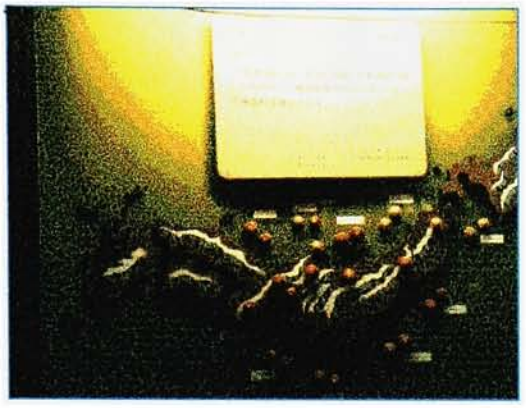


Figure 7:
Beautiful graphic design for showcase.

Figure 8:
Fixtures for an outdoor water playground.

Figure 9:
A corner of an outdoor water playground.

Tokyo, Japan

The museum is a very sensible and considerate family museum, providing an excellent graphic presentation with well thought out details for both the children and their parents. Instead of ticket booths, there are vending machines for entry ticket, brochure, and note book as well, which is very encouraging in the do-it-yourself atmosphere. The brochure and note book are also specially designed for different aged children. A very effective patio water playground composed of different water related games is a real attractions.(Figure 8, 9) *Sound effects re-creation and great lighting design in the insect section are very successful. The light turns dim while the sound increases. As a result, the children will surely remember that certain insects sing at night. Some utilities for group visitors are separate from those for individual visitors, so it is easier for school teachers to take care of a large number of small children. The class size in Asia is usually more than thirty students in one classroom. Furthermore, in public school, they seldom take only one class along for a field trip. The museum is located in Ueno park which also includes Ueno Zoo and Museum of Western Fine Art forming a very complete Museum group.

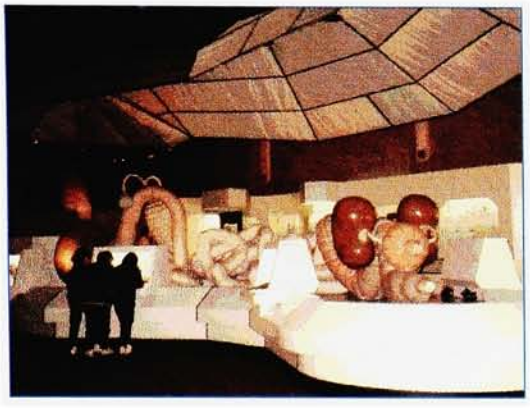


Figure 10
A model of human digestive system.

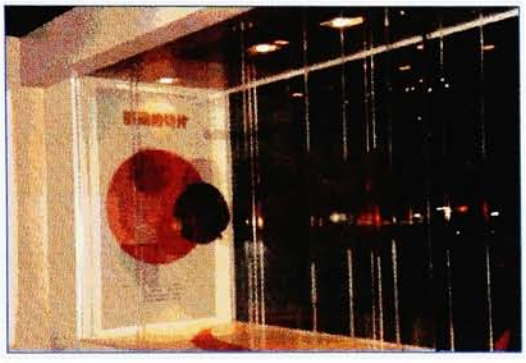


Figure 11:
A display about Pin Worm.

Figure 12:
Museum classroom regarding the topic of environmental protection.

Tai-Chung, Taiwan, R.O.C.

This brand new science museum is equipped with an abundance of computer facilities which fully reflect the local culture: computer manufacturing. There is an outstanding multimedia presentation and great models made in many sizes. A high percentage of displays are in 3-dimensional format, from miniature houses to enlarged DNA sculpture. As shown on figure 10, there is a huge model of a human digestive system. It is surely amazing, but might be a little bit over done. However, in general, most displays are impressive and carefully done with beautiful lighting effects. Some of the displays are so intelligently designed that they themselves are exhibition. For example, in a display of worms several cross sections of worms are printed on clear glass panels. They are placed perpendicular to the top view of the worm (figure 11). It is simple, clear, straight forward, easy to understand, and beautiful.

Beautiful space planning with creative interior decoration promotes the exhibition. The museum classrooms are small and specialized in different areas accordingly. Each room is fully equipped with vivid presentation material and theme decoration as well.(Figure 12) A well thought out, outdoor theme park fully evokes the natural science spirit. It even includes a preserved little land temple which in Chinese culture is believed to be a protector. There is a separate entrance for group visitors. Despite all the excellent exhibitions, the museum has a very institutional appearance and the overall interior space could be more organized. There is no single transition area between exhibitions to provide facilities such as a stool for resting, in this huge museum. The refreshment facility, is highly over-commercialized. It is almost totally irrelevant to the museum setting.

Figure 13
Section of Food and Nutrition

Figure 14: Sound Room

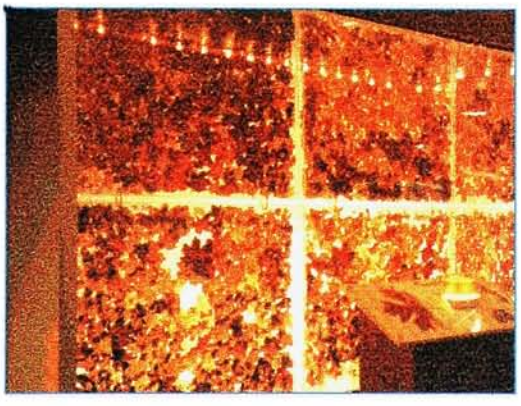


Figure 15: Maple display

Ontario, Canada

The science center is fairly well-known for its interactive programs and its devoted effort in experiential exhibitions. The majority of the subjects are closely related to daily life.(Figure 13) They provide an outstanding visual program that is easy to understand and play with. The computer interactive games are not only interesting, but also very scientific. One sound proof room provides a space for children to try some musical instruments.(Figure 14) Some of the displays show good ideas, but they could have been developed further. A maple leaf is displayed with light illuminated through the leaves. Since the maple leaf is the symbol of Canada, it could have become a major exhibition with a little more planning.

Unlike other museums this one separates the museum classrooms from the exhibition. The museum classrooms are integrated into the exhibit, along with other displays. Several special demonstration programs provide very convincing and entertaining experiences. Bilingual labeling and a color coordinated directory are provided. A variety of floor materials define the different traffic flows.

Besides the interior, there is a well-designed outdoor garden section which proved to be an alternative visiting experience. In many sections, each individual display unit is strong enough to stand by itself, yet they lack over all unity. The spaces, other than the exhibits, such as the main entrance and a grand hallway, are poorly utilized. They are simply empty spaces with several objects placed in them. However, there is a fair amount of equipment labeled "in repair". It is hard to tell whether the museum is well used or lacking proper maintenance.

Figure 16:
The exterior of **Cit'e des Sciences et de l'industrie**

Figure 17 Sound Bubble

Figure 18: Ant nest.

Paris, France

The museum is located in a large industrial park developed after years of professional planning. The facility exhibits tremendous high-tech architecture with two grand skylights, steel cable and glass curtain walls which contribute great natural light. Four large but shallow water ponds surround the building which beautifully reflect sunlight and the building itself. The whole theme park is an excellent achievement in highly artistic, sculpted landscape surroundings.(Figure 16)

The interior includes large open space interacting from one level to another. The exhibit facilities themselves are a wonderful exhibition as well as the displays they enclose. Some interior design details are so well thought out, so that particular detail becomes a display. For example, there is a seating area which is designed as a sheep herd in the transition between the animal and the plant exhibitions. These sheep are so beautifully integrated with the building yet are highly functional.

The museum provides a very high percentage of children's sections. Obviously, even in the adult's section they are mostly designed from a child's perspective in creating wonderment. In the sound section, special seats are caves in the wall, one who sits can hear very clearly the music, while another who stands hears nothing at all, even though they are only an inch away from each other. Another interesting fixture is the Sound Bubble (Figure 17), a big balloon blown up with carbon dioxide. It focuses the sound of people's voices to build a sort of acoustic lens. One can sit down and have a quiet conversation with another visitor across from her. The small children's area is strictly controlled: no adult is allowed

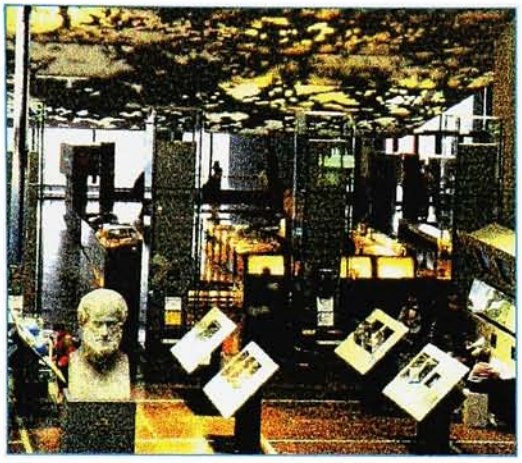


Figure 19: Exhibition Hall.

except a licensed teacher. However, according to the brochure, some of the programs are very creative. Shown in figure 18 is a brave boy putting his head into an ant's nest. There is a variety of performing presentations; from a puppet stage to an omnimax theater, which attract both children and adults.

The display show cases are carefully designed to match the museum in both architectural and artistic aspect.(Figure 19) Outstanding graphic arts, publications, and advertising keep the park fully occupied. However, compared with the overwhelming environment, some of the display programs lost their luster and shine. Many of the software programs are similar to most other modern museums, with different or better packages, but similar content. It made me wonder if they had put in the same amount of effort in promoting the museum program itself.

Culture diversity

Figure 20 :
Museum of Natural Science in Taiwan" Form , Shape and mathematic"

Different cultural backgrounds and educational systems have a great impact on museum applications. While the museum in Tokyo provides a program to involve parents with their children, the Canadian Science Center individualizes the display units and lets the computer take over most of the assistance. Furthermore, in Paris, parents are not even allowed onto the playground. A small community museum in Rochester provides comfortable transition areas for resting between display rooms, while other highly equipped, large science museums do not even consider it. Those differences are very distinctive and show differences in cultural expectations.

Exterior integration

However, they do share many universal concerns as well. Many of the museums either have well designed landscapes or adjoin other cultural facilities to make a more complete presentation and generate more visitors.

Multimedia exhibition

Multimedia presentation really enriches the museum with the latest techniques in lighting, sound and other projecting media. This new atmosphere eliminates a warehouse image completely.(Figure 20)

Computerized program

More or less, most of the museums are now equipped with computers for interactive interpretation. They provide better communication and more in depth information. Many of the same programs are widely shared in museums through out the world in different languages and packages. The biggest advantage is that computer presentations are always advanced by the constant changing technology to be competitive, marketable and of benefit to the user.

Intriguing playground

On the other hand, specially designed playground facilities for small children have become very popular. How to differentiate these facilities from the amusement park, is a

great issue worthy of study.

Theatrical presentation

Planetariums and different kinds of theaters are always in demand. Despite the expense, they are truly the most memorable part of a museum. Recently, with proper financial management and advanced technology, theatrical presentation such as the IMAX theater have become available and more popular than ever. It can be predicted to be the presentation technique of the future.

Museum classroom

Many museums improve their classrooms constantly by utilizing new equipment and new programs. Some of the museums are so systematic that they have their own schools.

Refreshment facilities

Refreshment facilities have been ignored for their educational potential in the past, yet they are necessary amenities. They are often over commercialized and are out of the museum's control. On the other hand, they provide a great chance for a designer to play with.

Disabled accessibility

The consideration of disabled population access is a important concern for everyone and one should take part in learning from it.

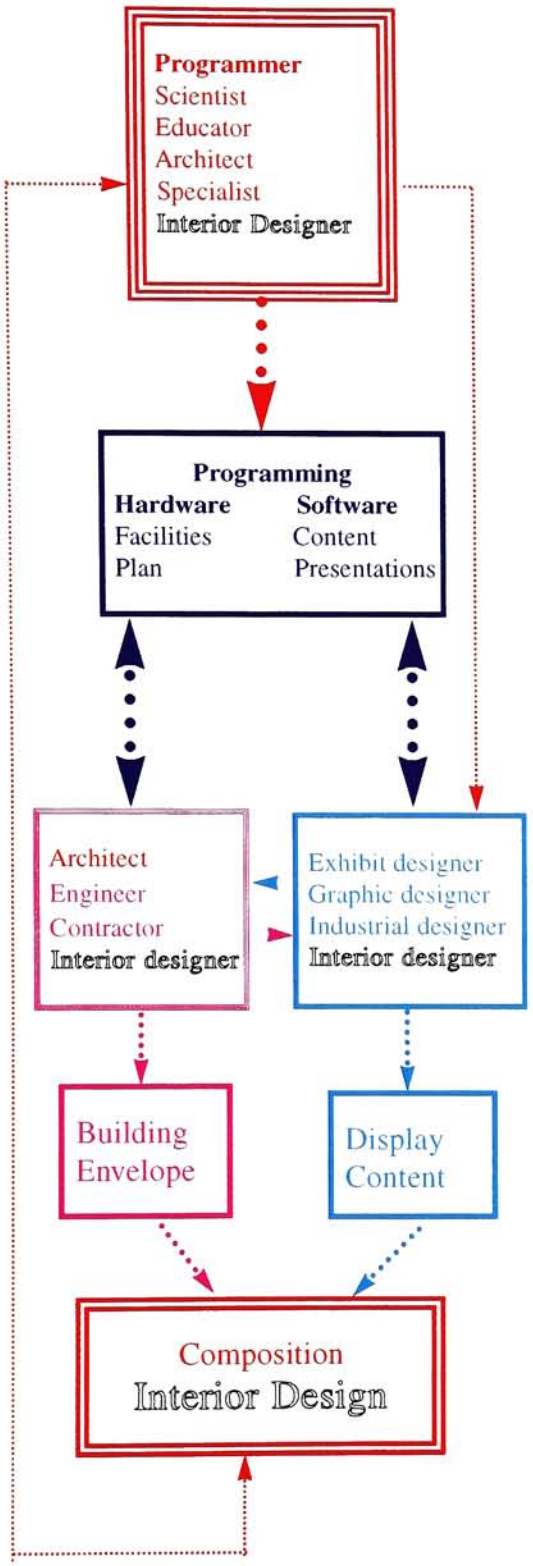


Figure 21: Schematic Diagram of Museum process.

After gathering and analyzing the data, the research is nearly complete and the direction is clear, yet the complexity is overwhelming. In order to implement the information, it is necessary to take a survey establishing the process of designing a museum.

The chart on the left is a simplified structure of the museum establishment with the managing factor excluded. The top square is the programmer group. Theoretically, there should be a program committee consisting of an educator, scientist, artist, architect and many other specialists to decide what kind of museum it will be and what will be delivered by the museum.

The blue square represents the program in progress and is divided into two major categories: the hardware and the software. The programming would establish the principle, the policy of the museum, the format of the exhibition, and the number and sizes of the desired facilities. The quality of the museum is really generated at this stage.

Following the program are the two executive working teams. The magenta architectural group represents the professionals who design the building and the equipment for the museum. The cyan exhibition group represents the specialists who determine how the content will be organized and presented. Both groups might influence each other by sending messages from their speciality areas. They are the quality controllers who execute the program.

Ideally, the interior designers should play an important role in both groups by assisting space planning and other details relative to interior space. They might function as messengers as well as by communicating information between groups. However, the major role for the interior

designers is in finalizing the composition of various elements within the constructed envelope respecting the content, exhibition intent, architectural vocabulary, and recommendations of the museum committee.

Beyond Knowledge

From the analysis of the organizational chart, it is very clear that each individual profession works as a part, but the group actually functions as a whole. Therefore, sharing an overview of knowledge with other professionals is critical for team work. Besides, appreciation and respect come from understanding. With appreciation and mutual respect, each must fulfill his or her responsibility. It is especially true for these complicated projects. No project could be done missing a part of the work.

Therefore, even though this is an experimental, conceptual project, the programming will be based on the most recent knowledge of a possible ideal museum in the near future. An overall concern from all aspects will be considered, but my primary focus will be on interior design. Practical factors such as constraint of an actual site, a client, budget, and construction engineering will be taken into consideration but not directly applied.

Chapter 3. Contour

Design Process
Program
Schematic diagram
Building diagram

Marketing

"...In fact youth museums do not exist. No community can afford the luxury of a museum just for children. Activities must be programmed for the older student and adult, not only because of community need but because adults do the financing."(9) True, but in fact, the youth or children are the greatest market of all. It is a matter of marketing.

How to attract the youth back to the museum? What are their prime concerns with the museum? Where would they rather spend leisure time? The concerns of youth are the primary goals of this project. The major target group is from age 8 to 14.

Consumer Stratagem

In America, children of this age are very energetic as are other children in the world, but they are most vulnerable to temptation. They have their own social values, aside from the main stream of the adult world, caused by peer pressure. They are eager to be recognized by their friends', not their parents', values. Therefore, instead of forcing upon them certain knowledge that we believe is good for them, it would be better to present it in "their way " and have them absorb it. So, why not create a environment where they can release their energy, hang out and share with friends what they have learned and still be considered "Cool".

Youth Center for Art and Science

With less concern for prestige and more for service, museums might start a new fashion by developing museums in adjacent buildings; gallery, library, theater, shops, restaurants and other necessary facilities connected one to another. It would emphasize the connection between art, science and daily life by integrating the message into the building itself along with the exhibit.

Reception

Reception is the first and biggest circulation space where visitors are received and diverted in many directions. It should provide a ticket booth, information desk, coat room and rest room.

Administration

Administration is the executive department which keeps the museum operating. This department often includes the museum school with various classrooms. This is a very important department of any museum. It coordinates, besides, all the exhibitions and facilities.

Exhibition

My design for this museum will include the major exhibition: the permanent exhibit, changing exhibit, arts and crafts gallery and work shop.

Library

A new multi-media library system will be integrated as a valuable support source, and as an independent department as well. It will consist of a media circle, a career center, and a data bank.

Book Store

A museum bookstore, in addition to selling souvenirs, should provide pieces of information, messages or knowledge that people can take home with them and come back for, such as a complete collection of multi-media CD Roms exhibiting the museum's collection and activities.

Leisure facilities

There will be a refreshment district where restaurants and stores are located. Beside the necessities, refreshments provide both financial and educational benefit for a museum to rediscover. They could be part of the museum attraction or an exhibit that delivers messages.

Theaters

Many different kinds of theaters will be the major attractions of this museum. They will not only provide realistic electronic cinematic experience, but also be a valuable source of education and support the mission of the museum.

Glass globe

There will be a glass globe enclosing a tropical garden

and an aquarium to introduce the plants and animals in a closer and manageable scale.

Plaza

An enclosed plaza will be provided with a small elevated performing stage, and a large open space for activities and seating.

Slogan

"Science as way of learning; Art as way of enjoyment" is the museum slogan which translates to the language of youth as "Science is hot; Art is cool".

Concentration

In order to focus on designing the major exhibition interior, the administration department and library will not be designed in full detail. However, they will be shown as part of the design program to provide necessary alternative spaces to complete the program.

Preliminary Diagram

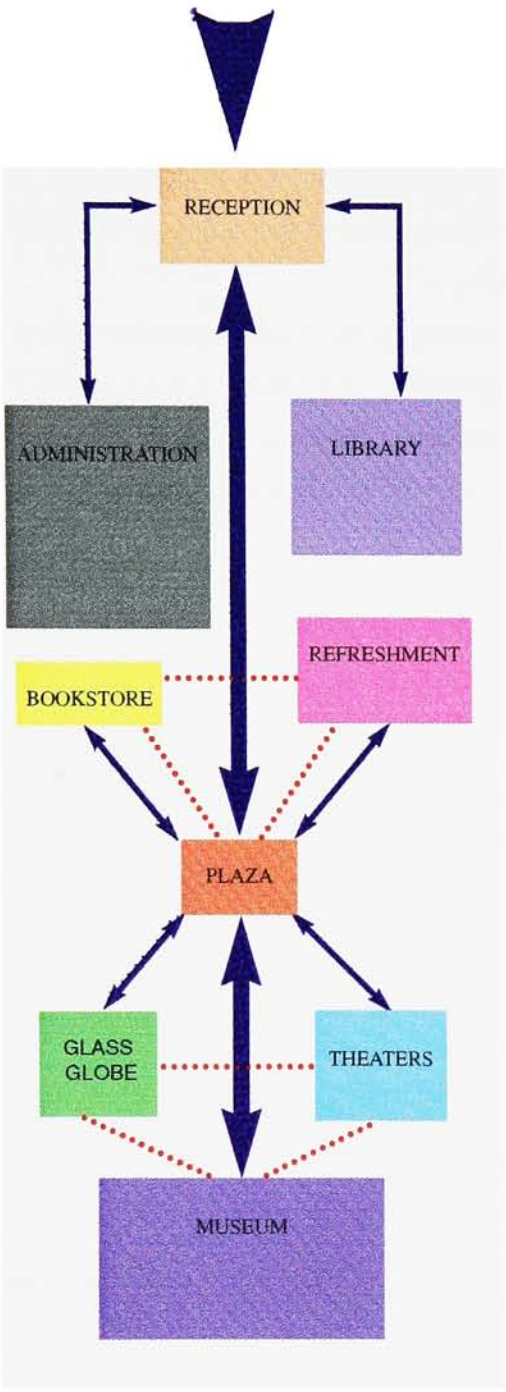


Figure 22 : **Preliminary Diagram**

Shown on the left is the basic initial schematic diagram. The different color blocks represent different departments of the Youth Center. The blue line represents the circulation. The thicker the line is, the heavier the traffic flow is; the arrows show the flow direction. In addition to that, the red dotted line represents the proximities between the different departments.

There are two circulation pools where the human traffic flow is being distributed: the reception area and the plaza. The reception area receives the incoming flow and leads it into three sections: the administration, the library and the plaza. The administration and the library are two departments being separated from the main traffic stream for better noise control and privacy. The plaza contains the main stream traffic flow from the reception area and forms a second circulation pool where five major active, public facilities are connected: bookstores, refreshment, glass globe theaters, and the museum.

At this stage, the exhibits have an equal position with four other supporting departments, yet are far from the main entrance; the reception area. The purpose of this project is to create an environment for youths' activities rather than a single museum alone. In order to do so, one stratagem is to create a special shopping district, along with the museum, to provide an additional motive for visitation. Another stratagem is to highlight the museum by illuminating certain popular facilities such as IMAX theater, aquarium, etc.

Therefore, the bookstore, the refreshment facilities and the plaza become a tri-shopping area while the museum forms another tri-active area with exhibits, the theater and

the glass globe.

Even though the basic diagram is clear at this point, there are issues of concern at the further stages. For example, all of the departments are under the administration's supervision and should have certain accessibility to the supervisor. Second, many facilities require a service entrance for daily delivery, such as the restaurant. Furthermore, the actual physical size of each department will alter the diagram. The more details the diagram includes, the more changes will have to be made. Therefore, a second, more detailed diagram is necessary.

Preliminary Building Diagram

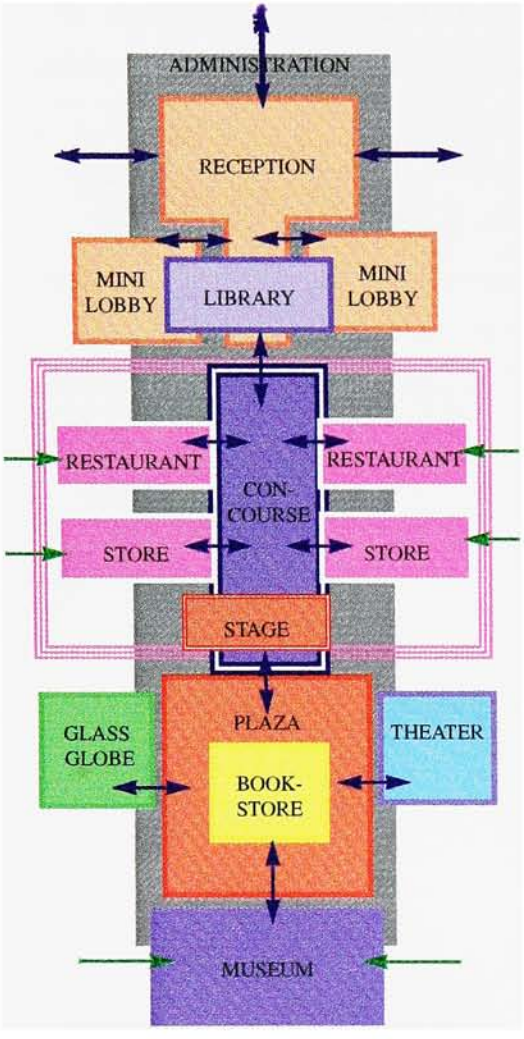


Figure 23 : **Preliminary Building Diagram**

The diagram shown on the left is a final building diagram, a refinement of the initial diagram, with more details, and in symmetrical order. The different color blocks still represent different departments, but one department may have more than one block representing different areas within. The blue line represents the circulation, and the arrow shows the flow of traffic, while the green line represents the service traffic flow. The tri-line square identifies a shopping district.

Administration: This is the supervision department, and should have easy access to all, but still maintain it's own privacy. As I stated before, the administration department will not be designed in full detail, but retain its position in the program. Therefore, I have decided to preserve the basement for its future development, along with mechanical space. In this way, each building could have access to the basement through stairways and elevators. Therefore, the ground around the potential basement space will be excavated considering the offices and classrooms in the department will demand natural light and direct access to the outdoors. However, this part of the design will be excluded from the final drawing.

Reception: Instead of one grand entrance, there will be three major entrances to accommodate the size of the Youth Center and the energetic young visitor group. In addition, two handicapped entrances will also be provided.

Many of the public rest rooms are hidden in the corner of the building. To provide visibility and security, public rest rooms adjoin two mini lobbies.

Library: The library is one of the departments which require higher privacy and quiet. The basement is reserved for administration. A high rise library is a natural and good

alternative. Not only will the library have a great view in overlooking the entire Youth Center, but it will also reside in a symbolic position.

Shopping District: The tri-line square representing the original refreshment block and the concourse, comes from the main traffic stream shown in the initial diagram. The length of the concourse can be adjusted according to the actual number of stores provided.

The Plaza: It includes an elevated mini-stage between the concourse and the plaza where people can see it from both sides.

Bookstore: The bookstore could have been located in the shopping area, but it would lose its identity. This is a museum bookstore. It is unique and is intended to strongly support the museum activities. In the building diagram, the book store is placed above the plaza and in the center among the museum, the glass globe, and the theaters. One intention is to show the close relationship among all of them and possibly connect each with elevated tunnels in the air. Another intention is to make the bookstore itself become a high rise monument in the plaza to attract the youths' attention.

Theaters: The primary plan is to have several of the most popular and advanced theaters which means a planetarium and an IMAX theater. But, they are both very large facilities. Certain adjustments later on in the design process are expected.

Glass Globe: In order not to compromise the symmetrical arrangement, the globe will have to adjust its size according to the size of the theaters across from it.

Museum: The museum remains in its original position and naturally will be a multi-story building.

3-Dimensional Building Diagram

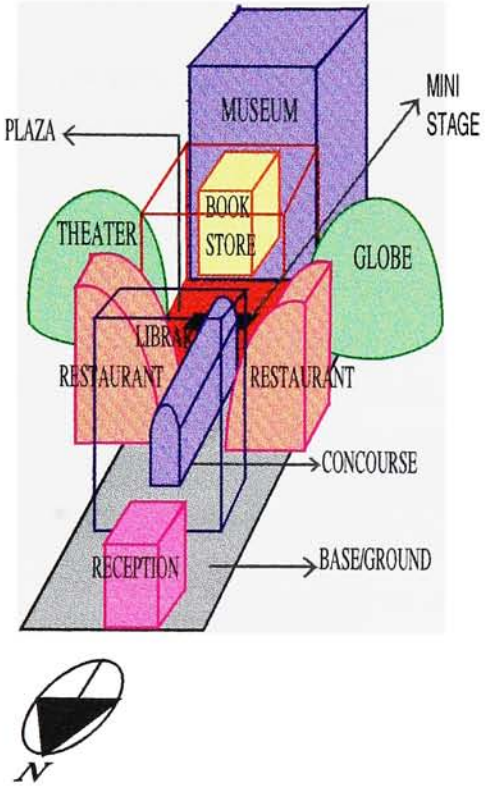


Figure 24: **3-Dimensional Building Diagram**

3-D Diagram: The third diagram is a three dimensional diagram which was projected from the building diagram. It shows a rough idea of the building massing and how the vertical relationships will be among the major buildings.

In addition to the functional aspect, the reason for the form of the building is to create an interesting structure which reflects the theme and spirit of the Youth Center for Art and Science.

The gray flat area represents the administration department in the basement which will not be developed further in this project. Starting from the north, a single open space for reception is followed by a high rise library building and connected to a tunnel with two restaurants side by which lead to the plaza with a dome structure on each side, the bookstore on the top and the museum at the south end. The reason for the shape of the restaurant is to create stepped up multi-lofts to provide an open view from the restaurant toward the concourse, including the mini stage at the end of it. The glass globe is intended to be a dome shaped green house, while the theater on the other side is an OMNIMAX theater. An OMNIMAX theater is an alternative choice to an IMAX theater with a dome-shaped screen instead of a flat screen.

Chapter 4. Application

Building Relationship
Reception Lobby
Main Concourse
Telephone Booths
Restaurants
Mini Stage
Indoor Plaza
Eastern Dome
Western Dome
Museum Building

Building relationship diagram

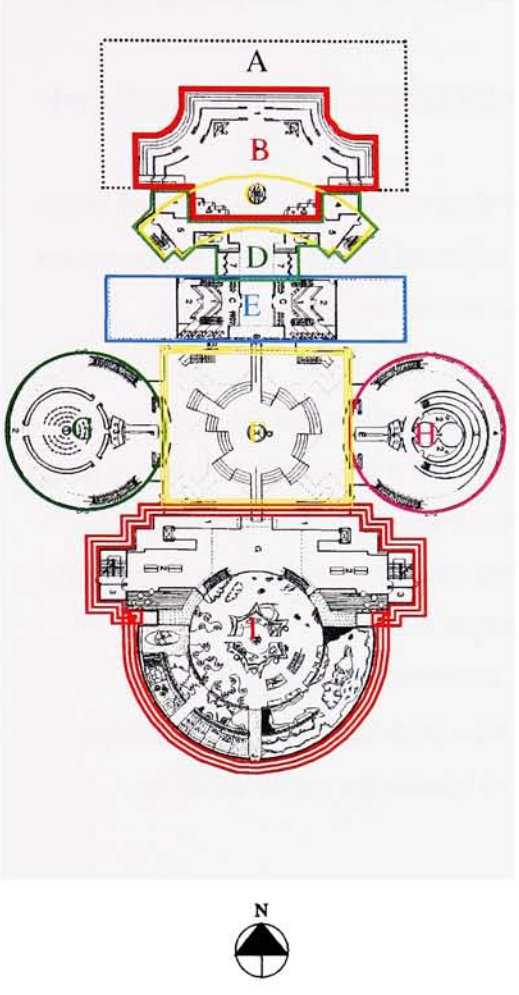


Figure 25 : **Building relationship diagram**

It is clear from the diagrams that the design direction of this project is generated more by the first floor horizontal flow than by each functional section vertically. Therefore, it will be easier to understand the project by introducing it in the same way which is by first presenting an overall First Floor Plan, and then each section in detail.

Material

The whole building group consists of large amounts of glass to emphasize the character of youth; their purity, and high sensibility to the surroundings.

Building relationship

Shown on the left (figure 25) is the final First Floor Plan with color contour highlights representing different building sections. The building group retains symmetrical order in conformance to the original building diagram. From north to south are:

(A) The outdoor reception plaza;

Shown in black dotted line is a platform for visitor's transition from vehicles to building.

(B) The reception building (with red contour):

One story, 20' high open space with double glass curtain walls on three sides (except north where it leads to the lobby area). A glass elevator in the center connects the library to the upper floors.

(C) The library is a narrow curving multi-story building (represented here in yellow line overlapping the green lobby area) above;

(D) The facility lobby section (green contour);

The facility lobby includes coat rooms, rest rooms and two mini lobbies beside the stairway to the library level;

(E) The major concourse (in cyan);

The concourse has one restaurant on each side and a mini stage at the end. The concourse carries the major traffic flow to the square plaza and is covered by a transparent, half circle sky light on the top.

(F) Enclosed plaza with bookstore above (in double yellow line);

The plaza gathers the flow underneath the elevated bookstore. The plaza also is adjoined by the domed structures on the east and west and the exhibit building on south.

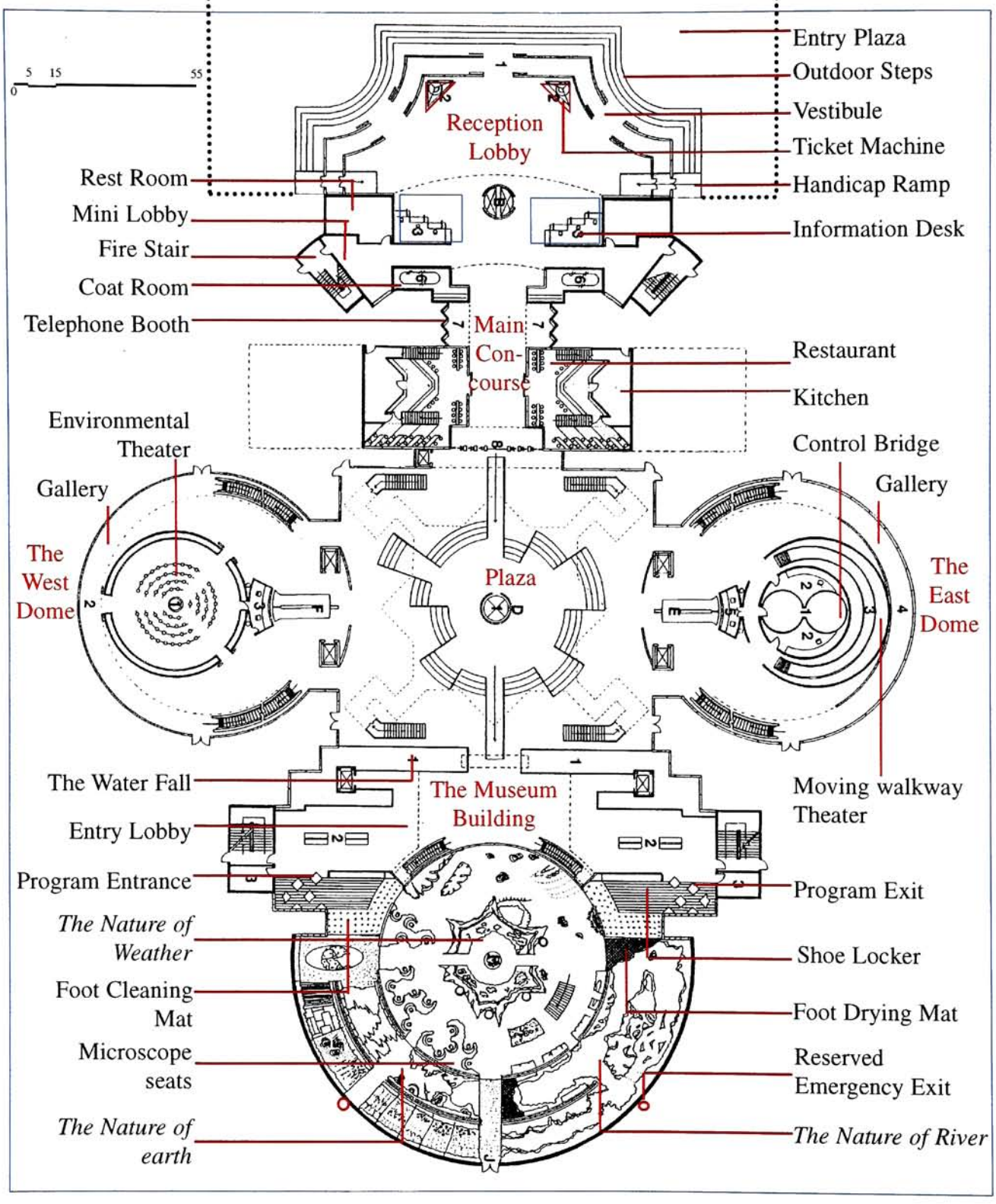
(G/H) The Domes;

The Green dome is the glass globe and the orange dome is the theater. Both domes have a basement, two upper floors and a transparent glass dome ceiling to seal the contents. The east dome has another smaller glass dome within, while the west dome has an opaque one in it.

(I) The main exhibit (museum) building;

The circulation sequence from the north culminates in this four story wing which houses the major exhibits.

Figure 26 **First Floor Plan**



Walk through the building

I provide many segments of the floor plans and sketches as reference for the content, as I explain the details of the building. The floor plan segments vary in scale, and the sketches are not in exact measurement. However, they are in proper proportion. They are represented this way so that the reader may easily interpret the designs.

The entrance plaza, which I have mentioned above, is an earth-toned, rubble stone transition from vehicle to building. Several recessed fountains are placed in it irregularly.

The Entry Plaza

The reception area begins from the four steps around the building's front entrance. The steps are not only designed for the imposing façade of the museum, but they may also serve as seating for museum visitors. Most of the young visitors are under driving age. Therefore, they will be picked up by parents or school buses, etc. In good weather, this will be a nice place to wait and move around outside of the building.

The outdoor steps

Vestibule: Two parallel, full height, glass, curtain wall vestibules, on three sides of the building provide great visibility from both inside and out. They also serve as a form of insulation during winter. The 6'-0" wide space between the parallel pieces of glass is another excellent area reserved for seating. Three, 10'-0" wide, electric, double glass sliding doors serve as entrances for the handicapped at sloped entrances on east and west sides.

The marble floor: Marble is an excellent material for lobby floors because of its durability and grandeur. The lobby floor is composed of a variety of Italian, colored marbles, in abstract arrangement, though all the tiles are the same size. This pattern not only brightens the lobby image for youngsters but, more importantly, it is a statement of the spirit of American Youth: liberty, creativity, vitality, diversity, and equality. The acoustic tiles on the ceiling shall have a similar arrangement but lighter colors

The Reception Lobby

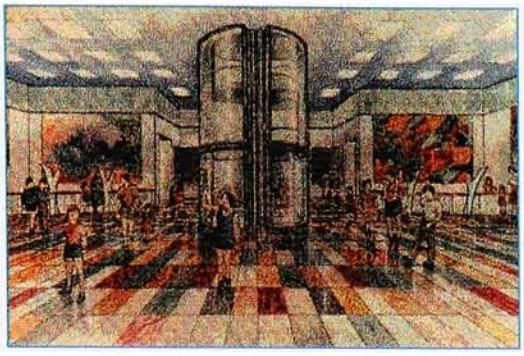


Figure 27:
A perspective view of the reception Lobby from North Entrance

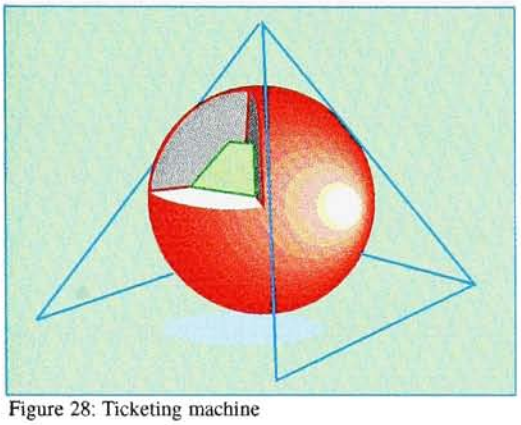


Figure 28: Ticketing machine

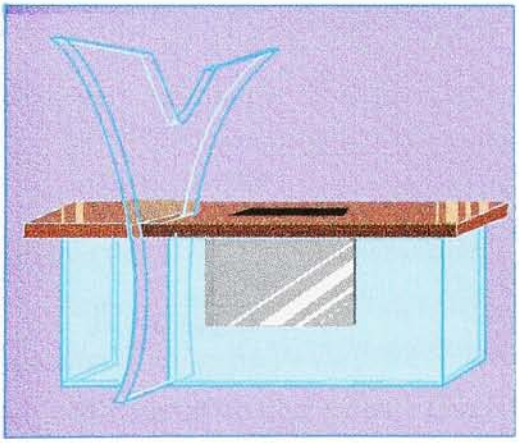


Figure 29: Information Desk

will be used. Sculptures will be suspended from the ceiling. The marble tiles are also a continuation of the theme of the stones in the square outside of the lobby.

Elevator column: At the center of the lobby there are two semi circular, transparent, glass elevators which form a grand glass column for the lobby. These take people to the library upstairs. From the psychological point of view, the elevator is a symbolic lure for children to use the library: a curiosity path to knowledge; Jack's magic bean stalk to the world of knowledge.

Projection wall: The south lobby wall also has a continuous transom which leads the viewer's eyes to the main concourse. The walls are reserved for large art work, and also serve as screens for a multi-media projecting system for promoting programs at night.

Ticketing machine: There are two machines in the reception area (outlined in red) as shown on these Floor Plans.(figure26) They are also shown in a three dimensional sketch in figure 28. The recessed part of the machines are designed to sell entrance tickets, brochures, and maps, as well as display exhibition information on a screen that can be printed out if needed. The spherical part of the machine has an interior projector which projects images on its surface. Another purpose of the machines is to create a do-it-yourself atmosphere to encourage the young visitors.

Information Desk: After the visitors walk through the entrance they can either get tickets from the ticket machines or cross the lobby to the information desk for help. There are two information desks in the south end of the reception lobby (shown on the floor plan with blue highlight squares). Each desk(figure 29) consists of three units. These desks are

Facilities units

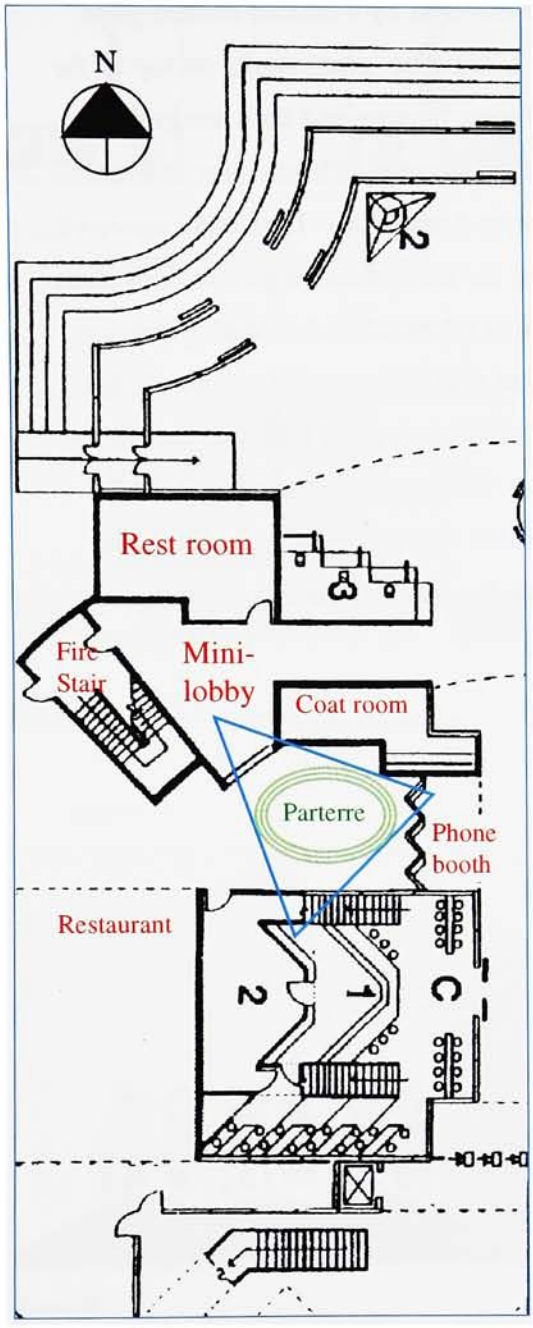


Figure30: First Floor Plan Segment of The Youth Center for Art and Science.

designed for children; with a lower counter and a recessed computer underneath which has a similar function to the ticket machine. The monitor is designed for visitor and employee use, meaning it can be viewed from either side of the desk. Therefore, the staff member will be able to assist very young or shy children by interacting with them through the computer screen. The Y shaped partition functions as signage for the information desk and at the same time reinforces the structure of the desk's base. The base of the desk is made of clear plastic with a piece of stainless steel plate in the front to cover the computer underneath.

The coat room: The coat room is located between the hallway to the rest room and the beginning of the main concourse. The L shape counter serves the crowd without interrupting the traffic flow. The 10' wide hallways that lead toward the mini lobby provide space where a line for the coat room can form. The length of the L shape counter is 6' in this floor plan to show a basic idea. The actual counter should be longer according to the Center's occupancy.

The mini lobby: The Rest Rooms require privacy. However, it is possible to place the rest room in a location where it is hidden from public view but is still easy to find, safe and comfortable. A mini lobby provides seating and supervision for the young visitors. Referring to figure 30 the south side of the mini lobby is a large glass wall which provides a great deal of light. This glass wall along with those of the phone booth and the restaurant, form a triangular visual pool as shown in figure 30. Within this area is a parterre providing a pleasant view for all. At the end of the two mini lobbies are stairs which connect to the library upstairs.

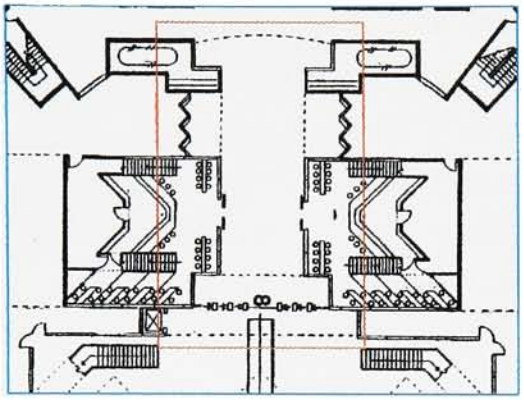


Figure 31 : Floor Plan of Main Concourse

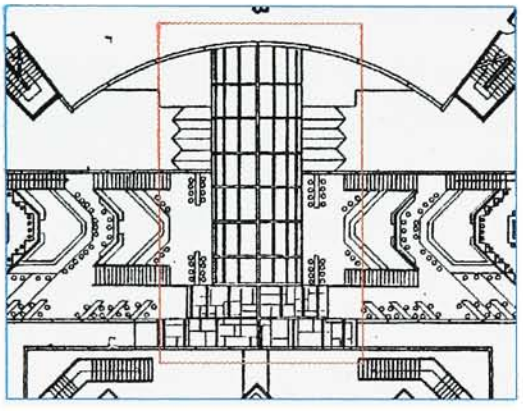


Figure 32 :
The roof view of The Main Concourse and the mini stage

The main concourse: The main concourse is 20' wide, , 50' long, 25' high and is covered by a double shaded glass vault skylight.(Figure 31, 32) The glass vaults on top of the mini stage have two different heights and both are higher than the vault of the main concourse.(Please refer to Figure 39A or the Cross-section in Appendix.) The center space of the concourse is reserved for seating although I did not show it in the drawing here. It is where all the shopping districts connect and allows a great deal of free traffic flow. At the end of the concourse are six ticket gates with one special gate for handicap access. This is where the machines take tickets and control the traffic flow. Due to the vulnerable nature of the facilities, no food is permitted beyond this point.

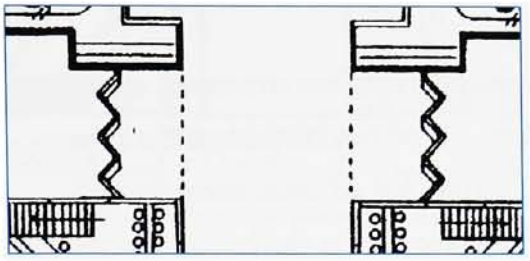


Figure 33.:
Floor plan of the telephone booth and concourse

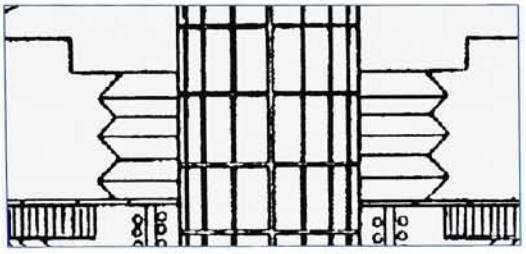


Figure 34:
The roof view of the telephone booth and concourse

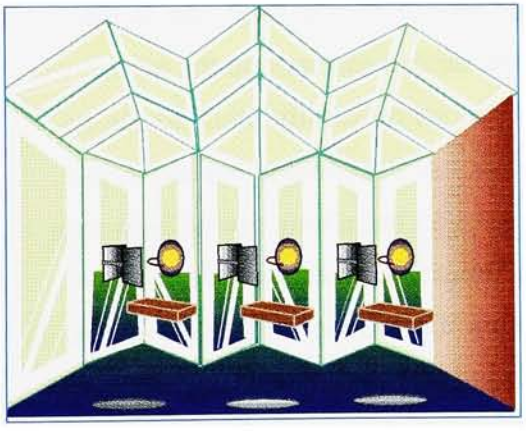


Figure 35 :
Perspective sketch view of the phone booth.

Telephone booths: The telephone booths are located in zig-zag recessed areas along the main concourse. Figure 35 is a sketch of the phone booth. My intention is to create an architecturally integrated phone booth. The walls and roof are made of glass and steel cable. Like many other units in this project, the phone booths can be extended according to the length of the corridor. In addition to the consideration of sun control the glass portion is reserved for the architectural glass artist's creation. The gray squares are automatic extended screens, the circles are sound boards and the red lines are adjustable speakers. The seats adjust, by sensor, to correspond to the user's height. Ideally, only the user could hear the conversation. Circles on the floor indicate where the next caller should wait to use the phone.

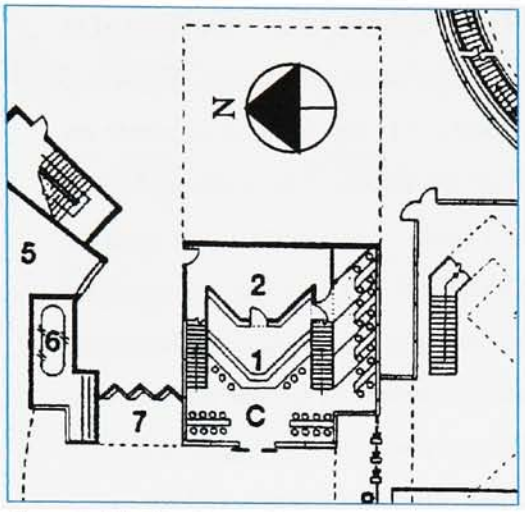


Figure 36 : The First Floor of Restaurant

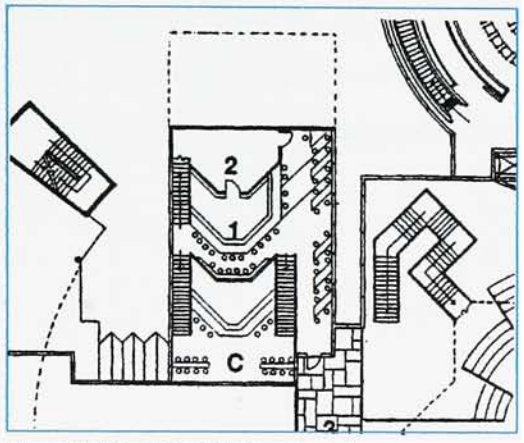


Figure37: Second level of the restaurant

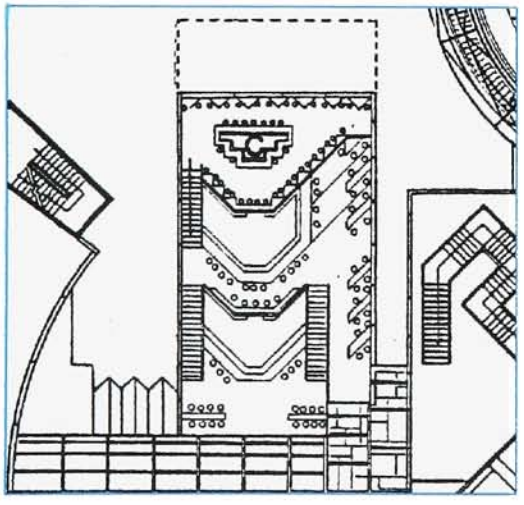


Figure 38 : Third level of the restaurant

The restaurants: These are two glass structures, each with a 30' high open space. These two restaurants have the same basic structure and layout, but different decorative themes. There are two basic sections in each restaurant: service area and working area. The service area is an open space with a ground area and two lofts up to the roof. The first loft is 11' high; the second is 9' high. Each level has a bar with a working area and kitchen underneath each loft. A double, automatic, glass, sliding door serves as an entrance at the ground floor. Next to the door are two rows of high stool seating. A main service counter facing the door with stairs on each side goes to the upper levels. There is a service door underneath the south side stairs with an 8' high clearance. The working area inside the counter is higher than the service area outside the bar. Therefore, the seats on the south of the bar are steps down to the ground. The kitchen is behind the working area with one service door in front, one in the south side of stairs and one service entrance on the north side. This is a restaurant that serves mostly snack foods, so the kitchens are small as most of the cooking is done in the first floor kitchen. The east wall has a long row of high windows, and is reserved for fire stairs. Outside of the wall is the loading area for delivery. On the second level, a row of seats is placed along the edge of the loft where there is a narrow circulation space between the bar seats. The major seats of the second level are located on the south side of the bar and a bridge extends to an outdoor terrace that can be used as a mini stage. This connects the two restaurants. The second service counter is a juice bar where all kinds of natural fruit and vegetable juices are served. There is only one stairway

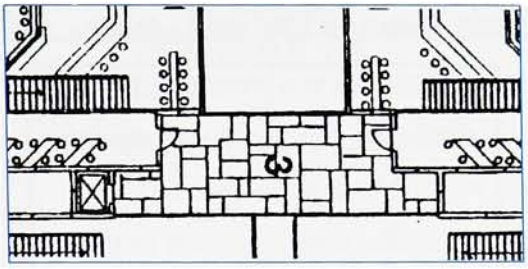


Figure 39 : Mini stage

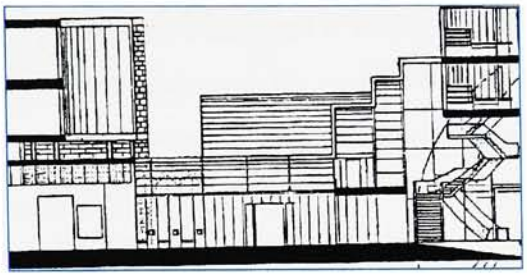


Figure 39A:
Section of the Main Concourse and Mini Stage.

going up to the top level. On the top level of the restaurant is a unique healthy ice cream bar. This probably is the only food that could make people climb that far. Most of the seats are arranged along the edge of the loft for a better view. The east wall is sloped backward to the east to match the circular roof top. The south wall of the bar is reserved for fire escape.

The mini stage: This is an 11' high bridge or terrace which connects the two restaurants. It serves as a terrace when un-programmed and serves as a mini stage for musical performance when planned. It is 13' deep and 22' wide on the concourse side; and 40' wide on the plaza side, therefore it is a two sided stage. As shown in Figure 39A, the mini stage has a higher glass vault than the main concourse, so the viewer can watch the performance from both the main concourse and the indoor plaza. Ticket gates are below the mini stage. This is a stage made to encourage young artists to perform in public as groups, or as an individuals. There is a lift for handicap access in the west side corner.

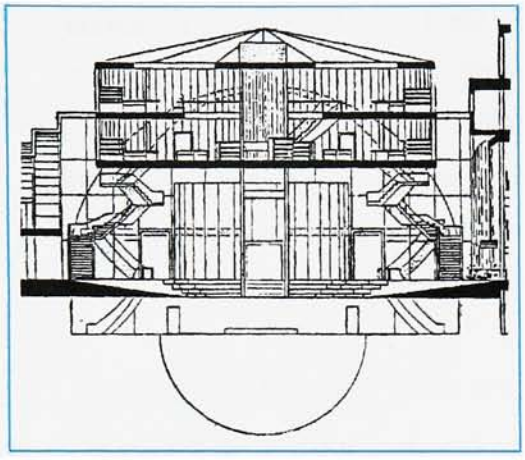


Figure 40: Cross section of the plaza and book store.

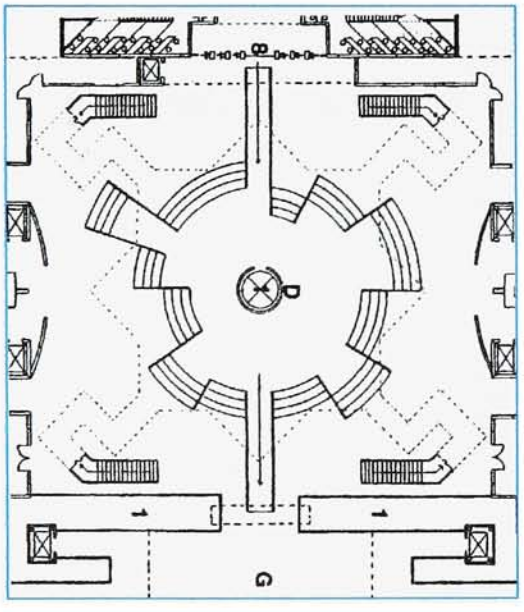


Figure 41: The Grand Plaza Floor Plan

The Indoor Plaza : This plaza is a 120' wide square enclosed by 36' high glass walls. This is a transition to the natural science museum on the south, the two dome structures on the east and west, and the bookstore above. Specially designed, concave, circular steps go down to the center of the plaza as shown in Figure 41. The plaza is designed for the young visitors to rest and get together with friends in different size groups. That is the reason the circle is cut into different lengths. Each piece either pushes in or out of the center to create different gathering corners. This idea came from my visit to museums, especially the museum of Versailles and the Louvre. In Versailles, due to the nature of the building, there are not many seats available for visitors. Surprisingly, in a corner of the building where the grand stairway was located, hundreds of teenagers were seated on the stairway talking. Even in the Grand Louvre where much seating is provided, many teenagers still sat on remote stairs. They seem very comfortable with a space of this kind. This plaza is designed for young visitors to rest and gather in the circle while enjoying the performance on the mini stage. In addition, there is a glass elevator in the center. Four double swinging doors on each corner lead to an outdoor garden.

The Staircase: For the younger child, a staircase always means something unknown. I often see parents having trouble with young children who want to go to upper floors just because they are curious to see what is up there. "Just one peek" they say, even though they were told not to go beyond the exhibition area. Based on this observation, I placed steel staircases on the four corners of the plaza to the bookstore 25' above. Figure 40 is a cross section of the plaza which shows the staircases and how the plaza's glass walls

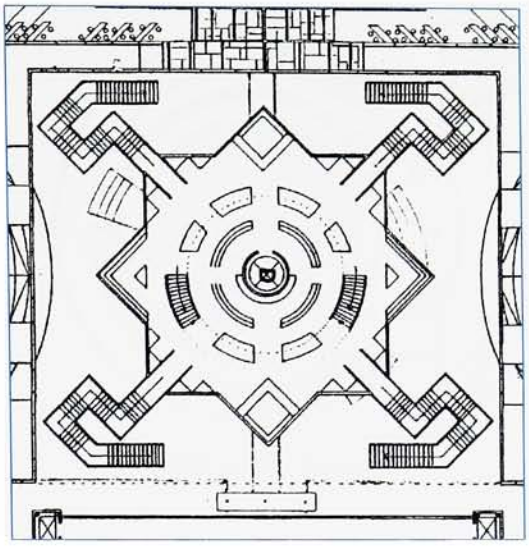


Figure 42: The first level of book store.

connect to the concourse and the nature museum.

The Bookstore: There are two levels to the store. The first level has an open space in the center for the elevator. (It can be reserved only for handicapped if it is necessary) The elevator goes up to the second level and connects the loft with the bridge. The second level is a donut shaped loft with stairway on the east and west sides and a donut shaped sky-light on the roof. All of the surrounding walls are transparent glass. One can oversee the main concourse, library, domed structures, and the museum building from this book store. The four staircases are 6'-0" wide; while ascending or decending one turns in five different directions. The staircases also make great observation points.

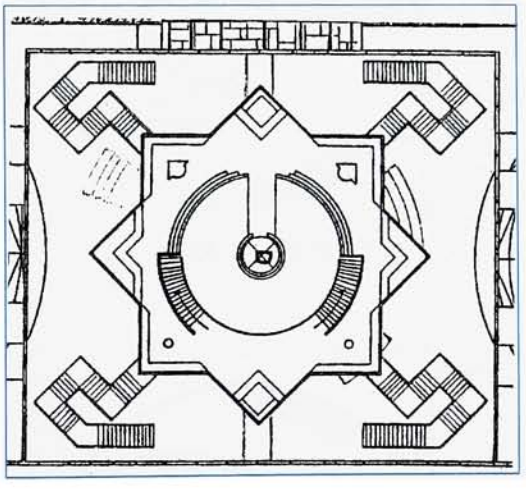
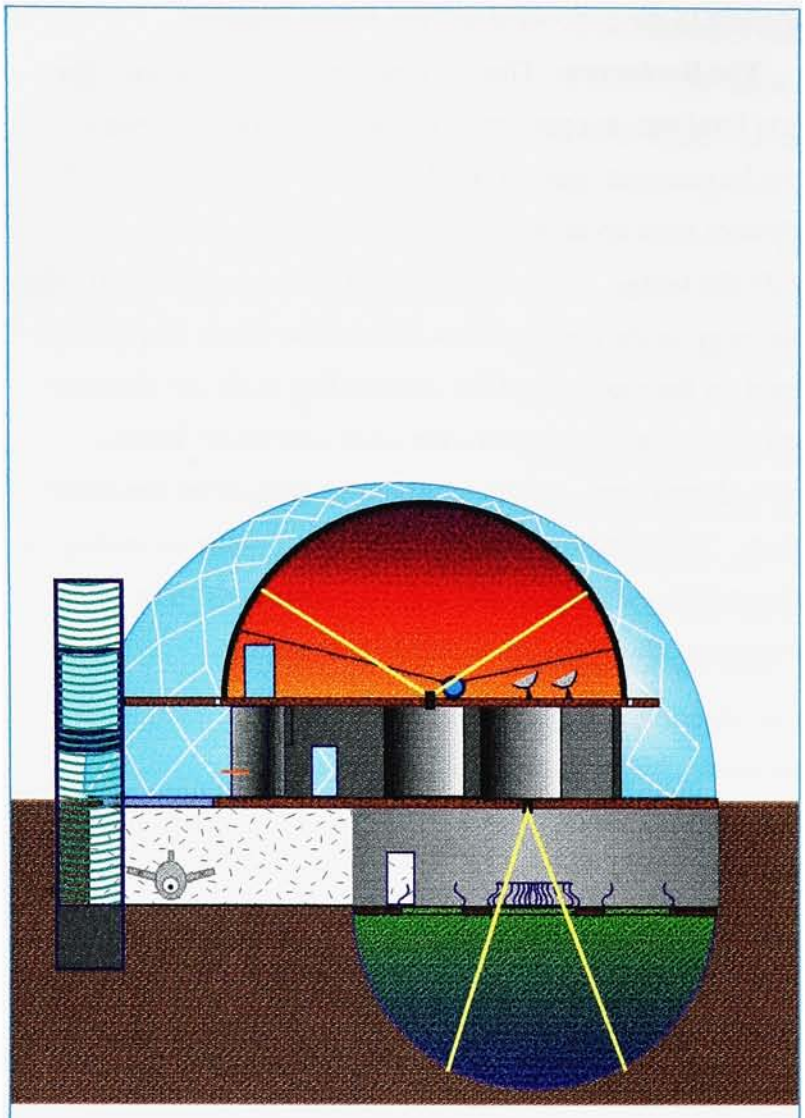
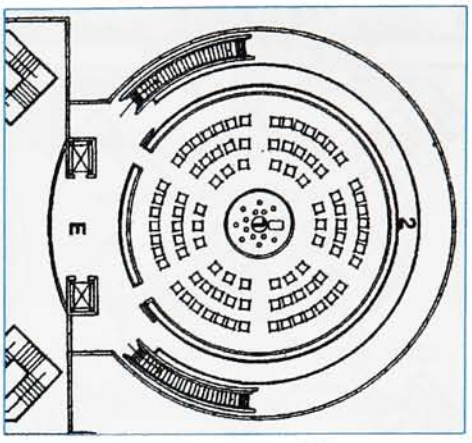


Figure 43: The second level of book store

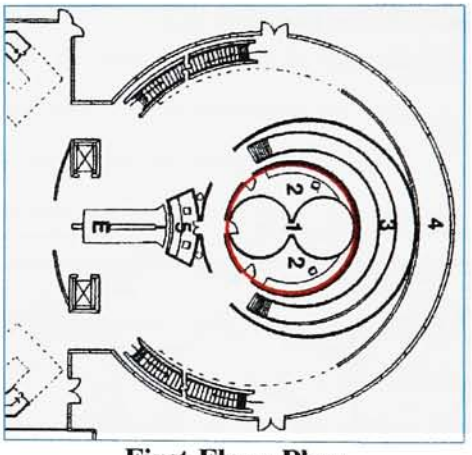
Figure 44 **The East Dome**



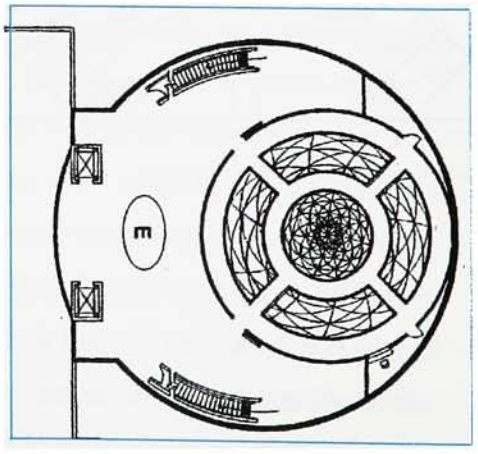
Cross Section



Second Floor Plan



First Floor Plan



Basement Floor Plan

The Dome structure: The 100 diameter dome consists of glass, steel bar and chords. The building has three levels with two elevators in the front. The two escalators on the north and south sides lead to the ground emergency exits.

The entry lobby: The first floor includes an entry lobby with inlaid glass floor that leads to a reservation booth. Behind the booth is a moving walkway theater with a control bridge enclosed in the center shown in Figure 34 East Dome First Floor Plan (red circle)

The control bridge includes two projection rooms in the center and two other mechanical rooms on the side. One of the projection rooms is for the omnimax theater on the second floor, the other is for the bird's-eye view theater in the basement. "The size of an IMAX projector is equivalent in size and weight to a small automobile"(9) Due to the latest technology, the two projecting systems for each theater is very compact and easy for one person to operate. Each room has a 15' diameter space. The standard projection system for omnimax theater usually projects in a horizontal direction. "The key to its superior performance is the rolling loop film movement which advances the film horizontally (not vertically as is standard) through the projector in a smooth, wave-like motion."(10) However, in order to combine the planetarium and the omnimax theater, I am assuming the technique could be altered into a vertical direction. The bird's-eye view theater requires an over head projection system. Therefore, I placed these two projection rooms next to each other to save space and to create easy access.(Figure 34 East Dome First Floor Plan). Around the control bridge is a laser projecting theater with a moving walkway to carry the viewer through the tunnel. This theater usually plays a brief

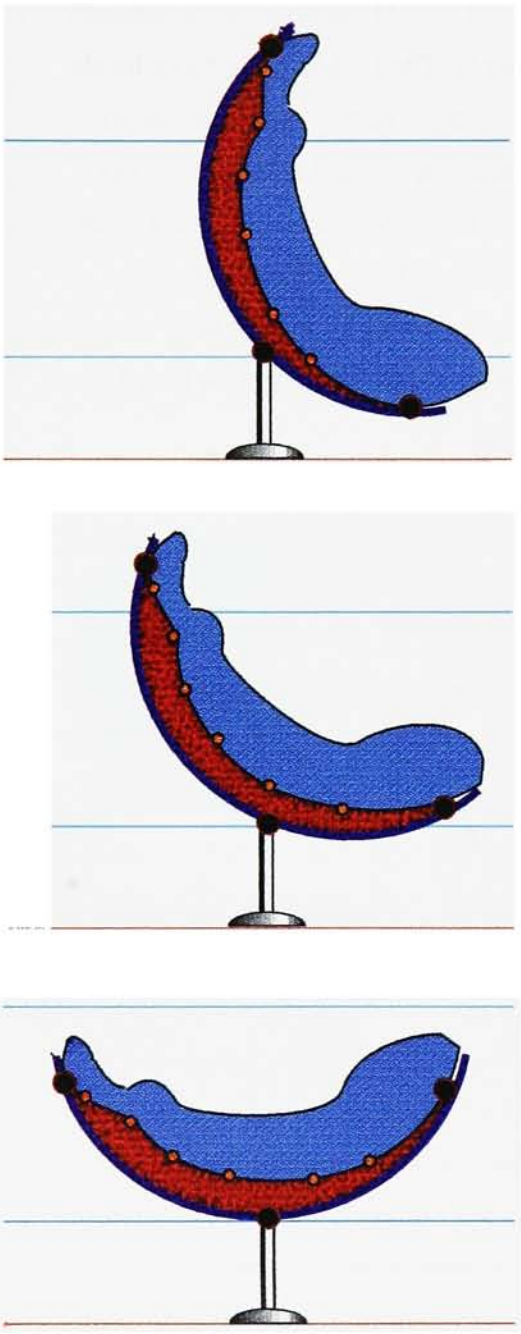


Figure 45: Seats for the omnimax theater

historical prelude to the program showing in the Omnimax theater. In addition to that along the west side of the dome is a planet gallery where a graphic exhibition of the planets is displayed.

The second level of the dome is the theater which combines the planetarium and omnimax theater.

What is IMAX and OMNIMAX? "The IMAX (eye-MAX) stands for "image maximum" and rightly so, because both IMAX(flat-screen) and OMNIMAX (domed-screen) use the largest film frame in motion picture history -- ten times the size of a conventional 35 mm frame and three times larger than a normal 70mm movie frame." (11) The standardized omnimax theater is designed with a domed-screen at a 30 degree angle with high sloped rows of seats. From personal experience, it is not very comfortable to keep your head up all the time to enjoy the presentation. The same is true in the planetarium. Theoretically, the best way to look up at the sky is to lie down. Therefore, a specially designed seat is necessary to assist the viewer in enjoying this presentation. Figure 45 is my design for a chair that can turn from the regular 45 degree to a 180 degree angle, which will automatically adjust according to the performance. I call this the sunflower chair (the sunflower faces the sun). The chairs face the dome screen. The chairs have a perfect, half circle, hard, back bar support to control the sloping angle and a soft cushion with supporting points that adjust to the viewer's body. More important is the head rest which has a round design to support the whole head not just the neck.

There is a narrow deck around the west side of the theater which is a great place for visitors to explore the structure of the dome. This deck is also a good choice for the kite gallery.

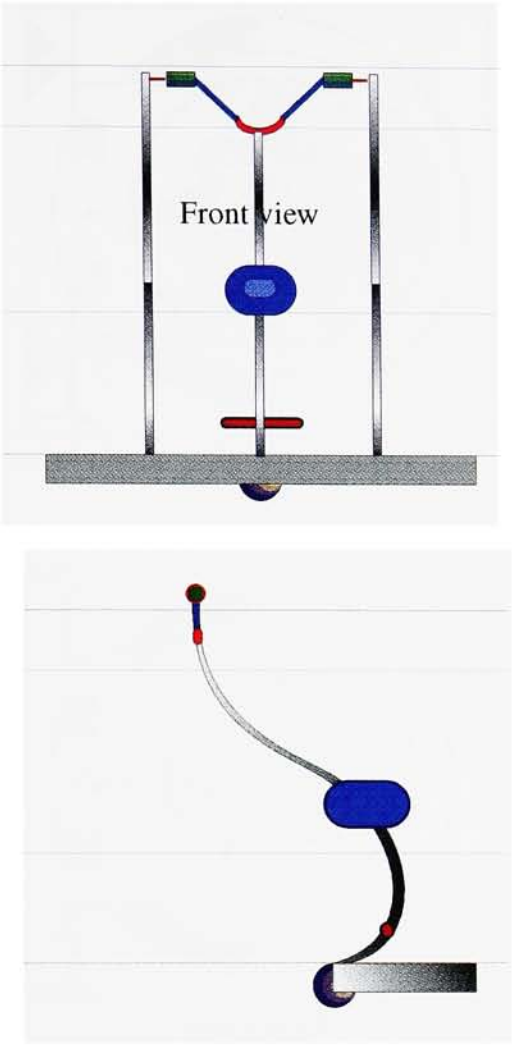
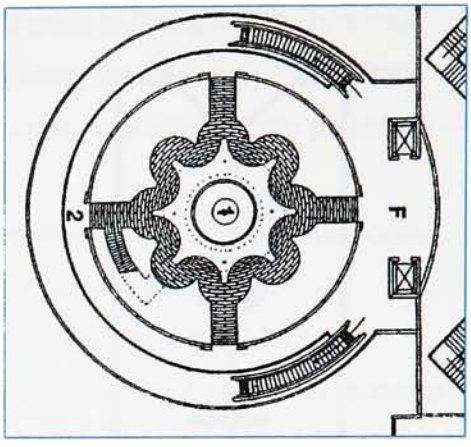


Figure 46: The handrail seats for the observation bridge.

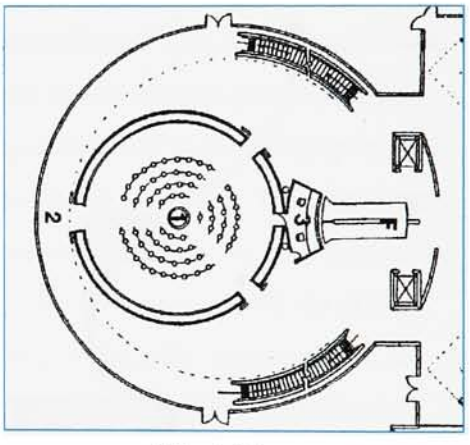
The basement is where the bird's eye view theater is located. This is a unique theater in which the viewer stands on the bridge and looks down into a concave dome screen which receives images from overhead. The films are shot from a bird's eye view to show the beauty of the earth. I designed a special diving- simulation seat for this theater to match it's theme. The railing on the bridge converts into a support to hold the viewer at a 120 degree angle from the floor edge to look down into the concave dome. This sky diving position is to make the ride more interesting. As shown on the figure 36 there are three different views of the railing. The (cyan) horizon lines are reference lines to show the height in relation to other views. The regular railing is made of steel pipe in an S shape. It turns into seating by adding a cushion, a foot rest and Y shaped adjustable hand bars. The seating and the regular railing is an alternative order(Figure 46). The red rubber rope which connects the handrail and the hand bar are adjustable for the user for greater comfort. The seats are installed on the floor's edge by an adjustable ball that controls the angle of the railing. It is just like riding a bicycle. Outside of the theater is a mini airplane model display with natural light coming through the glass from upstairs.

Figure 47: **The West Dome**

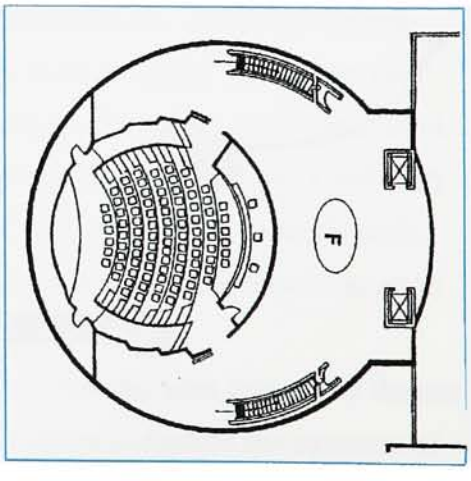
Cross Section



Second Floor



First Floor



Basement

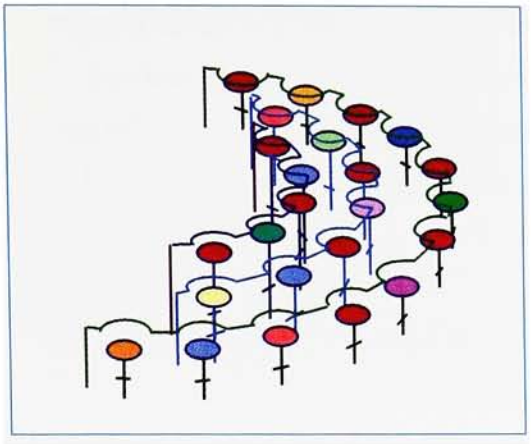


Figure 48: The seats in the environment theater.

Dome Structure: The west dome has the same basic structure as the east dome except, it has a second glass dome inside.

The first level is a 360 degree environmental theater. The double wall encloses all the necessary equipment within. Usually, this type of theater provides only handrails instead of seating. Because of that, the viewer must always be warned not to sit on the handrail. So, I designed rows of stools to go around the circle.(Figure 48) Each row of stools remains the same height until the presentation. The closer to the center, the higher the stools will be raised for better view. The center of the circle is a recessed lift reserved for wheelchair. The purpose of this system is not to make the inside seat better than the outside seat. Because, this is a 360 degree theater the height differences will be carefully calculated so that each spectator will have the same quality view. Theoretically, with a computer generated sensor, each stool could be adjusted individually. The key design of the stool seat can be rotated and the back rest does not stop the viewer from turning around, because this is a 360 degree movie theater. Like the east dome, there is a gallery behind the theater.

The Basement: The basement is a 3-D theater with it's own projection system and special headset for the viewer to provide 3D and *virtual reality* vision. This theater can also serve as a lecture hall. In contrast to the sky diving theme of the east dome, the topic of this theater is scuba diving. Therefore, there is a mini submarine model that the children can play with and the natural light coming through the glass floor above creates a very dramatic effect in the basement.

The second level: The tropical green house is the major attraction of this floor. It is based on a hypothetical solar

system which requires very little mechanical space to convert sunlight to energy. The energy is collected, generated and converted to electricity through the dome structure. Like the east dome, there is an observation deck around the tropical green house too. The greenhouse has a flower-petal like walkway with four automatic, double, sliding glass doors at four sides. The walkway is the result of careful planning. Each petal is 6'-0" wide and each half circle is 12'-0" in diameter. This is designed for small group study so that one can get a closer view of plants and flowers. There is also, however, enough space for a wheel chair to move around. The center of the green house is a glass ball aquarium which has a column running through the middle. The column provides heat, light, oxygen, food and filtration to the ball. The ball is elevated in the air, supported by the center column, and has an observation deck around it.

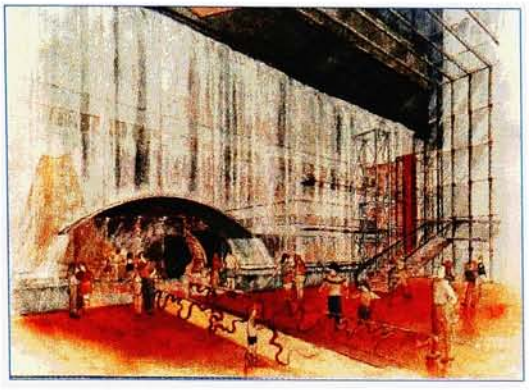


Figure 49:
The perspective view of the museum building entrance.

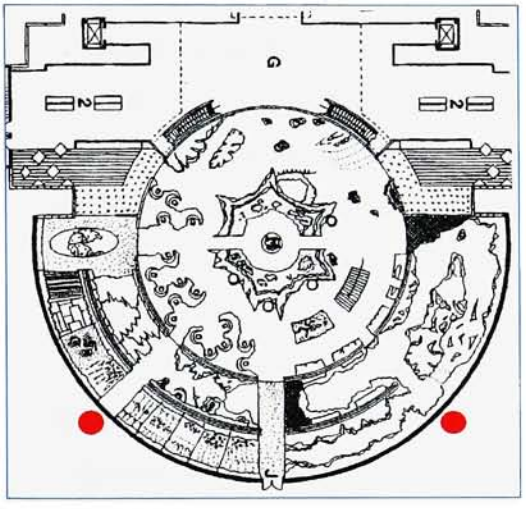


Figure 50: First Floor Plan of Museum Building

The Museum Building: This multi-story building has two symmetrically placed elevators. There are two fire stairs at the east and west ends of the building along with Rest Rooms, and a pair of escalators near the center of the building. The plan is a long rectangle that merges with a perfect half circle.

The Entrance of the museum building is a grand water fall which extends three floors up and across the entire façade.(Figure 49) There is no actual wall between the plaza and the museum on the first three floors. However, the space is enclosed on the top and the sides by glass walls. There are U shaped fountains on each side to hold the water from above and a device in the center of the façade to split the water flow and create a clear entrance. There are rows of water curtains on each side and there are two elevators located between. This is a very dramatic design based on one of America's wonders, Niagara Falls. It functions as an introduction to the natural science museum on the first floor, and echoes the volcano scene inside to support the museum slogan " Science is hot; Art is cool".

The First Floor: The 10' height entrance lobby contains sofa groupings on each side, a transparent glass screen in the center, where you can see a volcano inside, and two escalators which connect it to the Second Floor. The volcano is in the program area about the *Nature of Earth*. As an interior designer, this was an exciting opportunity to design both the exhibition program and the interior. Therefore, out of respect to science, all of the information about the earth is based on The Visual Dictionary of the Earth published by Dorling Kindersley. The idea is to convey to the children how the earth's surface has changed during its stages of evolution.

Figure 51: Oblique Drawing of The Nature of Earth.

Children will experience this by taking their shoes off and exposing their bare feet to the different surfaces. Therefore, most of the design attempts to recreate nature science for educational purposes.

The Nature of Earth area:(Figure 51) The exhibit is a 20' high space open to the second floor. One enters the program from the west, and exits in the east. At the entrance are several colored stools on a wooden floor so that the children can sit and remove their shoes and socks. A wall of lockers acts as a partition that divides this area from the lobby. This entrance locker will take the shoes and send them through a tunnel to the exit locker to be picked upon exiting. Before the actual program presentation area, there is a foot cleaning mat to ensure that children do not carry any dangerous particles to the area. (This job could be done precisely by sensor too.) The program area consists of a circular area and two curved rows of hallways. At the beginning, there is a map room where the children listen for basic instructions and watch several simple demonstrations before they are allowed to actually enter the program area. The ideal walk through sequence will be:

A The *Nature of Land*: two curved hallways in the west;

B. The *Nature of Rivers*: two curved hallways in the east;

C. The *Nature of Weather*: the circle with the volcano;

D. The *Nature of Rock*: the basement: the circular part.

Since, this is a fairly large section of the building the numbers of emergency exits are critical. There is one emergency exit on the north between the A and B sections and one other exit reserved in each section as shown in little red circles. (Figure 50)

The exhibits not only display the information by showing

a cross-section relief model on both side sof display wall, but also duplicate a miniature on the floor. The children can read the cross-section while they walk on top of the floor model. In addition, the children will also see projected images on the walls and ceilings.

In the A section, (*The Nature of Land*) is the formation of earth where they experience nine different surfaces of earth.

In the B section, (*The Nature of Water*) are displayed the different natures of river. There is actually water, 1 1/2" deep, on the recessed floor. There are two foot-drying mats at the two ends of the river section where the children can dry their feet.

The C section *(Nature of Weather)* includes the simulated volcano. Inside of the volcano are many different volcano scenes made of safe materials to prevent injuries.

The wind ball: I designed two devices to match the nature scene in this section. One device is the wind ball, which is a glass ball with a recessed base. Activated by a push button, it blows the wind from a certain direction to form a sand dune in the glass.

The microscope seat: Another device is my favorite part of this section; It is the microscope seat area. Seats are built in a cave-like wall to integrate with the other exhibitions. Each seat is equipped with a chair, a light table, built in microscope,and a whole case of different kinds of rock samples. Each rock sample is preserved (cast) in a thin piece of acrylic glass like a mini compact CD case so that it can be inserted into the microscope directly. The light purposely illuminates the rock sample case, which makes the case itself worthy of show. This is just one part of the rock section

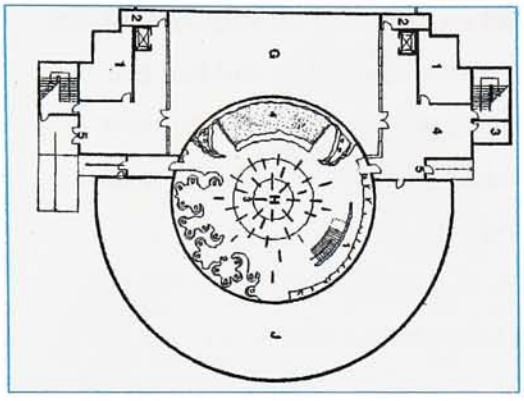


Figure 52:
The Basement Floor Plan of the Museum Building

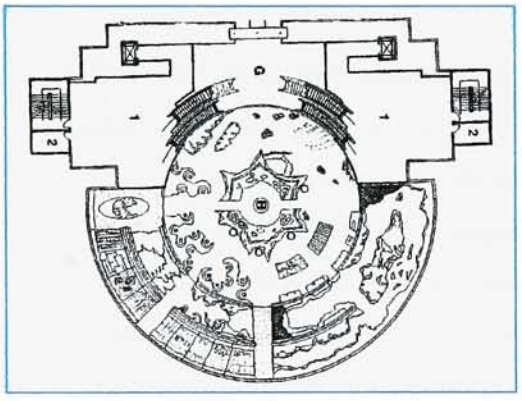


Figure 53: Second Floor of The Museum Building.

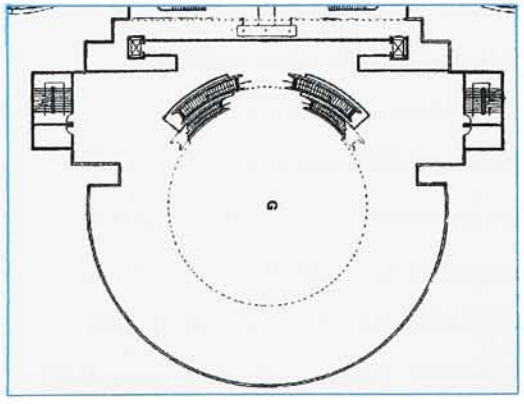


Figure 54: Third Floor of The Museum Building.

which extends to the basement where a component of rock is shown: the mineral.

Basement:(Section D) Following a walk through a brief pictorial of history of the cave, the center of the basement is a large two level platform. On the platform there are different kinds of large, thin, mineral slices displayed vertically as screens in a maze-like pattern. These mineral screens will have very impressive translucent images in very large sizes, with sources of light coming from underneath the platform. The purpose of this display is to amaze the children and pique their curiosity.

Another display is the *fossil factory*. It includes two stations where tools and instructions for digging are provided for discovery in the sand area. If the children want, they can even have some of their organic personal belongings compressed into an instant fossil. There are two fire exits on the east and west side for egress.

Work Shop: The rest of the basement is a service area where the employees design and construct displays. There is one service entrance for loading material on the west side, two locker rooms, two maintenance closets, one refreshment area and two rest rooms. Behind the fossil factory is the major work shop with two large moveable partitions.

The Second Floor includes two separate balconies, to accommodate the double space of the First Floor program area. These balconies are defined by the water fall to the North and over look the first floor exhibit space. There are two great places for seating along with some art and crafts displays which relate to the program downstairs.

The Third Floor is reserved for temporary exhibition. It is a great circular space surrounded by a continuous, curved,

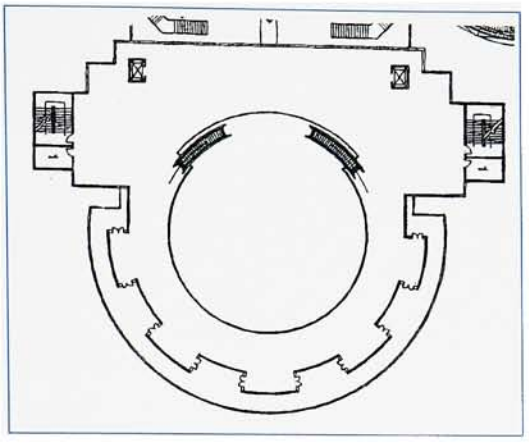


Figure 55: The fourth floor

glass wall and is open in the center to the Fourth Floor (Figure54 dotted line). On top of it is a half circle skylight where the light comes from the sides; not directly from the top.

The Fourth Floor is an art gallery overlooking the third floor. There is no waterfall on this floor. The major gallery space is around the open circle with alternating alcoves as display area. Doors between each alcove are perpendicular to the walls. Inside, the art gallery has an 18' to 25' wide space which is 10' high. Outside of the doors there is an 8' to 18' wide space which serves as an outdoor sculpture garden.

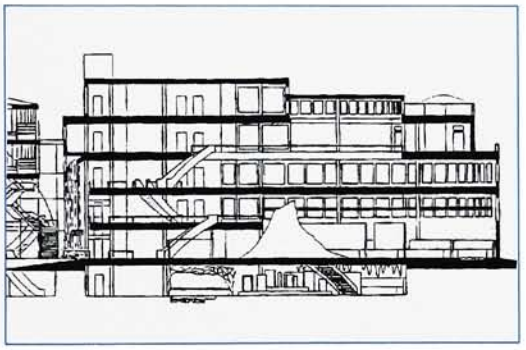


Figure 56: The cross section of the museum building.

Fifth Floor: The indoor space of the fifth floor is reduced to a long rectangular part, and has access to the outdoor patio. On the patio, is a 5' high platform which is the top of the skylight underneath. This platform serves as the second level of the patio. People can see inside through the window on the sides of the skylight. Inside, the south wall is divided into an upper and lower group of windows (Figure55). In other words, one could get an overhead view of lower floors from a fifth floor window. This is the only upper floor without an escalator because this area will not have a frequent traffic flow. This floor consists of small craft shop studios where children can work with their hands under adult supervision. There are five different work shops: ceramic, glass, paper, wood and printing. These work studios are not only small in size, but are modified to resemble the real thing while being completely child safe. For example, in the glass making workshop, theoretically, it is possible to make sugar glass by using sugar with low safe heat, instead of melting real glass with silica at extremely high temperature.

Chapter 5. Conclusion

Evaluation

Theoretical approach

The Youth Center for Art and Science is my interpretation of a modern museum. It is an environment created for youth and with great concern for their perspectives, which include their social needs. It is a place where the youngster can spend his/her leisure time, have fun and at the same time be educationally influenced by it. More importantly, art, science, technology, and other forms of knowledge the museum tries to provide, should be completely integrated into the museum policy, in every aspect of the exhibition, and the whole museum environment. A child who grows up in a creative environment tends to be more creative when he or she grows up. What I am trying to accomplish in this project is not to create a so-called "correct environment," but rather an environment that exposes youngsters to the wonder of knowledge, and encourages them to think independently. In this way, a youngster would realize that knowledge is not something that is only found in the classroom, but something that fulfills his or her life. I personally believe that if we treat young people with the respect we show adults, and take their perspectives into our design consideration, they will respond, as an adult, with appreciation.

Designing efforts

Originality, creativity, flexibility, fluency and comprehensiveness are my design principles for this project. As we discussed before, the major role for the interior designer in museum design is in finalizing the composition of various elements within the constructed envelope, respecting the architectural content and exhibition intent. But this is a conceptual project, without any existing building or any specific display content. The whole design process is dependent on virtually one person. Therefore, I modified the program to a manageable scale, but in keeping with my proposal, I uphold

the five design principles.

Architectural Massing

Since, this is an experimental project, the building should be considered an experiment as well. Because as an interior designer, it would not be practical to try to build one without proper training. Therefore, I designed the building with full awareness of that, and reserved space for structural elements, such as columns, along with the present design. So it is possible to build, and the design would not have to be altered too dramatically by actual construction. The major theme for the building is to expose the beauty of the structure to the visitor and make the building itself become part of the exhibition.

Space planning

There are three primary issues for this project in space planning. The human traffic flow, the flow control and the spatial assembly. The Center allocates space for people to gather, and, at the same time, allows a very straightforward traffic flow. Seating, ticket machines, information desks, reservation booth, ticketing gate, and different kinds of stairs are ways of controlling the traffic flow. The 6' wide space in between the double glass vestibule is one of the areas reserved for seating in bad weather while the youth wait for a ride. The center area of the 20' wide main concourses is also available for every day seating.

Art and Science connection

On the other hand, instead of separating the space for the art display from the science exhibition, I combined the concepts by assembling them together to emphasize the art and science connection. Many galleries are assembled with science displays and related topics. Both of the domed structures include at least one gallery. In the museum building, there are two double height spaces on first/second and third/fourth floor which also provide galleries within.

Exhibit programming

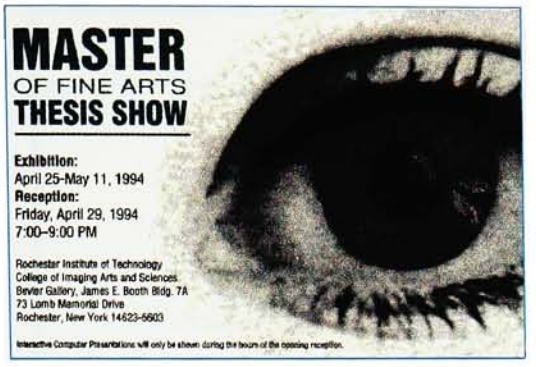
My selection of exhibit themes is based largely on some I have seen which failed to develop, in my view, their full potentials. For example, the adjustable stools I designed improve the performance of the Environmental theater. The five selected theaters in this project are the major attractions of the Center. Each is the further development of existing theaters I have seen. In addition, the section called *The Nature of Earth* is the result of my design. It is original, experimental and fully developed as a result of my own exploration. Other spaces, such as the third and fourth floor of the museum building are reserved for temporary exhibitions on the topic of technology.

Learning experience

It has been a great challenge and wonderful experience to work on this project as an interior designer and as a museum lover. Many of my struggles with this project during the design process resulted in enhancing the project itself as well as my personal learning experience. My only regret is that I lost track of time due to the large scope of this project. It could have been presented in more detail for the thesis show with better time management. However, my thesis report does complete the documentation and design process to provide you with a better and more complete view of this project: The Youth Center of Art and Science.

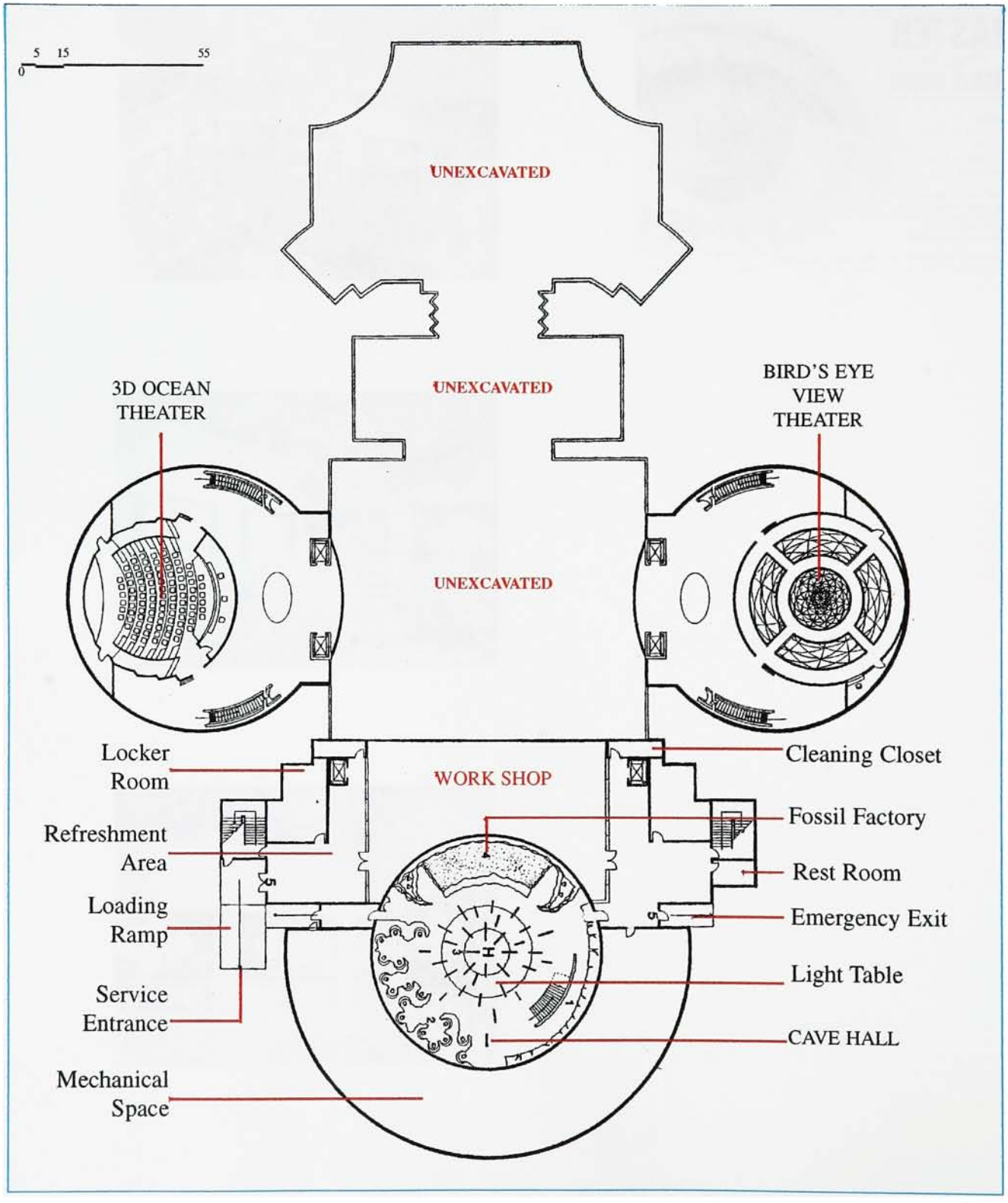
Chapter 6. Presentation

Thesis Show
Floor Plan
Section
Perspective Drawing
Oblique Drawing


MASTER
OF FINE ARTS
THESIS SHOW
Exhibition:
April 25-May 11, 1994
Reception:
Friday, April 29, 1994
7:00–9:00 PM
Rochester Institute of Technology
College of Imaging Arts and Sciences
Bevier Gallery, James E. Booth Bldg. 7A
73 Lomb Memorial Drive
Rochester, New York 14623-5603
Interactive Computer Presentations will only be shown during the hours of the opening reception.

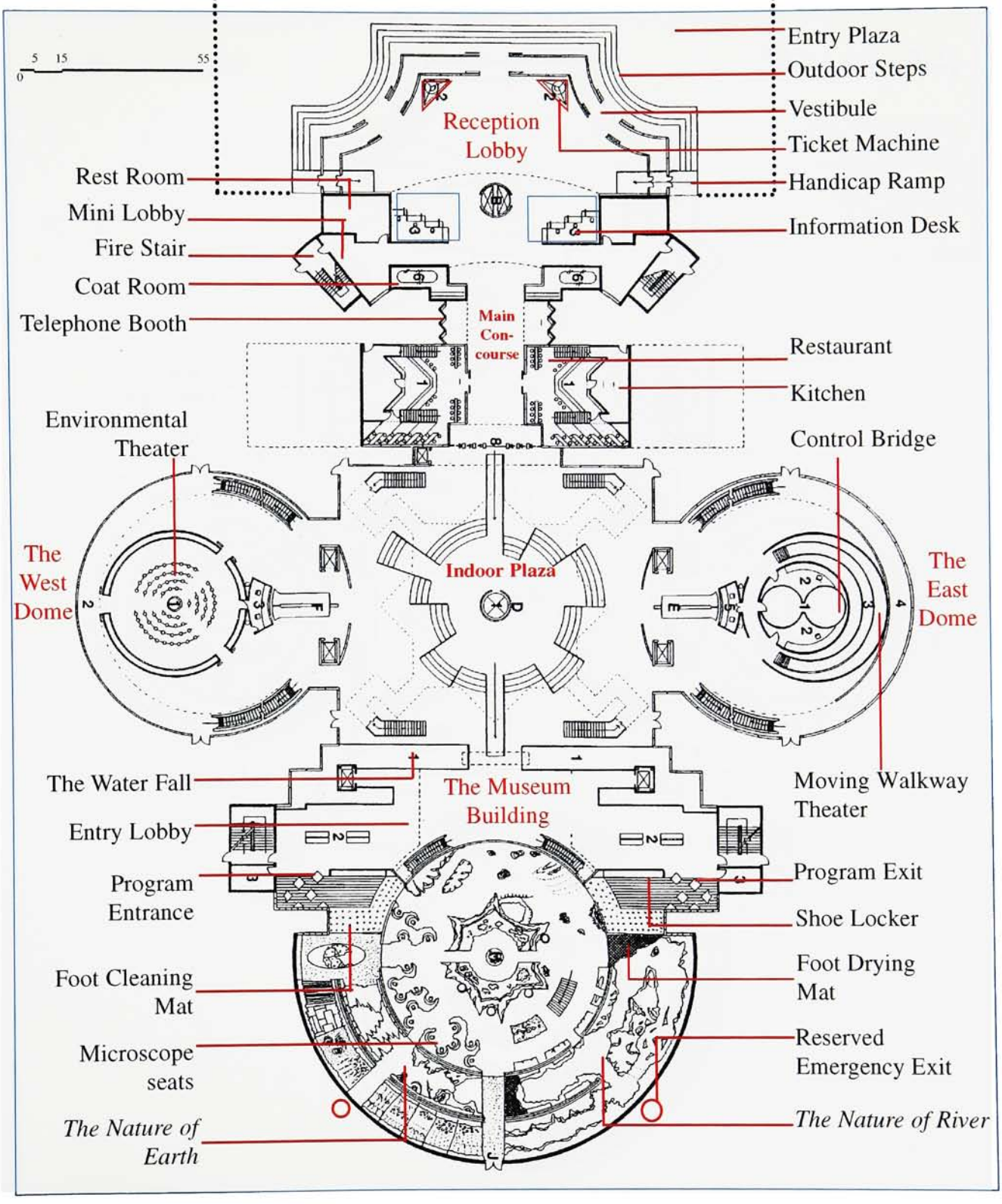
Youth Center for Art and Science

Basement Floor Plan



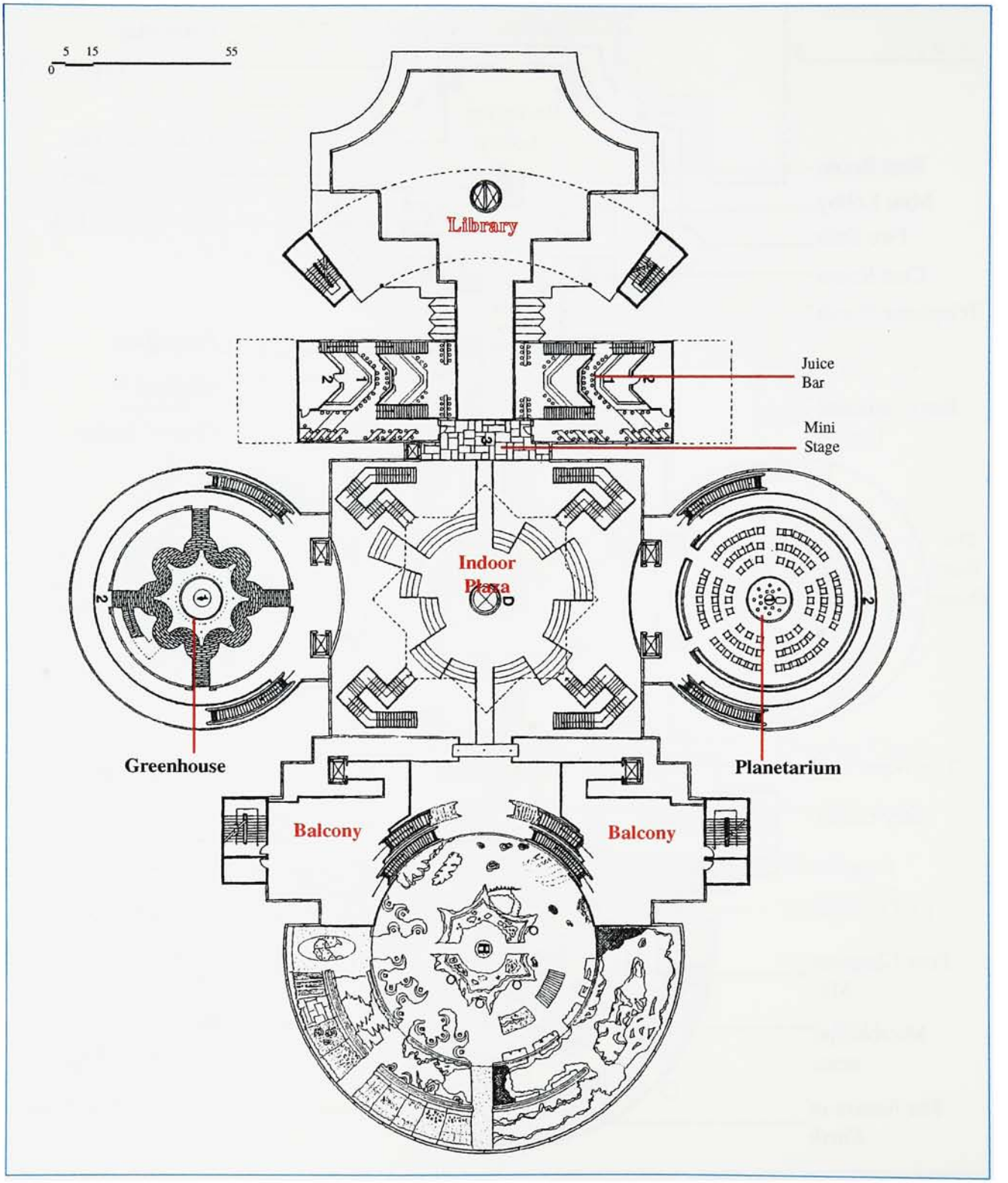
Youth Center for Art and Science

First Floor Plan



Youth Center for Art and Science

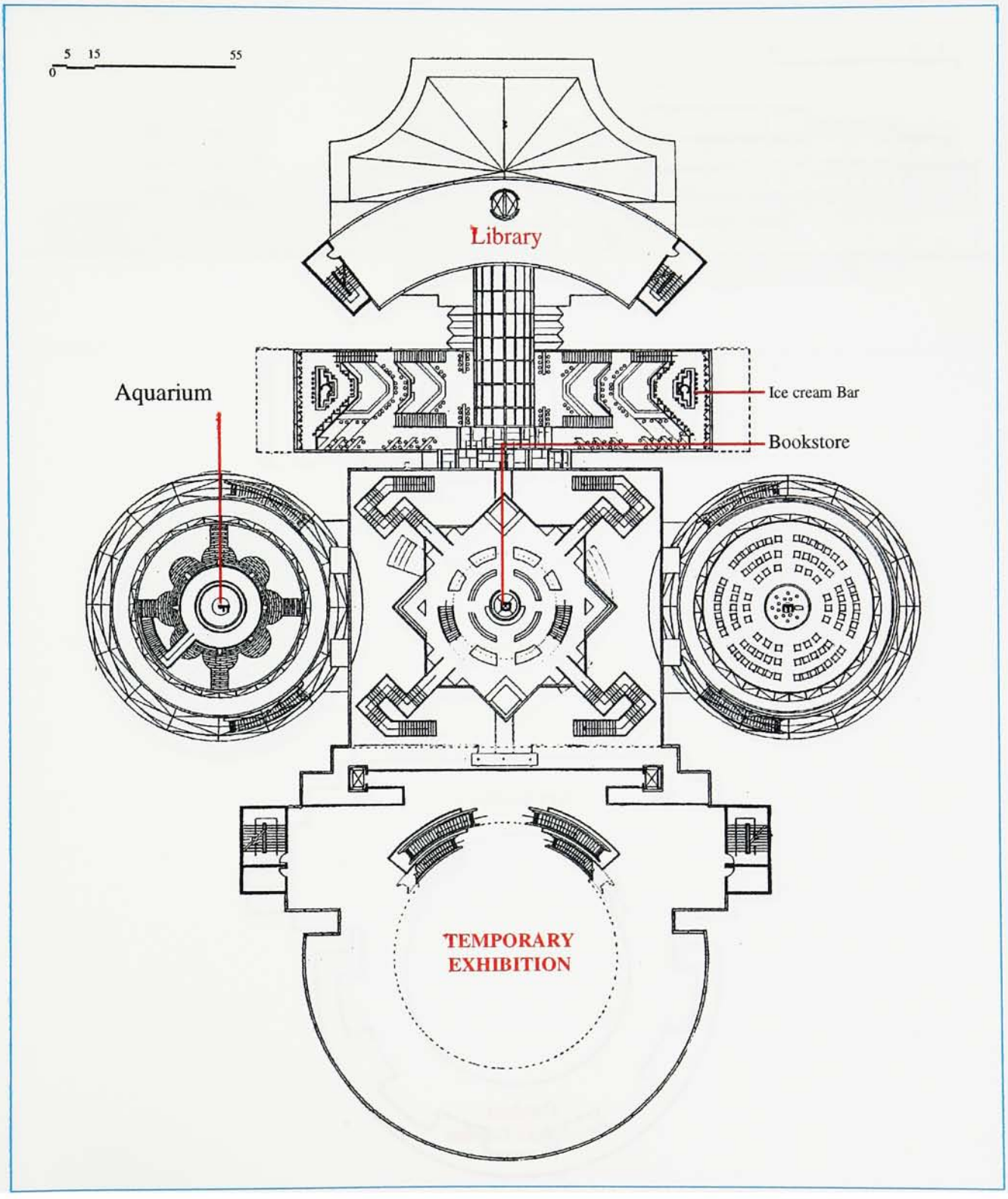
Second Floor Plan



Youth Center for Art and Science

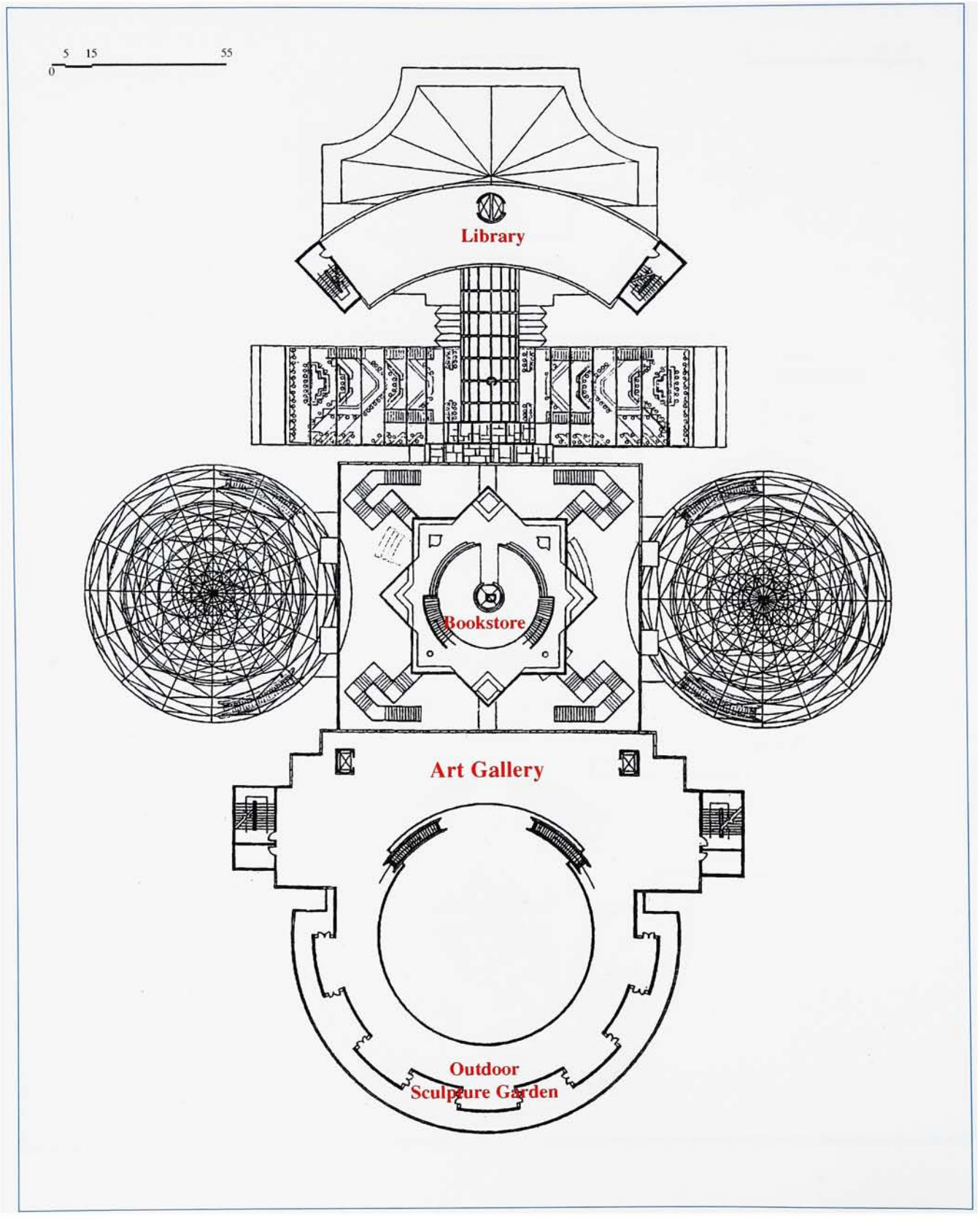
Third Floor Plan

N



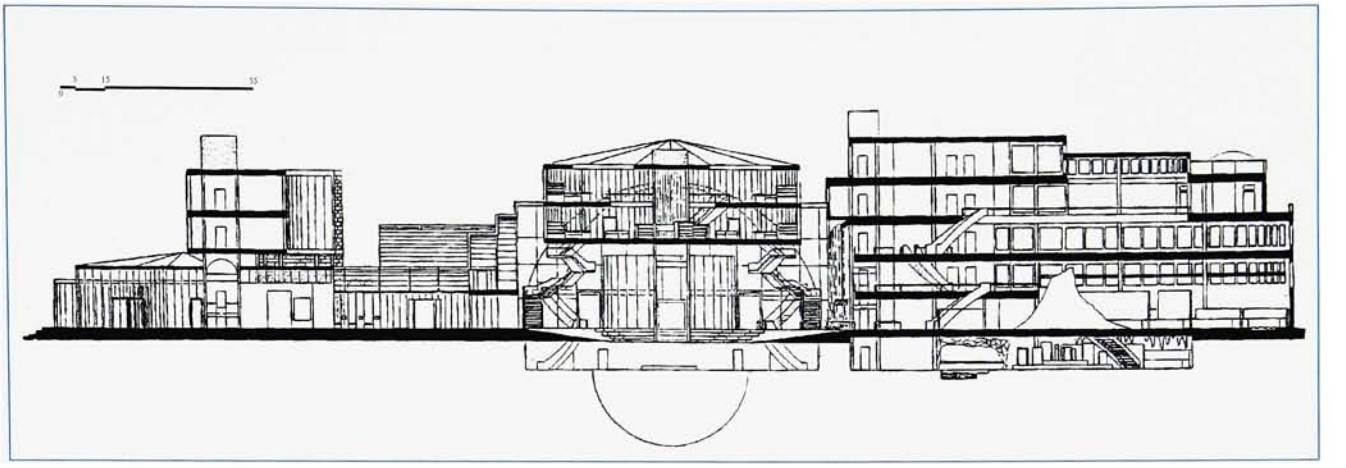
Youth Center for Art and Science

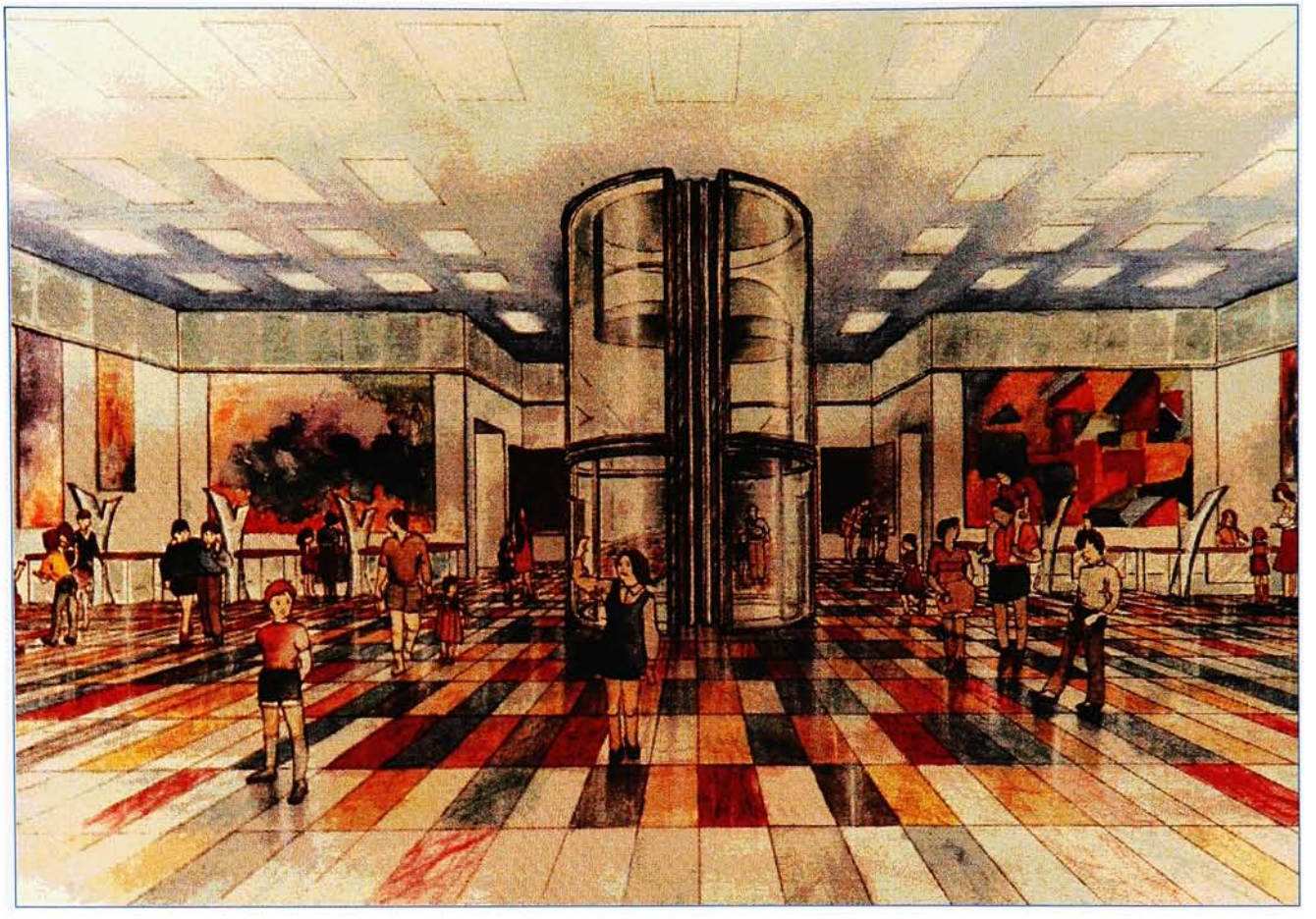
Forth Floor Plan



Youth Center for Art and Science

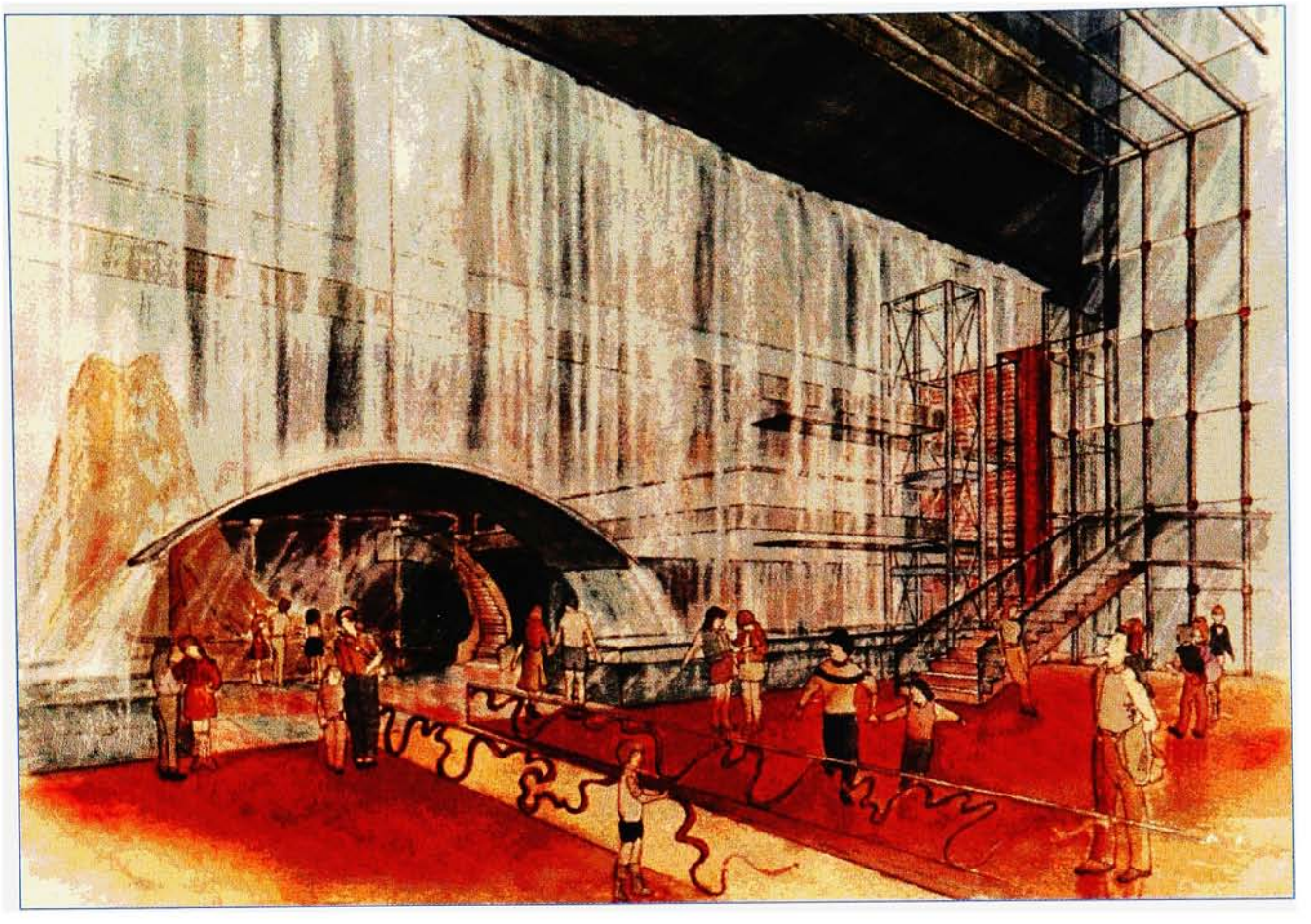
Cross section





Perspective view from South Entrance to Reception Lobby

The multi-Colored Marble Floor symbolizes
the spirits of American Youth:
Liberty, Creativity, Vitality, Diversity, and Equality



Perspective view from Indoor Plaza to the Museum Building Entrance

This water fall functions as a water curtain
between the Indoor Plaza and the Museum Building lobby
for both esthetic and symbolic reasons.
It
echoes with the volcano behind it to support
the museum's slogan
"Science is Hot; Art is Cool"

A. Stools for taking off shoes
B. Lockers
C. Foot-cleaning Mat
D. Earth's Crust
E. Theory of Fault
F. Theory of Fold
G. Volcanic Mountain
H. Fold Mountain
I. Block-Fault Mountain
J. Uplifted Block-Fault Mountain
K.1,2,3,4. The Four Stages of the Formation of the Himalayas.
L. The River
1. Headward Erosion
2. Waterfall
3. Gorge
4. Entrenched Meander
5. Boundary to the Lakes
6. Natural Bridge
7. Braiding
8. River Terrace
9. Levee
M. Feature of A Coastline
N. Different Lakes
O. Features of Ground Water System
P. Examples of Springs
Q. Foot Drying Area
R. Igneous and Metamorphic Rockes
S. Sedimentary Rocks
(Sedimentary Layers of The Grand Canyon Region)
T. Microscope Seats
U. Weathering and Erosion
1.Features Produced by Wind Action
2. Examples of Physical Weathering Processes
3. Wind Globe
(Sample of Sand Dunes)
V. Glaciers
W. Stair way to the Cave Hall
1. Surface Topography of A Cave System
X. Volcano
1. Solfatara
2. Geyser
3. Mud Pool
4. Fumarole
5. Structure of A volcano
6. Development of An Atoll

*****Appendix

Site Visitation Report
Footnotes
References

National Science Museum of Tokyo

Site Report

Date: 11/20/93'
Weather: Cloudy
Location: 110, Tai-To Ko, Ueno Park 7-20,Tokyo, Japan

Environment:

Park; Ueno Zoo; Museum of Western Fine Art; Tokyo Culture Center ; Tokyo National Museum are all in a walking distance.

Architectural structure:

The three storage original concrete structure has brick exterior and adjoin with four other additional three and five storage.

Division:

A. Exhibition
- I. Permanent
  1. Galaxy & Aeronaut
  2. History of Natural History
  3. Science technology (Children Age 14-18)
  4. Adaptation and Evolution
  5. Adventure (Children Age 8-13)
  6. Animal and Plant in Japan
- II. Temporary
  1. Observation of Wildlife (Children's Section)
- III. Outdoor Activity
  1. Patio water garden (Children Age 8-13)

B. Educational Facilities
  1. Microscope Room (Children's Section)
  2. Teachers' Center

C. Recreation Facilities
  1. Refreshment room for group visitors
  2. Cafe
  3. Gift Shop

D. Administration
  1. Office
  2. Reach Department
  3. Lecture & Meeting room

E. Other
  1. Vending Machine for Ticket
  2. Information desk
  3.Coat area/Reception
  4. Rest room

Memo:

* Excellent illustration and graphic design on display units.
* Special sound effects in the Insect Section
* Some of the facilities are a little bit out of fashion, however the museum is now in renovation.

The National Museum of Natural Science in Taiwan

THE NATIONAL MUSEUM OF NATURAL SCIENCE

Site Report

Date: 11/30/93'
Weather: Sunny
Location: 1, Kuanchien Road, Taichung, Taiwan , Republic of China

Environment:

Newly developed suburb
Taichung Municipal Cultural Center and
Taiwan Provincial Museum of Art
are in twenty minutes driving distance.

Architectural structure:

Contemporary concrete building group with a grand patio in the center and a landscape park all around the building.

Division:

A. Exhibition
  I. Permanent
    1. Space Theater
    2. Science Center
    3. Life Science Hall
    4. Chinese Science Hall
    5. Global Environment Hall
    6. 3-Dimensional Theater
  II. Temporary
    1. Dinosaurs form the Main Land China
  III. Outdoor Activity
    1. "The path of Evolution" walk way
    2. Outdoor museum garden
B. Educational Facilities
    1. Multi-media classrooms
    (Each one has its own speciality)
    2. Computer Room
C. Recreation Facilities
    1. Book store and Gift shop
    2. Cafe and Fast food store (several and separated)
D. Administration
    1. Information Building
    2. Administration Building
E. Other
    1. Security Post 2. Ticket Room 3. Reception
    4. Information center
    5. Computer information stand

Memo:

* Two little temples on the two corners of the museum park for religious reasons
* Excellent model making with lighting effect.
* Special lighting effect projected on floor.
* The transition areas are poorly utilized.
* Great amount of computerized programs.

Rochester Museum & Science Center

Site Report

Date: 12/17/93'
Weather: Fair
Location: 657 East Ave., Box 1480, Rochester, NY 14603 U S A

Environment:

Suburb
Eastman House; Memorial Art Gallery
Strong Museum are within short driving distance.

Architectural structure:

Contemporary three storage concrete structure, one of three
building group: Strasenburgh Planetarium; Gannet School of Science & Men

Division:

A. Exhibition
  I. Permanent
    1. At the Western Door (Seneca Indians, Europeans and Americans in the Genesee Valley)
    2. Face to Face: Encounters with identity
    3. History of Rochester
    4. Theater
  II. Temporary
    1. Demand in decorative art
    2. Bug (Design for Children)
B. Educational Facilities
C. Recreation Facilities
    1. Book store/Gift shop
    2. Cafe (One major for Dining and one special area for vending machine)
D. Administration
C. Other
    1.Coat room 2. Reception/Ticket/Information desk
    3.Rest room

Memo:

* Special design on display details for children's convenience.
* Excellent design in transition areas.
* Special signage for blind.
* Gift shop well integrated to the museum (even thought a bit dominating)

Strong Museum

Site Report

Date: 12/17/93'
Weather: Fair
Location:
One Manhattan Square
Rochester,
New York 14607
U S A

Environment:

Downtown area
Rochester Museum & Science Center;
Eastman House; Memory Art Gallery;
are within ten minutes driving distance

Architectural structure:

Part of a three storage contemporary concrete building

Division:

A. Exhibition
  I. Permanent
    1. Collection of Margaret Woodbury Strong
    2. One History Place (Children's Section)
    3. Historical Rochester
  II. Temporary
    1. Memory & Mourning: American expressions of grief
    2. Neither Rich Nor Poor: Searching for the American Middle Class
    3. Altered States: Alcohol and Other Drugs in America
    4. Jolly
  III. Outdoor Activities
    1. Play ground
B. Educational Facilities
    1. Auditorium
    2. Library
C. Recreation Facilities
    1. Gift Shop
    2. Cafe
D. Administration
E. Other
    1. Reception/Information/Ticket Desk
    2. Rest room
    3. Gift shop

Memo:

* Special alternate presentation board in the Drug Section.
* The collection section is designed for study rather than display.
* The transition needs to be reinforced.
* There is no relationship among exhibit units.

Ontario Science Centre

Site Report

Date: 12/22/93'
Weather: Snow
Location: 770 Don Mills Road, Don Mills, Ontario M3C 1TS CANADA

Environment: Suburb

Architectural structure:
The Science Centre is built into the side of a ravine which consist of five levels .

Division: The Main exhibit areas are at levels (C)(D)(E).

A. Exhibition
  I.Permanent
    1.(B): Great Hall;Auditorium;Theatres A,B,C
    2 (C): Exploring Space;Challenger Learning Centers;Earth / Food ; Sport
    3.(D): Science Arcade;Transportation;Technology;Atom; Communication;The Living Earth
    4.(E): Matter, Energy;Canadian Resource;Change; Human Body and The Learning Center
  III. Demonstrations
    1.(C): Star Lab :Challenger;Laser ; Rock Shop; Amateur Radio Station
    2.(D): Foundry ; Wood ;Model Making ;Electricity ; Papermaking; Printing ; Jacquard Loom
    3.(E): Chemistry
B. Educational Facilities
    **Integrated into exhibition , no separate facility.
C. Recreation Facilities
    1.Fast Food store 2. Gift shop
D. Administration
E. Other
    1. Lockers
    2. Reception/ Ticket/Information desk
    3. Kids Station
    4. Transportation
    5. Wheel chair and Stroll station

Memo:

* Excellent program in intellectual games which are integrated with the exhibition.
* The transition areas need to be reinforced.
* Each display unit is so strong itself that it might lack unity as a whole.
* Interesting demonstration units.
* Variety of floor materials.
* Some of the lighting designs are controversial (re-considerable).
* Need great deal of maintenance.(20 % display units are in repair)
* Beautifully designed museum poster.

Cite des Sciences et de l'industrie

Site Report

Date:3/8/1994
Weather: Fair
Location: 30, avenue Corentin-Cariou - 75019 Paris FRANCE

Environment: The cite is one of the five parts of the La Villette Park (136 acres) which located at the east of Paris.

Architectural structure:
High-tech building with steel frame, cable, glass curtain wall,and two grand skylights on the roof and a highly reflected steel Geode in frond. The structure works dramatically with the surrounding water.

Division:

A. Exhibition
- I. Permanent : EXPLORA
  - 1. Mathematics 2. Sound 3. Expression and Behavior
  - 4.Computer Science 5. Stenope, A pinhole picture of space
  - 6. Images 7. Material 8. Cultivate the earth
  - 9. Automated production shop 10. Industrial Adventures
  - 11. Health and Mankind 12. 100 years of Communication
  - 13. Planetarium 14. The ocean 15. The space
  - 16. Rocks and Volcanoes 17. Stars and Galaxies
  - 18. Environment 19. Light games
  - 20. Movie District (The green bridge)
- II. Temporary exhibitions
  - 1. Gold 2. Scientists and the Revolution
  - 3. Machines for Communicating.4. Age of Plastics
  - 5. Human Blood 7. Grapes and Wine 6. Hooray for Water
- III. Aquarium (Divided up into three areas)
- IIII. The Cite des Enfants (for children age 5 to 12)
  - 1. Machines and Mechanisms 2.You and Others
  - 3. Live surveys 4. Communication Techniques

B. Educational Facilities : RESOURCE AREAS
- 1. Multimedia Library 2. The Job Center
- 3. Movie Theaters 4. Science Newsroom
- 5. Eurocite (information center)
- 6. International Conference center

C. Recreation Facilities
- 1. The aquarium restaurants; 2. Fast Food store;
- 3. Ice cream shop; 4. Cafeterias

D. Administration

E. Others
- 1. Ticket window 2 Check room 3. Bank
- 4. Information desk 5. Book store
- 6. Museum shop 7. Reception
- 8.Multipurpose Hall

Memo:
* Outstanding and extremely artistic in architecture and landscape design.
* Overwhelmingly large size of the museum.
* Highly professional management in tourism.

Footnotes

Museums and Education

(1) P.2;(3) P.4 (5)P.3
S. DILLON RIPLEY "Introduction"

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HELMUTH U. NAUMER
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(4) P.168
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(8) P.188
MICHAEL V. BUTLER
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(9) (10) (11) P.10
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Children's museum

Educational use of museums