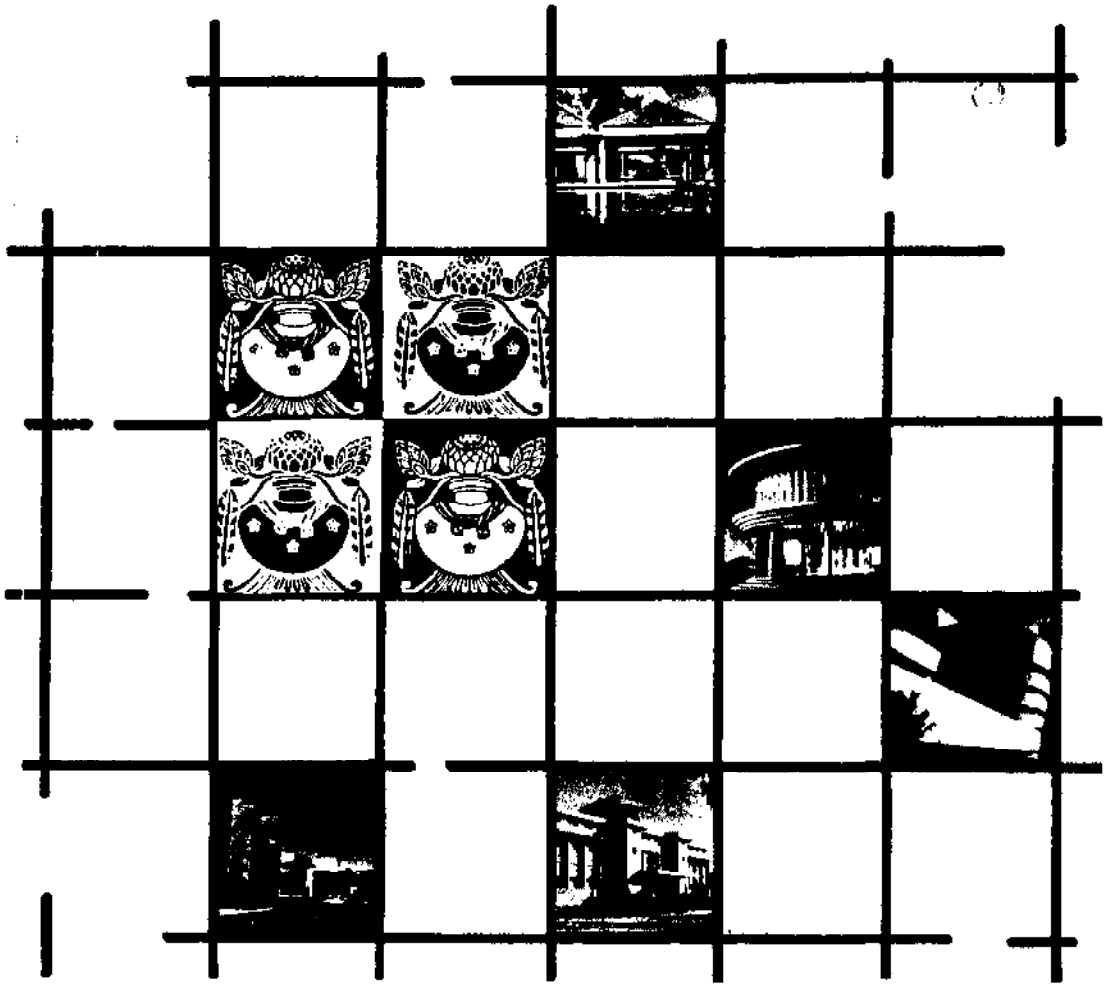
MUSEUMS ASSOCIATION OF INDIA NEW DELHI FEBRUARY 71



ALL INDIA MUSEUMS CONFERENCE

# MUSEUM ARCHITECTURE

# Museum Architecture

Proceedings of the
All India Museums Conference
New Delhi

Feb, 1-4 1971

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# FOREWORD

Some persons are in the habit of collecting beautiful objects such as sculptures, paintings, manuscripts, rare books, first edition of books, clocks and watches, musical instruments, old vases, crockery and lamps, and even old swords, rifles and pistols. Generally many years later when the collection of such objects becomes substantial that the heirs of the collector or collectors decide to display the collection in the family building or in a new building or in some cases decide to donate the collection to the Municipal Corporation or a Trust. This is how in many cases in the past a museum was born.

When the family mansion becomes a museum, it is obvious that it cannot serve adequately the functioning of the museum as the mansion was built as a residence rather than as a place to display works of art. Further, it is often difficult to provide glare-free and safe lighting for the exhibits so as to display them to their best advantage. Again, there is the risk that if these exhibits are not kept in secure places they can be easily stolen.

There has been an increasing consciousness that museums can be used to educate the viewer and not merely to amuse him. It has been seen that people living in countries with scientific, musical, artistic or other traditions have been inspired by the masters in those fields since their works have been open to public view, and these countries have continued to make advances in those fields. India has a great cultural tradition. Not only have beautiful sculptures, both in metal and in stone, been produced over the centuries, but literature of a very high order covering the fields of religion, medicine, political science, social science, law, drama, poetry and prose has encriched our land and there is thus an abundance of sculptures, paintings and books which could be arranged in a suitable manner and kept on view for the public or for research by scholars. Many museums have, therefore, sprung up either under the auspices of the Governments or Muncipal Corporations, Trusts or other bodies. It is essential that all these museums should be housed in buildings suited for the purpose of display, involving proper design of the galleries, well

and properly lighted show-cases or pedestals and suitable entrance and exit arrangements. In view of all these factors, it is imperative that the museums should be designed by architects with specialised knowledge. The architects as well as those who are incharge of the museums should know various requirements of space and lighting. The Conference on Museum Architecture organised by the Museums Association of India in February 1971, whose deliberations are given in this Bulletin, has therefore rendered useful service by arousing the interest of all lovers of art to this problem.

I trust that all those who read this publication will gain useful information on some of the essential aspects of museum architecture. I hope also that a deeper and well-coordinated study will follow, which will provide some economical type-designs for buildings for large as well as small museums.

A. B. CHANDIRAMANI

Joint Educational Adviser to the Govt. of India
Department of Culture

# INTRODUCTION

Recent years have seen a great spurt in the interest on the part of the Government and on the part of the public towards cultural field, which has resulted in the establishment of many new museums in the country. Sometimes old buildings earlier used for residences or for some other purpose were redesigned or remodelled in an effort to make them fit for housing museums. At times new buildings specially designed for museums have also been constructed. Very often, it is observed that many of the new museum buildings, although outwardly looking modern, are not able to ful-fill the functions which they are supposed to ful-fill. Museum is not simply an office or simply a public institution, school or an exhibition hall, it has certain special functions to accomplish ; there are certain special demands on a museum which it must be able to meet.

However, very often it was felt after the building was ready that due weightage was not given in the design to these various special demands. It was felt by many prominent members in the profession that what is really responsible for such a situation is lack of a proper consultation between the museum authorities, the architects, the conservators, the designers and the other persons connected with the working of a museum. In order to rectify this situation, at least to some extent, the Museums Association of India decided to hold a Seminar on the subject of Museum-Architecture and as a result the 1971 All India Museums Conference was devoted to it. The notes presented in this publication are the result of the deliberations and discussions of this meeting. It is not claimed that these proceedings are the last word on the subject; these denote only a beginning. It is hoped that this Conference and this publication will provide some stimulus for greater study of the problems which are involved in the construction of a building intended to be used as a museum.

I wish to express my gratitude for the co-operation, I have received from many people in the preparation of the Conference and this publication. The main load of the organisation fell on Smt. Smita Baxi, Keeper (Display) of the National Museum, who very kindly agreed to be the conever of the meeting. It was mainly

her efforts, forethought and planning which made the Conference a success. Without her personal devoted interest, this programme could never have been realised. My thanks also go to all the participants of the Seminar, members of the Association and others. The words of Shri J.R. Bhalla, President of the Indian Institute of Architects and the Commonwealth Association of Architects who kindly agreed to inaugurate the Conference provided the much needed inspiration to all. The leading lecture of Dr. Grace Morley set the pace for the whole of the Conference. She agreed to speak to us at a very short notice and for this we are indeed very grateful to her. I should make a special mention of Shri H. Rehman, the Chief Architect, C.P.W.D., of the Govt. of India, Shri G.C. Mathur, Joint Director, and Shri S.T. Jani, Deputy Director, National Buildings Organisation and Shri K.R. Ahluwalia of the Philips India.

I shall fail in my duty if I do not thank Dr. Brahm Dutt who has given all help in the editing, proof-reading and other matters connected with this publication.

The exhibition which was arranged at the time of Conference and which remained open for public view at the National Museum for many months could not have been organised without the active help and generosity of the various museums and architects, abroad and in India. On behelf of the Museums Association of India, I wish to express my sincere thanks to all the contributors to the exhibition .

Thanks are also due to the Department of Culture, Ministry of Education and Social Welfare, Govt. of India, for their continued financial assistance to the Association which made this publicatio n possible.

O.P. Agrawal
Hony. Secretary
Museums Association of India

# Conference on Museum Architecture
## A Preamble

**Development of Museums in India**

Museums came into existence in India as early as 1814 when the Asiatic Society of Bengal brought together a collection of geological, botanical, zoological, anthropological and archaeological exhibits to establish the Indian Museum at Calcutta. Before the turn of the century many museums like the Madras Museum, Victoria and Albert Museum, Bombay, Grant Medical College Museum, Bombay, Mysore Government Museum as well as museums at Nagpur, Lucknow, Rajkot, Mathura etc. came into existence. With the establishment of the Archaeological Survey of India several site museums and archaeological museums were set up by the Central and State Governments. The Prince of Wales Museum at Bombay made its beginning before the end of last century but its new building was ready in 1914. First University Museum was established by Sir Asutosh Mukherjee at Calcutta. Since then, the number of museums is on steady increase. At present there are more than 300 museums in India devoted to arts and sciences.

**Situation of Museum Buildings**

Very often the buildings utilised by museums for housing their collections were not designed for use of museums. Most of the museums made use of public and residential buildings which were available and they just grew up without any relation to the functions of a museum.

Most of the existing buildings do not have sufficient space for carrying out the functions and activities of a museum. There is no space for proper storage of reserve collections as all the available space is utilised for galleries. There is no room for library books and other reference materials like slides, photographs and films. The visiting scholars and research workers have to carry out their work in the galleries as there is no separate room available. For lectures, demonstrations and even conferences, no facilities are available in most of the existing buildings. The visitors, art-objects, stationery and other goods enter the museum through the same entrance in many buildings and create confusion. There is no place for staff members to work and no room for workshops. The galleries in which the collections are displayed are not provided with sufficient natural or artificial lighting. They are also unsuitable for effective presentation of the collections.

It is obvious that most of the museum buildings did not receive any help of the qualified architect in the planning of buildings or the installations of

galleries. Museums should have a good floor plan for efficient and effective presentation of the collections, to accomodate storages and to provide functional space for educational and research activities.

It is necessary for museum authorities to work in close collaboration with the architects right from the beginning when a decision is taken to build a new building for a museum, or even for reconstruction of old buildings. It is the job of an architect to scrutinize space requirements and determine planning requirements to review mechanical and electrical services required and to select building materials and establish methods of construction.

It is also necessary to lay down certain minimum standards for different types of museum buildings which will help and guide the prospective planners. Architects and museum authorities should jointly undertake the job of preparation of such standards. For formulating these it is necessary to discuss :

1. The demands on a museum of to-day.
2. Circulation problems in museum buildings with special reference to security.
3. Technological developments and their utility for museums with special reference to lighting, airconditioning and security alarms.

## 1. Demands on a Museum of to-day

Museums are not just repositories of collections but they are centres of education for children as well as adults. Museums are also used as community centres. These are places where people expect to find pleasure in looking at a rare object, a masterpiece of art and thus expect to find recreation and intellectual relaxation.

Museum is defined as a public institution which collects, preserves, exhibits and interprets cultural and scientific objects of the enviornment.

A museum building should provide functional spaces for all the activities and functions of a museum.

## 2. Circulation problem with special reference to security

Circulation in a museum building is a complex problem as there are many areas in a museum building which should have independent access from the main entrance but still they have to be under good control.

Circulation of objects is as important as the circulation of visitors through the galleries, as well as through other public areas like library, auditorium and cafetaria. A museum auditorium is in demand for the use of communlty performances during the closed hours of museum and this, of course, needs an independent entrance which affects the security of the museum, but without an independent entrance the circulation too is hampered.

Staff - members need offices as well as work - rooms and they should not be far—away from their galleries. Easy and convenient linking of different areas in a museum with a special consideration for the security needs a serious thought and careful planning.

**3. Technological developments and their utility for Museums :**

Lighting of a museum gallery is a determining factor in planning a museum building but it is also dependent on the nature of objects which will be exhibited in the galleries. New materials especially different types of glass sheets and acrylic plastic materials and paints which cut down heat, ultra-violet rays and reflection need a special study.

Humidity control in air-conditioning of a museum building is a specific requirement. Electric and electronic systems for fire-alarms and burglar alarms are coming into the market and need looking into for determining their reliability.

If these devices are established, the guarding and maintenance of security of museums will be simpler.

Smita J. Baxi
Convener
All India Museums Conference
On Museum Architecture

# Presidential Address

## Dr. K.K. Ganguli

**Ladies and Gentlemen, friends and co-workers,**

It is a great honour that you have conferred upon me by giving the opportunity of addressing you to-day as the President of our Association. I am indeed overwhelmed by your kind gesture and like to offer you my sincere thanks for the same. To-day, I remember an occasion some fifty or more years from now, when I had for the first time visited a museum in Dacca and had experienced one of the greatest thrills of my life. Since then I have had the good fortune of treading upon the corridors of many of the greatest museums of the world and have enjoyed the most pleasurable time of my experience in these persuits. Indeed, I have no secret in revealing that in my profession as a museum man, I have experienced great happiness which has always inspired me to think deeply indeed about the social and moral responsibilities of the profession to which I belong.

Since a collection of exotic objects were made by some inquisitive persons a hundred and odd years ago and later thrown open to public, there have been now in our country nearly a thousand establishments that can lay their claim to be deemed as museums according to the specifications of the ICOM. Such public places as the art galleries, collection of antiquities, zoological gardens, aquaria, herbaria and botanical gardens, agri-horticultural gardens, planetaria, ethnological galleries, and museums of science, technology and natural history constituted by private enterprise or by public endeavour, and increasing and growing every year all over the advanced and developing countries of the world are a new social phenomena of the modern age. Though in India the endeavour had started quite an epoch from now, elsewhere countries have advanced in quick pace. Here, as things stand to-day, it will take enough labour, understanding, planning and imagination on our part in order to catch up and gear this new phenomena to the real and fruitful service of the society. I may be pardoned if I say that we are yet at the threshold of a vast and poorly envisaged future wherein rests the real development of museums destined to play a very unique role in the progress and development of human culture.

The world has been a gift of nature; it has however, not remained as nature had intended to shape it. Man has undoubtedly contributed his share in shaping the world in its present vogue and this human agency promises to

reshape it in future as his destiny leads him to do. If man has now acquired enormous powers to wield and has become aware that in future he will gain limitless power at his command, the extent of his knowledge and achievement have also been increasing every day, calling for specialization of a very intricate type. Knowledge, it may be reiterated, is the product of curiosity which has prompted and motivated the human agency to explore uncharted realms. Human civilization has undoubtedly arrived at the threshold of a totally uncomprehensible turn regarding its future. As man in every walk of life has been compelled to think deeply about the future, a museum has more so been required to divine what crucial part he is destined to play in building the future of human society.

There is no denying the fact that the collections that have constituted the museums in India were made by persons urged by their curiosity, though the limits of their knowledge were also increased in the endeavour of making those collections. The museums were named "*Ajaib Ghars*" and those have by and large remained as such. Though some change has been engendered insofar as the accommodation, display, curatorial care and visitor facilities are concerned, the museums, I am afraid, remain far away from the general throb of the people of the country. One thing that I feel essential at this hour, is to bring the museums much nearer the unspecified masses of the people to whose service those should be truly dedicated. People in India, much more than in any other country, need the services of the museums, so that they may align themselves with the present day progress of human knowledge and culture all over the world.

A change has become overdue in the life and society of the people befitting the requirements of time. The expanse, knowledge and power of man, is becoming manifest in the unrest which becomes more and more apparent everywhere to-day. In this world phenomena, the situation in India becomes quite alarming. This phenomena of unrest, deep and latent in the society is manifesting itself in political shifts and fluidity, wavelike movement of human masses most excitingly in student and youth unstability and explosions. This is a phenomena of deep and profound introspection and calls for understanding and action by all thinking people, conscious of their social role and responsiblity. Against this background the museum worker has a role of uncommon peculiarity. The museum worker has no direct role in the field of production nor does he serve the society in the way a teacher, a lawyer, a medical man, a technician or an entertainer serves. The undefined role of the museum man has, however, the combination of an entertainer and an educator, none of which has yet gained the social recognition that it deserves. The entertainment that a museum provides is inherent in the quality of the objects on display and the appeal of such objects as brought out by the technique of organisation and display. This is a highly technical process and requires imagination and skill of a highly professional nature. The museums undoubtedly need this technical embellishment in order to prove themselves

more serviceable to the visiting masses. But the museum should, as it has occured to my mind, not remain a mere stimulus for entertainment as a ball game or a cinema show is required to do. A visit to a museum should start to bear fruit as a visitor goes out of the precincts of the gallery. The museum visit becomes successful only if it can stimulate the visitor and invite him to come back so that he can acquire something sustaining and abiding for his life. Then and then only a museum may be a social reality and an instrument that shall be able to sustain in social value.

This sustaining social value of the museum rests more on its educational potentialities than anything else. That the museum can well serve as a centre even in the academic sense could be envisaged from the fact that the eminent educationist Asutosh Mookerjee, who in the beginning of this century, while he was the President of the Board of Trustees, Indian Museum, Calcutta, provided opportunities to students studying for their post graduate degrees, to use the museum galleries and the coin room for the purpose of their study. This integration of academic education with museum background, though at the highest level, has remained hanging at where it had been, without expanding in a rational way. In the meanwhile academic education itself has come face to face with a crisis of immeasurable magnitude. This crisis in traditional academic pattern of education has already manifested itself in the campus flare ups in the United States, and some countries in Europe and Asia. The mightly blow up in the West Bank of the Seine had too glaringly brought to light the inner contradictions of present day academic education and its failures.

Here in India, along with a colonial system of administration we obtained a colonial pattern of education framed up to suit best the requirements of the rulers of the time. In a great hurry we had commissions, recommendations and some arrant changes by way of reforming out educational system. Today the crisis has attained such proportion that the universities, colleges and schools are frequently coming to a standstill due to unrest of various kinds. It is high time now to think as to how our education should be re-planned. Patch-work reform such as reducing teacher student ratio which under present circumstances would require colossal sums to attain success or reforming examination systems by introducing simultaneous assessment, objective test and semester system and diverse other innovations, in fury of student unrest can never be stalled. There may soon be some drastic eruption in this field if the whole system of colonial heritage patterned upon the western method is not scrapped and a need and utility based general education and sound and fruitful system of higher and specialised education are not brought about to be intergated with the present day structure of the society. The change is inevitable and it will not be possible to keep the gates against the rush of drastic changes closed for long. In the event of such changes, as I envisage, the museums will have an extremely important role to play. In the new perspective

a board of general education will be a basic requirement for the mass of younger people who would normally be required to attend need-based courses in schools. In envisaging that day when for wider and profounder contacts with natural environments and human attainments the museum would serve as an agency of primary importance. Our efforts in this perspective should be directed towards the fulfilment of this end wherein the museums will emerge as institutes for catering to the requirement of masses and be able to disseminate knowledge of diverse nature in the most easily assimilable way In a speedily changing social background museum, which are now looked upon as instruments of social luxury will undoubtedly take shape as instruments of social necessity and help the citizens to attain a fulfilment, befitting the requirements of time. I envisage a very vital and responsible role for the museum worker in the future. With this dream before us let us dedicate ourselves to the work.

# Inaugural Address

## Shri J. R. Bhalla

I deeply appreciate your kind invitation in asking me to inaugurate the All India Museums Conference on Museum Architecture. I understand this Conference is being attended by experts and specialists from all parts of the country. I hope your deliberations would be fruitful and result in useful guidelines for the design of museums of the future.

It is significant that this Conference is held in Delhi which offers glimpses into our past civilization. The city bears the impress of successive civilizations, from the Mauryans down to the Mughals and the British.

A great museum debate is presently going on in all parts of the world. The basic issue as to what a museum should be, is engaging the attention of experts in many countries. UNESCO is doing commendable work focussing attention on museums by publishing reports on the development of all aspects of museum activity including new buildings and display. The seminars conducted by UNESCO have further promoted the understanding of the role of museums in community service. UNESCO's recommendations concern the most effective means of rendering museums accessible to everyone, and provide the services necessary for international exchange of information concerning the design and display of museums. Their quarterly review on museums contains really useful information.

Museums are an important link in the cultural life of a community. They are the shrines of the cultural heritage of the country. An interested person can spend an exhilarating time visiting a museum. To a lay man, however, it is a place where the past is unfolded or where some rare beautiful objects are displayed.

A museum which is really meant to interest and educate must be something which connects its objects with the things the visitors are used to seeing in their lives and in their environments. It should not be just a symbol of the distant, unconnected past. Experts should, if possible, plan their museums on these lines. It is important and necessary to collect and display antiques; but such displays have an impact upon the visitor if it is related in some form to the contemporary world. Every period in the past has some relation to the present. Such relationship, if brought out vividly, could create an interest.

Museums must attract a large number of visitors who must benefit and learn from their visits. They should not be confined to a visit by the experts

only. Students normally keep away from museums. They must be encouraged and attracted so that they could benefit by their visits and add to the knowledge. Museums must have facilities for a lecture hall and educated guides, who could explain various objects displayed and increase the interest in the minds of the visitors. Museums in fact must become the centres of learning in particular for young students and children who should be exposed to history through the displayed objects.

Museum is basically a medium of communication. It is primarily concerned with the visual communication of objects of cultural and scientific interest. Unless the museum is able to fulfil this task it is failing in its purpose. Museum design, both in terms of architecture and display must make possible such communication and actively contribute to it.

The museum, unlike cinema or television, communicates to an individual at a time, and is able to exhibit the object itself. Museum architecture through its display must, therefore, exploit this unique sense of intimacy this direct encounter between the viewer and viewed.

The definition of the proper function of the museum has changed since the early times. Until the 15th century, collection served two purposes, they were the accumulation of objects for either religious or personal enjoyment. Museums were considered as Mausoleums where one went with some reverence and tiptoed around with a hushed air. The notion of the work of art as public property or at least as public enjoyment is of relatively recent origin.

We had been accustomed to museums conceived architecturally in monumental scale, a shell into which the work of art were inserted at a late stage. Now the works of art themselves create the architecture, dictating and organising the spaces, displaying and creating a new environment. Museums are now full of laughter and frolicking, full of popular music and flashing lights. More and more museums are acting as community centres or as performing art centres. Their scope has broadened considerably from the original contemplated temples for an already initiated cultured elite. It is symptomatic of changing society's changing relationship to art. The American Museums Association defines the functions of a museum as collecting, preserving, exhibiting and interpreting the national and cultural objects of the environment. The mission of the museum, according to the Association, is the advancement and diffusion of knowledge and the enhancement of the awareness which affords pleasure and delight. Such a definition is broad enough and calls for new thinking on the design of museums.

The opening of the Louvre as a museum of the French Republic in 1793 firmly set in motion the great 19th century period of museum creation. The motive at the beginning was national and civic pride which to some extent changed to philanthrophy.

The assumptions on which the museums of the 19th century were based have undergone radical transformation during the last 40 years. The economic, social and technological changes which have occurred and their effect on education, leisure and mobility have become almost commonplace in their documentation. Each has had its effect on a wide variety of museum aspects from lighting to visitors visual knowledge.

Location is, of course, of crucial importance to any museum and its nature may well be determined by it. The Louisiana Museum in Copenhagen, in the centre of recreation area, is normally crowded and so is the museum of Modern Art in New York. A public library, whose function in terms of communication has considerable similarities to that of the museum, has become increasingly open and inviting and its location more firmly rooted to the every day paths of its users. Libraries and Museums required huge capital and recurring expenditure. Unless therefore these buildings are well used, the money spent on them would not be worthwhile.

Museums should be sited in the main stream of community activity so that it becomes a medium of communication of objects of cultural and scientific interest. Children should be encouraged to visit museums as part of their curriculum. Lectures and discussions should also become a part of museum activity.

The method of communication will ultimately determine the architectural organisation of the museum. The anatomy of the building will be shaped by the social role envisaged and emphasis on the different aspects of communication. Foremost amongst these is the encounter between the object and the individual.

Art in the museum must exist as part of its environment. The architectural anatomy of a museum will be strongly influenced by two aspects of its functions the general role assigned to the museum and the relation between the object and the spectator. The first will affect the relative disposition of spaces the second their nature.

Graphics are invariably neglected in museums. Legible identification of an object should be simple and placed near the object. This may be supplemented by a more descriptive label acting as an introduction to the section.

Museum architecture does not exist in isolation as some special branch of design, but is inevitably and properly part of the general trend of architectural thought. If it is of sufficient calibre it will itself in turn exert an influence on this trend.

The affluence in society in certain countries have created a demand for a large number and variety of museums. The large established museums are in the process of renovation, remodelling and expansion so that their collections

could be rearranged to communicate its message more intimately. The design of museums or its renovation will need a great deal of architectural ingenuity before workable and humane places are achieved. Architecturally it is a great challenge for the future.

Every museum has an obvious responsibility, to make certain that the objects will survive and will remain intact to communicate in the future. Climate control, like lighting, calls for specialised approach, security arrangements to protect the displayed objects, in terms of theft, disfigurement and fire, require proper attention when planning a museum. Furniture likewise is not a matter of after thought but part of the museum design.

Since Museums will continue to play an important role in the preservation of heritage and at the same time educating and enriching entire communities, I hope architects and other specialists would work in close collaboration with forward looking vision to fill vital roles as public education resources by evolving designs and methodology in keeping with our great heritage.

I have great pleasure in inaugurating the Conference and wish your deliberations all success.

# Museums And Architecture

Dr. Grace Morley

# Museums and Architecture

Museums generally speaking have not had happy experiences with architecture, yet these remarks are an earnest recommendation, based firmly on general international opinion in the museum world that the co-operation between architects and museum professionals should now be closer than ever before. The role museums are likely to take in the rapidly changing contemporary world will require application of all the skills of architecture as well as of museology in order to devise new and more appropriate patterns, in museums' physical plant as well as in their programme.

Historically museums have had either to adapt themselves, their collections and their activities, to buildings constructed for other purposes (examples: the Louvre and the Palais de la Decouverte, Paris, respectively a former palace and a portion of an exposition building or, to take examples close at hand, the National Gallery of Modern Art, Jaipur House, New Delhi, and the Birla Industrial and Technological Museum, Calcutta, both in former mansions), or they have been provided with buildings intended for their use but built without adequate regard for the requirements of contemporary museums (examples: National Museum, New Delhi, and the Visvesvaraya Industrial and Technological Museum, Bangalore). In all these cases the result has ,been a keen struggle of ingenuity on the part of the museum people responsible to find ways of exhibiting successfully their collections, while storage and work space, whether for offices or shops, has generally had to be improvised as well as possible, often most inconveniently and illogically from the point of view of efficient operation.

Obviously for historic buildings that have to be used as museums there is little hope of improvement in museological terms (example: the Nehru Memorial Museum, New Delhi). The museum professional therefore might as well resign himself to the limitation of his quarters and derive whatever benefits he can from their historical associations. The large private residence which may be transformed as ingeniously and completely as possible perhaps more flexible in allowing modification, but is far from ideal (example of notable success Birla Industrial and Technological Museum, Calcutta).

Buildings constructed for museums, but without practical provision to their requirements, represent the most difficult problem of all, slightly discouraging always because of misplaced effort, and wasted resources. Among those built for museums in the past couple of decades such buildings probably represent a majority in whatever country one considers.

The fault of defective museum buildings cannot always, or even often, be placed on the architect, though it is a commonplace in museum circles to remark that the architect has ignored, or failed to seek professional museological advice. Frequently, indeed, the fault can be laid directly at the door of whatever authorities commission architects to build museums, or even of the museum people who are to operate them and who, when consulted, or when guiding architects, fail to define clearly their requirements. In the first case a government or other authority orders a museum, perhaps providing the architect with opportunities to see other museums throughout the world, but the museum experts, if any, are not taken into confidence and the authorities have not themselves sufficient understanding of museums and their contemporary functions to specify what is needed. Moreover, for the architect seeing museums abroad is of little help because Indian conditions and requirements are diffierent. In the second case, if the museum people are consulted, or if they themselves give the commission to the architect, they fail to have clearly in mind what they need for their museums and they do not describe in precise terms to the architect the character of their collections, the programmes they foresee and their specifications for every part of the structure. They simply do not realize that the architect can interpret in structural terms what they prescribe but cannot, on his own, invent a building suitable for their needs.

The Museum professional's greatest comission normally in regard to planning his building is failure to visualize in concrete terms and to describe clearly the museum he requires. There is a great temptation for everyone, when planning a museum, to remember one that he had enjoyed and admired and therefore to have that duplicated, possible in reduced size, without giving thought to how his museum differs from the model, but especially forgetting how times have changed and the whole concept of museum as well.

It should be made clear here that it is not necessary for the museum professional, in describing his requirements, to be able to suggest their architectural form, though it is helpful if he can do so to some extent. What he must do is to have clarified in his own mind the character of his museum, the programme planned for it and the precise functions and services to be provided for it in his projected building. On the basis of this information the architect can then be expected to find a suitable architectural expression for what the museum man requires, which will be pleasing but also practical, and in exact correspondence with the use and programme planned.

There is, of course, the case of the master architect, the man of great creative power, who undertakes to do a museum, studies carefully the professional and technical museological requirements, consults to the greatest extent possible museum experts, examines the environment and the social conditions of the community, and then creates a museum building after his own vision of what a museum should be. The result is a spectacular building, often a work

of art in its own right. It does not always follow; however, that it is a functional building, suitable to its purpose. This is possibly sometimes because the architect's imagination leaps over the rather prosaic details of day to day museum operation or underestimates their importance.

Examples of museums by architects of outstanding international reputation known to every one are the Guggenheim Museum, New York, by Frank Lloyd Wright and the three museums by Le Corbusier, the Museum of Western Art in Tokyo, the Sanskar Kendra in Ahmedabad, and the Central Museum, Chandigarh. Those in Charge of the Guggenheim Museum have come to terms with it, partly, as a result of adding another building for utilitarian functions. The Museum in Chandigarh is by far the most satisfactory as well as the most recent of Le Corbuseir's three museum buildings and could be so recognized before the actual installation was begun and had perhaps modified to some extent his own intentions. The Museum's installation is successful, and extremely handsome and rich, but it does not function exactly in the direct terms of space and colour that he is thought to have planned. The Chandigarh Museum takes into account in a much more practical manner varied museum requirments, in its space allocation, its organization, its circulation than had been the case in Tokyo, while the Ahmedabad building was intended as an exhibition hall primarily and so was left as somewhat rough open space that has been adapted as the architect undoubtedly intended it to be, to diverse changing exhibition and museum requirements (as for example: the Gujarat Museum Society's galleries fitted into one corner). As experienced and practical museum professionals, whenever you visit Chandigarh you will be at once able to distinguish the basic building plan, as apart from the installation apparatus placed within it—successful certainly, but in a somewhat different key from that in which the building was originally conceived. There is no question about the fine quality of the building's architecture; on the contrary, it strikes one as monumental sculpture, in which the form and the material employed have been carefully contrived, in an effective setting, to achieve an aesthetic effect.

More recently outstanding architects of less international prestige have produced some excellent museum buildings. There are some examples from several countries in the special exhibition organized for this Conference. Generally speaking, though these examples may have notable architectural quality, you will note that they tend to give a large proportion of space for the working activities and services, and so reflect increased awareness of the multiple functions of museums in contemporary society and the fact that exhibitions are only one aspect of their activities today.

The monumental museum buildings so frequent in the nineteenth and the first half of the twentieth centuries, conforming to a classical European style of, architecture (examples; Indian Museum, Calcutta; Prince of Wales Museum Bombay) or to a composite Oriental style (example; Central Museum, Jaipur) echoed in India corresponding prevalence of fashionable architectural styles

applied to museum buildings elsewhere in the world. Museums were then thought of as monuments, worthy of the treasures of science and art that they housed, and the architecture of their buildings, from the outside and, often in some parts of their interior as well, were conceived by their architects as noble and majestic, and were accepted respectfully by those who operated them, despite their shortcomings as practical and functional museum quarters. They reflect a passive aspect of museum: collections as material for research; exhibitions as the major service to the public. For such museums, exhibition halls were the principal requisite and they tended to be vast and like the building itself based on a monumental conception, drawn from a cathedral or a palace perhaps. Storage and space for staff and research constituting the principal behind-the-scenes needs were not usually very generous.

The requirements of today's museums are very different; they are more varied and more precise, for the whole concept of the museum and its relation to its community has changed drastically, especially in the past decade or two. Further change is to be anticipated.

Both museum workers and the architects who try to serve them almost everywhere recognize the fact that museum buildings must today differ radically from those of the past, and must reflect contemporary ideals of museum functions and operation. But no one should jump to the conclusion that all the answers have now been given.

The museum concept is continuing to change at an accelerated rate and, even, almost unrecognizably in many parts of the world in response to economic and social pressures. There is indeed a great uneasiness in many places about the established image of even highly successful museums. India has not felt as yet the full impact of these changes in thinking and in action, but here too they are inevitable, though there is no reason why they should duplicate exactly what occurs elsewhere. Indeed it can be hoped that they will not do so, but rather will find their own way of service to the new society that is emerging here. It is not necessary that museums in India, having started so long ago from approximately the same point as museums of the West as places of collection, research and passive incidental exhibitions—should recapitulate exactly the same stages and come out exactly at the same place. Indeed, in the West, countries of even the longest, most deeply rooted museum traditions have in the past few years begun to think about a diversity of forms suited to specific communities and environments instead of the long established large all-inclusive museum whatever its subject. Museum architecture must obviously be in conformity with the new purposes.

It may therefore be taken as appropriate and timely that the Museums Association of India is focusing attention on museum architecture at this Conference. Inevitably there will be many more museums in future in India. Despite its number being approximately 300 at present, more are needed for so

large a country. They will be built as time goes on, some surely to continue the present dominant type of archaeology/art museum, conceived to preserve and exhibit and study India's endless heritage of prehistory, archaeology, arts and ethnology, but undoubtedly for other subjects, in new forms and in a more vital way. Every type of museum is needed in India. Museums are required here for study and public instruction in the natural sciences, now far from adequately served; in the applied sciences, which have only recently begun their indispensable contributions to a developing country; in History, which has been hardly developed in India at all as yet; and in the numberless other subjects which need museum to collect, to exhibit and to serve the educational and social aims of a free land taking its place in the modern world.

To every observant and thoughtful person in India today it is obvious that the country is undergoing rapid changes of many kinds and in many directions. Social attitudes are being transformed in many ways; economic conditions are changing; groups of people with at least small means and some leisure are becoming larger and more numerous; there is increasing appreciation of India's own culture in crafts, dance, music; education at every level is expanding; the urban population continues to grow in size and demands more sophisticated conditions of living; everyone is more aware of technological devices and is more dependent on them. Even rural life is not untouched by progress, not necessarily improvement perhaps—one thinks of the pollution of air and water and the destruction of the natural environment as present concommitants of progress, very easy to recognize as bad and needing correction even in India Those represent just a few aspects of change, but all represent broader demands for knowledge of every kind from an even larger number of people than ever before, and therefore an opportunity for museums, teaching by their own visual methods.

To India, with conditions of transition and change—and many more instances one might cite of modifications from what formerly was a predominantly agricultural society to an emerging technologically oriented one—museums of every kind should be able to contribute constructively. Identifying the circumstances of each locality to which its museum can contribute and achieving an appropriate form and function or a museum effective for the purposes is rather a challenge to Indian museum people today. This is a great opportunity, for it draws museums out of their "ivory tower" role. It is also a great responsibility, for it involves museums themselves in the process of change. May they not indeed take other forms? Can it be foreseen that the large elaborate museum in the urban setting may be less frequent in future museum building than smaller units, possibly dependent on a State or Central Government museum, but functioning separately when distributed among a certain number of district centres, even in some cases serving groups of villages? This possibility provides opportunities for a new type of museum planning for both museum people and for architects.

Given these premises what should museum people in India be thinking about for their museums, what should they instruct their architects to do for them? A very precise and thoughtful general answer, applicable to museums of every kind, is provided in the current *Journal of Indian Museums* (Vol. XXV-XXVI, 1969-1970) by Mrs. Smita Baxi in her thoughtful and quite helpful article: *A Minimum Museum Building for India—a programme of requirements.* It is written from an architect's view point. My remarks here are more general and should be taken as a commentary on many of the same points, but from a slightly different angle, emphasizing the kind of collection and the type of museum as opposed to Mrs. Baxi's abstraction.

Obviously one desires a building architecturally distinguished. What does that mean in thinking of to-day? It can be summed up perhaps by saying that the museum professional concerned should demand an honest building, its size and form dictated by the use to which it is to be put museologically speaking, with sensitively established proportions, conscientious use of its materials, and without decoration for the sake of decoration. In other words, structural steel and cement can, properly designed, be as worthy a realization of the needs of a museum as red and buff sandstone and marble. To put it another way and in familiar museum terms: the building's shell should be like the paraphernalia of installation, only a setting for the exhibitions and activities of the museum, and it is better that the building avoids competing for attention with what it contains.

In frank terms this is a plea for simplicity, forthrightness and economy for museum buildings. Perhaps it will at first glance alarm or offend architects. There is no such intention. Indeed the frank terms of the contemporary museum building present a greater challenge to architects and assures them greater applause, if they are able to solve the individual museum problem well and with distinction in their own art. A sensitive architect, well briefed by the museum professional, and both co-operating intimately, can hardly fail to produce a good building, architecturally as also functionally satisfactory.

But creating the building for a museum makes an even greater demand on museum people than on the architect: they must consult with their architect frankly and at length; they must understand the way in which he has to work, how he has to know and understand their precise requirements in order to bring to concrete form what they ask him to do for them. Above all they must formulate fully what they want their museum to be and to do, and they must strive to explain these purposes fully. In short, in a sense they must be not only very practical museologists but to some extent prophets as well, for they must explain to their architect not only the museum of today and tomorrow, but the probable museum of five, ten or twenty years from now.

In preparation for planning a museum building it is useful, of course, to review museum buildings and their adaptation to functions as illustrated

and described in good books, in such technical journals as Unesco's *MUSEUM*, the *Museums Journal* of the British Association, *Museum News*, *Curator*, also in publications here in India, like the Museums Association's *Journal of Indian Museums*, *Studies in Museology*, the magazine *Design* which has frequently included museum buildings in its continuous review of architectural development, particularly in India. However, such a survey is more useful for museum people as a reminder of museum requirements in different conditions than likely to provide a ready-made model. Probably the examples one does not like, those one could criticise, in general, or in relation to one's own aspirations towards achieving the perfect museum, are as useful as any in clarifying one's own thinking on the subject. That is why the exhibition on museum architecture organized for this All India Conference and, more especially, the discussion proposed are so valuable. They contribute to reaching greater precision of thought in regard to museum buildings.

In passing it should be recalled that at different times various rules of thumb have been cited for guidance in distributing space in a museum. For example, a proportion of one third exhibition and public areas to two thirds for storage, offices, library, workshops has been quoted. Similarly the ratio of one fourth to three fourths and of two fifths, to three fifths and of other proportions still have been recommended. Actually there seems no sound basis and really no reason to adopt such a formula. It rather begs the question and, taken literally, is misleading. The only point to note, as a sort of lesson from experience, is that whereas in earlier days little space was allotted to storage and work areas, now generous space assignments for them invariably and as a matter of course, definitely exceed the exhibition and other public portions of the museum, no matter what its type. More realistic guidance for planning space is to make as clear an assessment as one can of the projected programme of the museum in relation to exhibitions, permanent and temporary, to use of stored collections and their organization, to research, to education of different kinds at various levels, and to activities of some diversity. Then one can try to decide what is the optimum amount of space really required for each function. Then the problem is how best to plan for it in designing the entire building complex as a coordinated operating unit, which obviously must also contain the services for public and for professional/technical operation common to all museums. Naturally each kind of museum has special requirements and the relative proportion of space assignment must be modified according to need.

For an archaeological museum permanent exhibitions are the core of the public areas, because many exhibits are likely to be quite large and heavy and to require special installation, difficult to provide and to alter quickly. But large enough storage areas are needed to accommodate the material required for research and reference, preferably in a well organized logical arrangement, making it readily accessible for study. Congested, unorganized, crowded

storage is not permissible in the modern museum. Yet space is expensive. Should material that can be used only in storage be accummulated indefinitely? What is the solution? Libraries are increasingly using micro-film reproductions of printed material to reduce the bulk of their collections. Is it pertinent to consider something of a comparable kind in relation to prehistory and archaeological and similar museum reference collections? Or can surplus reference material be distributed to other museum in some fashion? This is a policy matter, but it should be decided in each case before planning a new building.

The ethnological museums' needs are similar to those of archaeology in regard to storage: sufficient space must be allowed for logical arrangement and convenient access. They may, however, require a somewhat smaller area for exhibitions, if the policy is to show collections in rotation, because the nature of the material, so much of it organic, makes limited exposure to light desirable.

Museums of contemporary art may stress changing exhibitions to the exclusion of showing their permanent collections, or they may plan space for such exhibitions in addition to that for the permanent collection. A larger proportion of exhibition area seems justified in this case. Again it is a policy decision, but the architect needs to be informed.

In the three foregoing types of museums work-shops are required but probably not large ones or in great variety. For a contemporary art museum, featuring loan exhibitions, an adequate receiving and packing room is indispensable and space for temporary storage for loans when they arrive or are waiting to be shipped out must be provided. Likewise storage areas for boxes and crates and for packing materials are needed. Such items from shipments must not be left about to spoil the museum's halls or clutter up its surroundings. After all the museum must represent an ideal neatness.

Natural history museums, if they plan for well organized habitat groups, reduced scale dioramas, charts, even some taxonomic displays, to make the essential statements on their subjects from an educational point of view, need ample exhibition space. Their exhibits are mostly dependent on built-in cases, to be regarded as permanent fixtures. But if they are serious research centres, they require likewise large areas for reference collections of various kinds, whether in bottles for snakes and fish, in drawers for small animals' and birds' skins, in trays of mounted insects; portfolios of pressed flowers and plants, etc. This space must be arranged systematically, to be instantly accessible for study and reference. Special workshops are needed for taxidermy, moulding of foliage and the like. The architect must be told in detail about these requirements so that he can plan accordingly.

The museum devoted to the applied sciences, industry and technology emphasizes its exhibition areas. These areas must be large, therefore. Reference storage is likely to be nominal for the museum itself. However, it may need large storage space for extension exhibitions and educational demonstration apparatus, films, slides and other teaching aids. Receiving and shipping facilities must likewise be provided. This type of museum, so directly useful in a developing society, is likely to become increasingly important as a centre for sending out extension exhibitions of various kinds, and this expectation must be considered carefully in planning the headquarters' building. Since this kind of museum is engaged to a considerable extent in manufacturing its exhibits, both for use in the headquarters' building and for extension services of various types, its requirements for work space must be correspondingly large in proportion to that needed by other museums. Likewise the size and weight of its machine tools and of the materials it prepares for exhibition—a sectioned airplane motor, for example—are likely to dictate specifications for the shops. These detailed technical requirements the architect must understand and plan for.

Museums of archaeology, arts, ethnology, natural history must have provision for a conservation laboratory or workshop, depending on the size of the museum and the kind of conservation needing to be carried out. Because of the visual demands of much of this type of work, studio lighting, that is north light, is often preferred and may dictate the location of laboratory or work room. The architect must study the problem in relation to his other spaces.

These remarks represent a sketchy indication of how one must consider the contents of a museum, in relation to some of its principal types, and be guided for architectural expression by the double requirements of the public areas and of those for internal use only. Important for the first are exhibitions — the basic educational device of museums at the service of the general public, and the usual diverse public services. The second category of requirements are more varied, serving as they do all-the behind-the-scenes operations (internal or housekeeping requirements) — the storage, study and reference collection space reserved for scholars and students, and the staff areas of offices and workshops.

For treatment of the interior space, after the organic form of the museum has been determined by its character and what programme it is to carry on, the museum people in charge can give a series of simple directives to the architect : as wide a span of open space as possible for the exhibition galleries, encumbered by the least number possible of pillars; sufficiently lofty ceilings to provide a feeling of spaciousness and to assure ventilation in the absence of air conditioning; windows placed eight feet above the floor so that good uninterrupted wall space is available; ample general artificial light, with flexible provision for spotlights and connexions in floor, wall and ceiling for tapping

electricity "channels" or "points", so that special case lighting may be arranged as required. The simpler the "shell" that the architect provides for the exhibition areas the better. His responsibility is to provide open space of pleasing proportion and agreeable light. This is no extravagant demand, for there has been recently a tendency to plan galleries with "flowing" space (examples : Guggenheim, Pasadena and Chandigarh originally.)

After the architect has provided the shell it remains for the installation designer -- director or curator of the museum or exhibition presentation officer to adapt this space to the requirement of the material to be exhibited. However, consultation between architect and museum professionals in charge of the museum for which he is preparing the plans, can be fruitful in relation to space-dividers, to built-in cases, to the devices to make changes of temporary exhibition galleries easy and quick, so that they are all in harmony with the architectural feeling.

For technical construction details the architect's advice is indispensable, but again the museum professional must define the requirements.

How about floor loads for example? Must the expensive "warehouse loading" strength be provided, for one floor only or for both ground and first floors, in the case of archaeology museums likely to have heavy stone sculptures ?

For workshops, how to provide access from outside the building without jeopardizing security ? How to assure logical relation of workshops to galleries in order to provide easily the services an active museum requires, and to the offices, in order to assure frequent supervision ? How should they be interrelated? What arrangements of space should be made ? Here as in the galleries the maximum clear open area, which can later be divided by non-permanent partitions, according to requirements, is likely to be most practical.

In general, circulation, both in the internal service areas and in the public areas of the museum, can be well planned by the architect if he understands thoroughly the way in which the museum is expected to operate, the kind of activities, behind-the-scenes and for the public, that it will probably carry on. Convenience of access from staff offices to galleries, to workshops, to library is another aspect of space organization to consider. Likewise, the communication between auditorium and other educational and cultural facilities, galleries, offices must be considered for effective use. The order of the galleries and the way in which they open into one another or to some central space or hall and all other facilities used by the public must be carefully studied so that circulation of visitors is convenient for them, but also is practical from the staff point of view of general security and supervision at all times. When galleries must be closed for installation, for special activities being arranged in some areas, and the like, how can it be done without interference with circulation ? Similarly, for educational and cultural programmes offered to the public, relation of meeting

and class rooms, of auditorium and other facilities, and the relation of them all to the galleries, should be studied. Restaurant or tea room facilities, lounges, smoking rooms, lavatories and toilet rooms are likewise to be arranged conveniently for those attending special events or following educational programmes, as well as for the gallery visitors.

After the major areas of the museum according to its kind have been worked out, all the other requirements of the museum for the public and for professional technical operation must be taken into account in providing the architectural form. Structure in relation to open spaces, to courts and verandahs, which may serve also as avenues of circulation, can play a part in design of the building, very favourable to its aesthetic effect, but they also provide relief from the enclosed gallery spaces, valuable psychologically. Features of museums no matter what their kind, are likely to be almost identical. They fall into related groups. Their size, their degree of elaboration obviously can be modified to meet specific needs; some may even be omitted in some circumstances. The architect's assistance is required here, and due regard must be given to psychological as well as other aspects of designing them.

The principal common features of museums, today may be listed :

Entrance and public lobby : They would be attractive and welcoming. Architect and museum staff may co-operate to achieve both aesthetic and functional success. An agreeable impression from the moment of entering a museum is important. It sets the mood of the visitor for what he is to see and may learn. Light, colour, proportion, channels of traffic, are significant in relation to this impression that the public lobby creates. What is it to be used for? A lounge? A meeting place? An assembly point before the gallery tour ? How can it serve to control visitors. How does it contribute to security ?

In this entrance area, planned to contribute to its pleasant appearance as well as to the visitor's convenience :

Information Desk—ticket sales if any, contact with staff members; general Information about the museum and its services ? Special care to make it attractive as well as efficient is recommended

Checking space—depending on policy for canes, camaras, packages, and on climate, the extent and type of space provided is determined. It should be accessible, but not detract from the appearance of the area.

Sales counter - or sales shop - sometimes combined with the Information Desk. It should be planned to be attractive and to encourage sales, not only because of the financial profits but because selling museum publications for the visitor to carry home may be considered an aspect of education.

Educational and cultural facilities must receive careful attention. They should have separate entrances to be used when the galleries and other working areas of the museum are closed.

Library and reference and reading room—Is it to be for staff and occasional scholars only, or for the general public? Its size and its arrangements, provision of stacks as well as reading accommodation must be planned according to the intended use. Likewise lighting must be well designed for excellence of appearance as well as for illumination of close work.

Auditorium, class rooms, educational meeting rooms of various kinds according to programme. What is to be the scope, variety and size of the educational and cultural programme? Is it to be for school children; for young people's leisure time; for adults? Is it to be for lectures and films only, or also for practice sessions? (for example: a lapidary club for a natural history museum; painting classes for amateurs, etc.). Therefore, what class and meeting rooms and of what kind? Then meeting rooms for Board, for staff discussions, for members of the Museum Society, if there is one, are other pertinent details.

Public services: Restaurant or snack bar or tea room. What is practical and profitable? Lounges, smoking and sitting space, concentrated in one place only or distributed? This depends on size of exhibition area and arrangement of public portions of the museum, obviously.

Staff requirements: Staff amenities, especially for workmen, guards, cleaners, such as lunch and recreation rooms, lockers for clothes and possessions, wash-rooms apart from the public facilities, should be provided.

Control rooms for heat, light, air-conditioning, likewise find place in a large modern museum. Even television scanning of galleries for day and night guarding have been tried by some museums with success.

Security, that is safety of the building against fire, carelessness, robbery, both from within and from without, must be given attention. Delivery and shipping entrance, as distinct from public entrances, likewise need study. They represent special problems. The architect can help in solving them.

This summary review of aspects of museum planning represents some of the principal points where close collaboration between architect and museum professional is required. There are many more, for when-ever it is necessary to give physical form to requirements and organic relation of space and of function in a museum, the architect's guidance is indispensable. But once more, in closing let it be emphasized: the major responsibility still lies with the museum professional in charge of the museum: only he can describe and explain the museum and its proposed programme, project it indeed, some way into the future. It is he alone who must make all aspects of his proposed museum clear to the architect, and then endlessly check and recheck, in the light of his practical experience, the solutions that the architect offers.

# Session I

Demands on a museum of today and their effects on the Museum Design

SESSION I

# Demands on a Museum of Today and their Effects on the Museum Design

Chairman : Dr. S. Roy
Convener : Smt. Smita Baxi

**Introduction** :

Demands on a Museum of today are the functions to be fulfilled by it in order to meet the requirements of a Society or a Community. It can safely be concluded that the museums are used by the people for purposes of relaxation and for gaining knowledge. The traditional role of a museum as a repository of collection, as well as its concept of 'Museum for elite', have now changed. Now Museum is a public institution. It is a centre for culture and education—education without the text books; education that is relaxation, rather intellectual relaxation: education that is fun for the children and the adults; education by means of visual communication. The museum is now gaining popularity as a medium of communication.

How does a Museum Communicate ?

A museum communicates through its collection of cultural and scientific objects of the environment, arranged or presented in an exhibition. Well conceived, systematically planned and perfectly illustrated museum exhibitions arranged after thorough research can tell a story through the objects. Exhibition is the best instrument of visual communication.

How does a Museum interpret ?

It interprets the objects and the exhibition through numerous activities.

It interprets through research which is the basis of exhibitions and publications.

It interprets through the guided tours of the exhibitions, through the lectures and demonstrations, through the films shown inside and outside the museum.

It is obvious that a museum has to arrange proper exhibitions. It has to carry out research as a basis for exhibition, for the study of objects and for increasing knowledge. It has to publish the results of research for dissemination of knowledge. It also has to carry out educational activities for spreading knowledge. These are the demands a museum has to fulfill in addition to carrying out its original function of housing a collection and preserving the same.

These multifarious activities and varied functions of a museum, have certainly influenced the design of a museum building. It is no longer a simple building with a few halls for housing the collection and a few amenities for its caretaker and occasional visitor. It is now a complex type of building requiring a variety of spaces.

It requires suitably designed, adequately lighted, easily accessible galleries, with security provision. It requires study-rooms for research where collection as well as reference books are available. It needs a sizable auditorium for film-shows, popular lectures, cultural programmes as well as a lecture room for specific groups. It needs staff-rooms for its administrative, curatorial and technical staff, work-shops and work-rooms, storages for reserve collection and a place for visual storage. It needs a conservation laboratory as well as a photo-studio. It needs an information counter as well as a sales counter for publications, reproductions and other souvenirs. For the visitors, open circulating spaces and easy accesses to all public areas are needed while for security reasons entries to reserve collections, work-rooms have restrictions.

As a first step towards the study of museum building, it is necessary to examine the various activities of the museum and prepare a programme of requirements, keeping in view various demands made on a museum.

There are various types of museums devoted to different kinds of collections, like art, archaeology, science, technology, history etc. Though actual requirements may vary from collection to collection in respect of its display in galleries, storage or security requirements, still there are many common requirements like facilities for bringing in objects safely, study-rooms, auditorium, galleries, offices for staff, work-rooms etc. The exact requirements will also vary from museum to museum depending on the accent on a particular function though most of the museums will have to carry out more or less all the function of a modern museum to a certain extent, whether it is a small museum, a regional museum or a national museum.

It will be worth-while to decide what minimum facilities a museum must have in order to fulfill its functions. It is natural that the facilities will expand to meet the actual demands.

It will be best to list facilities needed according to the functions :

1. Collection — Facilities for bringing in the collection will require a special entrance.
   Packing and unpacking rooms.
   Inspection and study rooms.
   Storage for reserve collections.

2. Preservation — For care of collections
   Laboratory.
   Storage for equipments and chemicals.

3. Exhibition — Galleries for permanent and short-term exhibitions.
Work-shop for preparing exhibits and exhibition furniture.

Packing, unpacking and storage rooms for circulating and mobile exhibitions.

4. Interpretation through research, publication and education.

(a) Research — Study room for studying collection.

Reference library.

Other reference materials like slides, photographs, films.

(b) Publication — Facilities for sale of research publications reproductions, so that they reach the visitors.

(c) Education — Information counter.

Orientation facilities for introducing the museum in a nut-shell.

Facilities for guided tours.
Auditorium for filmshows, cultural programmes, popular lectures.

A lecture room for special lectures, and demonstrations.
A conference room for holding discussions and seminars.

Special nobile exhibitions using originals and/or replicas for easy transportation outside the museum.

Popularisation of museum objects through the sale of replicas and reproductions.

All these functions are carried out by a museum as per the visitors demands. Facilities for visitors include easy accesses to all public areas, rest-rooms, tea-shops or cafetarias, pleasant terraces and gardens for relaxation as well as parking facilities. For services like air-conditioning and lighting, accommodation is needed for plant-rooms.

For organising all the activities and carrying out different functions, staff-members of varied qualifications are needed who in turn need office-rooms, study and research rooms or work-rooms. The staff members can be roughly classified under the following categories :-

1. Administrative staff — Director and his administrative assistants need staff rooms.

A reception room and a meeting room for the Director.

2. Curatorial Staff — Office rooms, work-rooms for accessioning and indexing collections are needed for curatorial staff.

3. Technical Staff — Work-rooms, studios, workshops, storage-rooms for equipment and raw-materials are the requirements for the technical staff.

4. Housekeeping Staff — These staff-members need changing rooms, storage for cleaning and maintenance equipment.

5. Security Staff — Facilities for guard-rooms, changing rooms, storage of equipments.
Residential facilities for security-in-charge.

Only spatial requirements are considered here. Other requirement like those of lighting, air-conditioning, circulation are not considered here as they will be considered in details in other Sessions.

Smita Baxi

**Curator's Role in Museum Design**

The fact that most of our museums of note and longstanning tradition continue to be accommodated in improvised structures should not be allowed to justify neglect of a basic need a museum organisation, i.e., a suitable building facilitating modern display and effective service. This basic need has to be brought home to all the agencies responsible for planning new buildings for museums and galleries.

An architect, however brilliant or competent can hardly do justice to a design for a museum building unless he takes pains to study the problems peculiar to museum architecture. His textbook may have already made him aware of this peculiarity, yet he can comprehend it only after a first-hand study of some museum buildings with specific reference to the experiences of the Curators and Keepers concerned.

The most important consideration, therefore, is the functional aspect of the design vis-a-vis the collection intended to be displayed.

Even within the same museum the demand of all the galleries need not be of identical nature. This is particularly true of a multipurpose museum like that

of Srinagar which has to ensure suitable display of paintings and sculpture, coins and manuscripts, crafts and textiles, natural history and social authropology, prehistory and archaeology, as well as a children's gallery presenting some landmarks in the Indian civilization and culture from the cave man to the cosmonaut. The display has, of course, to be contemplated in terms of museum service so as to play a significant role in the new educational setup of the country.

A building for such a museum has to be designed primarily from the functional point of view but the museum building at the same time deserves to be designed as an object of display, in its own right, ensuring security of the art treasures in its custody.

The Conference could, therefore, work out the essential of just and suitable building not in terms of generalities as given by textbooks, but in terms of concrete suggestion emerging out of the personal experience of the members participating in the Seminar. The experiences are certainly expected to cover not only suitable display and effective service but also arrangements of security without hampering free movement of the visitors.

P. N. Pushp

**Needs of Science Museums**

It's an honour to be here to present my views on the topic in question namely "Demands on a Museum of today and their influence on Museum design". I shall talk on the aspects of building design based on the requirements for an exhibition display in a Science Museum and be as concise as possible in mentioning them to you. From my experience here and abroad, I may mention that building designing is an important factor for proper exhibition display.

What is most important in a museum, is the effectiveness of the exhibition.

In a modern exhibition the main principle should be that the exhibition design should help to emphasize the objects on display.

If the decorations stand out too prominently then the visitors will be distracted from the objects on display. Such exhibitions will obviously drift the museum away from its purpose.

For the same reason, ornamental and decorative architecture has fallen out of stride and appears out of place as the background of modern exhibition display.

The building of the Birla Industrial and Technological Museum, Calcutta, initially built for domestic purposes in the earlier part of this century, had all kinds of decorations like wall mirrors with relief, wooden and plaster mouldings, heavy cornices, decorated doors and other such ornamental fixtures which were popular in those days; but for a modern exhibition these were unsuitable.

A major alteration was necessary and the partition walls of the smaller rooms including the decorative trappings had to be removed to provide larger space for exhibitions.

The modern trend is to have simple interiors allowing sufficiently spacious exhibition halls, in which it is possible to have a view unobstructed by pillars or load bearing walls.

This gives a greater degree of freedom to the person in charge of exhibition display to plan the exhibition lay out and allow necessary arrangements to help visitors to see the exhibition at ease and in comfort and also to provide sufficient space in the galleries to accommodate large groups of students who can congregate and attend lectures.

I may mention here that during my visit to the "Palais de la Decouverte" in Paris last year, I have observed that they have excellent arrangements for demonstrations and lectures on Chemistry and Static Electricity in their spacious exhibition halls.

The requirements from the point of view of exhibitions should be communicated specifically to the architect so as to enable him to envisage the provisions for the exhibition with exactitude. For instance, the architect having a preknowledge of the requirements can design concealed systems for the supply of electricity, gas, water and other installations for the demonstration of exhibits in the exhibition hall.

The building of the Birla Industrial and Technological Museum not being initially meant to be a museum is found lacking in these respects. Some of the well known science museums are using their basement for exhibiting true-to-life models of coal mines, which is very effective.

It would be useful therefore if the building meant for a museum is provided with basements designed for setting up such special exhibits.

While still on the question of provisions, I think it is more practical to arrange exhibitions of heavy and massive exhibits such as locomotives, ships, engines, heavy transports on the ground floor for the reasons of safety and easy

handling. During my visit to the Museums like Science Museum, London and Deutsches Museum, Munich, last year, I have seen the same thing being done there.

Consequently, the height of the ground floor ceiling should be higher than that of the other floors to display such bulky objects. The upper portions of the walls of this gallery may be utilised for painting murals.

In fact we are planning to paint a mural showing the history of transport in the Birla Industrial and technological Museum in our future Transport Gallery; the ceiling of this hall of transport is about twenty feet high.

But in the case of small exhibits, the ceiling should not be too high in order to avoid dwarfing effect on the objects.

Owing to the use of air-conditioner and artificial lighting techniques, windows in modern times play a less important role in ventilating or illuminating the exhibition halls; specially in Science Museums, natural sources of light has been found unsuitable for the various purposes, but a window overlooking a pretty patch of landscape or giving a pleasing view of a garden can be welcoming to a visitor in the gallery.

However it would be better if these windows are placed towards the end of the exhibition space to avoid glares and reflections on the display cabinets. In order to keep an eye on the exhibits, the exhibitions or display should be so arranged that the least number of supervisors can look after the exhibits and detect any attempt of theft or intentional damage to the exhibits. And for the same reason it is advisable to keep curatorial offices attached to their galleries for better co-ordination.

What I have said till now is mostly on what is required of the architect in setting up a good exhibition in a Science Museum.

There are of course many other important matters, such as the provisions of space in the lobby for the reception counter, sales counter for the publications and tickets, seating arrangements for the visitors, and cloak rooms.

To maintain a canteen for the visitors' convenience will be very much appreciated.

It is impossible to mention here all the aspects of today's architectural requirements in science museums in detail, and so I shall briefly state a few of the more important points such as : location and site, character and style of building; lifts, escalators and staircases, museum library, auditorium, planeterium, car park, temporary exhibition halls, space for open air exhibits, workshop for model making, storage space for models and exhibits; administrative sections, laboratory for the Curators.

Discussions on the requirements and necessities of museums will provide a helpful guideline for the architect in the construction of buildings that would easily lend themselves to the purpose of museums; otherwise the difficulties encountered are too many in setting up a museum of a laudable standard.

R. C. Chandra

**Problem of Museum Building**

In this brief not I propose to consider the architectural features of museum buildings in India and then proceed to discuss some of the problems that the Indian museologist is obliged to face especially in the context of the current trend towards modernization. I must admit that India has but few ideal museum buildings, few museums with those cool, spacious and inviting galleries such as the ones we often see in many American and European cities. From the point of view of external architecture, it may be said that Taxila—a great centre of Greco-Buddhist learning and culture--has one of the most attractively built and charming museums of India, although the newly built museum—buildings such as the National Museum in New Delhi, the Salar Jung Museum at Hyderabad, and the relatively smaller new buildings of the site museums at Konarak, Nagarjunakonda and other sites are not less attractive and impressive. The site museum at Saranath also has an attractive building. Another very pleasing museum building in India is that of the Sardar Museum in Jodhpur, designed by Mr. G. A. Goldstraw. In the design of this building care has been taken to provide adequate accommodation for the staff, while the public galleries are well lighted and well-proportioned. In Baroda, the internal architecture of the Picture Gallery is very pleasing indeed with high ceiling and spacious, pillar-less, well-lighted halls, but the exterior of this and the adjacent building which houses the museum proper shows a marked contrast of style.

For internal elegance and suitability, there is perhaps nothing to surpass the newly designed galleries, especially in the Natural History Section, of the Prince of wales Museum in Bombay, for these galleries are well proportianed and afford a very effective setting for the modernized display that has been attempted in them. The main defect, however, in most of the existing museum buildings in India is the presence of too many large windows placed far too low which considerably reduce the available wall space for exhibition, and which are responsible for the excessive glare and the entry of direct sunlight into the

galleries a condition which is not only a source of great discomfort to the visitors, but also highly injurious to the objects displayed, especially natural history specimens and objects such as textiles and paintings which rapidly fade and decay when exposed to sunlight. Another defect is the presence of large, clumsy pillars which obstruct uninterrupted view in the galleries, thus rendering even modernized display quite ineffective.

Generally speaking, museums that have been recently built have had better opportunities for sensible planning in the matter of their buildings; the earlier ones, of course, have been at a disadvantage, having been housed in buildings not intended for use as museums and at any rate antiquated and quite unsuiltable, judged by modern standards. Any large building easily available has been considered fit for accomodating a museum and this has greatly hindered effective presentation of even the best material. For instance, the museum at Pudukkottai is housed in just a large, residential building totally unsuited for a museum, resulting in overcrowding and confused arrangement of the exhibits.

The Lucknow Museum's old building is another example of such an architecturally unsuitable building. Another satisfactory feature about the Lucknow Museum is that the Galleries are housed in two different buildings separated by some distance, thus interfering with the uninterrupted routing of visitors round the Museum. It is fortunate that some of the museums which have just sprung up have had the advantage of better-planned new buildings which have amply compensated for the cramped existence they might have endured in old and antiquated buildings during the earlier years. The Municipal Museum at Allahabad has now an excellent, well planned building, which is a tremendous improvement over the old ill-lighted rooms in a wing of the municipal buildings.

The new building of the Bharat Kala Bhavan which has recently been completed, is another fine structure. The Mathura Museum which was originally started in an unsuitable building is now in a well-planned structure with ample scope for future expansion. An excellent modern building for a museum was planned and constructed in Ahmedabad for the recently organized museum which is styled the "Culture Centre." In the Madras Museum, although the buildings are old, most of the galleries are on very spacious grounds where there is ample room for visitors to relax. There is also a scope for future expansion.

The National Museum building in New Delhi is of course, a lavish structure, with a good auditorium, library, office and storage accommodation and other ameneties, and with various large, spacious galleries radiating from a large, central rotunda.

Careful and thoughtful planning is most essential for museum buildings, for without well-fit, specially designed galleries, even the best material cannot be effectively presented. In India, unfortunately, we have few architects who

have had special training or experience of museum architecture which has become very specialized in recent years as the functions of a museum to-day have become more numerous and varied. It is unfortunate that the planning and constructions of the Government Museum buildings in India is generally left entirely to architects and engineers of the Public Works Department who have no specialized training or experience in Museum architecture and design. Very often, the P.W.D , who build the Government Museum buildings in India and the Museum Directors do not discuss matters of design, lay-out, and the provision to meet the various specialized requirements of a modern museum complex, so that the results are not entirely satisfactory. In the planning of modern museum buildings, great care should be taken to provide for adequate space all round for future expansions, for a museum is primarily a growing institution and requires ample facilities for its growth. Museums that have started their existence in crowded surroundings without allowing sufficient space for expansion sooner or later became cramped and their future development threatened to become severely hampered. The Indian Museum in Calcutta, for instance, which is perhaps the largest and finest in the East from the point of view of the richness of its collections, has unfortunately not only an old and unsuitable building, but also lacks many essential ameneties. There is no space around it for future expansion.

The design of the galleries should be determined by the nature of the exhibits that are to be installed in them. The existing old building of most of the museums in India are functionally unsuited for modern museum presentation and modern museum functions, and hence the question, of adapting old-buildings to the present needs poses a difficult problem to the Indian museologist. In fact, in many large museums of the West, such as the American Museum of Natural History or the Metropolitan Museum at New York, there is a separate Architectural Department with specialists in Museum Architecture who draw up blue prints and even build small scale models of the proposed new galleries which are carefully planned in consultation with the curators and directors concerned, so as to confirm to modern standards and to meet the requirements as satisfactorily as possible. Of course. the subject of Museum building is a complex and specialized one, and I cannot go into technical details here. However, it may be helpful tomention the broad essential principles. In planning modern museum galleries, maximum provision should be made for wall spaces and free moving space for visitors, eliminating or reducing windows as far as possible and introducing artificial illumination in the form of concealed fluorescent lighting, or, in special cases, spot-lighting. Windows, if present, should be of the clerestory type, i. e., confined to the uppermost portions of the walls (i. e., pushed up close to the ceiling level). If windows are eliminated or reduced, ventilation poses a serious problem especially during summer, in a hot country like ours. Exhaust fans in the walls near the ceiling, and air circulators at strategic points may offer a partial solution to the problem, but where funds permit, airconditioning may be introduced. At any rate, air conditioning appears

to be a necessity at least for the art galleries in India. Lighting also should be carefully controlled. The modern tendency in museums seems to be to replace natural light by suitable artificial lighting but since the latter is more fatiguing to the eye, it is better to adapt a judicious combination of both natural and artificial light.

In planning the modern museum building, due consideration should be given to the comforts of visitors. Changing the colour scheme from gallery to gallery relieves monotony and helps in reducing museum fatigue. Comfortable seats should be provided at convenient spots in the galleries for the comfort of visitors, and toilet rooms with modern sanitary fittings within easy reach of the visitors are a necessity. Other conveniences such as lounge, cycle stand, parking space for cars, cafeteria and spacious lawns and gardens are also essential ameneties in a modern museum.

If a museum is to function effectively, provision should be made for the following in its plan, and the museum administrator should see that these are adequately provided for in any proposed future expansion of the museum.

1. Galleries suitable for the installation of modernized display cases, including provision for installation of built in cases and dioramas, wherever necessary, with concealed artificial illumination.

2. Administrative and curatorial offices.

3. Adequate storage space for research collections as distinct from the public galleries.

4. Rooms for study, examination, etc., of the research and reference collections.

5. Laboratory, including a good chemical laboratory for restoration and conservation of antiquities and works of art.

6. Photographic dark room and work rooms for taxidermists, artists, modellers and preparators.

7. Auditorium or lecture hall, provided with audio-visual equipment.

8. Library accommodation.

9. Space for periodical special exhibitions, etc.

10. Conveniences for the public such as cafeteria, lounge, toilet rooms, cloak rooms, etc.,

11. A sales and information desk and adequate provision of accommodation for the storage of the publications, models, replicas, etc., which are kept for sale at the museum. In other words, there should be provision for accommodating a "Museum Shop" at a suitable place in the museum building, preferably somewhere near the entrance.

In this context, I cannot help striking a note of admiration for the architectural excellence of the museum buildings in the United States of America and in some of the countries of Europe such as the United Kingdom, the Netherlands and West Germany, which I had the privilege of visiting some years ago. One of the features that impressed me most was the remarkable harmony between the exhibits, the show cases and installations and the interior architecture of the buildings, the extraordinarily pleasing and effective way in which the exhibits were presented and how the architecture of the museum buildings helped to enhance the beauty of the presentation, especially in the art museums of Europe and the natural history museums of the United States of America. In fact, the exhibits and the show cases fit in so harmoniously into their setting that they almost appear to form part and parcel of the buildings themselves in these advanced museums.

In the American Museum of Natural History, for instance, most of the halls contain huge dioramas of realistic habitate groups of various animals from all over the world, and I found that the architectural designs of the halls in that museum were eminently suited for the built-in installation of a series of such life-sized illuminated dioramas. When a series of such habitat groups are built in a huge, spacious, pillarless and windowless hall so that they apparently constitute part and parcel of the building all round along the wall spaces, the visitor feels as if he is looking out through large windows into distant scenes in wild nature as he walks along in the gallery. There are numerous such great halls of habitat groups of birds, mammals, fishes and reptiles from various localities of the world in the American Museum of Natural History and they rightly deserve to be admired as masterpieces in the field of museum presentation. The great Akeley Hall of African Mammals, for instance, which dominates the great mammalian Halls of the Museum is almost a miracle in display, transplanting the wild life of the African jungle within the four walls of the Museum.

And new halls of this type are being continued to be built year after year and added to the over expanding museum. In India such magnificant Museum halls are still only a dream, although a few such large-sized habitat groups have been successfully attempted and installed in the Prince of Wales museum in Bombay, and we have been able to introduce a few such groups, though of a much smaller size, in the Madras Museum also in the recent years. But unless the buildings are newly designed and built specially for the museums, the results will fall far short of the ideal.

S. T. Satyamurti

**Factors Influencing Museum Design**

Museum—a store-house of exhibits.
—a display centre of exhibits.
—a cultural exchange and link between the past, present and the future.
—thus a medium of mass communication/education,

Factors that influence mass communication/education.

1. Social.
2. Economic.
3. Political.
4. Cultural and spiritual.

To note that the factors influencing the education are in a bad state of disorder. Man is made/educated not by schools alone but by the overall environment. Museum, and activities through the museums, can help achieve this objective. The media therefore have to be very similar to the one employed in the political field. Roughly speaking it would mean mass attack on illiteracy and rigidity prevailing due to illiteracy.

Our objective thus has to be a step-up chain towards cultural evolution. The basis would necessarily be of goodness in life, whatever it be.

The programme thus calls for both indoor and outdoor, working as a core that will function, direct, co-ordinate or guide the entire movement with a broad perspective in view. It is not imposing on people or institutions any dogma, but illustrating by their work, the goodness in them; and as a platform for all activities connected with communication, education towards this 'goodness.'

Implementation of such a programme would mean work at all levels.

1. Museums of all facets of life.

   e. g. Painting Museum,
   Sculpture Museum,
   Abstract Art Museum,
   Natural History Museum,
   Geography Museum,
   Science Museum etc.

   (Itinerary museums may form part of each of such categories)

2. Exhibition branch — a dynamic source by which to reach the masses. The entire division has to be region-wise, and section-wise. The importance is borne when the same forms a part of the people's life in

terms of their aspirations, conveniences etc., (e. g. it would be unwise to have exhibitions during days of climatic extremes, or make an exhibition for school children with examinations approaching).

3. Production of educational material through publications available at popular prices -but of a higher taste in art -thus the necessity of art consultant pannels.

4. Education and formation of second cadre of the art-conscious by art and hobby classes initially through institutions with such awareness.

Such programmes would need a second look at the design of museums,—which may basically be 'introvert,'—but will have to have a second aspect which will be 'extrovert,'—and indeed a third which will 'go' out to the people.

1, Museums of normal type

2. Itinerary exhibitions.

3. Cultural educative section which may operate through what are known as 'Maison de la Jeunesse' (Youth houses)

In terms of space these would radically change the concepts of museums to be built in future —as they would take two more forms than to-day and at the same time change the traditional concept of a "Museum."

A. J. Talati

## Building for Museums

In modern days a variety of buildings are required to meet special requirements. Museums and museum buildings occupy a place of national importance. Most of us are familiar with some of the internationally renowned museums which are known not only for their collections and display but also for their being landmarks in the architecture of museum buildings. With the diversity and variety of subjects which are now coming under the purview of musuology, and the modern concepts of the role of a museum, the work of planning, designing and construction of modern museum buildings calls for high level of proficiency and specialisation.

In India, as in other countries, we have a variety of museum buildings in different parts of the country which reflect the rich architectural heritage. Besides, several new buildings have also been constructed. These are, in the

country, multipurpose museums and during the last two decades specialised museums, such as technology museums, personalia museums, medical museums etc. have also come up.

By and large, museums are set up by the Governments and corporate institutions. There are, however, some privately owned museums also. Generally special purpose museums have been housed in buildings which have not been designed for such use. The need for well-designed buildings suited for the purposes cannot be over-emphasised. It is necessary, therefore, to consider this matter in the light of modern developments.

Planning of Museum Building

It is difficult to list out each and every requirement of all types of museums. However, some common features have been identified and the functional requirements of these are mentioned below :

Requirements for museum building can be divided into three main categories.

(a) Public area spaces
(b) Official or restricted areas and
(c) Protection/Preservation

(a) Public Areas

(i) Display halls/galleries.
(ii) Enquiry, information, book and card counter.
(iii) Entrance hall and Waiting rooms.
(iv) Educational activities room.
(v) Library, Documentation/Research and Study room.
(vi) Space for temporary and short-term exhibitions.
(vii) Auditorium.
(viii) Toilet and drinking water, etc.
(ix) Open spaces for Sculpture Garden.
(x) Parking spaces.

(b) Official or restricted areas

(i) Administrative Office rooms.
(ii) Storage and work room.
(iii) Workshop.
(iv) Laboratories.
(v) Photo Section.
(vi) Meeting or Conference room.
(vii) Mechanical Plant room.
(viii) Receiving and Dispatch room.

(c) Special requirements for protection and preservation

(i) Security of building and objects.
(ii) Fire protection.
(iii) Climate protection.
(iv) Protection from termite and other insects.
(v) Protection from dust.
(vi) Protection from light.

It is needless to emphasise that the location of the museums at specific locations in city/towns greatly influence the size, shape, planning and design of the building.

Architectural Concept

As museum buildings serve for public utility and also as monumental buildings, great care is required in conceiving and designing them. As these buildings are normally permanent buildings, great care and thought are also needed in the choice of suitable building materials and construction techniques.

Planning and designing of museum buildings has to take into consideration the functions which the museums are intended to serve, and also the modern requirements of such buildings, for example for providing required type of finish on the floor, walls and ceilings; thermal insulation, protection from weather particularly dampness, protection from insects like termites, dust, etc.; internal lighting and ventilation, air conditioning etc. In form and contents such buildings have to be designed giving due consideration to art and aesthetics. They must be designed in relationship with the surroundings and also in tune with the changing requirements imposed by developments in science and technology.

In earlier times the structures for museum buildings had to be evolved on the basis of the then known principles of structural designing which imposed certain restrictions in the organising of spaces and building. The modern advancement in structural designing have made available greater possibility of organising spaces efficiently as well for achieving economy in cost of construction. Larger spans can be provided resulting in greater flexibility in planning and ease in making additions and alterations. Lighting and ventilation can be organised in a better way, surface treatment of required type can be ensured, provisions of services and utilities can be arranged at required places and the quality of such buildings can be improved.

Advancements in construction technology supported by development in building materials and building products are being applied to museum architecture. One notable development is the planning, designing and construction of tall buildings and heavier structures instead of low buildings. The introduction of industrialised building methods and prefabricated techniques of construction have resulted in speedier construction and architectural forms modern in concept and design.

Building Museum

If the intention is to promote the development of museums for a variety of purposes in the country, it is essential that not only efficient designs of buildings are evolved, but at the same time it should be ensured that such activities can be undertaken with possible economy in cost of construction, consistent with the standard set for performance, durability and maintenance of such buildings.

To assist in this task and to provide required information and data to architects, engineers and builders, a number of Building Centres—which are "Building Museums" in their own right—have been set up in Europe and similar Centres are also being developed in India now, on the lines of the building centre established at N.B.O. in 1966.

These 'Building Museums' fulfill all the functions of a modern museum. They collect and exhibit building materials and equipment; they conduct research in planning and designing of buildings and building technology; they also guide and assist planners, designers as well as laymen by providing the required information and demonstrate new techniques of buildings and construction. In short they act as centres for dissemination of knowledge in the field of building, i. e., planning, designing and construction of various types of buildings including buildings for museums. In course of time it is hoped that museum buildings will gain their due place of importance in the matter of planning, designing and construction. After all museums are not built every day.

G. C. Mathur
K. R. Jani

DISCUSSIONS

During the discussions there were many suggestions particularly for programming for additions and alterations to the old and existing buildings which are used by various museums.

Shri H. Rahman, Chief Architect, C.P.W.D., drew the attention of the house to the difficulties of the architects in collecting information needed for planning museum buildings. He felt it necessary that the museum authorities should help architects by giving a correct picture of the requirements. Regarding the "specially trained Museum architect" he informed the house that no-where in the world, any training is given to architects for specialising in Museum Architecture. He felt better results could be obtained through co-operation and team-work.

The Chairman summed up the papers and discussions.

# Session II

Circulation Problems in Museum Building with Reference to Security

SESSION II

# Circulation Problem in Museum Building with Reference to Security

Chairman : Shri V. L. Devkar
Convener : Smt. Smita Baxi

**Introduction :**

A modern museum is divided into many different spaces and areas through which people as well as museum objects are circulated. So the circulation problem needs a specific consideration. A museum building is used by two different categories of people—visitors and staff members.

Visitors are outsiders who visit the museum only once in a while. So the spaces meant for visitors should be so linked up that they can move from entrance to the required area like a gallery or an auditorium or a library easily, freely and directly without crossing areas used for other purposes. It is also necessary to plan the circulation in such a way that the visitors can orient their position in relation to the entrance hall.

Court-yard planning where museum galleries are built around a courtyard with the entrance hall at one end can be considered ideal from the circulation point of view. This type of circulation has been very successfully used by the architect Pedro Ramiraz Vasquez in the building he designed for the National Museum of Anthropology in Mexico City, Mexico.

But the court-yard planning unless it is well protected creates security problems. Some architects have overcome this problem by covering this central court as it is seen in the M-W-Proctor Institute at Utica (U.S.A.) designed by Philip Johnson. and in the Guggenheim Museum at New York designed by Frank Lloyd Wright.

I. M. Pei's Everson Museum of Art at Syracuse (U.S.A.) is also designed around the central courtyard open to sky. Balconies which link up the different galleries on the first floor overlook this courtyard, so the visitors can orient their positions in relation to the entrance and the courtyard.

The staff-members are the other group of people who use the museum building—for altogether a different purpose. These are the people who have to work for the whole day in the different parts of the building. They have to visit

or work even in some of the public areas as well as in the restricted areas of the museum building.

It is necessary to consider the circulation of staff members through the office areas as well as through the public areas. It should not be planned in a way that the staff-members have to cover long distances for reaching different areas of the same building as they may have to go to and fro many times a day. At the same time it is necessary to plan the circulation in such a way that visitors do not gain entry easily to the office areas without going through the reception or linking-up-lobbies and these should be guarded. This is necessary considering the fact that office areas may be closely linked up with the reserve collections which need protection and restricted entry.

Circulation of objects is as important as the circulation of the visitors and the staff-members. Especially entry and exit of the objects to and from the museum need a special consideration and it is best to provide a special entry for objects where the objects could be loaded and unloaded under sheltered and guarded places.

There are a number of security measures which can be introduced through the use of equipment and gadgets but that is the subject of another session. However security can also be achieved by careful planning of different areas and through well-planned circulation.

Smt. Smita Baxi

**The Circulation Problem in the National Museum of anthropology, Mexico City**

Increasing popularity of museums in a country brings many problems with it, the foremost being the problem of circulation of visitors through the galleries. In a country like ours, the problem's seriousness increases many folds because of our old museum buildings, shortage of space, overcrowded galleries and above all high percentage of illiterate visitors. The problem becomes even more difficult when we do not want to let the public know that we are trying to divert them according to some arrangement. Most of the visitors, if they come to know that they are visiting the museum according to a pre-laid path, resent it. The circulation has to be so controlled that the visitors are not conscious of it and yet they follow it. Building's plan plays a great role in it and we will try to show in this paper as to how this has been successfully achieved in the National Museum of Anthropology at Mexico city. Like India, Mexico is also a developing

country under similar climate and circumstances, that is why its relevance increases for us.

The Museo Nacional de Anthropologia, opened in 1964, is situated in a large park, called Chapultepec Park, which gives it a beautiful setting. The covered area of the building measures 44,000 square metres, the uncovered area 35,7000 square metres, including the central patio, the large entrance plaza and some sunken patioes around it. The background vista of the Chapultepec Park can be seen from the large windows of the exhibition rooms. After crossing the large entrance plaza, the visitor enters a vast central lobby. In the centre is a raised area below which is situated the Sala de Resuman (the introductory hall) with steps from which the visitor can see a sound and light show which prepares him for his visit to the museum. All this is automatically operated and has proved very attractive, something all visitors want to see. This pre-view of the museum's exhibits sustains visitor's interest throughout his visit. A large hall on the right is used for temporary exhibitions. Next to it is an auditorium seating 400, which is used for talks, projections of slides and films, and even as a theatre. To the left of the lobby are a shop, cloakroom and other services and, behind these, the general offices. Above this is the library which can be reached easily without entering the museum galleries.

A glass wall separates the main lobby from the Central Patio (courtyard) around which are the exhibition rooms. The exhibition rooms make a U-shape. The large, graceful open roof (82 × 84 metres) over the entrance to the patio rests on a single central column sheathed with sculptured copper. From the top of the column a spiral of water falls as from an inverted fountain and in the centre of the courtyard is a rectangular pool. Maxico is a hot country and these give cooling effect. Quite apart from its beauty, the courtyard is extremely convenient, the visitor can entire any room he wishes without having to go from one to another in a fixed order. This freedom from routine, however, induces them to resume from where they left. A breathing-spell in the open courtyard again fills them with enthusiasm to resume their tours of the galleries.

Another feature of this building are lounges made after every-three or four galleries. All these are having atleast one-glass-wall overlooking greenery in the outside park. This again provides a change and soothes the eyes otherwise tired of looking at exhibits. Quite often serious visitors do not go out at all and rest in these lounges and again resume their tours.

At the end of every gallery there is an arrow pointing to the next gallery and also announcing the exhibits to be seen. This also gives direction to visitor's tours. Infact, in many cases, standing in one gallery, the visitor can have a partial view of the next gallery, which is always quite inviting and forces the visitor to see the next gallery as well. This is quite essential. If the gallery seems to end in a closed wall, it gives a psychological feeling of the end of the tour and quite often visitor even when reaching nearer and finding the door to

next gallery turns back. Each next gallery should be so interlinked that the visitor may keep on going forward.

Open courtyards, like the one in this building, should be a welcome idea for the Indian museum buildings and doors leading to the galleries should open in such courtyards. Further, the idea of providing lounge with a glass-wall overlooking greenery should also be tried in our country. If possible, the courtyard should have a pond also to give a cooling effect.

V. P. Dwivedi

## DISCUSSIONS

During the discussion many suggestions came up like having minimum 2 or 3 entrances to Museum and that in addition to the planned security, security guards, some mechnanical devices should be used, Suggestion for employment of oniy military guards for security was also received.

The convener summed up the discussion stressing the importance of the circulation and planned security through circulation as well as by use of mechnical devices. The chairman closed the session with the remarks that security can be maintained through the well scrutinised guard system and through provision of separate entrance and exit for the visitors and a separate entrance for staff and other purposes.

# Session III

## Technological Developments and their, Utility for Museums with Reference to Lighting, Air-conditioning and Security Alarms.

SESSION III

# Technological Developments and Their Utility for Museums with Reference to Lighting, Air conditiong and Security Alarms

Chairman : A. Bose

Co-ordinator : O. P. Agrawal

## Introduction

Technological developments are having a profound effect on the every day life of man. Many modern innovations that are available to us were not known to our predecessors. In the museum field also the technological developments if properly utilised may mean better care of the objects inside the museum building. Security of the objects in museums have two important aspects—security against deterioration and security against theft. It is widely recognised now that the environment which surrounds the museum objects has a great influence and bearing on their preservation or disintegration. Environment in the present contest denotes the atmosphere inside the museum and the lighting conditions. Modern technology has placed at our disposal various means of controlling the environment and controlling the light. It is proper, therefore, that a study of the control of museum climate and control of light be made for the safety and security of the collections.

Similarly, the importance of modern technology in checking of theft of objects can never be over-emphasized. Now a days different types of lock-systems, Central alarm systems, local alarm and sonic alarms are available which can very well be used in a museum. A museum houses thousands of irreplaceable and valuable art objects, and as such fire alarms have a great importance.

There have been a number of studies on the inter-relationship of museum-climate and material housed inside a museum. These studies indicate that inside the museum too high or too low a humidity content or a wide periodic variation in it have a considerable effect on the objects. If the humidity content in the atmosphere is too low, leather, parchment, palm-leaf, paper and similar material become easily brittle. Too high a humidity content promotes micro-organisms to grow on the material and causes it to disintegrate. Deterioration of metals is hastened in the presence of moisture. If the atmosphere is polluted with corroding gases, dust particles of dust and salts, the action is still greater. The particles and salts are generally hygroscopic and when settled on museum objects become potential seats for moisture. Acids and salts present in the industrial atmosphere attack even stone. Variation in the moisture content of the surrounding atmosphere causes great damage to the museum objects, and

for this reason a constant relative humidity is of great importance in the preservation of objects, especially organic. Wood, for instance, swells and increases in size when the humidity content of the surrounding atmosphere is high; it shrinks when the humidity content falls low. Thus a periodic variation in the relative humidity of the atmosphere produces periodic swelling and shrinking of wood, and thereby cause as also a strain on its structure on its fibre. Ultimately the wood becomes weak, and warping and twisting appear in it. If the wood is painted, paint may crack and ultimately peel off, due to constant movement of the wooden support. An uniform atmosphere with a relative humidity of about 55% is found to be the best for most types of objects.

In this context air-conditioning has two missions to fulfill, first to provide atmosphere conducive to preservation of objects and secondly cater for the comfort of visitors. However, it should always be borne in mind that the comfort of visitors is secondary to the preservation of museum objects. For the comfort of visitors control of temperature is more important, while for preservation of museum objects control of relative humidity is of a greater importance. In a museum it would be best to control the relative humidity at a constant level.

No doubt, air-conditioning is the best solution for controlling relative humidity as well as temperature inside the building. But in our country, and in most other tropical countries, it is financially still not feasible to go for airconditioning. It is, therefore, necessary for the museum authorities, the architects and engineers to study whether by suitable changes in museum building designs a certain amount of control of climate can be brought in. For example, orientation of the building in a particular fashion or plantation of trees outside the building has a great bearing on the environment inside the museum. Similarly, provision of fountains, either outside or inside the museum halls, may be of profit to the museum objects. There can be many other possibilities which have yet to be looked into. Very little work has been done so far in this direction.

If the building is being air-conditioned the designer will have to keep certain points in mind. He must remember that certain types of objects like wood, paper and paintings suffer more by variation in the relative humidity. While on the other hand, ceramics, pottery and stone objects are less affected. The pollutants present in the environment also have a tremendous affect on the preservation of susceptible material. Provision of filters for air being circulated inside museum galleries, therefore, become a great necessity, There are various types of filters in use. Air filters are generally of four types : (1) Air washers type, (2) Mechanical type, (3) Electronic type and (4) Adsorptive type.

In this type of filters the air supply is forced through a fine spray of water or to a water soaked metal mesh or glass wool mesh. Air washers do not filter the air in the usual sense. This type of filter can be used both for humidification and, if cool water supply can be used, for dehumidification. Water soluble

pollutants of the air are also very effectively removed by this type of filters. In some places alkaline sprays have been used to eliminate sulphur dioxide.

Mechnical air filters use blanket type materials of various thicknesses and substances. Cellulose fibres, glass, wool, synthetic fibers of various grades have been used for this purpose. Care is taken that maximum amount of filter surface is exposed to the air stream and is thus able to remove a good percentage of air pollutants. In this type of filters a great defect is the resistance offered by the filters and thus requiring more forceful fan system.

The electronic filters function on the basis of charging the air supply with heavy positive electrical potential (usually between 10,000 to 15,000 volts D. C.) The particles suspended in the air get charged electrically and when passed over a series of plates carrying alternate current, settle down on the negatively charged plates. This is one of the most efficient type of air filters for removing even small size of particles present in the air. For museum, however, electronic air filters are never recommended because the high electrical charge produces great amount of ozone, and ozone as we know is harmful to several types of organic compounds, for example, natural picture varnishes.

Adsorptive type of filters work on the principle of physical condensation of a gas on activated solids. The most frequently used activated solid for this purpose is activated charcoal. It has the capacity to adsorb material upto the extent of 50 per cent of its own weight. Used activated charcoal can be reactivated by heating. It is known to adsorb several types of odours also.

Since air-conditioning, not only its installation but also its maintenance and running cost, is very costly, the air-conditioning designer will make provision for such installations which cut down the running cost of the plant; for example, insulation of the roofs, double glazing of windows, use of glass which cuts out the heat, are some of the aspects which he will certainly provide for.

While planning for air-conditioning it is necessary to remember that the relative humidity is the most important factor for control. Whatever point of control within the permissible range is selected, there must be a rigid control at that point. Another important point to remember is that the relative humidity must remain constant day and night—all the twenty-four hours-- throughout the year. Several instances are noted where the air-conditioning unit is switched off when the museum is closed and restarted when it opens. This system, to say the least, is more dangerous than having no air-conditioning.

Where air-conditioning is not possible humidifiers and dehumidifiers can be of great assistance.

Preservation of museum objects also depends on the design of show-cases. In some countries show-cases with inert gases filled inside were

designed but did not prove very efficient, for the obvious difficulty of maintaining the inert gas intact. Substances like silica-gel or lumps of lime kept inside air-tight show-cases have been found useful in maintaining controlled atmosphere. A good quantity of the material which absorbs moisture, like unvarnished wood, paper, cotton, also help in maintaining level humidity inside the cases. These substances absorb moisture when the relative humidity is high and give it to the atmosphere when it is low.

Light is another factor which accelerates the deterioration of museum objects. The deteriorating effect of light has been the subject of several studies. One of the earliest of such studies was done by Russel and Abney in 1888. Interest in the subject grew after the World War II, partly because, after the war several new sources of artificial illumination came in the market, particulary the tubular fluorescent lamps. Professor Genard was one of the first to point out to the high amount of ultra-violet radiation emitted by fluorescent tubes. Since then intense work on the effect of ultra-violet radiations on museum objects has been done.

As a result of these studies it is noted that all types of objects are not affected by light. Specially sensitive to damage by light are paintings, textiles, paper, leather, animal skins, feathers, and many other natural history specimens. Besides causing fading, light also tenders the material of the object. It can also cause the medium in paints to yellow and shrink.

The ICOM Commission for Lighting of Museum Objects in its report points out that the extent of deterioration of objects due to light really depended upon several factors :

(a) The intensity of irradiation. This is influenced by several factors, including distance of the light source.

(b) the time of exposure

(c) the spectral character (wave-lengths) of radiation

(d) the capacity of the objects irradiated to absorb and be affected by radiant energy.

It can thus be seen that the damage due to light, increases in direct proportion to the intensity of light and the time of exposure. Means have to be found to lower the intensity of illumination and to reduce the time of exposure. It is well known that the eye adapts itself to various degrees of illumination and cannot therefore be relied upon to record the absolute level of illumination. The illumination should always be measured by instruments.

Low level of illumination, although recommended from the preservation angle, gives rise to the difficulty of viewing the objects properly. However, it has been pointed out by several workers—specially Thomson and Brommelle—that situations can be created, by taking into consideration the quality of eye to

adapt itself to different levels of illumination, in which low levels of illumination are acceptable. If the eye has adapted itself to a dim illumination, the object can be satisfactorily viewed. For proper adaptation, rapid transitions from light to dark between rooms, and also within a room, should be avoided. It can be very well achieved by gradually lowering the level of illumination from the rooms containing less susceptible objects to the ones having highly susceptible objects.

The recommended levels of illuminations are as follows :

| Name of object | Type of illumination | Maximum Intensity of illumination |
|---|---|---|
| Objects insensitive to light such as metal, stone, glass etc. | Daylight and fluorescent light at about 6500°K or 4200°K | Unlimited though not necessary to exceed 300 lux |
| Most museum objects except the susceptible objects | Day light, tungsten lamps, fluorescent tubes cool types—about 4200°K | 150 lux |
| Susceptible objects like textiles, water-colours, tapestries manuscripts, miniatures etc. | As far as possible only tungsten lamps. | 50 lux |

Obviously the design and orientation of the building, location of the windows, and distribution of galleries will have a great bearing on preservation.

O. P. Agrawal

**Effect of light and moisture on the museum objects and their relation to museum architecture.**

A large number of factors like light, heat, moisture, dust and dirt are responsible for deterioration of museum collections. Let me start with the most deteriorating factor on museum objects i. e. light. The light may be (a) Lateral light or (b) Over-head light. If the natural light is divided into the different components constituting it, it can be divided into several regions. The unit of length for measurement of wave length of light and intra-molecular distance is called Angstrom's unit $\frac{1 \text{ micron}}{10000}$ which is equal to $\frac{1}{10000000}$ of metre.

Light has two components: visible portion and invisible portion. The visible portion of light consists of seven colours namely red, orange, yellow, green, blue indigo and violet. The invisible portion consists of radiations to which our eyes are not sensitive. They have short wave-length and thus more frequency. It is this part of light which is most destructive. Beyond the red we have still larger infra-red radiations of wavelength 7230° A° to 3 x $10^6$ A° which are called, Hertzian or Radio waves. I. R. radiations are mainly the heat waves affecting superficially. Beyond the violet we have Ultra-violet (500-4000 A°), X-rays and Gamma rays (.0310A°) and finally Cosmic rays.

Now we shall discuss about the possible effects of the sunlight which accounts for the most widespread deterioration of art objects. The portion which lies beyond violet possesses the capacity to bring about certain chemical reactions with or without moisture or oxygen, while the light in infra-red-region having the characteristic property both of waves and particles is seldom capable of inducing a chemical reaction in the material because of its low energy. But as the wave-length becomes shorter and shorter these rays become more effective and penetrating type and instead of affecting the surface, they produce photo-chemical reaction in the body of the object. This reaction is governed by several laws.

Grotthus-Draper law is one of them, which states that only those radiations which are absorbed by the object may produce the chemical reaction. This process of absorption is very complex and involves electronic system of molecules. It occurs in two stages:

1. Primary stage: In this stage the photons are absorbed and excitation is brought about.

2. Secondary stage: In this stage the moisture is converted into hydrogen per-oxide.

This is the final product which brings about fading of dyes in textiles, discoloration of pigments in paintings and other coloured objects. A good amount of work has already been done to find out the causes, the mechanism and the methods of prevention.

Silk is more affected by sunlight than cotton, while woolen material is practically unaffected. The effect of ultra-violet exposure to the dyed objects or colouring matter is devastating and it is believed that even if the sun had no bad and harmful effect on fibrous material, the dyes would still have faded. The reason being that the dye-molecules are easily attacked due to oxidation and catalytic mechanism, with the result that a large number of coloured objects and textiles are bleached. Metals are not affected by light. Manuscripts are badly affected.

Nowadays emphasis is laid on the artificial way of illumination in which the ultra-violet light radiations are not present, and if, present, are cut off by chemical-absorption process. In order to avoid these harmful wave-lengths from reacting with the museum objects, ultra-violet absorbing powders like benzophenones (Cyasorb)—Ultra-violet-284, supplied by Cyanamid, soluble in water) or the triazoles (Geigy-Tinnuvin 326) are much in use. Polymethyl-methacrylate—(Plexiglass U. F. I, U.F.3) are strong ultra-violet absorbers.

Another way to cut off the harmful light effects is by means of safety glass (2 glass sheets with violet filter between them. Fadeban Ultra-violet-393). If a diffused form is needed, Ultra-violet-Northlite—393 with 50% of transmission of visible light is available. We have to be very careful with the green-house effect in relation to absorption and transmission of infra-red radiation. In order to avoid this, lamps should be placed outside the show-cases. Some special glasses to reflect back the infra-red radiations should be used. Fluorescent sources have been recommended for show-cases.

Another very important factor of deterioration that we have to consider is the sudden change of moisture content of the atmosphere. A term "relative humidity" has been used as a measure for moisture content of the atmosphere. Due to much moisture content in the atmosphere, metals start corroding and the wood starts swelling. The moisture can act as a chemical agent as well as physical agent. Changes in the moisture content of the atmosphere produce expansion and contraction in the objects disturbing the equilibrium and finally producing deterioration. It produces moulds and brown-bee line effect on paper and textiles. Physical dimensional changes are produced in the wood on account of the moisture content in the atmosphere.

It has been recommended that a relative humidity of 50%—60% and a temperature of 68°F are quite suitable for museum objects. Relative humidity and temperature are inter-dependent. The objects which suffer most in excessive conditions are wood; panel and canvas paintings; parchment; leather; and manuscripts (all of them having cellulosic content which is quite hygroscopic in nature).

There should be proper circulation of air and proper ventilation to minimise this effect.

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B. N. Tandon

**Lighting in museums**

Museum is defined as a public institution which collects, preserves and exhibits cultural and scientific objects of the environment. This is its essential nature. In the display of objects, visual conditions represent one of the most important elements in creating an environment appropriate to the interior concerned, yet quite often, no more than casual or incidental attention is given to this aspect.

It should well be realised that lighting is indispensable in visual display and must be considered as part of the total design of the museum. The requirements of a museum are varied and often specialised and, therefore, effective fulfilment of its role is only possible if expert advice on lighting practice is sought right at the preliminary stage. Perhaps the most strategic decision which has to be made at the outset of the design process is how to use the available natural or artificial light sources to the best advantage. Although, in the interests of display, care-

fully designed artifical lighting systems are most effective, many of you may still maintain that daylighted-galleries are essential, even if the windows or skylights are permanently screened.

In a building designed for side wall fenestrations, discomfort and disability glare will arise even if direct sunlight is not present. At the same time undesirable shadows will be present and there will be strong specular reflections in show-case glazings. Side windows also result in a loss of wall display area, disadvantage of which is soon discovered as collections grow. Although daylight itself is free, its provision in a building is costly, both initially and in service. The skylight and daylight control for instance will be more expensive than a ceiling slab construction. It is, therefore, debatable whether utilisation of daylight can be supported on either economic or functional grounds.

We shall now discuss some of the problems which arise in the museum and the factors to be considered in their solution.

Although good presentation is highly desirable, it cannot be disputed that conservation of irreplaceable collections is of prime importance. In practice, the limitations imposed by conservation requirements are such, that special care has to be taken to achieve optimum viewing conditions. Many categories of exhibits such as oil paintings, water colours, costumes and tapestries are subject to damage if exposed to visible light and ultra-violet radiation. The most common forms of deterioration are the fading or discolouration of dyes, tendering of textile fibres, embrittlement of paper, and bleaching or darkening of woods.

Conservation control consists, in principle, of eliminating the potent ultra-violet radiation from daylight and certain artificial light sources, and strictly limiting the total luminous energy to which the light sensitive exhibits are exposed. Each material and dye stuff has its own specific reaction to light but the general tendency of light of shorter wave-length is to produce a greater damage.

(a) Elimination of Ultra-violet radiation.

Although the amount of ultra-violet radiation varies with different lamps, in the case of fluorescent tubular lamps it is extremely low in ratio, and for limited values of illumination, is not likely to prove deletereous. Tungsten filament lamps emit a lesser proportion of ultra-violet radiation than fluorescent lamps or daylight and their damaging effect in this respect can be discounted unless very high levels of illumination in the order of some thousands of lux are adopted.

For effective elimination of ultra-violet radiation, filters can be used which should be capable of absorbing condition of wave-length less than 4000 A°. There is no strongly defined line between ultra-violet radiation and visible light, and the more efficient filters do, in fact, absorb a proportion of violet and blue

light, which is itself undesirable as short wave visible light is also a source of photo-chemical damage. These filters are slightly yellow in appearance but the effect produced is not noticeable in practice provided they are used for the control of general natural or artificial lighting. They may be unacceptable, however, if placed directly between the object and the observer, e. g., as glazing for a picture or showcase, due to direct comparisons of colour inside and outside the show-case.

(b) Control of illumination.

Photochemical deterioration of light-sensitive materials can be retarded if total exposure to light radiation is limited. In general the law of reciprocity prevails and this reduction of illumination and/or time of exposure will prove of value.

There is in fact no level of illumination below which the photo-chemical reactions producing damage will cease to occur. The problem is, therefore, to strictly limit illumination to a value which, taking into account modern display techniques and the process of visual adaptation, will permit comfortable viewing inspite of an admitted loss of visual acuity. As some exhibits can be considered moderately light-sensitive and the others specially susceptible, they can be grouped in relation to maximum illumination.

| | *Object* | *Max. illumination* |
|---|---|---|
| 1. | Oil and tempera paintings, undyed leather, lacquer. | 150 lux |
| 2. | Objects specially sensitive to light, such as textiles, custumes, water colours, tapestries, painting in distemper media, wall paper, dyed leather. | 50 lux |

Outside illumination from the sun and sky can be as high as 100,000 lux and even if the direct sunlight is screened, vertical illumination values from a grey overcast sky are unlikely to be less than 600 lux. The most difficult problem in practice is the control of daylight which itself varies according to the time of day or year, so that illumination value of 50 lux or 150 lux are not exceeded on the exhibits concerned. Perfectly uniform illumination of the whole of the display wall is impossible to achieve and it is considered visually acceptable if a maximum to minimum ratio of not exceeding 3 to 1 is attained. Under condition of strict limitation of illumination, one can be tempted to ask "why design for daylight at great expense and then proceed to eliminate it at an even greater expense."

On the other hand artificial lighting can always be controlled to provide a pre-determined, fairly constant level and quality of illumination with directional emphasis, and the scheme can be planned with a high degree of flexibility to suit re-arrangements in the display.

(c) Use of light of low colour temperature

Although materials differ in their reaction to light in general, radiation of short-wave length, i.e., violet and blue, is more destructive than that of long wave-length i.e. red. Consequently, from the conservation aspect, 'warm' rather than 'cool' light sources are to be preferred, assuming that the illumination produced is same for each. Also, for psychological reasons, the former are more acceptable when viewing display under low values of illumination. Tungsten filament and fluorescent lamps of warm colour are recommended, therefore, provided their colour rendering is acceptable.

Lighting techniques and Equipment.

1. Pictures and tapestries

For such areas where pictures and tapestries are displayed, a satisfactory effect can be obtained by lighting the pictures and let the illumination of the room look after itself. The basic approach to this sort of lighting is provision of almost uniform illumination on the vertical surface.

One of the first design decision concerns the distance of the source from the picture. The closer it is the higher the illumination, but if it is further away the greater the approach to uniformity. Also fundamental is the choice between concentrated or extended sources, i.e., in practice, between incandescent lamps and the tubular fluorescent type. The light source has to be above the display and its position will be affected by considerations not only of the uniformity of the illumination, but also of any surface reflections being in directions which do not interfere with the spectators' view.

We shall, now, try to investigate the distance of a point source of light with uniform distribution from the top of the picture in order to produce the highest illumination at the bottom of its rectangular shape. When this point source is at a considerable distance, the uniformity will be good, but the illumination low. On the other hand if the source is very close, the illumination at the bottom of the picture will be low because the angle of incidence is extreme. It can be found that the offset distance to produce the highest illumination on the vertical is given by dividing the height of the picture by 2 i.e. by this criterion, the optimum offset distance is about 0.7 of the picture's height. A calculation to compare the illumination at the top and the bottom under these circumstances shows that the uniformity ratio is about 5 to 1.

If we carry out a similar investigation by using an infinite linear source, we find that the distance from the vertical plane to give the highest illumination

at the base of the picture is equal to its height and the ratio of illumination on the top and bottom under these circumstances is 2 to 1.

The choice between incandescent and fluorescent sources is affected by many other considerations, but practice confirms that tubular lamps are more suitable for general illumination of vertical display surfaces. They may well be supplemented by incandescent sources, particularly reflector lamps, but normally this would be to meet some special need such as that to reveal texture or possibly to penetrate varnish.

An important consideration for the lighting of paintings is clearly that of colour. The tungsten filament lamps have been used in museums for very many years because there was no practicable alternative, inspite of the fact that this light by itself is too warm. With the advent of different types of fluorescent tubular lamps the colour rendering properties have been considerably improved.

Choice of light sources in respect of colour temperature is strongly influenced by level of illumination. Fluorescent tubular lamps of cool-daylight type at 6800° K, for instance are not generally acceptable for light sensitive exhibits, because at values below 150 lux a psychologically 'cold' and depressing effect is produced. For this purpose 'white' fluorescent lamps of colour temperature 4200°K are more appropriate.

Two outstanding points apply to the lighting of tapestries. The first is the very definite texture interest and the second the importance of conservation considerations particularly for material which may be in a delicate condition.

A relatively lower level of illumination can be provided by fluorescent tubular lamps of warm white deluxe colour type, giving reasonably diffuse light from a direction approaching that of the perpendicular to the surface. In order to reveal texture, low wattage of incandescent light, probably from reflector lamps, in a direction approaching that of grazing incidence can be used.

In extreme cases when the condition of the material requires that very great attention has to be given to its preservation, and this applies not only to tapestries but also to manuscripts and other old and fragile items, the principle will be that the exhibit is illuminated only while being examined.

Sculptures :

A sculpture which is essentially a three dimensional art can best be exhibited by right combination of concentrated and diffuse lighting. On the one extreme, completely diffuse light will provide flat and dull effect and on the other hand, only concentrated light will create a great contrast with the background and the whole effect may be a little unsettling. A proper balance between direct and diffuse lighting has to be settled, after which the relative positions of the sources and the object has to be considered to obtain the desired effect. Light

from the top front is normally most revealing because whatever surfaces are exposed to view are also exposed to light.

S. T. Ahluwalia

**Security in museums**

Security of objects is important for museums. In planning and constructing museum buildings, care should be taken to ensure that the buildings are secure and well protected from the risk of fire and theft. From the point of view of the architecture and construction of the museum buildings, the following precautions have to be taken :

Compound walls, gates and railings generally afford little or no protection. They can, however, be made more secure by fixing glass metal spikes or barbed wire at the top. The protection should be uniform and made equally strong at all points of the perimeter wall or fence, as the thief will take advantage of any small weak point which is left unprotected.

Too many entrances and exits should be avoided. The ideal would be to have only one entrance and one exit for the whole of the museum building and these should be well guarded.

External doors should be kept to the minimum and should be of solid construction. All sliding and folding final exit doors should be examined and tested to ensure that they cannot be lifted from the rails or bottom grooves by levers.

Care should be taken to see that all downfall pipes, drain-pipes, etc. running down on the exterior walls on the sides of the building are adequately protected by: (i) covering a section of the pipe with a meta shield. (ii) by fitting a number of circlets of barbed wire. (iii) by fittingl one or more collars of inverted spikes.

All glass windows are vulnerable. Ideally there should be no windows, at the ground level but where this is not possible, the windows should be protected by fitting iron bars preferably on the inside. Glass windows, even when they are located high up on the wall, should be protected by providing substantial metal grills of heavy guage wire or expanded metal, preferably on the inside. In addition the windows may also be protected, if funds permit, by installing an electric burglar alarm system which raises an alarm when any part of the window is attacked. The exterior of the building should be sufficiently well illuminated at nights and adequate yard lighting should be provided for the lawns and gardens immediately surrounding the museum buildings.

S. T. Satyamurti

DISCUSSIONS

Most of the members felt that here in India we have very limited choice as far as the use of fluorescent or incandescent lamps is concerned for lighting purposes. Practically no indigenous filters are available in the market which can be utilised for omitting or at least reducing the ultra-voilet rays from the fluorescent lamps. Low levels of lighting (50 lux) for susceptible objects like textiles, paintings, manuscripts etc. as well as indirect lighting can help to a certain extent. It was felt that natural lighting can be utilised if it is diffused by means of various sun breakers etc before it enters a gallery. This can be taken care of at the time of iniital planning of galleries before museum building is built. For most kinds of museums, it was felt that air-conditioning is very essential.

Tribeni alarms system, based on entirely Indian products was demonstrated by M/S Parkash Securlty Devices. These are automatic electrical devices for fire as well as burglar alarms. This was very much appreciated.

# Recommendations

# All India museums conference on museum architecture

General Recommendations

1. All India Museums Conference on Museum Architecture recommends that the Indian Institute of Architects and the National Buildings Organisation be requested to take up a study of museum buildings as specialised buildings, and to hold seminars on museum architecture and create professional interest in the field.

2. The Indian Institute of Architects should be requested to organise exhibitions on the subject of museum architecture, or museum architecture should be a section of general architectural exhibitions arranged by the Institute.

3. Museums Association of India should request the Govt. of India and the Central Advisory Board of Museums:

(a) to study the demands on different types of museums and formulate a programme of their requirements.

(b) to set up a Committee to formulate minimum space standards for museum-buildings. It would be essential to co-opt architects and the National Buildings Organisation as members of the committee.

(c) to make architectural help available for designing of museum-buildings, especially buildings built with government grants, by appointing a panel of architects.

(d) architectural help may also be given for renovation and remodelling of existing buildings to make the best use of available spaces.

(e) to give special grants for the maintenance and upkeep of existing buildings since maintenance is as important as constructing new extensions or new buildings.

(f) Museums Association of India should prepare documents on museum buildings in India and abroad. Members of the Association should be requested to send the plans and other information required for such a purpose.

SESSION I

## DEMANDS ON THE MUSEUMS OF TODAY AND THEIR EFFECTS ON MUSEUM DESIGN

Recommendations:

I. 1. Considering that there is a total lack of standards for museum buildings in our country, it is felt that the demands on museums in general as well as particular demands of specialised museums should be studied as a first step towards the formation of standards. It is obvious that before undertaking such a study, the museums should be divided in different categories as follows:

(i) Small town museums (population of 2 lakhs).
(ii) District Museums.
(iii) State Museums.
(iv) Regional Museums.
(v) University Museums.
(vi) National Museums.

Types of Museums.

(i) Art, Archaeology and Anthropology Museums.
(ii) History and Technology.
(iii) Natural History Museums.
(iv) Science Museums.
(v) Multipurpose Museums.
(vi) Specialized Museums.

(a) Transport
(b) Architecture
(c) Building Materials
(d) Medical
(e) Agricultural and Forest
(f) Children's Museums

I. 2. A programme of requirements based on the demands should be prepared for each type and category of museums.

I. 3. Space standards as per programme of requirements should also be prepared.

I. 4. Functional study of important spaces as listed below should be made for preparing standards.

(i) Study and research rooms for different types of collections.
(ii) Storage for reserve collections.
(iii) Work-shops (general).
(iv) Conservation Laboratory.
(v) Work-shops (special) for natural history collections, science models etc.

I. 5. Problem of remodelling existing buildings to suit modern functions demands immediate attention. A committee should be set up to study the problem and prepare proposals and programmes. It is necessary that the committee should comprise of architects and museum-authorities.

I. 6. Building standards and structural requirements should be prepared for all the museum areas.

I. 7. While choosing the building materials for walls, floors and ceilings, as well as lighting fittings, their easy maintenance and upkeep should be a consideration.

I. 8. Design of galleries should be considered in relation to the collections to be presented in a particular gallery. The design of galleries should be based on the lighting fixtures available in our country.

I. 9. Climatic requirements of a particular region, i. e., hot and humid zone or hot and arid zone should be considered while laying down the building standards.

I. 10. Standards for building protection against termites, fire, thefts etc. should also be prepared.

I. 11. Selection of site is important in relation to the accessibility to the museum as well as the transport system in the city or a town. Site should be chosen taking into consideration the possibilities of expansion of the museums building.

## SESSION II

## CIRCULATION PROBLEMS IN MUSEUM BUILDINGS WITH REFERENCE TO SECURITY

**Recommendations:**

II. 1. Circulation of visitors is important in public areas. Entrance hall should give direct access to all the public areas like galleries, auditorium, library, educational activity rooms, cafeterias, rest-rooms, book-shop or sales room.

II. 2. Objects should have independent facility for entrance and exit, adjoining packing-unpacking rooms. The entrance for objects may be adjoining the staff entrance or the staff can use this in small museums.

II. 3. Circulation of the museum-staff through the museum as well as through the work-rooms, reserve collections and offices is equally important.

II. 4. There should not be too many entrances in a museum building.

II. 5. The entrances should be well guarded.

II. 6. The linking areas between the galleries, the office and the working areas should have restricted entry.

II. 7. Security is essential for museums but circulation should not be sacrificed for security, neither should the security be sacrificed for circulation of objects or of visitors.

SESSION III

TECHNOLOGICAL DEVELOPMENTS—THEIR UTILITY FOR MUSEUMS WITH REFERENCE TO AIR-CONDITIONING, LIGHTING AND SECURITY ALARMS

Recommendations:

III. 1. CLIMATIC CONTROL:

III. 1. 1. Considering that in India the climatic conditions are very rigorous and variable, and also considering that museum objects are most susceptible to deterioration due to adverse climatic conditions, top priority should be given to control the climate inside the museum.

III. 1. 2. The best means to control the climate is through air-conditioning.

III. 1. 3. Specifications for air-conditioning in a museum should be laid down after a thorough study taking into consideration the visitors, comfort and the preservation of susceptible objects.

III. 1. 4. For preservation of susceptible objects like paintings, textiles, wooden-objects, relative humidity should be controlled at a fixed point somewhere between the range of 50—60% R. H.

III. 1. 5. Other types of objects do not require rigorous control of relative humidity.

III. 1. 6. If it is not possible to control the relative humidity at a fixed point in all the galleries, then atleast those containing susceptible material may be so designed that humidity can be controlled there. As a corollary it may be stated that if air-conditioning is not possible due to financial reasons in all the areas of the museum, selected areas alone may be air-conditioned. Exhibition galleries, reserve rooms, storage and work rooms and laboratory are some such areas.

III. 2. LIGHTING:

III. 2. 1. All sources of illumination represent a certain degree of danger to materials which are susceptible.

III. 2. 2. At equal levels of intensity the three principal sources of light can be rated as follows: (a) sky-light, most dangerous (b) Fluorescent light, less dangerous (c) Incandescent light, least dangerous.

III. 2. 3. Attempt should always be made to eliminate ultra-violet portion of light, since it is harmful and plays no role in the visual observation. Special filters may be used for the purpose. Where colour has no importance yellow filters can be used.

III. 2. 4. It is recognised that deterioration also depends upon the intensity and time of exposure; these factors should be kept at a minimum. Levels of illumination of about 50 lux are recommended for specially susceptible material.

III. 2. 5. Paintings, textiles, paper, dyes, and pigments are in the special susceptible group.

III. 2. 6. Every museum should have lux-meter to maintain different levels of illumination as per requirements of the particular collection.

III. 3. SECURITY MEASURES :

III. 3. 1. Fire and burglar alarms should be installed atleast for important museum areas like reserve collections, valuable collections, jewellery, coins, rare and valuable objects, conservation laboratory etc.

# Exhibition Of
# MUSEUM ARCHITECTURE
## In India And Abroad

# Introduction to the Exhibition of Museum Architecture in India and Abroad

Museum Architecture is not a special branch of architecture. It reflects the architectural thought and trend of the country but is also influenced by the world-wide trend of museum design and solutions to the museum problems. It is an expression of the time and experience.

The old world museums or the first museums, whether in India or abroad, were built for either showing the personal wealth of the kings and noblemen, Popes and princes, accumulated for their personal enjoyment or for preserving the artistic treasures and rare objects of the past as a matter of civic responsibility. The requirements for such museums and their collections were a number of large halls. The available lighting was accepted without any complaint. Architects did not have much scope for the planning of such buildings and so they concentrated more on the ornamental treatment of interiors and exteriors of the building itself. But the concept of museum has been undergoing change during the last century. From the repository of collection, the museum has moved very fast to become an institution for learning. It is now a public institution for education and it has also been accepted as a medium for visual communication. The museum-concept was changing so fast and the functions of the museum were growing so numerous that collaboration of the architects, "as the inventors of space-organism", for the functional planning of museums became indispensible, as a result of which museums and art-galleries came into existence as a new "building type" during the last few dcades.

"The museum makes for one of the newest architectural phenomena in the United States and in many other countries." This is reflected in the various museum buildings included in this exhibition of "Museum architecture in India and abroad". Most of these museums were built or renovated after the second world war. Some of these excellent museums were designed by architects famous internationally as well as nationally. Frank Lloyd Wright, L. Miss Van der Rohe, Le Corbusier, Franco Albini, Philip Johnson, C.M. Correa, Mario J. Ciampi, M. Lehmbruck, are well known for their contribution to architecture. These stimulating museum-plans prove the consciousness of the architect to the museum problem.

As any other challenge, museum-design has emerged in characteristic forms while passing through the hands of able architects. Mies Van der Rohe provided lofty glass hall for changing exhibitions but designed only low galleries for permanent exhibitions which were concealed in the podium of the changing exhibitions' great hall. The Guggenheim Museum's winding galleries surround

a stair-well-kind of central hall which is top lighted. The ramp of the Guggenheim Museum which is used for circulation as well as exhibition has raised a controversy in the museum world. But it is very popular amongst the tourist and museum visitors. The Pasadena Art Museum designed by Ladd and Kelsey architects has a cluster of galleries of varying size and height. The individual galleries are arranged to "enable a continuing and fluid sequence of space", but are also conceived as being separate and individual enough in scale and height to permit the widest flexibility of modern art exhibits. The same flexibility has been achieved by Marcel Bryer and I. M. Pei in the Whitney Museum and in the Everson Museum of Art respectively, by providing galleries of different sizes and different heights. In both the cases, provision has been made for natural light through the occasional windows more as a measure for psychological relief than as a source of light.

All the three well known museums of Mexico City have been designed by the same architect, Pedro Ramirez Vascquez, but each has its own characteristic plan. The National Museum of Anthropology has been built around a large courtyard, a part of which has been covered by a large umbrella, which serves as a focal point. The Museum of Modern Art has circular galleries with external glass-walls but solid radiating partitions for hanging the exhibits. The gallery of the History Museum is a winding ramp used for exhibition and circulation and also has glass walls on the external side, in order to bring-in the beautiful Chapultepec park in which these are located. Le Corbusier's museums at Ahmedabad, Tokyo and Chandigarh have square plans and are like magic boxes, closed on all the sides. Philip Johnson's Utica Museum in U.S.A. is an excellent example of a museum in the community. The plan takes into account all the functional requirements. The galleries are situated around a top-lighted central court used for the display of sculpture, which is a dominating feature. In the design of this museum, Philip Johnson had applied a good many of the beliefs he had formed during his experience as the Director of the department of architecture and design at the Museum of Modern Art, New York, in particular the notion that art is not necessarily best displayed in undifferentiated distinction and that there is a great need in all museums for a focal space.

The University Art Museum at Berkeley designed by Mario J. Ciampi is considered the largest University Museum in the United States and is supposed to be the outstanding contribution to contemporary museum design. It is a delightful fan-like structure consisting of five cantilevered exhibition terraces that step down the sloping site and fan out in an arc from a central lobby. The three museums in West Germany designed by the well-known Stuttgart architect Manfred Lehmbruck are also very interesting. He designed a glass-walled pavilion as well as top-lit pavilion, connected by a sunken courtyard for different types of exhibitions for the Lehmbruck Museum in Duisberg. This was designed mainly to house his father's sculpture. The Reuchlin-Haus, by the same architect is a group of pavilions for combining diverse institutions

like the Jewellery Museum, Art Library, Arts and Crafts Society, which were linked by their common cultural mission. Lehmbruck's plans made provision for separate buildings, each having a distinctive character of its own. The group possesses an organic unity and fit harmoniously into the environment of the surrounding municipal park.

Museums in Japan have beautiful structures and picture-like interiors with big-glass windows which unite the interiors with the outside landscape, as is evident from the Yamato Bunkakan Museum. Museums in India have still to capture the trend of the world but the efforts are noteworthy. Rabindra Bhawan's Art Gallery designed by H. Rehman provides uncluttered and continuous exhibition spaces on different levels in an impressive structure. C. M. Correa's Gandhi Memorial Museum at Ahmedabad consists of small square galleries linked through the terraced courts and lily-pools. The structure is simple yet refreshingly beautiful and harmonises with the other buildings of the Sabarmati Ashram due to the use of the same building materials, and the gable-roofs.

Most of these museums have different types of galleries varying in size and height for permanent collections, new acquisitions and changing exhibitions. Additional provision has been made for a restaurant, sculpture-garden, an auditorium, seminar-rooms, storages for collections as well as service areas, which are normally housed in the basement and sub-basements while the upper floors are used for exhibitions.

The museum planning as seen here has been considered from many different angles, like the circulation of visitors, lighting, the main angle being the exhibition galleries. The primary requirements of exhibition galleries are blank wall spaces and lighting - natural lighting is still favoured but only in addition to the artificial lighting. The provision of natural light through the skylight or top-lighted central courts has dominated many museum buildings like the Guggenheim Museum at New York by Frank Lloyd Wright, the Munster-William-Proctor Institute at Utica by Philip Johnson, Museum of Western Art, Tokyo by Le Corbusier. While planning the gallery of Modern Art, Turin, the architects—Carlo Bassi and Goffredo Boschetti attempted to devise an ideal lighting solution within a multi-storey building. The glass halls lighting the galleries from the sides as designed by Mies Van der Rohe for Gullinen Hall at Houston in Texas and the New National Gallery at Berlin are a total contrast to the windowless galleries of many other museums. Pedro Ramirez Vascquez has used external glass walls for the Museum of Modern Art at Mxico City in order to bring in the natural urroundings of the Chapultepec Park and thus blend the art with the nature. These glass walls also serve the purpose of inviting visitors of the park to the museum due to the visibility of art objects through the glass-walls. The security considerations have not prevented the use of glass-walls for the museum. Rather the visibility of the ineriors through the glass-walls has been considered a safety-measure.

The planning of exhibition galleries on several levels, interlinked but with independent accesses as well is the favourite of many architects like Mario J.

Ciampi, Pedro Ramirez Vasquez. The circulation patterns or the movement of visitors through the galleries has also interested many architects, which has resulted in continuous exhibition spaces like that of the Guggenheim Museum, the Museum of Western Art, Tokyo, the Pasadena Museum of Art, though the character of the exhibition spaces differ.

Few museums can provide adequate space for sculptures, and the traditional out-door setting is the most suitable exhibition environment as can be seen from the sculpture court, designed by Philip Johnson for the Museum of Modern Art. The University Museum of the University of Pennsylvania at Philadelphia designed by Mitchell & Giurgola Associates, Architects, will enclose a series of sculpture-courts with distinctive atmosphere.

In the recent years underground museums like the Indian cave temples have made their appearance. Franco Albini's Museum of the Treasury of the San Lorenzo Cathedral at Genoa in Italy is an underground structure which is partly a museum and partly a storage for church collections still used in ceremonies. Albright Knox Art Gallery at Buffalo in U. S. A., is planted around sunken sculpture court. Manfred Lahmbruck has also planed terraces and a sunk courtyard used for exhibitions, between the museum pavilions of the Reuchlin-Haus.

The clean exhibition halls, devoid of any ornamental architectural features, which can be altered in size and shape with flexible partitions, have been very much in demand especially for periodic or short-term exhibitions. The views of the exhibition galleries of the Virginia Museum of Fine Arts, the Corning Glass Centre, University Museum at Philadelphia, the Museum of Modern Art show the effective interiors devoid of any dominating architectural features which contribute considerably to the exhibitions.

However successful the functional planning may be, the building of a museum will be outstanding if it is distinguished architecturally. Most of the museum buildings shown here like the M. W. P. Institute-Utica, the Pasadena Museum of Art, the New National Gallery-Berlin, the Everson Museum of Art, the Whitney Museum, Guggenheim Museum, the University Art Museum, Berkeley, the Lehmbruck Museum, the Rehchlin-Haus, the Gandhi Memorial Museum have already made a mark as architecturally outstanding museum buildings.

Museums will continue as a part of our culture in spite of the changing museum concept, and the future museums will play a vital role for the enrichment of the entire community. In Philip Johnson's words, "Let us have grand museums and let them be among our monuments."

Smita J. Baxi

We thank the following contributors for participating in the exhibition :--

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11. Shri R. C. Chandra
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12. Shri K. R. Vijayaraghavan
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13. Shri P. G. Ranade
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    New Delhi.

14. Shri C. K. Gaekwad
    Maharaja Fateh Singh Museum Trust
    Laxmi Vilas Palace Compound
    Baroda.

PROJECTS INCLUDED IN THE EXHIBITION:

MUSEUMS IN U.S.A.

1. Munster-William-Proctor Institute, Utica.
   Architect : Philip Johnson.

2. Corning Glass Centre, Corning.

3. Solomon R. Guggenheim Museum, New York.
   Architect : Frank Lloyd Wright.

4. Albright. Knox Art Gallery, Buffalo.
   Architect : Skidmore, Owings & Merrill.

5. Wadsworth Athenium, Hartford.

6. Whitney Museum, New York.
   Architect : Marcel Breuer.

7. Cleveland Museum, Cleveland.
8. Everson Museum of Art, Syracuse.
   Architect : I. M. Pei.
9. The Chase-Manhattan Bank Money Museum, New York.
10. Museum of Modern Art, New York.
    Architects : Edward Stone and Philip Johnson.
11. Los Angeles County Museum, Los Angeles.
12. Avery Brundage Collection.
    De Young Memorial Museum, San Francisco.
13. University Art Museum, Berkeley.
    Architect : Mario J. Ciampi.
14. Cullinan Hall, The Museum of Fine Arts, Houston
    Architect : L. Mies Van der Rohe.
15. Wright Brothers Museum.
    Architects : Mitchell and Giurgola.
16. University Museum, (Extension), Philadelphia.
    Architects : Mitchell and Giurgola.
17. Virginia Museum of Fine Arts, Richmond.
18. Pasadena Art Museum, Pasadena.
    Architects : Lodd and Kelsey.
19. Bishop Museum, Honolulu.
20. Honolulu Akedemy of Fine Arts, Honolulu.
21. Colorado Fine Arts Centre, Colorado.

MUSEUMS IN MEXICO.

22. Museum of Science, Mexico City.
23. Museum of Modern Art, Mexico City.
    Architect : Pedro Ramiraz Vasquez.
24. Museum of History Gallery, Mexico City.
    Architect ; Pedro Ramirez Vasquez.
25. National Museum of Anthropology, Mexico City.
    Architect : Pedro Ramirez Vasquez.

MUSEUMS IN JAPAN

26. National Museum, Tokyo.
27. Museum of Western Art, Tokyo.
    Architect : Le Corbusier.

28. Kyoto National Museum, Kyoto.
29. Yamato Bunkakan Museum, Nara.
    Architect : Isoya Yoshida.

MUSEUMS IN SOUTH AMERICA.

30. Museum of Modern Art, Rio-de-Janeiro.
    Architect : A. E. Reidy

MUSEUMS IN EUROPE

31. Gallery of Modern Art, Turin, Italy,
    Architect : Carlo Bassi and Goffredo Boschetti.
32. History Museum, Vienna.
33. W. Lehmbruck Museum, Duisberg, Germany.
    Architect : Manfred Lehmbruck.
34. Reuchlinpaus, Pforzheim, Germany
    Architect : Manfred Lehmbruck.
35. Federsee Museum. Bad Buchan, Germany.
    Architect: Manfred Lehmbruck.
36. Treasury Museum, Genoa, Italy.
    Architect: Franco Albini.

MUSEUMS IN INDIA

1. Lalit Kala Akademy Gallery, Rabindra Bhavan, New Delhi.
   Architect: H. Rehman.
2. Vishvesaraya Industrial and Technological Museum, Bangalore.
3 Nagarjunakonda Museum, Nagarjunkonda.
   Architect: CPWD.
4. National Museum, New Delhi.
   Architect: CPWD.
5. Archeological Museums, Kondapura, Sanchi, Sarnath, Amritsar, Khajuraho, Konarak and Bodh Gaya.
6. Central Museum, Pilani.
7. Gandhi Memorial Museum, Ahmedabad.
   Architect: C.M. Correa.
8. Adibasi Museum, Ranchi.
   Architect : State. P.W.D., Bihar.
9. Archaeological Museum, Indore.
   Architects: State P.W.D., Madhya Pradesh.
10. Chandradhari Museum, Darbhanga.
11. Maharaja Fateh Singh Museum, Baroda.
    Architect: Shri M.B. Dave.

# All India Museums Conference

**Programme : 1—4 February, 1971.**

**Place : National Museum, New Delhi.**

**1st February, 1971**

| | |
|---|---|
| 9 a.m. to 10.30 a.m. | Registration |
| 10.30 a. m. to 12 noon | Inauguration of the Conference |
| | Tea |
| 12.00 noon to 1.00 p.m. | Exhibition |
| | Meeting of the Executive Committee |
| 1.00 p.m. to 2.30 p.m. | Lunch, by the Museums Association of India |
| 2.30 p.m. to 3.30 p.m. | SPECIAL LECTURE |
| | Speaker : Dr. Grace Morley |
| | Chairman : Shri C. Sivaramamurti |
| 3.30 p.m. to 5.00 p.m. | Visit to the National Building Organisation Display Centre |

**2nd February, 1971**

| | |
|---|---|
| 10.00 a.m. to 11.30. a.m. | FIRST SESSION : |
| | "Demands on a Museum of today and their influence on Museum Design" |
| | Chairman : Dr. Sachin Roy |
| 11.30 a.m. to 11.45 a.m. | Tea |
| 11.45 a.m. to 1.00 p.m. | Discussion |
| 1.00 p,m. to 2.00 p.m. | Lunch by ICOM National Committee |

| | |
|---|---|
| 2.00 p.m. to 4.00 p.m. | SECOND SESSON<br>"Circulation problem in museum buildings with reference to security"<br>Chairman : Shri V.L. Devkar |
| 4.00 p.m. to 4.15 p.m. | Tea |
| 4.15 p.m. to 5.15 p.m. | Business Meeting ICOM National Committee |
| **3rd February, 1971** | |
| 10.00 a.m. to 11.30 a.m. | THIRD SESSION<br>"Technological developments and their utility for museum purposes with special reference to lighting, air-conditioning and security alarms "<br>Chairman : Shri A. Bose. |
| 11.30 a.m. to 11.45 a.m. | Tea |
| 11.45 a.m. to 1.00 p.m. | Discussion |
| 1.00 p.m. to 2.15 p.m. | Lunch by ICOM Agency in Asia |
| 2.15 p.m. to 3.30 p.m. | Business Meeting. Museums Association of India |
| 3.30 p.m. to 6.00 p.m. | Visits to Nehru Museum, Excavations at Purana Qulla and Gandhi Darshan<br>Reception Gandhi Museum |
| **4th February, 1971.** | Visit Central Museum Pilani |

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