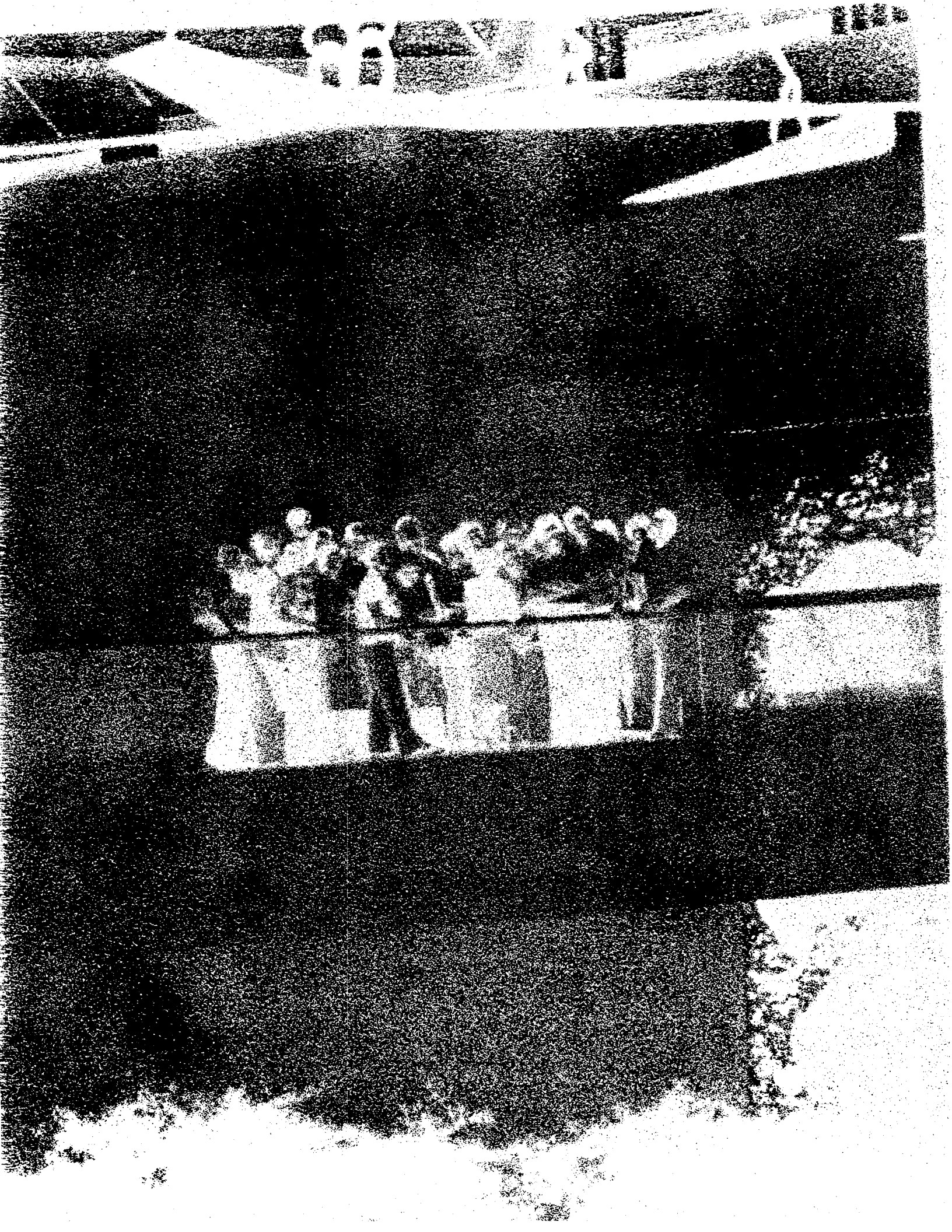


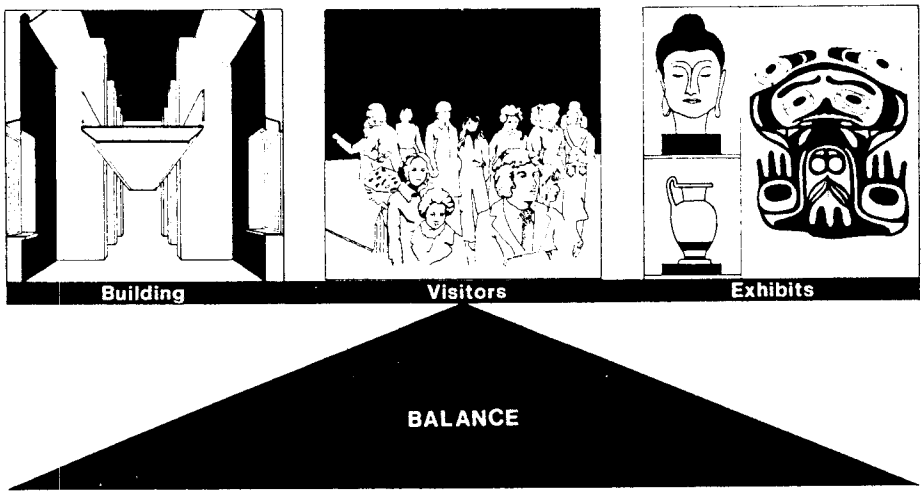
INTRODUCTION
THE MUSEUM PROBLEM

1

It is obvious that buildings are for people. People pay for them; people use them; people design them. The design of a building consists of people making decisions on behalf of other people which affect another set of people. Therefore understanding of design, and as a consequence the performance of its products, must start with an understanding of people.

This thesis focuses on the findings of visitor behavior studies in museums. These studies strongly suggest that the architect as well as the museum professional must be understanding and sensitive to visitor's needs in order to create a balance between the museum's building components (e.g., doors, colors, room sizes, and locations, etc.), exhibits and visitors.

It is hoped that a more conscientious effort in balancing these variables will inevitably result in a more successful museum environment and learning experience.



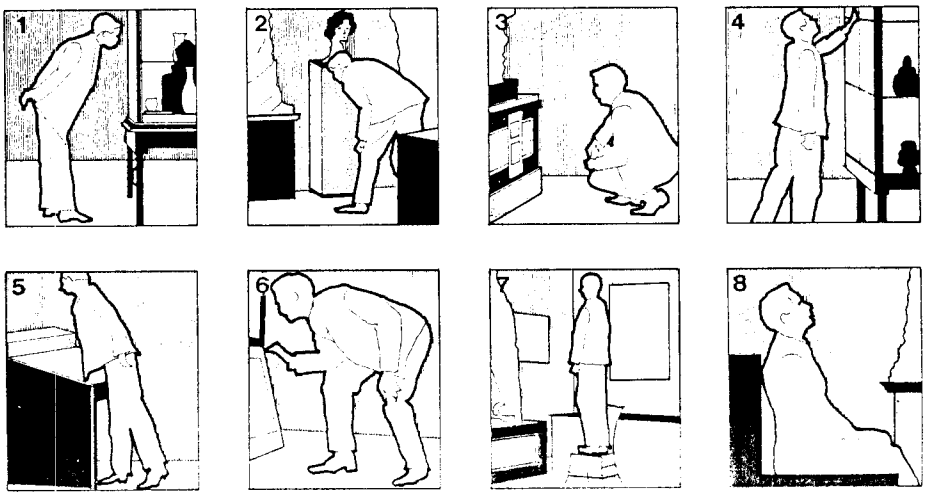
TOP- THE ELEMENTS OF A MUSEUM; BUILDING, VISITORS AND EXHIBITS. EACH MUST BE UNDERSTOOD IN ORDER TO BRING ABOUT HARMONY WITH THE OTHER ELEMENTS. WHICH WIL RESULT IN A MORE SUCCESSFUL MUSEUM ENVIRONMENT AND EXPERIENCE. BOTTOM- BODY POSITIONS DISCOVERED BY BENJAMIN IVES GILMAN THAT BRING ABOUT FATIGUE. 1. BENT, 2. MUCH BENT, 3. CROUCHING, 4. STRETCHING UP, 5. STRETCHING FORWARD,, 6. HALF CROUCHING, 7. CLIMBING UP, 8. LOOKING UP. STUDY CONDUCTED IN 1909.

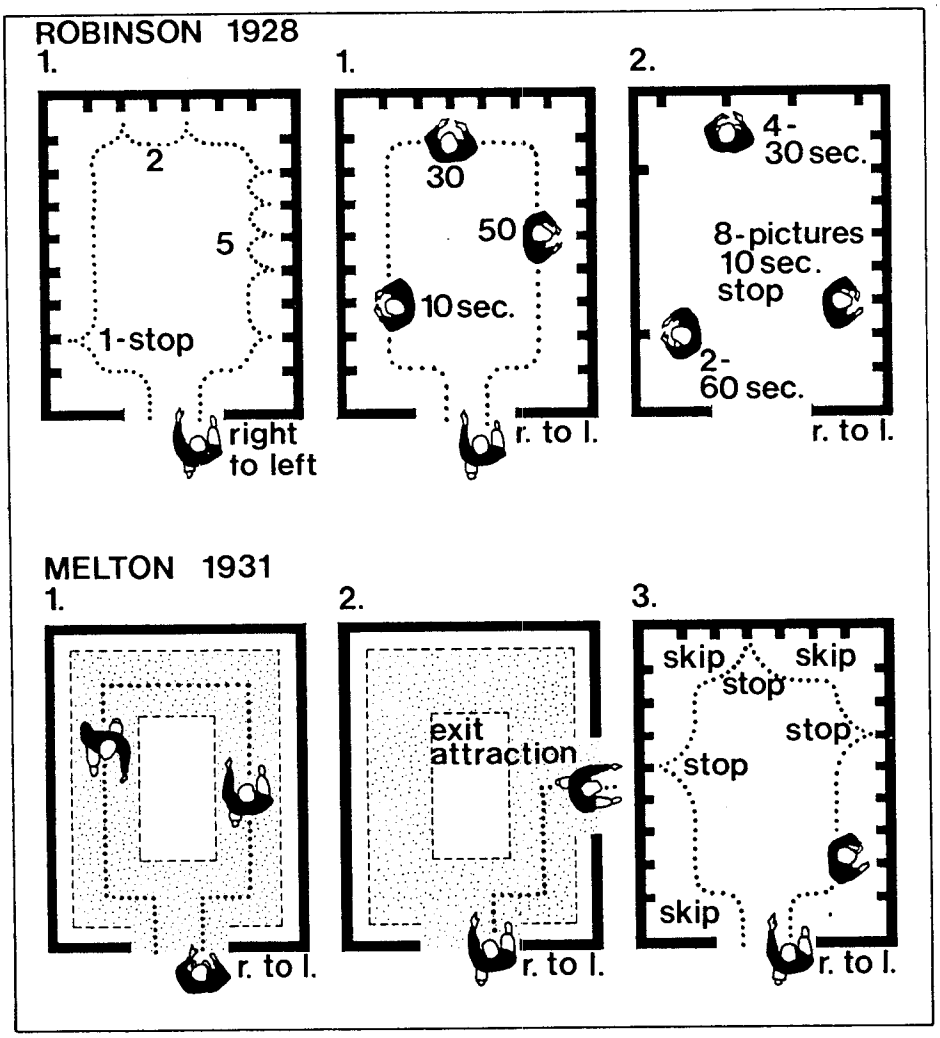
The Problem

Visitor-Behavior studies in museum's began with Benjamin Ives Gilman's work in 1909. Using actual observations, he set out to determine just what kinds and amount of muscular effort were demanded of the visitor who endeavored to see exhibits as museum authorities planned to have them seen. Gilman's findings indicated that an inordinate amount of physical effort was demanded of the ideal visitor by then current methods in which the maximum number of objects were offered for inspection.

Museum research on visitor behavior didn't stop there. Surprisingly, an abundance of studies, headed by Edward Stevens Robinson and Arthur Melton took place between 1923 and the early 1930's.

Robinson and his colleaques entered museums with stop watches and followed visitors around noting behavior (this form of data collection is often referred to as tracking or behavior mapping). The research team recorded the





RE-OCCURING VISITOR WALKING PATTERNS DISCOVERED BY ROBINSON AND MELTON IN THE EARLY 1900's. THE PATTERNS HAVE BEEN RE-AFFIRMED WITH CURRENT RESEARCH AND HAVE DEFINITE DESIGN IMPLICATIONS FOR GALLERY SPACES. SEE CHAPTER III.

time spent in the picture collections, the rooms entered, the number of pictures studied by the visitor in each room, and the time spent before each of these pictures. Although the number of visitors observed was small, certain general tendencies characteristic of museum visitors were remarked.

1. During the course of a visit and after a brief "warming up" period the person observed displayed a tendency to stop before a progressively smaller percentage of the pictures encountered and to make progressively shorter stops.
2. The more pictures simultaneously displayed, the smaller the average time spent in looking at each picture.
3. In large museums the likelihood that a visitor will observe any given picture is less than in smaller museums (Bennett, 1941).

Melton, working in art museums, confirmed Robinson's findings. He observed the behavior of museum visitors under normal and controlled conditions and found a number of factors which increase or diminish the effectiveness of museum display.

1. In a symmetrically arranged exhibit room there is a strong tendency for the visitor to follow the right hand wall, looking at displays to their right.
2. Exits from a museum room attract the visitor and compete with nearby displays so that stops are less frequent and of less duration before pictures or objects in the vicinity of doors leading from the room. If the visitor encounters an exit before the circuit of the room is completed, they are more likely to depart than to continue in the room
3. Visitors distribute their attention, usually pausing for brief periods to look at individual objects and then skipping several intervening exhibits before stopping again.

Research into visitor responses to museum materials, exhibits and environments continued to appear in books, articles in the peri-

odical literature and dissertation's between 1940 and 1980. The major contributor's include: David Abbey, Robert Becthel, Stephan Borhegyi, Homer Calver, Duncan Cameron, Lawerence Coleman, Alvin Goins, Ross Loomis, Robert Lakota, Lucille Nahemow, Arthur Niehoff, Mildred Porter, Chandler Screven, Harris Shettel, Frank Taylor, Robert Wolf, and Joseph Yoshioka.

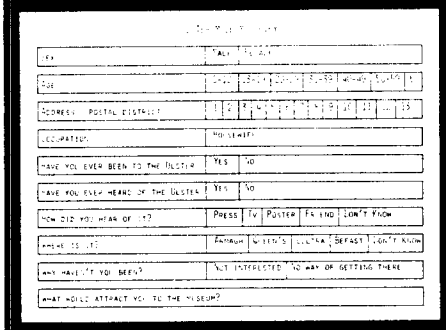
In summarizing and reviewing the exisiting state of knowledge, which has resulted from the research effort, the various studies of the museum visitor can be divided into four categories:

- Visitor Surveys
- Behavioral Studies
- Experimental Research
- Evaluation Studies (Screven, 1979).

The abundance of data generated from these studies has helped set the direction for current museum research and, when properly applied, they have significant implications for museum design and have had an impact on some museum planning and design. Visitor research has also helped museums:

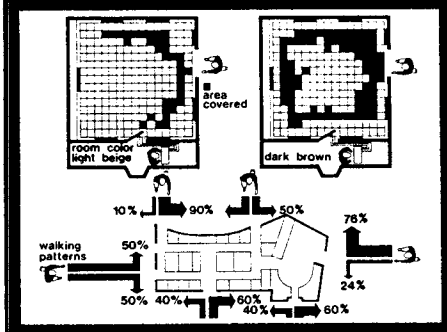
- Increase or maintain drawing power.
- Compete with competition from other visual media, (i.e., movies, television, magazines advertizing, literature, billboards, newspapers, fairs festivals and expositions).
- Assist the visitor and increase visitor satisfaction.
- Provide a more effective public service.
- Improve design and planning decisions.
- Make the transition from being a warehouse of cultural relics to being a genuine public service and educational facility.

TYPES OF VISITOR BEHAVIOR STUDIES



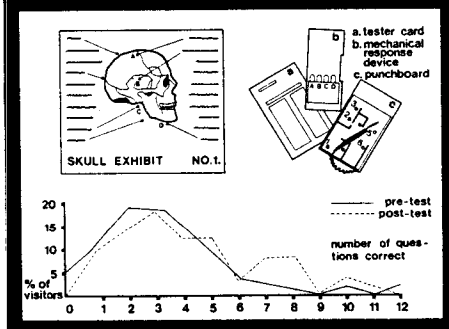
VISITOR SURVEYS

Museum visitors (or nonvisitors) are sampled with respect to demographic characteristics, frequency of visits, reasons for coming, group characteristics, etc. Over 75 percent of museum research is in this category.



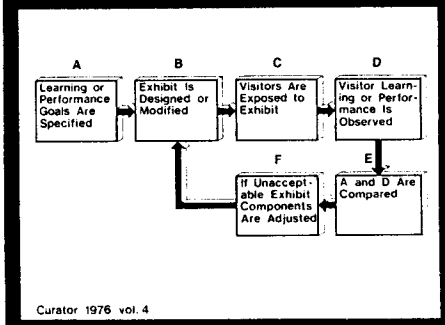
BEHAVIOR STUDIES

Systematic observations of visitor behavior in museum spaces - how they move, react, interact, what they avoid, how long they stay, where they go, with whom, etc..



EXPERIMENTAL RESEARCH

Studies of the effects of different exhibits or program methods on attention, time spent, learning, attitude change, etc.. Elements of the exhibit environment or pre- or post-exhibit activities are systematically varied to obtain generalizable information about their effects.



Curator 1976 vol. 4

EVALUATION STUDIES

Observation, interviewing or testing of visitors to determine if a particular exhibit achieves its chief goals or has some other desirable impact. Evaluations seek information to use in making decisions about particular exhibits, programs or methods.

ARCHITECTURE AND MUSEUM PROFESSIONALS CONCERN

"Outside their own experience, museum professionals have little they can rely on, particularly in areas where prior experience is rare. Substantial and complete data are not readily available and research is cumbersome as inquiries must be directed to each museum or architect in question. Even the most data-conscious architectural magazines do not provide drawings and descriptions that are detailed enough for any serious or comprehensive analysis."
Ludwig Glaeser. "Museum Architecture: Publish or Perish." Museum News. November, 1972.

The skeptic of psychological research in museums is quick to ask for evidence that the overall outcomes from such work not only justify the expense involved but also to question whether the information gained really supports changing the way exhibits are prepared. It is hard to answer such skepticism because, at the present very little effort has gone into organizing and interpreting what the results of work already done mean and evaluate the various research strategies for their utility."
Ross J. Loomis. "Museums and Psychology." The Museologists. November, 1973.

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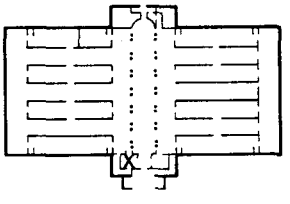

ENTRANCE HALL- Poor location for bookstore. Field Museum of Natural History. Chicago, Illinois 1893

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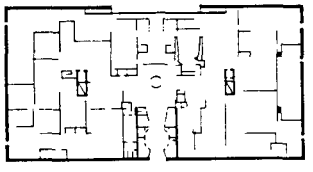

CIRCULATION- Little orientation assistance. National Museum of History and Technology. Wash.,D.C. 1964

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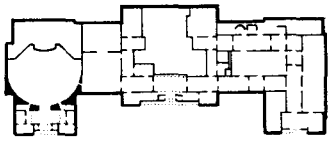

GALLERY- Poor doorway locations. The Toledo Museum of Art. Toledo, Ohio 1933

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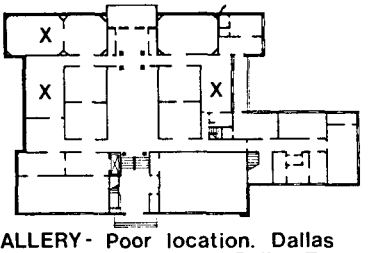

GALLERY- Poor location. Dallas Museum of Fine Arts. Dallas, Texas. 1936

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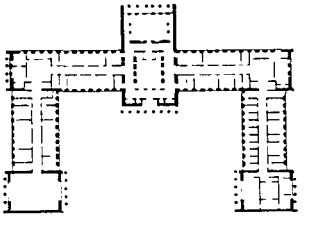

GALLERY- Lack of diversity. Philadelphia Museum of Art. Philadelphia, Pennsylvania. 1877

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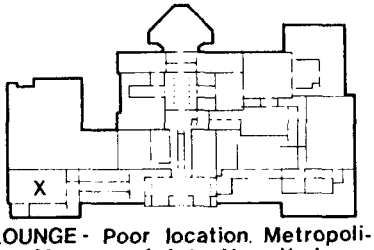


LOUNGE- Poor location. Metropolitan Museum of Art. New York, N.Y. 1870

LACK OF DESIGN GUIDELINES. Although a vast amount of information on the behavior of the museum visitor is available (predominantly in periodicals), much of it is cumbersome and difficult to translate into workable forms for practical use by the design and museum professions. According to Ludwig Glaeser, curator of the Mies van der Rohe Archive's, "the lack of adequate documentation in this area is surprising in view of the unprecedented museum build ing boom in the last two decades as well as the museum's special status as a building type." (Glaeser, 1972)

The inaccessibility of comprehensive books and articles on design guidelines for museum arch itecture looms even larger when carefully looking into some of the design decisions being made in museum public spaces. The following list, based on visitor behavior studies, represents some of the most reoccurring design decisions which could have negative impact on the visitor's museum experience:

- IMPROPER POSITIONING OF THE MUSEUM BOOKSTORE, GIFTSHOP AND INFORMATION BOOTH.
- INSUFFICIENT ORIENTATION ASSISTANCE .
- INCCORRECT NUMBER OF DOORWAYS IN A EXHIBITION SPACE AS WELL AS THE WRONG NUMBER OF DOORS USED.
- IMPROPERLY LOCATING GALLERY SPACES, RESULTING IN MISSED OPPORTUNITIES.
- LACK OF DIVERSITY AND CONTRAST THROUGHOUT THE MUSEUM, RESULTING IN VISITOR FATIGUE.
- THE LACK OF LOUNGES OR REST AREAS.
- POOR LOCATION FOR LOUNGES, LOCATIONS WHICH CAUSE THE SPACE TO GO UNUSED.

If the architectural profession is to meet the needs of future museum projects, with improved design decisions, insight into visitor behavior is essential. Will there be future museum projects?

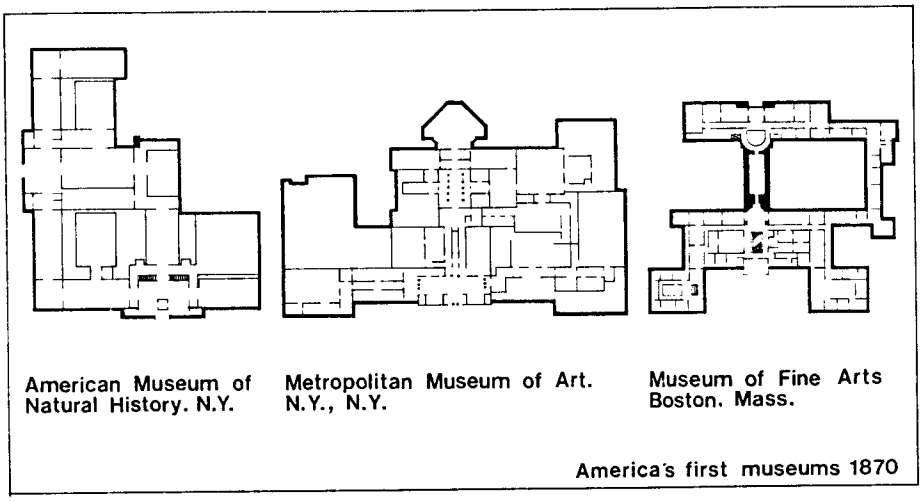
Importance of the Problem

The Charleston Museum, Charleston, South Carolina, was the first American Museum, founded in 1773 and predating American Independence. In 1870 the United States entered the museum mainstream when the American Museum of Natural History in New York, the Metropolitan Museum of Art in New York and the Museum of Fine Arts in Boston were established. Since then Americans have been collecting objects and creating museums at an accelerating rate and museums have become a major thread in the cultural fabric of this country.

Museums in the United States are growing rapidly, as is evident when one looks at the increase in the number of facilities, attendance, and the variety of collections and exhibitions being displayed. Improved museum design in response to the best research information, can enhance this trend.

The following sections present and review statistics which suggest a continuation to the museum building boom started two decades ago.

INCREASE IN FACILITIES. Surveys conducted by the American Association of Museums(AAM) indicate that, if one counts small museums (those with only one person on staff and that person is without professional training), there are about six thousand museums in the United States today. There was a steady increase in the numbers of museums built from 1900 to 1939. During the 1940's fewer were constructed due primarily to World War II. Then the rate of construction increased again in the 1950's and 1960's. Approximately 60 percent of existing museums have been established since 1950 and, in the 1960's alone, there was a 53 percent increase in the number of museums, from 2,238 to 3,425. Infact, since 1960 an average of more than 100 new museums have been established in the United States each year. And the growth continues; more museums were founded in 1970 or after than were founded in all the time be-



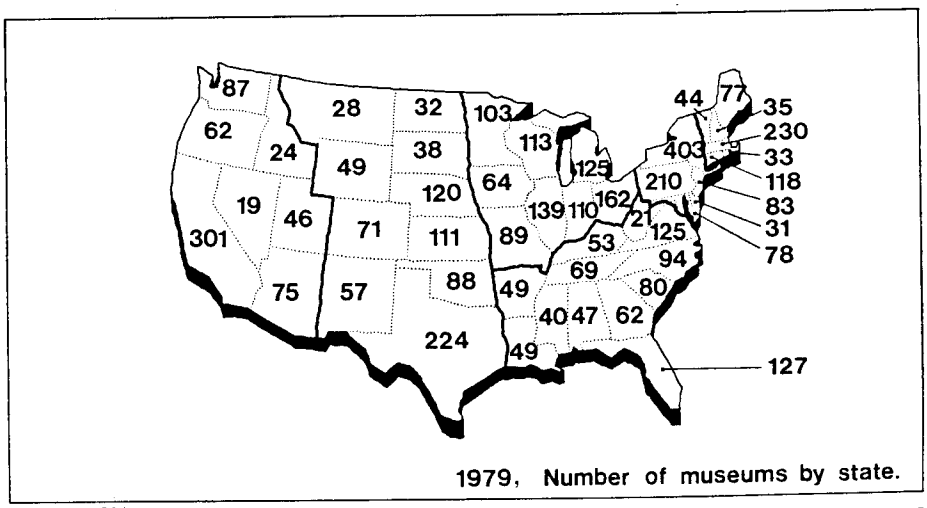
American Museum of Natural History. N.Y.

Metropolitan Museum of Art. N.Y., N.Y.

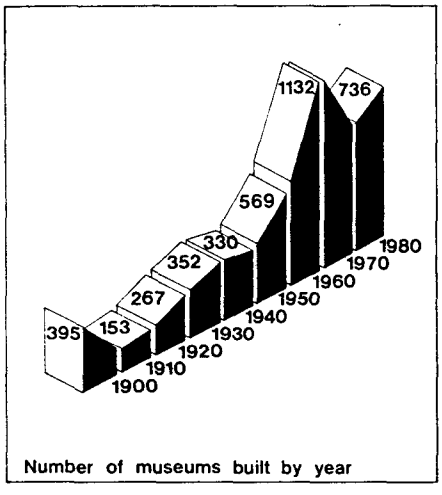
Museum of Fine Arts Boston. Mass.

America's first museums 1870

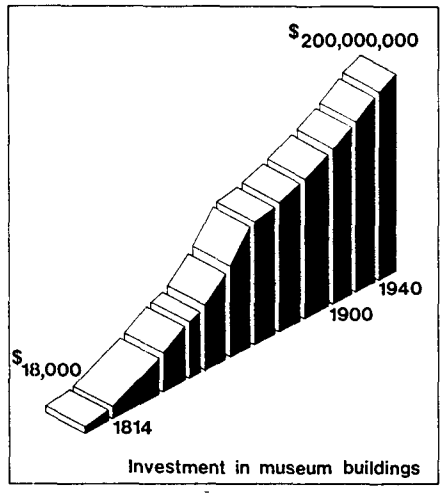
OPPOSITE PAGE FLOOR PLAN CHART- BASED ON VISITOR-BEHAVIOR STUDIES A NUMBER OF DESIGN DECISIONS COULD HAVE NEGATIVE IMPACTS ON THE MUSEUM VISIT. TOP- FLOOR PLANS OF AMERICA'S FIRST MUSEUMS. BOTTOM- SINCE 1870 THEIR HAS BEEN A CONTINUING INCREASE IN MUSEUM FACILITIES. THE MAP BELOW SHOWS THE NUMBER OF MUSEUMS FOUND IN EACH STATE TODAY. STATISTIC FROM "MUSEUM NEWS", 1980.



1979, Number of museums by state.



Number of museums built by year



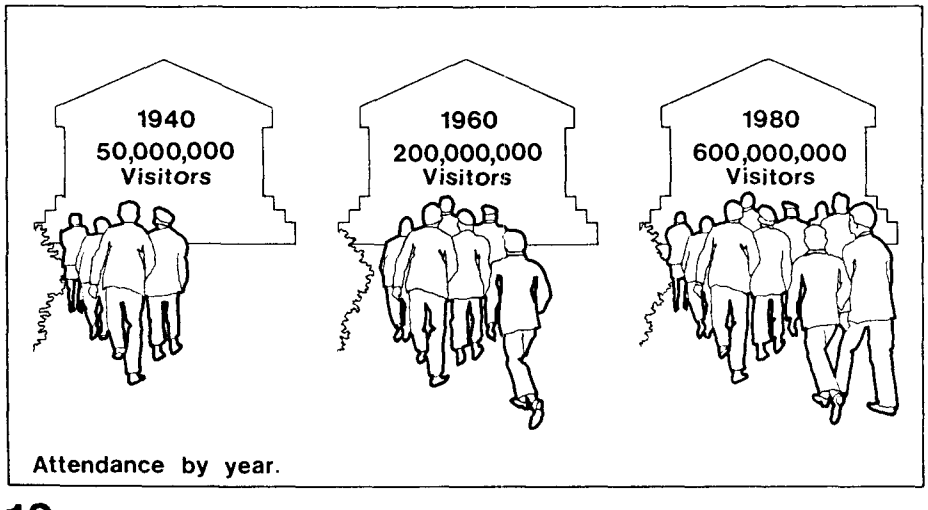
Investment in museum buildings

TOP- NOT ONLY HAS THE NUMBER OF MUSEUMS INCREASED BUT ALSO THE AMOUNT OF MONEY SPENT ON MUSEUM BUILDINGS. BOTTOM- ATTENDANCE OF MUSEUMS CONTINUES TO GROW PLACING HEAVY DEMANDS ON TODAY'S AND FUTURE MUSEUMS. STATISTICS FROM "MUSEUM NEWS", 1980.

fore 1920. Recently, new museums have appeared every 3.3 days.

In order to appreciate the magnitude of our national commitment to museums, Laurence Vail Coleman in his pioneering three-volume study, The Museum in America (1939), calculated that the total expenditures involved in all science, history and art museums, as of 1930, was $18,000,000. In contrast (and with due allowance for both dollar depreciation and increases in construction costs), the United States has since 1950, allocated over $550,000,000 for art museums and art centers alone, which is more money spent on buildings for visual arts than in the previous 150 years. This massive investment has produced 10.2 million square feet of museum space——more than 13 times the size of the Louvre in Paris.

INCREASE IN ATTENDANCE. Museums vary in size, as measured by attendance, from those attracting fewer than 5000 visitors a year to those that count visits in the millions during a single year. Museum attendance has increased much faster than has the population of the United States. The Belmont Report conducted by the American Association of Museums in 1968, stated that the increase in museum attendance has been so rapid, and has reached such a level, that museums now have to turn down requests for service.



Attendance by year.

It has been estimated (in a variety of publications, Museums U.S.A., 1974; Alexander, 1979; Museum News, 1980), that the number of people visiting museums increased from 50 million a year in 1940 to between 200 and 300 million in 1969 and to over 600 million in 1980.

Despite high levels of attendance, most museums expect and want to encourage further increases in the number of visitors. The American Association of Museums reported that nine out of ten of the nation's museum directors are interested in attracting more visitors to their museums. The AAM also feels that so far as can be foreseen, all the factors responsible for recent increases in museum attendance may be expected to

continue to operate. Such factors include:

- The increase in the United States population. The population of the U.S.A. from 1790 to 1950 doubled five times, increasing from less than 4 million to over 150 million in 1950. The rate of increase continues to be about 5 percent per year.
- Urbanization shows no signs of declining. The majority of major museums continue to locate near central city cores, areas which provide high concentrations of populations.
- Increased mobility. The auto mobile has greatly influenced the increase of museum attendance, since with increasing automobile ownership and the resultant increase in personal mobility, vast areas around cities now have convenient access to museums. A majority of the U.S. population is less than an hour's drive away from a major museum.
- People are more prosperous and have more leisure time. There is a continuing increase in the size of middle and upper classes and the number of families with both the husband and wife working

It should be noted that some of the most difficult museum statistics to obtain are attendance figures. While many museums maintain very accurate counts using ticket receipts, turnstiles and/or counters, many museum attendance figures represent estimates.

INCREASE IN COLLECTIONS AND EXHIBITIONS. During formative years, museums were classified into three types: art, history, and science. Today there are 6000 or more known museums, engaging in an extraordinary variety of activities. In all, 84 categories of museums exist today, 43 of which are variations of art, history and science museums. The remaining 41 are specialized museums with themes ranging from agriculture and animal farms to whaling and woodcarving, and subjects including circuses, crime, locks, money and numismatics, and transportation.

ATTENDANCE RECORDS.....

Attendance at Boston's Museum of Science rose from 411,483 in 1963 to 526,941 in 1967, for a % increase in 4 years.

Chicago's Field Museum recorded 1,049,000 visits in 1958 and 1,787,000 visits in 1966, for a % increase in 8 years.

New York's Metropolitan Museum of Art attendance went from 4,005,490 in 1960 to 6,281,162 in 1965, a % increase in 5 years.

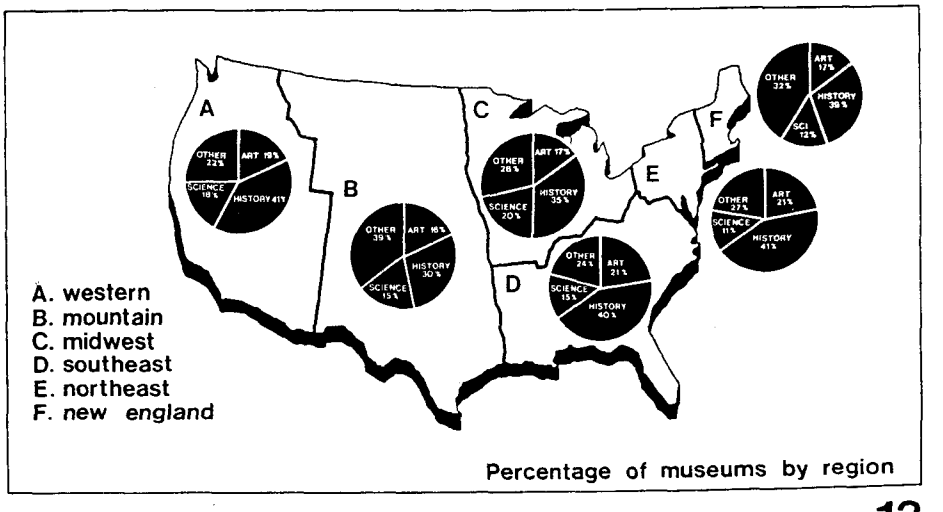
California's Academy of Science in San Francisco reported close to 3,000,000 visitors in 1967, as compared to 4,000,000 in 1980.

The American Museum of Natural History in New York reported attendance in excess of 1,500,000 in 1967, as compared to 2,500,000 in 1980.

The Smithsonians Museum of History and Technology, during its first ten months, recorded more than 5 million visitors.

Statistics from, "America's Museum: The Belmont Report." October, 1969.

BOTTOM- THE CATEGORIES OF MUSEUMS HAS GROWN FROM THREE (I.E., ART, HISTORY, SCIENCE), TO MORE THAN ONE THOUSAND TODAY.



Percentage of museums by region

Categories of Museums

ART

Art Associations, Councils and Commissions Foundations and Institutes
Art Association Galleries
Art Museums and Galleries
Arts and Crafts Museums
China, Glass and Silver Museums
Civic Art and Cultural Centers
Decorative Arts Museums
Folk Art Museums
Textile Museums

CHILDREN'S AND JUNIOR MUSEUMS

COLLEGE AND UNIVERSITY MUSEUMS

COMPANY MUSEUMS

EXHIBIT AREAS

GENERAL MUSEUMS

HISTORY MUSEUMS

Historic Agencies
Historic Houses and Historic Buildings
Historic Sites
Historical and Preservation Societies
Historical Society Museums
History Museums
Naval Museums and Historic Ships
Military Museums
Preservation Projects

LIBRARIES HAVING COLLECTIONS OTHER THAN BOOKS

NATIONAL AND STATE AGENCIES

NATURE CENTERS

PARK MUSEUMS AND VISITOR CENTERS

SCIENCE MUSEUMS

Aeronautics and Space Museums
Anthropology, Ethnology and Indian Museums
Aquariums, Marine Museums
Arboretums
Archaeology Museums
Aviaries and Ornithology Museums
Botanical and Aquatic Gardens
Entomology Museums and Insect Collections
Geology, Mineralogy and Paleontology Mu.
Herbariums
Herpetology Museums
Medical, Dental, Health, Pharmacology, Apothecary and Psychiatry Museums
Natural History and Science Museums
Planetariums, Observatories and Astronomy
Wildlife Refuges and Bird Sanctuaries
Zoology Museums
Zoos, Children's Zoos

SPECIALIZED

Agriculture Museums
Antiques Museums
Architecture Museums
Audio-Visual and Film Museums
Circus Museums
Electricity Museums
Fire-Fighting Museums
Gun Museums
Hobby Museums
Industrial Museums
Logging and Lumber Museums
Mining Museums
Religious Museums
Sports Museums
Toy and Doll Museums
Wax Museums

The most common type of museum in the United States is the history museum. According to the Museums U.S.A. Report, (1974), there were at least 1,821 established museums in this country in 1971-1972, of which 683 were history museums, (including historic houses, military museums and preservation projects as well as general history museums), 340 art museums, (including museums of china, glass and silver as well as folk art and textile museums), 284 science museums, (including aeronautics and space museums, aquariums, arboretums, aviaries and ornithology museums, botanical gardens, insect collections, herbariums, herpetology museums, planetariums, wildlife refuges and zoos), 186 art/history museums and 328 combinations of some or all of the above.

Increased insight into the behavior of the museum visitor will not only assist with design decisions for future museum projects but also museums needing rehabilitation or replacement.

FUTURE NEED FOR REHABILITATION OR REPLACEMENT, Studies have shown that the majority of American Museums occupy facilities which need either rehabilitation or replacement, giving architects and museum professionals an opportunity to improve on past designs.

In a survey conducted for the National Endowment for the Arts in 1974, most museum directors felt older museum facilities were less than adequate and that the need for rehabilitation or replacement was so great that it could not be met in a year or two. In response to the 1968 request of then President Johnson as to the condition of the American museum facilities, the American Association of Museums states, " a conservative conclusion is that the condition of most museum buildings and facilities is so unsatisfactory that the institutions cannot serve the public or perform their cutural and educational functions adequately."

The 1968 study by the American Association of Museums (AAM) pointed out that, of the 689 museums sharing quarters with

other institutions, 138 would need new quarters within the next ten years. Of the 1,053 museums housed in buildings not constructed for museum use, 630 institutions or 60 percent, would need new construction within the next ten years to adequately house and exhibit their collections for the public. And, assuming the effective life of a public building to be about fifty years, another 124 museums would need either to remodel or replace their buildings within the next two or three years.

The AAM also has disclosed that, of the museums housed in buildings designed specifically for their use, 149 were constructed before 1900, 75 were completed during the years 1901 and 1920, 233 were constructed between 1921 and 1940, 174 were built between 1941 and 1960, and 60 have been built since 1961.

Improving Future Museums

With the success of museums in recent years (i.e.,with the continuing growth in museum facilities, attendance and the variety of collections and exhibitions being displayed), there exists a challenge for architects and museum professionals to capitalize on past research and undertake current visitor-behavior studies to improve museum design. It also offers the opportunity to include the museum visitor in the design team of future museum building projects, which can increase designer's understanding of the characteristics and psychological problems of museum architecture.

This is essential if existing museums are to make the best use of their galleries and if future museums are to have an architecture that is appropriate to the characteristics of the public it serves today. It would, in fact, provide a richer variety of buildings than now exists because there are within society so many distinct groups and types of individuals, some of whom are not at present catered to.

It is well-known within architectural practice that the worth of a facility can be measured by its

NEED FOR REHABILITATION - A CASE STUDY

THIS IS A LARGE NATURAL HISTORY MUSEUM, ONE OF THE FIVE LARGEST IN THE COUNTRY. ITS BUILDING IS 47 YEARS OLD. ITS TOTAL AREA COVERS ABOUT 800,000 SQUARE FEET, OF WHICH 437,000 SQUARE FEET ARE EXHIBIT AREA.

THE ELECTRICAL SYSTEM IN THIS MUSEUM'S BUILDING IS OBSOLETE IN DESIGN AND INADEQUATE IN CAPACITY. FOR REASONS OF SAFETY IF FOR NO OTHER REASONS, A COMPLETELY NEW ELECTRICAL SYSTEM IS REQUIRED. IT WILL COST IN EXCESS OF $1,240,000.

MOST OF THE MUSEUM'S AREA IS WITHOUT FIRE DETECTION AND PREVENTION EQUIPMENT. TO PROVIDE THIS WILL COST ABOUT $ 210,000.

THE MUSEUM'S VENTILATION SYSTEM IS OBSOLETE. IT IS IMPOSSIBLE AT PRESENT TO PROVIDE PROPER TEMPERATURE, VENTILATION, FILTERING AND HUMIDITY FOR PRICELESS COLLECTIONS AND EXHIBITS NOT TO MENTION EMPLOYEES AND VISITORS. AN ADEQUATE AIR CONDITIONING SYSTEM IS ESTIMATED TO COST ABOUT $2,500,000.

THE FLOOR OF THE MUSEUM BUILDING HAS SETTLED BY ALMOST A FOOT. TO STABILIZE IT WILL COST ABOUT $200,000.

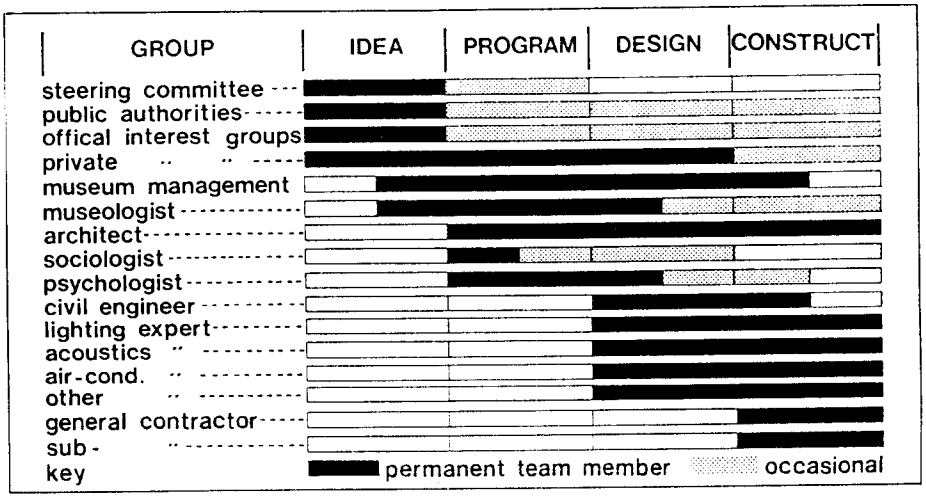
ESCALATORS AND A NEW PASSENGER ELEVATOR ARE TO COST ABOUT $275,000. NEW LOUNGE AND TOILET AREAS FOR THE INCREASED ATTENDANCE WILL COST ABOUT $250,000. BECAUSE THE NOISE LEVEL IN SOME OF THE MOST POPULAR EXHIBIT AREAS IS UNCOMFORTABLY HIGH, ACOUSTICAL TREATMENT IS RECOMMENDED, AT A COST OF ABOUT $200,000.

THIS MUSEUM'S TEN ACRES OF EXHIBITS, THE TRUSTEES AND DIRECTOR HAVE DECIDED, NEED OVER HAULING AND UPGRADING. MANY HAVE NOT BEEN CHANGED FOR DECADES. IT IS PROPOSED TO UPGRADE THEM OVER A PERIOD OF TEN YEARS, USING NEW AND MODERN TECHNIQUES, AT A COST OF APPROXIMATELY $200,000. A YEAR.

ALL TOLD, INCLUDING OTHER CAPITAL IMPROVEMENTS NOT LISTED ABOVE, AN EXPENDITURE OF ABOUT $11,500,000. IS REQUIRES BY THIS MUSEUM OVER THE NEXT DECADE.

THE BELMONT REPORT, 1968.

BOTTOM- IF FUTURE MUSEUMS ARE TO PROVIDE A BETTER ENVIRONMENT,VISITOR-BEHAVIOR STUDIES MUST CONTINUE AND THE MUSEUM VISITOR MUST BECOME PART OF THE DESIGN TEAM.



ability to accommodate its intended use and by knowing about the users, who have the most direct and extensive relationship with facility use. Each building prototype carries with it a different set of requirements, thus human needs must be understood and studied within the framework of each design problem.

Visitor-behavior studies conducted in museum environments support the proposition that visitor needs within these institutions are still being overlooked by both clients and designers. This omission can cause loss of time, wasted energy, decreased personal satisfaction and the loss of desired educational impact. Visitor needs often are ignored because they are not represented in the team that programmes and designs the building or its exhibits. A building design team should be established during the "needs analysis" or first stages of planning for a new museum so various points of view can be considered from the beginning. Working together, the various participants help guarantee a balanced approach.

Without the presence of the museum visitor in the design team, the owner's and museum director's concerns for operational efficiency, will focus attention on technology, resources, systems and cost rather than people.

In his discussion of The Museum as a Social Instrument, Theodore L. Low, former researcher for the American Association of Museums (AAM), states that "Museums must realize that as public institutions they have a duty to many more people than they are serving today and that every attempt must be made to expand the scope of their activities." (Coleman, 1939)

Researchers, involved with visitor-behavior studies have suggested a number of areas for further work. These can be stated as questions for museum directors, curators, designers and architects to answer, and include:

- Which galleries and exhibits do visitors miss most often and why? (Bechtel, 1977)

- How do windows and colors of walls and floors affect the use of space in a gallery?
- Why do some gallery spaces attract more visitors than others?
- Do warm colors increase visitor activity in gallery spaces while cool colors depress it?
- What does the museum visitor consider to be a comfortable social distance? (Borhegyi, 1963)
- What is the public's image of today's museums? (Cameron, 1967)
- What are the motivations underlying museum visiting?
- What paths do visitors usually take in the museum and why? (Cohen, 1974)
- Where should directional, orientation, and general information signs and maps be placed for optimal effectiveness?
- How do fatigued visitors structure their visit differently from the energetic visitor?
- Do visitors avoid some gallery spaces because of directional choices (i.e.,left versus right hand turn)?

Museums in the United States are likely to grow, which will place increased demands on staff and facilities. To continue to meet the needs of museum visitors, it is important that architects and museum professionals evaluate visitor-behavior patterns that are influential in the shaping of museum environments and translate these into design implications.