MUSEUM INTERIOR

The internal space of a museum building is classified into different areas to suit the different functions of the museum and various activities it organizes for the visitors. For this purpose it may be divided into exhibition, storage, educational, technical and administrative areas.

According to another type of classification based on utility by museum personnel and accessibility of visitors, it may be classified into public, semi-public and private areas.

Whatever, may be the method of the classification, its aim is to provide space for the museum's functions and activities; and an orderly arrangement of the exhibits and fulfilment of the needs of their users. This arrangement takes into consideration several aspects of museum management such as maintenance, administration and security. It also includes factors dealing with human behaviour and psychology. Further, the advancements in science, technology and the principles of mechanics are to be taken into account.

A museum has to have a wide range of rooms such as galleries, stores laboratories, work-shops, studios, library, auditorium, museoshop, cloak-room, information cell, toilets, board rooms and conference halls, temporary exhibition halls, offices and receiving areas etc. All these different types of closed areas are generally located under one roof and many of them are related to each other in function. So, the arrangement of these location needs meticulous plan to ensure efficiency in the function of the museum. Of course, it is the competence and adequacy of the staff that brings out efficiency in the functioning of a museum buildings. But the importance of the physical structure of the museum cannot be undermined. As quoted by Coleman[1] '*museum people take for granted that their work will go on regardless of surroundings, but without proper housing they cannot do the job as they should. A* ***functional staff is better than a functional shelter for it; but the shelter is none the less important in making the staff effective.*** *The future of museum work in all its branches rests heavily on the character of future museum buildings.*' It may appear to be an exaggeration of the fact, but it reflects the emphasis made regarding the importance of the utilitarian aspect of a museum building. Museum architecture was immensely experimented in countries like

[1] . Laurence Vail Coleman, *Museum Buildings*, V.1, American Association of Museums, Washington D.C., 1950, p.11.

Germany for a long time, before these countries established themselves for their excellence in professional practices and acclaimed an international reputation for the standard of their museums.

Reviewing the newly constructed museums (for instance as done by Bhowmik[1]) and periodical assessment of these projects ; coupled with professional seminars and discussions on this topic- would help to update the knowledge on this issue of considerable importance. Museological literature on architecture of the museums in India is scarce and sporadic ; and by no means continuous, consistent and exhaustive. Exception to this are the few articles written by individuals like - architect Charles Correa and museologists Mc Cann Grace Morley and Smita Baxi and a few others, occasionally. A monogram was published by the Museums Association of India, way back in 1971 is the only major source of literature exclusively devoted to this subject However, the concern for museum architecture is found from the earliest museum literature of the country right from the report of Markham and Hargreaves. Subsequently, Moti Chandra[2] expressed his concern on the need of a museum architecture suitable to the native requirements specially in a country like India with its vast geographic area and much varied climatic zones. Even the Central Advisory Board of Museums in its recommendations and resolutions voiced its concern about dilapidated buildings and the harm they cause to priceless and invaluable collections. Based on this recommendations some of the prominent museums of the country were renovated. (Details of this are given in the later part of this text) Government Museum, Madras is prominent among them for openly acknowledging the special assistance and the subsequent improvement it made in its appearance and functioning as a result of renovations. The museum authorities of that day published this fact through the publications of that museum and through other professional literature with illustrations about the changes made. Reviews or self-appraisals of this kind regarding any major professional activity undertaken by a museum are very important and highly desirable as they not only give an opportunity to share the museum's experience but also may prompt further development and experimentation on those lines and/ or in those areas.

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[1] . P.K Bhowmik, *Indo-US Sub-Commission workshop on Museum Architecture*, New Delhi,1993.

[2] . Moti Chandra, Museum Architecture, *Journal of Indian Museums*, Museums Association of India, New Delhi, pp.42-46.

A typical gallery looks like a long, narrow closed corridor.

A make-shift arrangement for a meeting in the Key Gallery of Prince of Wales Museum


'उन्नत पर्वतमाला और पुनित भूमि'
Inauguration by His Holiness The Dalai Lama

With this outset, the author seeks to explain different internal areas of a museum building and their importance. Whatever may be the method of classification, the discussion on museum interior logically should begin with, exhibition halls or better known as galleries. The detailed account of the different types of rooms/halls in a museum and their associated matters is as follows:

Galleries:

These are the main exhibition areas in a museum where objects are displayed. These should be constructed according to the nature of exhibits and their exhibition requirements.

According to Coleman[1] ***'museum-made period settings for antique works of art are now ruled out by practically unanimous agreement among curators'.***

This point finds a mention in the following chapter also in another context. But, here it may be admitted that this is a disputable topic. What was agreed upon unanimously, nearly half a century ago in the museum profession seemed to have taken divergent views among professions with repeated review of the matter and varied preferences and the emergence of supportive opinions in favour of those changes. Whatever may be the reason, no more there is a uniform agreement regarding this practice existing all over the profession, though it may be stated that still a majority follow the old principle.

Another much debated futile point is about the ***dimensions of a gallery***. Though it is desirable to have some understanding regarding the basic principles, it is unnecessary to follow any suitable and ideal structure as a model. Some experts try to suggest ideal dimensions for the size of the galleries but there is no standard now that one should stick to regarding any fixed measures.

The above two points are examples of some of the nagging problems to museum personnel over the years when they need to work on the internal requirements of a museum building. The reasons for this are not far to seek. An average museum employee, not being an expert in the field of construction and not likely to have any specialised study or training on this

[1] . op.cit., Laurence Vail Coleman, p.150.

area, tends to ask several elementary and basic questions with regard to the requirements of these internal provisions in order to bring out the best desirable and possible results out of them. There could only be very generalised answers for such problems. Each of them should be treated as an individual case and solutions to be sought accordingly based on the needs, requirements and possibilities.

However, they should be proportionate to the size and number of exhibits going to be displayed in them. They should not be very small or very big or equal in size and shape. A huge hall with a few and small objects displayed in it *dwarfens* the objects and at times even the visitor also. So there should be some sense of proportion. A small gallery congested with innumerable and/or large sized objects is equally deplorable, as it causes *claustrophobic* effect.

As far as the ***layout of the galleries*** is concerned there are a few established patterns in vogue. These are linear, circular, T and H shapes etc. Every type has its own advantages and disadvantages. Each pattern is to be provided with some break away points and relief areas from the exhibition galleries. There should be flexibility in orientation of the galleries. The entrance and exit areas should be easily identified by the visitor. In linear pattern there should be a break after every three galleries in a row to make the visitor feel comfortable. There should be an exit area after a few successive galleries if the visitor likes to break or discontinue the museum visit.

There should be an alternative path if a gallery in a linear pattern needs to be closed down for public view for any reason. The circular pattern forces the visitor enter and pass through the central portion repeatedly unless the galleries are interconnected. Rigidity of some kind is experienced with the layout of the galleries of the National Museum, Salar Jung Museum and to a lesser extent with the Prince of Wales Museum.

According to Coleman,[1] 'the main floor, it is now generally agreed, should have the principal exhibition space. In many recent buildings this floor is at sidewalk level or not more than two or three steps above it.

Steps to the main exhibits, whether they be outdoor or indoor steps are not good for several reasons. If placed outside the building, they may be

[1] . op.cit, Laurence Vail Coleman, pp.112-118.

hazardous in bad weather and are ever a barrier, especially to elderly and handicapped people.

Changes of level on an exhibition floor are a source of much difficulty. They may cause difficulty when material is moved from one part of the building to another, and also they may be hazardous for the public. Each exhibition level should, insofar as possible, be in a continuous plane throughout its extent. This may be a point of contention between architect and building committee, because changes of level are sometimes helpful to the designer.

It has always been assumed that floor planes would be horizontal as well as continuous. But architect Frank Lloyd Wright has designed a building for the Guggenheim Museum, New York which will have the exhibition floor ascending in a continuous spiral at a grade of seven inches in each 40 feet. This surely does not offer bodily hazards or obstacles to movement of things; and the grade may be, as predicted, quite unnoticeable.

Where exhibits require more space then the ground floor provides, exhibition space should extend to the second floor rather than to the basement. This arrangement lends itself to developments in exhibits, as noted below; and it is supported by the fact that the basement is usually overcrowded with other facilities. It is the floor for secondary exhibits, designed to serve students and other purposeful visitors.

If exhibits are on the ground floor only space above the ground floor is the natural place for the curatorial function with its need for taking care of expanding reserve collections.

Although exhibition and curatorial work are most likely to have space on the second floor, certain other functions may make claims at their level also. The library reading room too may be on the second floor.

Floors above the second are no longer considered entirely suitable for exhibition, nor are they redeemed for this purpose by elevators. It is a matter of observation that a sizable part of the visiting public will not ascend to a third and fourth floor of exhibits. *Science museums have sometime had as many as four floors for public space, with different branches of subject matter assigned to different levels; but this arrangement is hard on upstairs departments.*

Long, free-standing exhibit cases showing jute fibres at Indian Museum, Calcutta. Cases of this height are now discouraged as their utilitarian value is doubted.

Geological section at Indian Museum, showing a long series of uniform showcases. This type of arrangement though orderly, leads to monotony.

Exhibit furniture should try to become part of building by trying to merge with the interior surroundings. An ill-fitting showcase at a museum gallery.

Display arrangement at a museum gallery which leaves much to be desired in terms of pedestal, surrounding and the background.

Showcases directly built on floor and tucked into the wall.

-Not an ideal design for reasons of conservation and cleaning.

Floors above the second, by the inescapable logic of congestion at low levels, give the best place for study storage and curatorial work.

The basement, which is a story at least partly underground, is treated almost as the ground floor in many a museum of the past. The basement is the most congested part of the museum as a rule; crowded with everything except the main exhibits'.

Yani Herreman[1] stated, 'permanent exhibition areas have been a feature of museums ever since their origins. They too have evolved and a distinction may be drawn between two different approaches: the use of large open space, which offers the greatest flexibility by making it possible to change displays and that smaller fixed gallery like areas designed to house specific kinds of works. There is a third, intermediate approach that was first adopted by the Scandinavian countries during the 1960s, hereby a large space is subdivided in accordance with requirements of the exhibition, and small galleries are used for less bulky works'.

According to Coleman[2], 'exhibition furniture is not within the province of this discussion except as its purchase or design may fall to the architect or may effect the design of the building. Where the architect is thus concerned, as he is in some part of almost every building, he should have the help of the building committee's museum adviser.

Exhibition cases form the most important class of museum furniture. So, due thought should be given in conceiving and installing them, as they need to be in conformity with the design of the rooms and nature of collections.

Seats for visitors offer more opportunities than have yet been exploited. Though these are associated more with interior decoration than museum architecture per se, some thought should be given to the contents of the building as any unsuitable content of it may mar or distort its appearance and defeat its intended object or desired goal.

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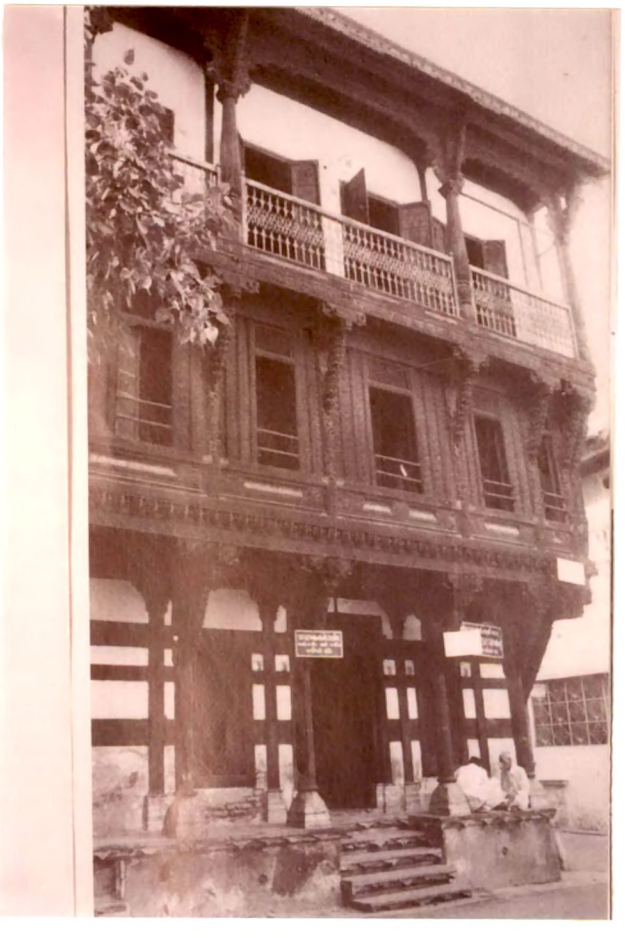
[1]. Yani Herreman, A new canvas for new creative talent: contemporary trends in museum architecture, *Museum*, v.XLI, n.4, 1989, UNESCO, Paris, p.199

[2]. op.cit., Lawrence Vail Coleman, pp.235-244.

Collections define the design of an exhibition gallery. The windowless Picture Gallery at Baroda.

State Museum Bharatpur - Jain sculpture in one of the niches of the ornate interior. (Courtesy - Museum, V. XVIII, n.4, 1965)

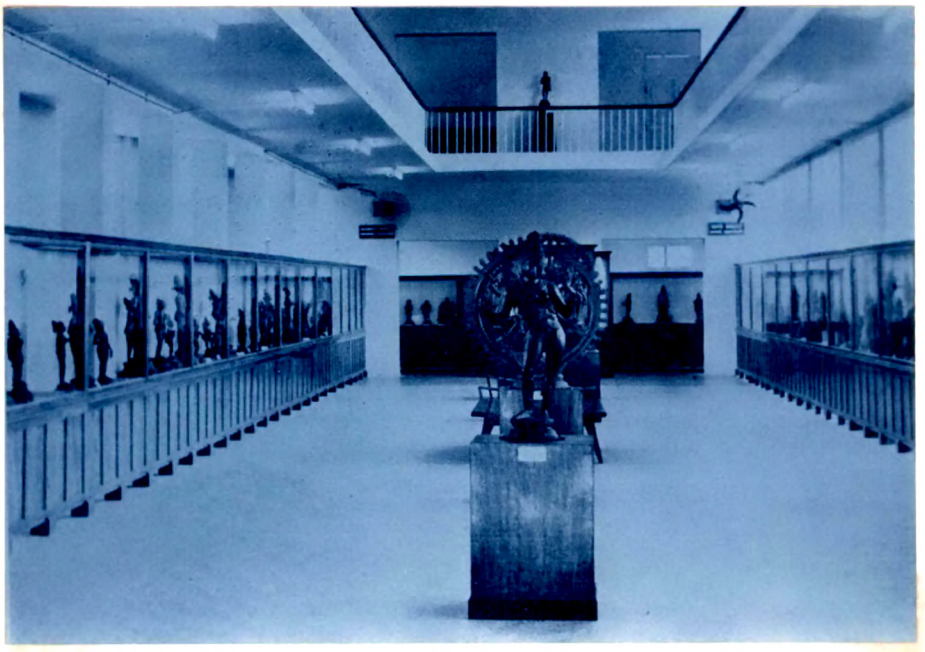
A recreated *haveli* from Gujarat at the Crafts Museum, New Delhi. It may give some idea about the spatial requirements of some exhibits. (Courtesy- *Museum*, v.XLI, n.4, Unesco)



Popular exhibits require special arrangements for viewing by visitors. Musical clock at Salar Jung Museum is one such exhibit that attracts tens of people for only a moment of time i.e. during its demonstration. Large crowds assemble in front of the exhibit around twelve o' clock everyday. Looking at the visitors' curiosity, Salar Jung Museum made possible arrangements for comfortable viewing. Besides provision of a few seats, it erected a shed for shade in the courtyard facing the exhibit.

Government Museum, Madras. Interior view of the Bronze gallery provisional installation; built in cases fitted into the deep bays on either side of the hall will provide more space and better grouping of the pieces, many of which are of the early, finest periods of bronze casting. (Courtesy- *Museum*, v.XVIII, n.4, Unesco)

Miniature Gallery at the Prince of Wales Museum. The museum is especially famous for its miniatures. They are installed as a study research collection until the presentation can be modernised. (Courtesy- *Museum*, v.XIX, n.4, Unesco)



Curatorial equipment required in live storages for the accommodation of collections, may consist of shelves, stacked trays, cabinets, picture racks and perhaps other kinds of special furniture'.

According to Hebditch[1], 'it is an usual practice while planning internal areas to 'start an examination of the spaces needed by reference to the exhibition galleries. There are a number of dangers in this. First, it leads to the presupposition that the museum is designed around the exhibition. Second, it is assumed that other spaces are less important. Third, that what is inappropriate for public view (such as ducting and services) can be pushed into the 'less important' spaces'.

Discussing about Museum and Art Gallery, Chandigarh, Grace Morley[2] stated, 'the individual percentage allocated to collections and exhibitions will vary according to the scale of collections and their importance.

Indeed, the arrangement of exhibitions of relatively small-scale works of art in the galleries was very difficult, and the success achieved merits recognition. The designer at this museum has countered the architect's pedestals of rich woods, and by use of handsome cases and screens. (this situation of appointment of a renowned designer to decorated the interiors arose with the sudden demise of the architect of this building)This resulted in a built-in series of panels to provide a gallery of reduced scale with its small dimension and minute detail'.

According to Molajoli[3], 'naturally, every type of collection, every kind of material, every situation has its own general and individual requirements which will considerably influence the structure of the building and the form and size of the *exhibition rooms* and related services. It is no use attempting to present a series of archaeological or ethnographical exhibits, whose interest is chiefly documentary, in the space and surroundings that would be appropriate to a collection of works of art, paintings or sculpture of great aesthetic importance ; nor is it possible to display a collection of

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[1] . Max Hebditch, The management of premises, *Manual of Curatorship*, Butterworths, London, p.499.

[2] . Grace Morley, Chandigarh Museum, *Museum*, v.XIII, n.4, 1970-71, Unesco, Paris, p.292.

[3] . Bruno Molajoli, Museum Architecture, *Organisation of museums- a practical advice*, Unesco, 1960, Paris, pp. 147-148.

small works of art, such as jewellery, small bronzes, medallions, miniatures, etc., in rooms of the size needed for large objects of less meticulous workmanship, which require to be seen as a whole and from a certain distance.

Even a picture gallery cannot be designed in such a way as to serve equally well for the exhibition of old pictures and modern ones: for, apart from the fact that aesthetic considerations recommend different settings for the two groups, it is obvious that a gallery of old paintings is comparatively 'stabilized', whereas the appearance of modern gallery is to some extent 'transitory,' owing to the greater ease and frequency with which additions, changes and rearrangements can be made'.

Molajoli[1] further commented about the features of *'Exhibition rooms'* as, 'A museum in which all the rooms are of the same size becomes very monotonous. By varying their dimensions and the relation between height and width - and also by using different colours for the walls and different kinds of flooring - we provide a spontaneous and unconscious stimulus to attention.

Monotony also results when a number of rooms follow one another in a straight line. Even where this cannot be avoided, entirely, the rooms should not be constructed such that the doors of them are not opposite one another, providing a 'telescopic' view through the building. An uninterrupted prospect of the long route ahead is usually found to have a depressing effect on visitors'.

Regarding *'Gallery'* Moti Chandra[2] stated, 'the galleries in the museum should be so designed as to provide maximum wall space for exhibition purposes. The breaking up of wall areas by windows, arches or pillars should be avoided. Ceilings should not be raised to unnecessary heights. Speaking of the buildings it is so high that the cases in the galleries seem to get lost into the vacant space above; this all leads to much waste of space.

In planning the galleries the control and convenience of the public must be considered. The layout of the gallery should be such as to avoid obscure corners, passages and small rooms as adjuncts to main galleries. The

[1] . op.cit., Molajoli, pp. 162.

[2] . op.cit, Moti Chandra, pp.45-46.

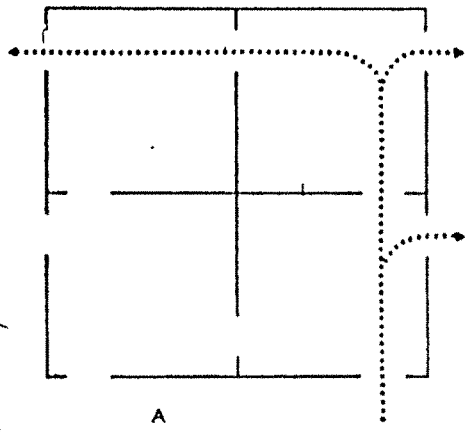
convenience of the visitors depends upon their facility of movement. They should be able to move from one gallery to another and see the display on e floor of the building without any obstruction'.

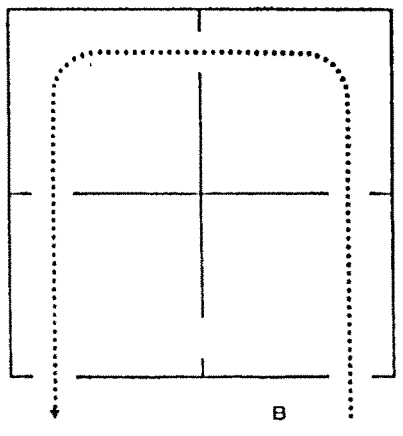
Describing the requirements of 'Exhibition Hall' Bose[1] stated, 'although there are some basic differences in requirements of museums of different categories such as museums of art, archaeology, folk art or science museums it would be better to discuss at first the common feature in a museum building. Every museum building should have halls of display of exhibits- the exhibits may be widely different in size, shape and bulk. A science museum usually has heavy and bulky exhibits, such as an aircraft engine, a tram car, a road roller, a fire engine, etc. This would require a spacious and wide hall so that visitors can go round the exhibits. The same analogy can be applied to a museum of archaeology where also objects are at times heavy and bulky. In the art museum a different system of display is followed - the pictures are hung from walls - although sometimes tubular stands could also be used in the centre of the hall and the pictures can be hung from them.

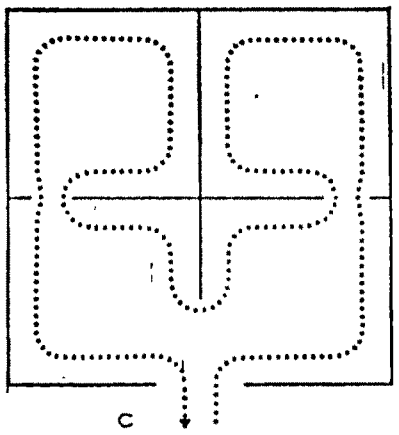
In a museum of natural history where dioramas are extensively used the wall spaces are always profitably utilized. Generalization is seldom possible. However, one can always say that a large rectangular hall is suitable as an exhibition hall and to make a maximum utilization of the wall space windows are to be fixed not at the usual height of two and half to three feet but at 8 to 9 feet level'.

Further mentioning about 'Hall For Temporary Exhibition' he stated, 'apart from the museum hall or gallery where exhibits are on display and which is usually permanently set up or changed at long intervals, there is a necessity of having a hall or space specially earmarked for exhibitions of a temporary nature. The purposes of temporary exhibitions are manifold. A temporary exhibition may be arranged to mark a special event, such as to observe the anniversary of the discovery of a scientific phenomenon. Science museums usually organize temporary exhibitions to portray the recent advances in a particular technology, say exhibition of domestic electrical equipment, cutting and welding techniques, etc. At such exhibitions demonstrations of new techniques and equipment introduced by the manufacturer but also of educating the students and the general

[1] . A. Bose, Planning a Building for a Small Museum, *Small Museum*, Museums Association of India, New Delhi, 1975, pp.67-68.







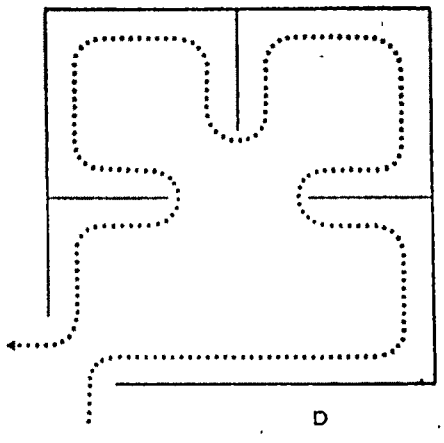
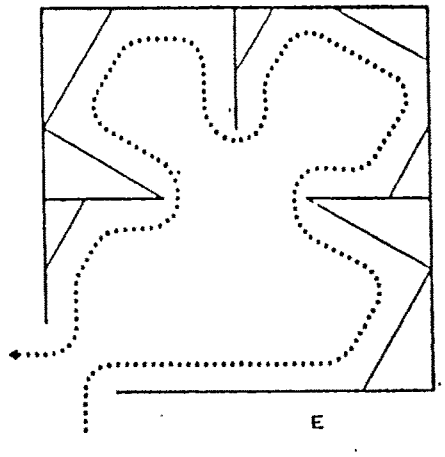


DIAGRAM OF ARRANGEMENTS THAT GIVE: (A AND B) FREE CIRCULATION BUT PROBABLY POOR COVERAGE, (C) COVERAGE AT THE EXPENSE OF MOVEMENT, (D) A COMPROMISE FOR CIRCULATION, COVERAGE, AND POSSIBILITY OF SEEING EXHIBITS IN LOGICAL ORDER. LAST ARRANGEMENT (E) IS A DEVELOPMENT OF SCHEME D FOR EXHIBITION



Botanical Section at Indian Museum. Circulation of visitors in a gallery should be a matter of serious concern in the layout of a gallery. It should keep in mind the anticipated attendance figures and visitors inflow to the museum; and the occupancy capacity of a gallery

A directional signage at Salar Jung Museum . Arrangement like this helps literate visitors to find the path.

A modified circulation area at Salar Jung Museum. Visitors who inadvertently reached upto that point are seen flouting the suggested alternate route with impunity because of their reluctance to retrace their steps.


WAY TO ROOM Nos
3 To 7

public in the use of new technology. Sometimes temporary exhibitions focus attention on a matter of topical or national interest. Holding an exhibition on 'Energy' now, would stress the rapidly dwindling traditional energy sources and the necessity of inventing and harnessing other types of energies. Most museums will have important exhibits in their reserve stores. There is no reason why periodically an exhibition cannot be arranged utilizing the reserve collections of the museum'.

Circulation:

The *act of moving in a closed path* is the meaning of circulation. This also could be planned as part of architectural scheme. In planning museum building the course of movement of visitors, staff and the objects is to be preconceived and the different areas of a museum has to be built as per the envisaged requirements. This should take into account the physical and mental limitations of a visitor, his psychological reaction in a new indoor atmosphere etc. The gallery layout should be such that the visitor should be introduced to the subject or the theme displayed in the museum and gradually carry to the further details of it. An `orientation gallery 'to that effect is existing in the National Museum of Natural History whose theme is basically environmental education though it touches upon a few allied aspects of contemporary concern related to life sciences having an immediate affect such as pollution, wildlife, energy resources etc. Similarly, the Prince of Wales Museum has a `key gallery 'at the entrance hall giving an idea of the different galleries inside the museum along with a ground plan showing the layout of various sections indicating their location. But, this sort of arrangements at museums in India are few and far between. Further, the adjacent exhibition galleries have to be organized in such a way that there should be some relevance in the subject displayed in them. Whenever, there is distinct change in the subject there should be some interval in the form of a passage changing the level, shape, size, lighting and colour of exhibition area, the gallery or the showcase; to make the visitors relax and prepare for the next topic in offing. This arrangement is clearly seen at Museum and Picture Gallery Baroda, where the ground floor is allotted to display mainly art and archeology and the first floor for the display of Natural History and Anthropology. Of course, the European Art section is a later addition to the museum and thus is away from the other two main exhibition areas of this museum. Similar arrangement or distinction is found in some of the leading museums of the country such as the Prince of Wales Museum, the Indian Museum etc. However, a similar pattern in a noticeable manner is missing at National Museum and Salar Jung Museum. The author considers this as a case

deserving special attention, for the reason that unlike Prince of Wales Museum and Indian Museum; National Museum and Salar Jung Museum are though multipurpose they only cover various disciplines of art subjects. Whereas the former two have natural history sections as well. To my belief and understanding, by looking at the way our museums are organised and taking into consideration the average viewing potentiality of an average museum goer, a conspicuous demarcation is desirable if not out rightly essential ; to make the museum visit more rewarding. One classic example that has practiced this to the fullest measure according to the author's opinion is Fateh Singh Museum at Baroda. No two galleries in this small sized museum are having the same wall colour. It goes without saying to any visitor that s/he has entered a new gallery as one becomes invariably conscious of the background shade. There is an argument by some experts against preconceived circulation in a museum on the ground that it restricts the free thinking and freedom of choice of the visitors movements.

According to Coleman[1], 'circulation, or the movement of visitors in exhibition space takes its pattern from the layout of the building; but how the visitors responds to the space arrangement may be affected by the exhibits and is ever influenced by a complex of human habits called visitor behaviour. *Routing, or precontrol of circulation*, seeks to take account of these factors in getting one or another desired result. It should be noted at once that a building may have excellent circulation without having good routing. Good routing promotes full and orderly coverage of exhibits by the visitor who yields himself to the arrangements made for his guidance; but under no circumstances should the routing interfere with free circulation of visitors who desire to move at will. Forced passage through a few rooms at a time is not objectionable, but a single unalterable route through many rooms (as through all the exhibits of certain large museums) is often exasperating.'

Coleman[2] further stated, '*In designing exhibition space, the architect should not fail to consider both the physical requirements of the types of material to be shown and bodily requirements of the visitor* '.

Routing:

Many museums follow routing to show the exhibits in a manner they want to show to the public or expect the visitors to see them. But the author

[1] . op.cit., Laurence Vail Coleman, p.144
[2] . op.cit., Laurence Vail Coleman, p.150.

feels there should not be any objection for a pre-planned circulation based on two clauses. One is that it should not be a rigid path restricting the freedom of movement of a visitor. Secondly, circulation may help the visitor in understanding the subject/theme displayed in a museum in a better way as the exhibits will be displayed in an orderly manner with a view to assisting the visitor to view them in a sequence and in an order of continuity ; let the exhibits be of different categories, subjects, styles, regions, dynasties, periods, themes, concepts, principles, classifications etc.

For example, Museum and Picture Gallery, Baroda has a circulatory route for the visitors. The guide lecturer taking the visitors on a guide tour in the museum normally follows this. Even the gallery attendants are seen showing the way to the visitors to the galleries expected to be seen first and informing them about the path to be followed subsequently. Further, the museum also has signages to guide the visitors, leading them to galleries. For example there is an arrow mark on the staircases leading to bird gallery. The Nehru Memorial Museum is an adapted residential bungalow with narrow corridors and small passages which are unusual with a purpose built museum. So, there are conspicuous arrow markings on the floor throughout the museum directing the visitors of the route to be followed. This arrangement is really useful wherever there is a labyrinthine route to be followed, as a visitor expects to be guided or assisted in the course to be followed or direction to be taken in his movement at a strange place.

The internal physical and climatological aspects of galleries have an important role to play. Like any other rooms a gallery also has walls, floor, and the roof. The gallery has to be properly lighted and ventilated also. The physical and climatological aspects of a gallery have a prominent role to play on the exhibits to be displayed in them and on the visitors that come to view them. The details of them are as below.

Floor:

This is an area that bears the exhibits or the showcases. And this is also the area over which the visitors walk. So it holds maximum weight and is exposed to regular wear and tear. It means that it has to be durable.

But at the same time it has to be aesthetically pleasant, in harmony with the surrounding things and try to be complementary to the other areas and exhibits displayed in the gallery. To fulfil all the above requirements, the

Kotah stone is a sought after flooring material as it is known for its durability, easy maintenance and good looks. But one should remember that it is slippery when it is wet. Picture shows a foyer laid out of Kotah stone.

The shiny but not glaring floor of the Prince of Wales Museum.

choice of construction material should be ideal. There are a wide range of flooring material and tiles available in the market. These material should have long lasting, easily washable, non-slippery and sound-deadening properties. As far as tiles are concerned they could be of ceramic, granite, mosaic or marble. Mosaic tiles are used in most of the modern museums for the choice of colours they offer along with many other criteria they fulfil. The National Museum, Delhi has pink coloured tiles matching the tone of the red sand stone of the building in the galleries and corridors, whereas its stairs are built of black granite stone. Overall, it has an appealing floor. Similar is the case with the Museum of the Department of Museology at Baroda where colour and design of the tiles chosen perfectly blend with the overall colour scheme of the building . Even a cursory glance at the interior of the building would reveal even to a commoner that the flooring material adopted for the construction of the building is in congruity with the surroundings. A poorly maintained cement floor was noticed at the Asutosh Museum (fig.) during the field work in 1990; when it was located in the Centenary Building of the Calcutta University. An extremely decorated floor of ceramic chips is found at the Lady Wilson Museum Dharampur. (This is what we normally found in murals today.) This is because of the reason that the museum is located in a former palace. Flooring of this kind poses two types of problems. Firstly, it competes with the exhibits for attention because of its exceptionally decorative nature and thus defeats the museum purpose. Secondly, it is difficult to maintain such a highly ornamented floor, made of small chips which wear out fast in a public building. Another modern museum with a strikingly impressive floor is the Lalbhai Dalpatbhai Museum at Ahmedabad The floor of this museum is made out of 'Kotah' stone, which is durable and easily washable. But, it becomes slippery when it is wet.* Prince of Wales Museum, Mumbai has a floor made of ceramic tiles, but the ninety year old museum is showing faint traces of chipping of the tiles which is a matter of concern to its authorities.

(*Though Kotah stone is known for its above mentioned advantageous properties the slippery character of the stone stated above has to be taken little seriously and with an element of caution. Although it is a known fact for the museum community here that the climatic conditions in this part (western region) of the country are dry and thus permit the selection and use of this material it may pose a danger to the visitors during monsoon and to the household staff during routine mopping. So necessary precautions and care have to be taken to safeguard any inadvertent mishap resulting from wet floor laid out of this stone. The author while doing this research work came across a few incidents of minor injury occurred to

Carpeted floor of a special exhibition area at the Prince of Wales Museum.

Striped tiles on the steps and other places give better grip and avoid any accident or injury

some elderly people who slipped on the wet tiles of bathrooms built out of Kotah stone.)

Apart from the tiles, wood, linoleum and carpet; form other flooring material of museums and galleries. Wooden flooring is expensive, difficult to maintain as it needs occasional waxing. Besides that it is noisy in nature, unless laid perfectly. But, still it is preferred in certain places like the painting galleries for its conformity with the collection, the rich texture it offers, its material elegance and for its hygroscopic property. So, one has to weigh the pros and cons, relate advantages and disadvantages involved with the use of a particular type of construction material. The floor of the European painting gallery at the Prince of Wales Museum is made of wood. Similarly, the picture gallery of Museum at Baroda is made of wood and is covered with linoleum. The choice of wooden flooring is followed all over the world for painting galleries. The National Museum of Natural History has wall to wall carpet in all its galleries. Carpet should be maintained moisture free, to avoid the growth of moulds and needs to be brushed and dusted occasionally. One principle to be strictly followed for its scientific reasoning is that, the colour of floor should always be darker to that of walls, so that it absorbs light.

According to Coleman[1], 'flooring presents not one problem but many. There are such different requirements in different parts of a building that even a very small museum may require several kinds of flooring and a large museum may have several kinds in exhibition spaces alone.

The flooring of exhibition rooms should be of good general appearance and of suitable color and tone; they should be of as much softness and resilience under foot (and hence sound-deadening properties) as their required resistance to denting and to wear will allow: and they should be as economical to install and maintain as other requirements will allow. Also they should be safe, otherwise children may slide and old people may feel their way along holding on to exhibits.

Color and tone of flooring is partly a matter of taste, taking the nature of exhibits and the desired general feeling into account. But there are also objective considerations which have to do with lighting. Glossy surfaces set up reflections. Too dark surfaces, by absorbing light, may cause contrast in brightness that interfere with seeing; and too light surfaces may

[1] . op.cit., Laurence Vail Coleman, pp.154-160.

also produce excessive brightness contrast. Floor should be a little darker than wall as a rule.

Desire for an enlivening touch has often led to the adoption of decorative floors with gay borders, geometric overall patterns and sometimes symbols - like the swastikas. Such embellishments take attention from exhibits, and tend to be troublesome generally.

Variety of flooring is good, and it is best achieved by change from room to room or from one department of exhibits to another, or from lobby or corridors to exhibits. This gives a wide range of possibilities. The following material can be employed for exhibition spaces: terrazzo, marble, slate, ceramic tile, several kinds of wood, linoleum and concrete.

Floor maintenance is an important consideration. Ease, effectiveness, and cost of cleaning, and durability of the wearing surface of a flooring are factors in selection. Manufacturers provide information about this.

Concrete floors, of either monolithic finish or topping finish, are low in cost and give good service, but they are hard, tiring, and noisy, and are not very good in appearance. Though used throughout exhibition space in many museums, concrete floor seems more appropriate for non public parts of the building which do not need other floor covering.

Terrazzo - a flooring made of small marble or granite chips bonded in a special cement, is in very wide use. Durability and ease of cleaning make terrazzo especially useful under heavy traffic, as in lobbies, central halls, and corridors. It is rather noisy, but pleasing in appearance and capable of finish in a variety of ways. In a small museum it is not tiring if used throughout public space.

Terrazzo should not be highly polished. Being unaffected by moisture, terrazzo is excellent for entrances, and also for toilet rooms, some kinds of workrooms, and cafeteria.

Marble, a material of beauty and durability, is much used in lobbies and corridors and for stairs, but it is not favoured in exhibition rooms because of its light tone, it shininess and the noise fatigue it sets up and its top cost. It is very slippery when wet, and though easy to keep clean, it tends to develop a gray film.

Ceramic tile of various kinds is used in museums. Tile flooring, though easy to maintain, is cold and hard. Also, tile is too noisy even for corridors, but for washrooms and closets it is very good. Ceramic mosaic is commonest, and is available in a great variety of forms and colour.

Linoleum is a common flooring in use. It is serviceable, resilient and silent, cheap to install and easy to maintain. It comes in various colours and shades. Linoleum dents under case legs. Some museums use linoleum only in rooms without cases or only in place where traffic is less. Linoleum can be used in offices and curatorial spaces.

Wood floors though fairly hard, wood is springy and accordingly silent if properly laid. Under heavy traffic, as along lines of thoroughfare in large buildings, wood is difficult to maintain and may even wear to the point of splintering; but under ordinary demands of service it is of too much trouble to maintain, when waxed, wood is glossy and of good appearance, but it need not become slippery or too shiny'.

Regarding floors Coleman[1] further stated,

Floor loads- that is, the live loads for which the floors of any building must be designed-are specified by building codes in minimum pounds to the square foot. These usually run from 70 pounds for office buildings to 250 pounds or more for heavy-storage warehouses, with intermediate requirements for other public and business buildings according to the nature of occupancy. In museums the minimum requirements of the code should not be the sole guide, since live loads vary with changes in use of the building. Probable loads should be calculated as accurately as possible, and provisions can then be made for any predictable excess loads at particular points. Thus, for example, in a museum of industry planning installation of heavy machinery, perhaps with movable parts, it may be found necessary to provide at some points for loads of 500 pounds, or perhaps considerably more, to the square foot ; whereas in many a museum the weight of expected visitors may be the principle live load on which to figure. Floors, and perhaps *roof*, design should not overlook the possibility of suspended loads of exhibits. In general, a minimum of 150 pounds to the square foot is a good figure to keep in mind'.

[1] . opcit, Laurence Vail Coleman, pp.223-224.

Expressing his opinion on *'floors'*, Molajoli[1] stated as, 'the choice of flooring for a museum is a matter of considerable importance, since the chief physical effort demanded of an attentive visitor will consist in much walking to and fro and standing about. *The nature of the floor may have its influence both on the fatigue of visitors and on their degree of concentration.*

Furthermore, the colour and texture of the floor must be such as to set off the exhibits. Generally speaking, the floor should be darker than the walls, with a reflecting capacity of less than 30 per cent. This is because a white marble floor, for instance, which has a reflecting capacity of about 50 per cent, will refract light on to the pictures, especially those in dark colours, and thus impair visibility.

Two other points to bear in mind- when selecting a type of flooring, are durability (i.e., resistance to the wear and tear to which the floor of the average museum is exposed, with the resultant danger of creating dust which is harmful to the exhibits), and maintain requirements (ease, efficiency and the cost of cleaning, and the time required for it).

The principal characteristics of the various types of flooring and their uses in a museum are as below :

Concrete floors- These are among the most economical, but also among the most common and undistinguished ; they are easy to keep in condition if polished by rubbing over with carborundum ; they do not absorb damp ; they are hard, noisy, and unattractive in appearance, especially if light coloured cement is used ; they are not very suitable for exhibition rooms, but may be used in parts of the museum not open to the public.

Stone and marble. These are always appropriate, though they must of course be chosen to suit the individual case. They are shiny and resonant, but these drawbacks are balanced by their beauty and decorative value- though these qualities make it preferable to reserve certain strongly marked marbles for stairs and corridors and to use others, quieter and more uniform in colour, for the withdrawn atmosphere of the exhibition gallery.

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[1] . op.cit, Bruno Molajoli, pp.168-169.

Wood. This may be of various qualities and cuts, according to position; if well bedded in a concrete base it is not resonant, though fairly hard; maintenance is difficult since wax polishes may make it too shiny and slippery, although synthetic varnishes are easier to use and keep in good condition. Certain of its characteristics make it very agreeable for exhibition rooms, as its colour is pleasing and tones in well with the works of art, and it is warm and comfortable to walk on.

Linoleum. Frequently used and easy and economical to lay; linoleum's pleasant appearance, yielding surface, silence and easy upkeep render it useful even in a fairly busy museum'.

Satya Prakash[1] stated, 'Chip or cement floors are the best for a small museum. The cement surface may be painted with gray floor enamel to lay the dust'.

Walls:

This is the primary exhibition area in a museum, displaying a majority of objects either directly on the wall or in exhibit cases built into the wall or providing space for majority of showcases with their backs against it. So the wall area should be free of windows at eye level as it is a loss of exhibition area. The colour of wall should be lighter in tone compared to the floor, so that it reflects light.

In natural history museums and galleries it was believed there should be a special provision for space in the walls for construction of dioramas. (But as there is an increasing shift in global trend from collection to communication orientation, this concept at present is not as relevant as it was in the past).

A minor provision to this effect, is found in most of the museums having natural history and anthropological collections. Museum and Picture Gallery, Baroda; Prince of Wales Museum, Mumbai; Lady Wilson Museum, Dharampur; are some examples of this which have impressive dioramas.

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[1]. Satya Prakash, Small Museums : Building and Allied Requirements, *Small Museums*, Museums Association of India, New Delhi, 1975, pp.13-14.

The State Museum, Lucknow is also familiar for its dioramic exhibits. The National Museum of Natural History which is in a rented building adapted its galleries to the needs of museum by having false walls made of ply wood to accommodate dioramas.

According to Coleman,[1] '*walls are sometimes surfaced with wood, with or without finish, for a special purpose.*

Mural paintings: In science and history museums it is usual to make mural paintings contribute to the exhibition story'.

Coleman further stated, 'exterior walls are no longer put up as protection against street mobs, and they do not need to be designed as masonry fortifications.

Exterior walls must be adequate as defenses against the weather, however. For this the usual construction is in two main layers- as outer impervious skin of brickwork and exterior facing material, and an inner pervious layer of hollow terra-cotta tile and interior finish- the two layers separated by a damp-proof layer and sometimes by an air space as well.

Heat insulation in walls, provided primarily as described above, is greatly increased by the presence of an air space between the outer and inner layers. Cork and other insulating materials used to be employed extensively, but a cavity wall with its air jacket is now common construction. Outside walls must be designed against any possibility of heat transmission such as would bring about condensation behind display cases or pictures placed against inner walls ; and they must also do their part in maintaining desired temperature conditions, and in thus easing load of air conditioning plant. However, heat leakage - inward and outward according to season- may not be through walls as much as through the roof and light openings, which must also be sufficiently tight fitted and insulated.

Facing walls is in stone as a rule, although brickwork facing with stone trim is common and some other materials are in use'.

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[1] . op.cit., Laurence Vail Coleman, p.151.

Morley[1] commenting on the *interior walls* of the Museum and Art Gallery noted, 'only in the contemporary painting section, where large-scale paintings in the collections are shown, has full advantage been taken of the noble proportions of the lofty unbroken wall and columns of the building, as Le Corbusier has designed it'.

According to Molajoli[2], 'the treatment of the walls can do much to make the rooms pleasant, varied and serviceable and to set off the exhibits, especially in art galleries, where appearance is obviously of particularly importance.

Materials and colours play the chief part, and it is difficult to make any suggestions on the subject, as their choice must be decided by the taste and judgement of the designer.

In theory, and always allowing for the nature of exhibits and the general aspect, it may be said that the larger the room and the greater the wall space, the lighter should be the colours used on the walls. *To avoid monotony, large surfaces may be treated with stucco.*

Dead white or neutral tinted walls are going out of fashion. Their popularity was based on the presumptions that white was equivalent to the absence of colour and consequently allowed paintings, whether ancient or modern, to reveal their tonal qualities entirely untrammeled. In actual fact, any colour darkness when seen against the background of a white wall ; and the colours, patina and lowered tonal contrasts of old paintings are particularly liable to be affected in this way.

It should be remembered that, whereas in a private house the ideal wall colour is usually one which refracts the light, *a museum*, on the contrary, *must use colours that absorb light, if good visibility of the exhibits is to be assured.*

A judicious use of colour in the background can go far to bring the general atmosphere of the room into harmony with the works displayed, provided the walls do not compete with them in tone or intensity. Furthermore, even a slight variation of the colours used in successive rooms helps to

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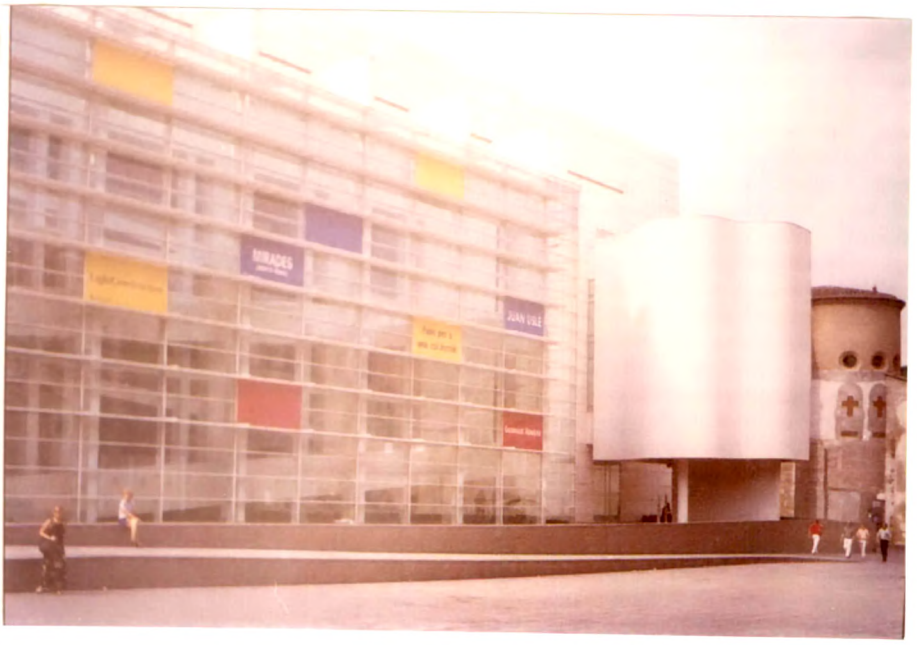
[1] . Grace Morley, Chandigarh Museum, *Museum,* v.XIII, n.4, 1970-71, Unesco, Paris. p.292.

[2] . op.cit, Bruno Molajoli, p.168.

The museum's broad plate-glass frontage looks out on the Place dels Angels - Contemporary Art Museum of Barcelona.

The Museum of Contemporary Art (MOCA) in Los Angeles, designed by architect Arata Isozaki in 1986.
(Courtesy- *Museum International*, v.49, n.4, Unesco)


IMAGES
JEAN DUBUFFET

compensate for uniformity of size and shape or for any inevitable inequality in the distribution of light.

Where the walls are excessively high in relation to the size of the objects displayed, they may be colour-washed only up to a certain height, leaving the rest white, like the ceiling'.

According to Burns,[1] 'smooth, even wall surfaces are preferable to heavy textures in stone or rustic wood. Plaster walls should be painted in neutral and pleasing light tones with a dull finish oil or Casein paint so as not to produce glare or distract from the exhibits. The same wall colour is often used throughout the exhibit room and is invariably darker than the ceiling but each separate room may have a different colour to avoid monotony'.

Colour:

Describing about the treatment of walls at Museum and Art Gallery, Chandigarh, Morley[2] commented '*colour as well as light was expected from the first to play a part in the space creation than the architect sought for the interior of his building.* Le Corbusier did specifically draw up plans for color to be used on (parts of the ceilings) and on the inside of the four walls, enclosing the principal exhibition space on the first floor. The space was so planned as to provide separate exhibition areas, but there are *no dividing walls'.*

The installation was rich, handsome and decorative. The space of the interior seems to have been somewhat overwhelming and there has been a tendency to diminish it, in favour of a more cozy effect. It must be recognized of course, that Le Corbusier's creation of space with in the building, of its flow from area to area, and his use for the interior of full walls respectively painted in white, yellow, red and black, results in an abstract composition of great value and overwhelming power but is not an easy setting for exhibiting art.

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[1] . Ned. J. Burns, *Field manual for museums*, United States Government Printing Office, Washington D.C., 1970, p. 44.

[2] . Grace Morley, Chandigarh Museum, *Museum*, v.XIII, n.4, 1970-71, Unesco, Paris, p.292.

Commenting extensively on various aspects of colour, Sinha[1] noted, 'by the middle of the 19th century, impressionist movement in Europe gave a greater importance to colour as an independent force than just as a means for achieving natural effects. This growing importance of colour was brought to an extreme by the painters of Fauvist School in the beginning of the present century, when colour itself was considered sufficient evoke human emotions and command aesthetic appeal even though being completely shorn of outlines or any kind of figurative endeavour. In India also, lately, the growing interest in folk art has given a similar stimulus to full colours in their own right. As such, the importance of colour gained a better recognition and now plays a vital role in display for creating general effects, atmospheric representation, aesthetic appeal and creation of proper background for all objects.

Material

All those working in museums agree that whatever colour may be given in a gallery it should invariably be of non-glazy substance for avoiding glare and giving comfort to the eyes of the visitors. In Europe varieties of materials are being used for this purpose such as plastic paper, plastic wood, raw silk, wire paper, Japanese glass paper, hessin cloth, pure silk, velvet and various kinds of oil and water prints. Two factors limit our choice for the selection of covering material. Firstly, some of these materials are not easily available. Secondly, plastic paper, silk or cotton fabrics, if applied on large areas, tend to peel off in the tropical climate of India. The high temperature and humidity would make it a difficult task for any covering material to obtain a strong grip on the walls. Secondly, all covering materials would be costlier than any kind of paint because replacement of any portion creates difficulties in case of the former, which is comparatively easy in case of the latter. It is not possible to avoid such replacements caused due to wear and tear or due to fading.

As such in countries like India paint is more suitable for walls but inside show-cases any covering material is equally convenient

It will always have to be borne in mind that a museum not only needs flat and non-glazy but smooth surface also which is absolutely necessary for dirt resistance. Distemper whether of water or oil-bound, though cheap,

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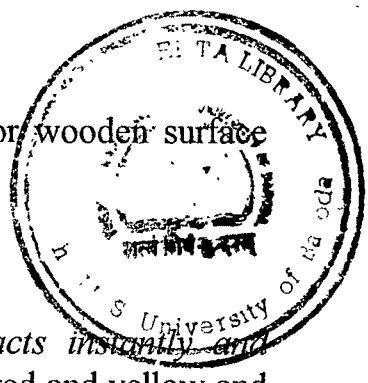
[1] . D. K. Sinha, Colour in museums, *Studies in Museology*, v.2,1966, Department of Museology, Baroda, pp.60-69.



neither can achieve very strong grip on the masonry or wooden surface nor is washable nor smooth enough for dirt-resistance.

Psychological effect of colour

Colour has warmth and coolness to which one reacts instantly and unknowingly. The reason is the human association with red and yellow and their variations with the heat of sun and fire right from man's appearance on the earth. Similarly, the blue and green colours recall, blue water and sky and green pastoral scenes and forests. *Obviously these reactions are only psychological and do not actually affect the temperature of the place.* Warm colours are therefore, more suitable for cold countries. Local conditions such as the position and directions of the gallery can also decide the type of colour to be used. Nature of art objects displayed can also alter the general arrangement. Of course there are certain intermediate colours such as lilac, cream, ash, etc., which are neither warm nor cool. Warm colours create an atmosphere of jubilience, stimulation, and dynamism, while cool colours create an atmosphere of quietness, restfulness and serenity. Similarly *warm and cool colours affect the height of the gallery as well. Cool colours make the room look bigger while warm colours make it look smaller.*

Position of warm and cool colours

Man has been accustomed to observe nature in a more or less fixed pattern where colours grade from dark to light. Ground is normally of heavier brown than the lighter colour of horizon and than further lighter on the sky. This pattern has created a taste of similar arrangement in the rooms and galleries as well by giving light colour to the ceiling and slightly deeper to the wall and still deeper for the floor, if a group of objects does not need otherwise. As such, the suitable colour scheme would be white for the ceiling, tint (a full colour mixed with white) for the walls and shade (a colour mixed with black) or muted colour for the floor. In no case it is advisable to use full colours for the floor. If we allow this pattern on a different intensity of giving tint for the ceiling, full colour for wall and shade for the floor, the arrangement may not be aesthetically suitable unless needed to meet the necessity of creating the atmosphere of a particular age. The discovery of the full colours asserting as an independent force has radically changed the aesthetic applications towards colour appeal. Objections for full colours put forward is its vividly, glare and chances of competing with the aesthetic appeal of the objects displayed. But if planned carefully its vividity can be useful for enhancing

aeshetic appeal of the objects and can create an atmosphere in keeping with the age of the objects displayed therein. *It is gratifying to find that the indiscriminate use of buff and grey is being given up in India also.* But the lead provided by the National Museum of New Delhi in this respect is yet to find adequate favour in other parts of India.

Reflectance value of the colour and its relationship with light

"when light is incident upon a non-fluorescent object or material, three things can occur. The energy can be reflected, transmitted, or absorbed, and usually all the three occur, but the proportion of each is different and is often different at each wavelength." (Burnham *et al*).

Spectral reflectance can be defined as the percentage of light reflected from a surface in proportion to the light falling on it. The higher the reflectance the better is the illumination of the room making it look more spacious. Different colours have different reflectance value and absorbing capacity. Light colours or the tints have higher reflectance value. White has the highest reflectance value measuring upto 80 per cent. But all cool colours need not necessarily have high reflectance value nor all warm colours have low reflectance value. Yellow, being a warm colour has higher reflectance value than green which is a cool colour. The approximate reflectance value of some of the colours are the following:

White- 85%, Cream- 80%, Yellow- 72% , Yellow-orange- 55%, Ash- 35%, Grey- 32%, Red- 15%, Maroon- 10%, Chocolate- 10%, Terracotta- 8%, Black- 5%

The Illuminating Engineering Society of New York suggests the following range of reflectance suitable for home-ceiling : 60 to 70 per cent; wall: 35 to 60 per cent; floors: 15 to 35 per cent. The problems in museums is different from homes. However, a combination of maximum prescribed for the above range may produce satisfactory results.

A room painted in white may be virtually bright but tiring to the eyes and tend to become monotonous if no other colour is used in the gallery. Painting Gallery of Charlotenberg castle at West Germany is an example of this arrangement. Yellow as a colour is too vivid and warm and needs special situation for its untinted use. When mixed with white its value is raised and the resulting cream colour is an intermediate colour neither fully warm nor cool. For ceiling it is not advisable to use any other colour except white specially in artificially lighted galleries since light reflecting

from a coloured ceiling may change the colour of the objects due to its tinged reflectance. Even otherwise a tint of any colour on ceiling would severely restrict the colour scheme of a gallery.

Some colours which are magnificent in day light may be dulled or undesirably changed in artificial lighting.

Colour Scheme

Before deciding a colour pattern for a gallery many factors have to be considered. The first question is the determining of the number of colours to be used in a gallery keeping in view that large number of colours may be distracting and may compete with the aesthetic appeal of the objects displayed whereas continued use of one colour may be monotonous, drab and results in museum fatigue. There cannot be any ready made formula of colour applicable to the galleries of all types, climate of the place, nature and type of lighting to be provided therein. Fashions and tastes also change according to the time, place and climate.

The importance of background was realised in the early thirties. But it had to play a different role. The ideal adopted was to display an art object in a completely neutral setting so that nothing should distract the spectator from his contemplation of an art object. It was soon realised that this rigid system of extreme neutrality was not only monotonous and adds to the museum fatigue but at the same time bars freedom of using a particular colour in keeping with the taste of a particular age. It should always be remembered that the nature of museum fatigue is more physiological than physical and cannot be solved by easy methods of providing only visitors' seats at frequent places in a gallery.

However, certain broad principles giving a clue to the criteria of colour selection in different situation can be formulated.

As already discussed, white is the only colour suitable for the ceiling. If the gallery is too high it is advisable to bring the white colour to the upper portion of the wall also to reduce the height of the walls. Of course this arrangement is not usually needed for the galleries provided with false ceiling wherein the walls are usually not very high. Provision of a 9' wide band on the lower portion of the wall, in the colour and continuation of the floor, is also advantageous in almost every situation. It conceals the stains and spots very often created on that portion due to constant touch of the shoe of the visitors and also reduces the heaviness of the ground colour by

cutting its impact of abruptness on the wall. (more than a matching colour of the floor, this provision should be made of flooring tiles, which would facilitate easy cleaning and maintenance.)

It is advisable to use two different colours on two separate walls of a gallery if colours of two groups of objects necessitate such an arrangement.

Special effects need a very detailed and exact knowledge of the art of a particular age. (Pink colour used in European palaces of medieval times is often used to exhibit European collection of Industrial Art in many museums all over. Fateh Singh Museum, Baroda; has a similar colour scheme in its central gallery, and the gallery lable makes a special mention about this preferential colour scheme, explaining the reason behind it.)

Individual emphasis through colour

This system provides a portion of the background having a colour absolutely different from the rest of the gallery for exhibiting an art object of extraordinary importance. It succeeds in attracting the visitor's eye immediately to the most important object of the gallery.

Conclusion

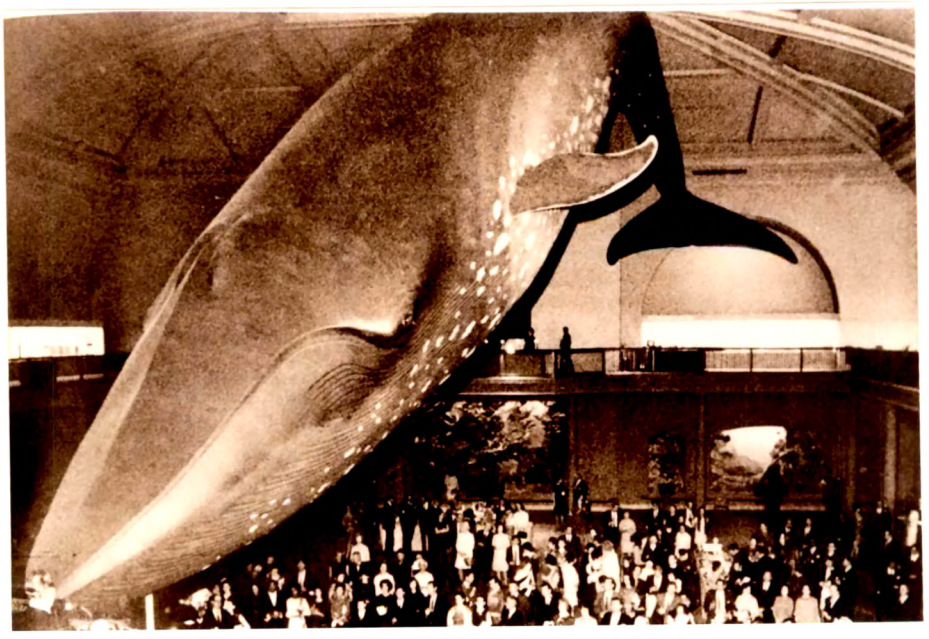
As already discussed no colour pattern is suitable to all circumstances. These colour schemes are only suggestive. Whatever the scheme may be, it should always be borne in mind that it has to play a positive role in the organization of the galleries by enhancing the aesthetic appeal of the objects as done in most of Dutch and Italian museums. It has neither to be neutral to the effective of the object displayed as done in most of the British Museums nor should it tend to complete with their aesthetic appeal as done in most of the museums in Germany. In the museums of India colour has already asserted its value and the days are not far when its potentials will be tapped to a great extent'.

The workers notebook of Witte Museum[1] gives the following notes on color, 'the day of the drab, grey and buff colored public buildings and exhibits is gone'. Color has come to the museum world but how to control it and who would do that are some of the moot questions to be answered

[1] . Witte Museum, *Museum workers notebook*, Texas, 1964.

Ceilings also form part of exhibition area (exceptionally), depending upon the exhibit needs.

An example of roof serving as an exhibition area, showing chandeliers. Jade Gallery, Salar Jung Museum. A vigilance camera can also be seen in the picture indicates the special security precaution taken to monitor the visitors movements in order to protect the precious collection.



by the museum profession. Some people have color sense and some do not. Many are color blind and do not realize it. Some have favorite colors and show definite preferences.

In preparing a museum exhibition a group of objects are brought together and then the question comes up ; what color background and accessories are desirable?

A good, interior decorator would have no trouble in selecting harmonizing colors and making a beautiful, modern exhibit . A curator or preparator usually does not have that color training . They could always refer to some printed authority of this subject to tell one color from another.

Ceiling:

It is the inner roof of a room. Even this is also an exhibition area with a few types of exhibits like lamps and umbrellas etc.(fig.). Normally the colour of ceiling used to be white to reflect the light. High roofs are needed for a few galleries to exhibit certain type of objects. The Whale Shark displayed in the natural history section of the Prince of Wales Museum is a case in point. High roof galleries such as the ones in the Museum and Picture Gallery can be utilized to hang or display large but light weighted objects in a suspended position (if the roof can bear the load), which could be viewed from the adjacent mezzanine.

Central room ceilings are a decorative architectural feature of some of the museum buildings. The Prince of Wales Museum has an attractive central dome (fig.). It needs adequate maintenance as was done in the case of this museum to protect it both externally and internally to keep it clean and free of pests. The main problem with a dome is the cleaning and maintenance of it, as it used to be located at an inaccessible height. Any damaged that takes place in the inside portion of the dome with cavities, will form a safe abode for the birds to build nests specially, by doves. A thin and strong wire mesh should prevent the entry of birds or other pests such as bats and squirrels to the dome and at the same time would not block the view of the fascinating structure. The successful renovation of the damaged dome of the Prince of Wales Museum in the recent past was considerably appreciated by the heritage conscious natives of Mumbai'.

According to Coleman[1], 'ceilings of exhibition rooms are usually flat. Acoustics are not much of a problem in exhibition room as a rule, partly because proper flooring absorbs *footfalls* and partly because exhibits help to break whatever sounds there may be. However, curved ceilings, as in central halls and some smaller rooms and corridors, may focus sound disturbingly'.

Coleman[2] further stated, 'the roof, as designed for most recent museums, is flat. In many an older museum the roof is pitched, and may have old-fashioned skylights set in its slanting faces (Picture Galley, Baroda has similar arrangement); but modern museums that have skylights at all, have them built on a flat roof.

Roof construction unless for exceptional purpose, anticipates live loading of not more than 50 pounds to the square foot.

Roofs are commonly of precast concrete slabs or patented roof slabs, set between intermediate beams and overlaid with several thickness of an impermeable membrane, topped with a concrete fill and tiles or gravel in pitch. Metal roofing has been used also. Drainage and weather-proofing are important. The roof surface should be laid to a fall for discharge of rain'.

Height of ceiling and pillars indicate the different areas and allow a flow of space from area to area, and "across-building " views. Empty, with only painted walls and ceilings, the building undoubtedly represented a masterpiece of organization of enclosed space, which could be considered a work of art in its own right.

Gilman,[3] on a philosophical note stated the following 'the word "roof" (yane) in Japan means "house-root" : i.e. as we may infer, the *constitute part* of a house'. He went on, 'a roof, not walls, constitutes a house. Sun and rain, not wind and cold, have forced men to build. Overhead protection alone may give all necessary shelter. The fact is registered in the free treatment of walls conspicuous in the architecture of the Far East.

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[1] . op.cit., Laurence Vail Coleman, p.153.

[2] . ibid., p.225.

[3] . Benjamin Ives Gilman, *Museum ideals of purpose and method*, Harvard University Press, Cambridge,1923, p.139.

In Oceania they are absent. In Japan they are removable. In China the pagoda derives from superposed umbrellas. Series of eaves arranged to give lateral protection appear in the blinds of Western houses. But no human shelter in any time or country lack a roof. Without an opaque and impervious covering an enclosure is not an interior but an exterior space, not a room but a court.'

Stairways:

According to Coleman,[1] 'stairways are present in some form, practically in every building. Flights of stairs should be arranged in a simple way that offers no unnecessary circulation problems.

The staircase must not provide a well for little boys to fall into. (The author has expressed his apprehension regarding the external staircases connecting the galleries at National Museum of Natural History.)

Public staircases are to be built in keeping with the lobby and corridors. If stone is required for steps, it should be of a kind on which wet shoes do not slip. Otherwise steps with friction treads may be adopted. (fig.)

There should be a grasp rail at each side of every flight of steps throughout the length of the flight. A middle rail is a nuisance.

Hand rails should not encourage sliding. Metal lugs in rails at intervals will prevent this quite effectively.

All stairways should have adequate artificial lighting. This means general illumination of the passage, and sometimes step lights as well. Natural lighting of stairways by day, regardless of other means, may be desirable.

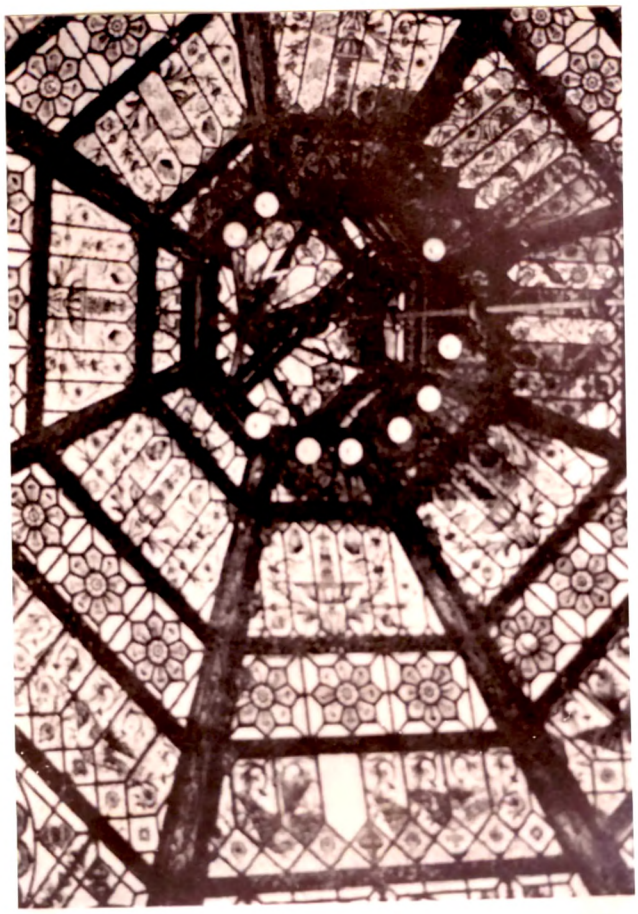
Ramps and *éscalators* may replace stairways and elevators in some future buildings. One of the former examples in this direction is the Wright design for the Guggenheim Museum, New York. This gave a building in which the exhibition space itself was to be a long spiral ramp.

Ramps and escalators have points for and against them. Both take up considerable space . Ramps are inexpensive in construction and operation, whereas escalators are costly to install and to run. For the present at least,

[1] . ibid., pp.227-228.

The Mysore Palace- Kalyanamantapa stained glass ceiling.
(Courtesy- *Museums and Museology*, Agam Kala Prakasan)

Tinted glass windows at Museum and Picture Gallery, Baroda

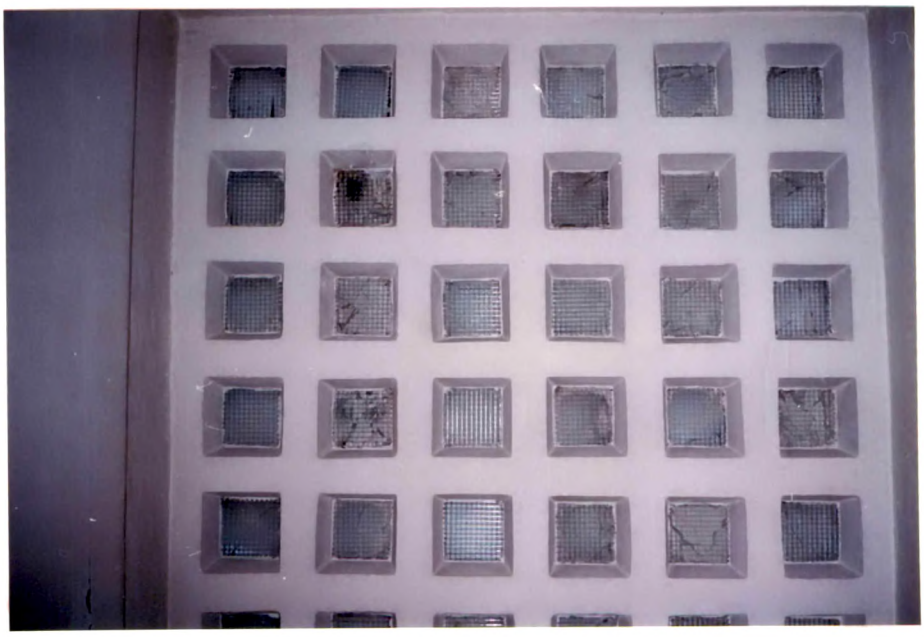



PICTURE GALLERY

The reinforced thick acrylic sheets covering the windows in the ceiling at a gallery in the second floor of Prince of Wales Museum, functioning as sky light.

Sky light at Bharat Bhavan, Gallery of Modern Art, Bhopal.(Courtesy- *Museum*, v.XLI, n.4, Unesco)

Architect Arata Isozaki's latest work, the Hara Museum ARC, is set in the mountains two hours from Tokyo. (Courtesy- *Museum News*, v.67, n.1, American Association of Museums)



Top-light in a studio

Louvers provide ventilation and outer view without allowing direct light and rain to enter an indoor portion. In a dark corner or in artificially lit surroundings, they provide a refreshing experience

Louvered and grilled windows

Even windows can be used as background for exhibits, specially to display transparent and translucent exhibits. Subdued light from a window being used as a background at Museum and Picture Gallery, Baroda to show glass paintings.

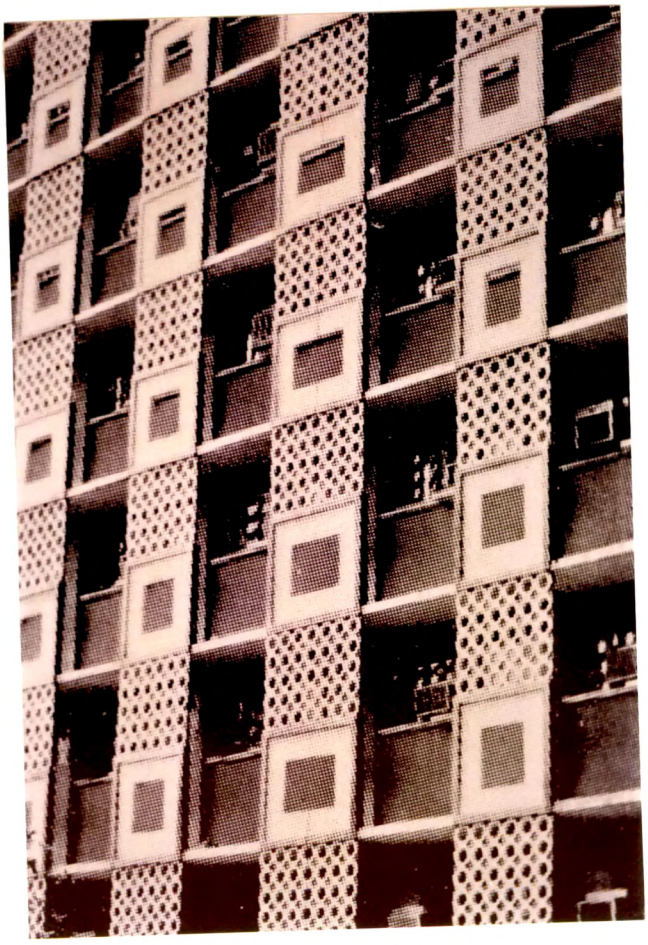
Natural light from above entering the Picture Gallery at Baroda

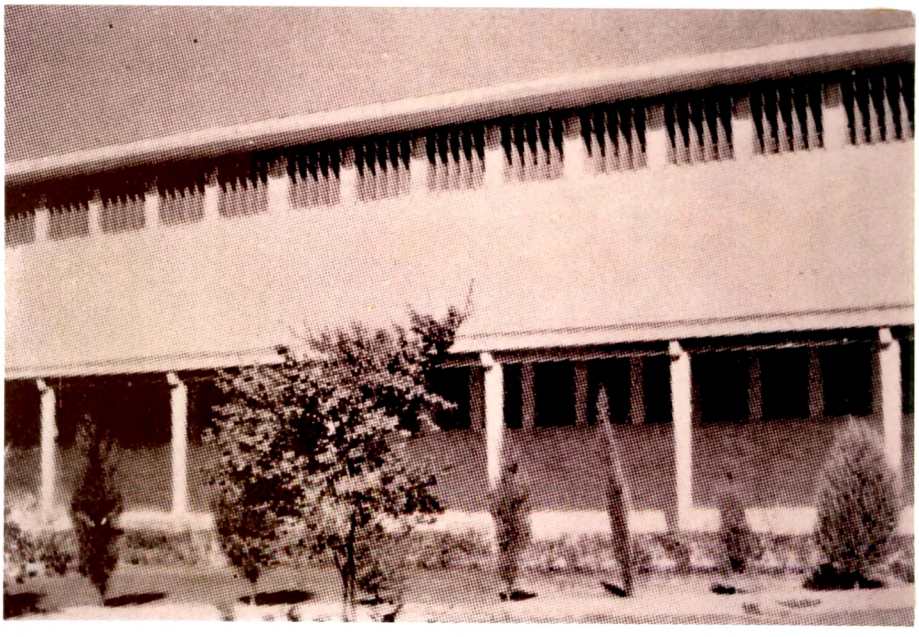
Interior view.

Vertical panels with pierced screen alternating with solid panels which shade the windows as well as the wall on the south and act as sun-shade.

Ground floor wall is shaded by a verandah while the upper floor wall is protected by the roof-projection as well as sun-breakers.

(Courtesy- *Conservation In Tropics*, ICC, Rome & National Museum, New Delhi)

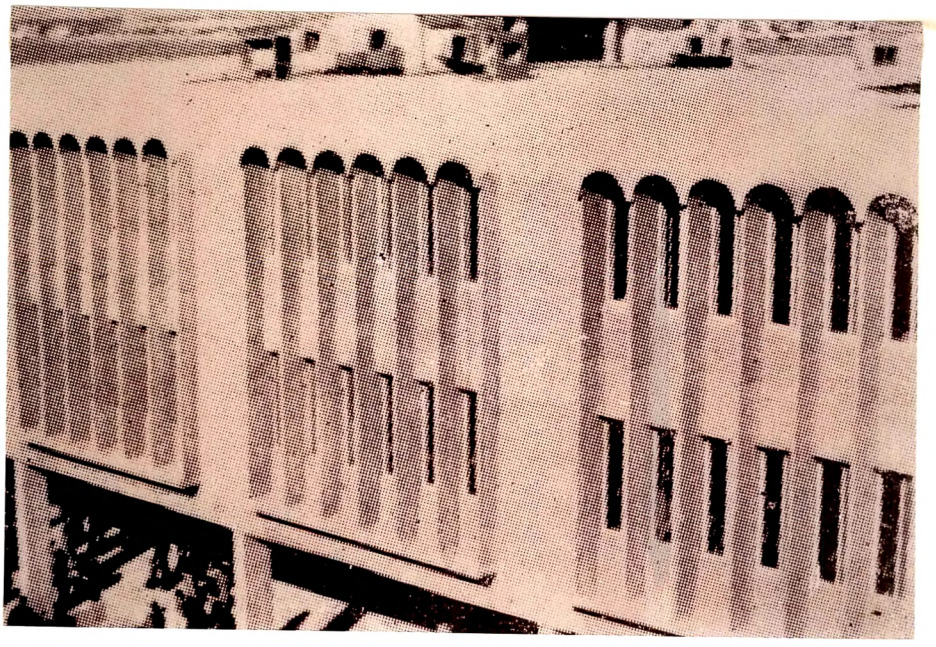


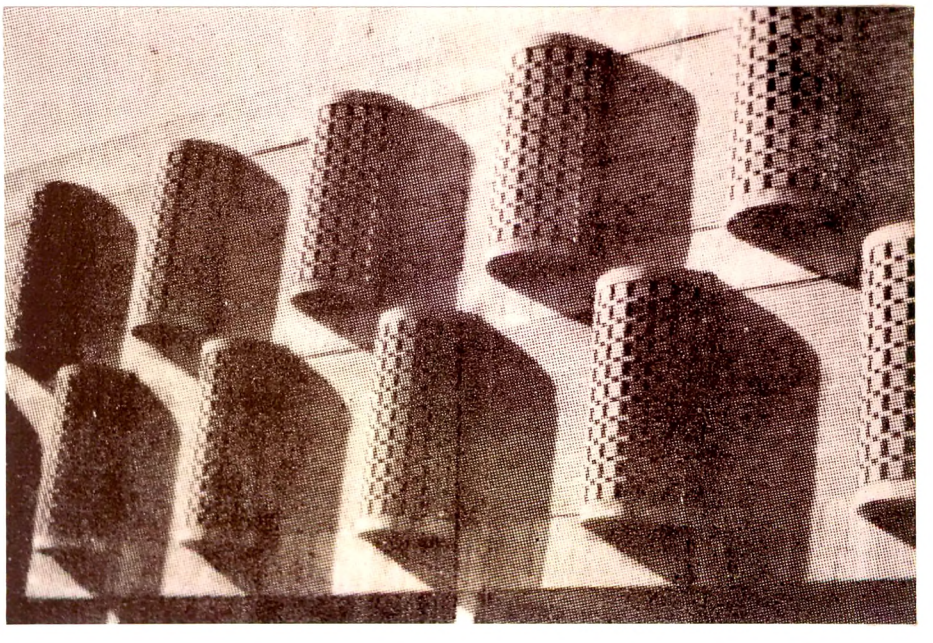


Tiny vertical windows protected by sun-breakers allow light but reflect glare.

Floor to ceiling semi-circular window-boxes enclosed with pierced screen allow breeze and light but keep away the sun from the windows. In shades the wall as well.

(Courtesy- *Conservation In Tropics,* ICC, Rome & National Museum, New Delhi)





Vertical and horizontal sun-breakers shade verandah and window openings.

Pierced screen shades the three-storeyed south wall in summer but allows low sun in winter.

(Courtesy- *Conservation In Tropics*, ICC, Rome & National Museum, New Delhi)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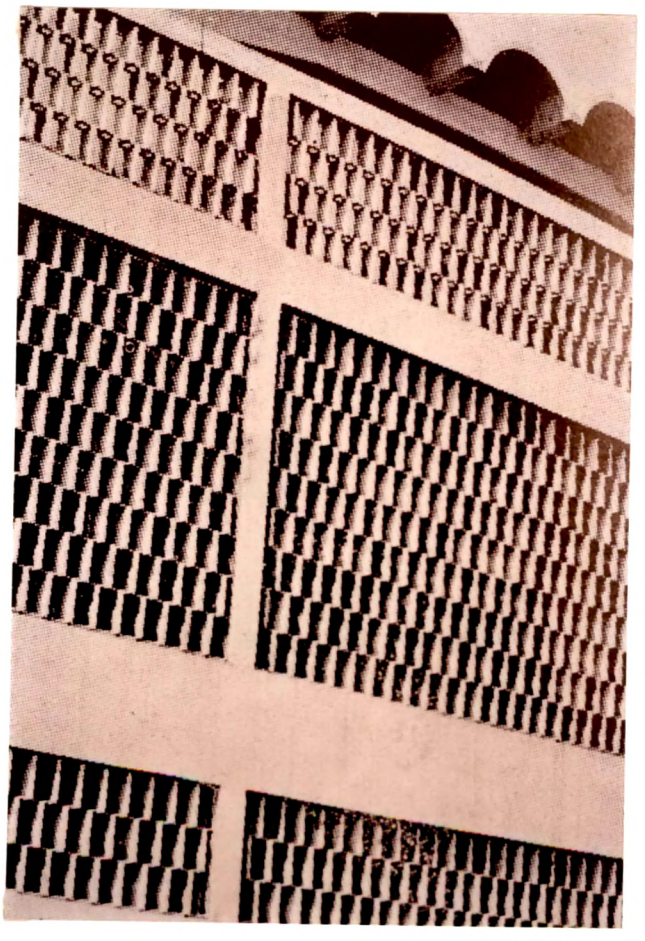
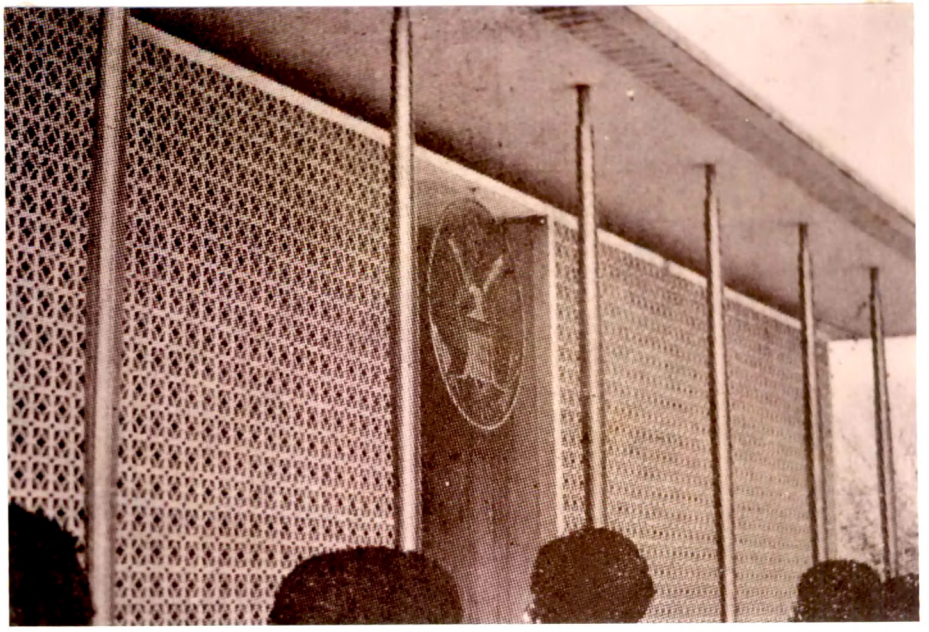
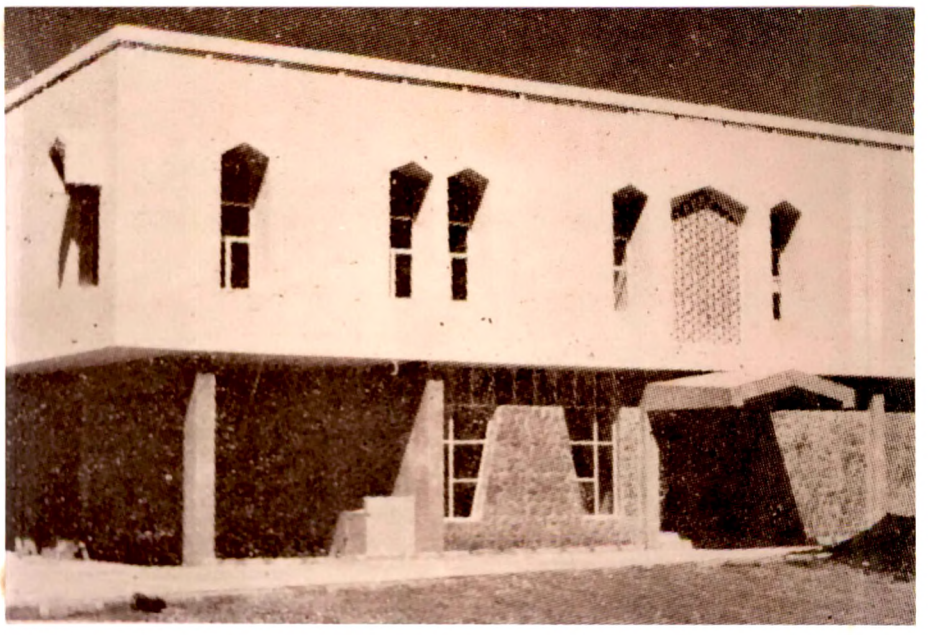


Wide roof -projection protects two-storyed wall from direct radiation. Pierced screen gives added protection from reflected radiation.

Recessed window openings prevent direct sun rays and provide shade.

(Courtesy- *Conservation In Tropics*, ICC, Rome & National Museum, New Delhi)





there is novelty in favour of both devices. Where enormous crowds must be moved something of the sort might even be a necessity. Ramps are silent. Escalators make noise, and they may perhaps be most appropriate in museums having live mechanical displays that set up their own commotion'. (National Science Centre is having an escalator.)

Morley[1] giving a description about this provision at Museum and Art Gallery, Chandigarh; stated, 'there are service stairways and a powerful lift for moving exhibition material'.

Light and ventilation:

Besides the physical aspects, the climatological aspects of a gallery play a vital role in the success of a gallery. Light and ventilation are the two main factors of climate within a gallery. Light is a 'necessity evil' in a gallery. Without light one cannot view the objects. At the same time light causes damage to a wide range of objects because of its inherent character of being photoreactive. It means light when comes into contact with a light sensitive object reacts with it chemically thereby damaging the object. All organic (carbon compound) objects are sensitive to light. According to Agrawal[2] the earliest experiments in this field were conducted by 'Russel and Abney in 1888'. So, looking at a century old experience and experimentation in this area, wherever possible, mixed light is considered as an ideal choice as it is both economic and appealing. An example of where the galleries are designed to exploit the natural light without causing harmful effects to the object is Fateh Singh Museum, Baroda. The architect, Dave designed high walls in the galleries with openings at the top which are covered by glass sheets. This arrangement would throw light on the opposite wall which in turn gets reflected and illuminates the galleries. But, here the construction cost for the high walls must have been more than that of a normal gallery. Two important functions of lighting in a gallery are to illuminate the exhibits and the passage areas of visitors. *There are three types of choices in this regard.* One is the illumination of cases which also throws some light into the passage area. But this situation makes the galleries look darker. In spite of that this is followed in certain galleries for its dramatic effect. An example of this situation is found in the pre-historic gallery of the Prince

[1] . Grace Morley, Chandigarh Museum, *Museum*, v.XIII, n.4, 1970-71, Unesco, Paris, p 290.

[2] . O.P. Agrawal, Technological developments and their utility for museums with reference to lighting, air-conditioning and security alarms, *Museum Architecture*, Museums Association of India, New Delhi, 1971, p.58.

of Wales Museum. The illustration shows the type of effect it gives (fig.) . The second choice is to light the gallery in such a way that both the visitors passage and the exhibits get illuminated. This pattern is generally followed in galleries displaying stone sculptures which used to be displayed on pedestals out of showcases. The third option is to illuminate both the visitors passage and exhibits separately (figs.). This is a common arrangement of light followed with the light sensitive objects as they cannot be illuminated by direct light or displayed closer to the light source.

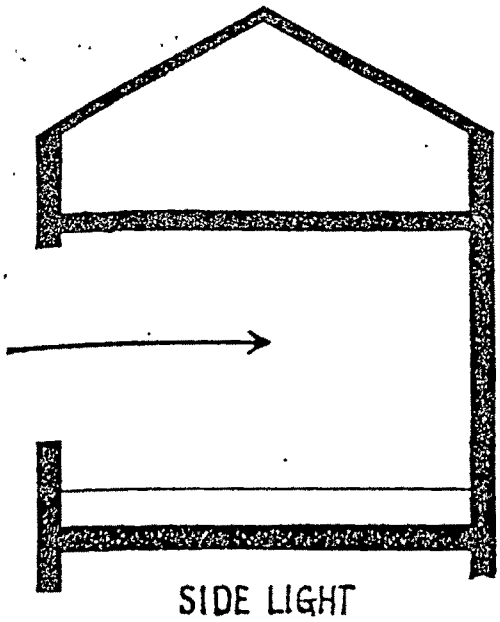
Natural Lighting:

Natural lighting in galleries could be of various types. Galleries may have light from the roof which is known as sky light. This arrangement is seen at some of old museums. It may be economical to use this type of lighting in a tropical country like India with abundant sunlight. But, it has its own problems. The glass covering, the window should be regularly dusted to keep it clean to allow light and to appear tidy. Again it should be covered with a strong metal grill for security reasons. This type of lighting is noted at the Chinese Gallery in Prince of Wales Museum. This further indicates that only light resistant material such as inorganic objects made of stone, metal, ceramics etc. can only be displayed in galleries illuminated by sky light. In case of the Prince of Wales Museum, majority of the objects in the Chinese Gallery are ceramics.

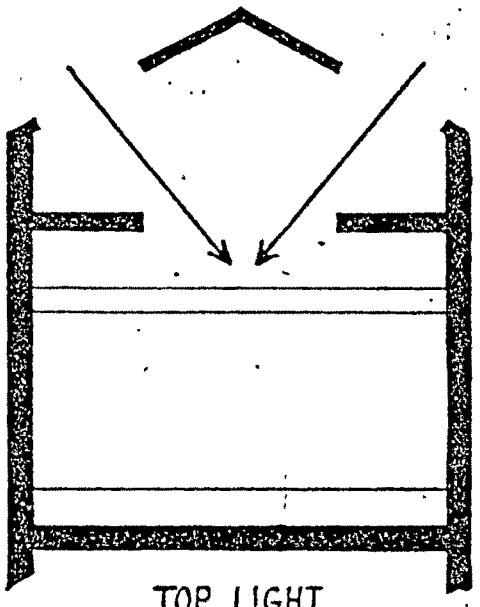
The exhibition gallery of the faculty of Fine Arts can be completely illuminated with the sky light on a clear day with normal sunlight. But to cope with the natural vagaries, it is equipped with artificial light also.

Side Light:

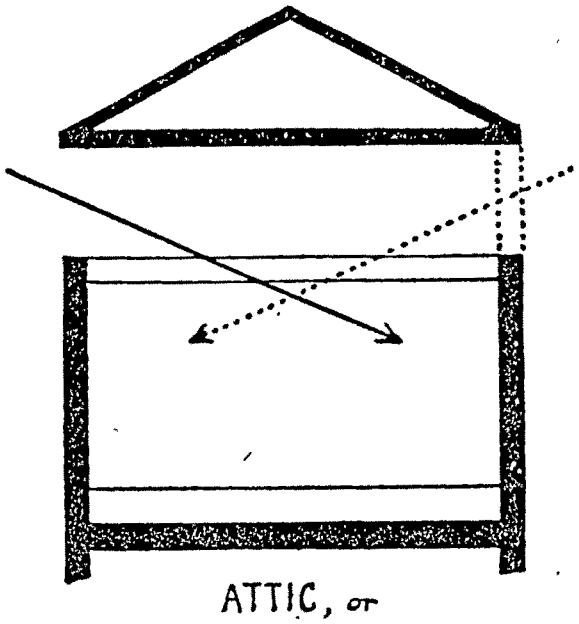
This is another arrangement of lighting in galleries predominantly existing in European context. One side of the gallery is entirely left open for passage of light with the use of transparent material such as glass. This type of lighting is beneficial for aesthetic and economic reasons. Generally the open side of gallery faces a pleasant landscape. This pattern helps to trap in the less quantity of sunlight available in the temperate countries. But this arrangement as an exception can be found even in a tropical country like India if the circumstances are conducive for the use of this type of lighting arrangement. The ground floor gallery at the Lalbhai Dalpatbhai Museum at Ahmedabad has such an arrangement with little variation. A side of the gallery, located on the opposite end of entrance, is opened and is situated slightly away from the main gallery, followed by a



SIDE LIGHT



TOP LIGHT



ATTIC, or
CLERESTORY LIGHT

DIAGRAM 1

Filtered light passing through ribbon windows.

Corner lighting at the end of a gallery.

passage flanked by cabins. The intensity of light is further controlled by the use of wooden blinds.

End Light:

This is a lighting arrangement located in the corner or at the end of a gallery. This type of arrangement only helps to permit a limited quantity of natural light in a gallery and to illuminate a portion of it. This arrangement is only followed to break the monotony in a gallery lit predominantly by artificial light. Generally a window is provided towards the north direction of a gallery.

Gilman[1] further stated, 'natural light from north direction is believed to have least harmful effect on museum objects. So, light from this direction is preferred in a gallery . This is termed as 'north light'. Needless to add this arrangement of light has a dual advantage. Firstly, it provides a psychological relief to the visitor in a closed place. Secondly, because of its spatial confinement towards the corner or end of a gallery it only causes negligible loss of wall space/display area in a gallery.

Top Light:

Light projected from the top of a gallery is known as top light. This invariably would be from the windows located on the high rise walls of a gallery. This is of different types.

Clerestory window:

This is linear arrangement of windows at top, preferably in opposite direction.

Ribbon window:

This is a horizontal strip of windows towards the ceiling on a wall. This type of arrangement is found at the museum, Department of Museology (fig.). This type of arrangement is used to substitute artificial light. The period for which direct sunlight enters the gallery in this arrangement is less. The intensity and harmful effects of light could however be controlled by use of venetian blinds, sun control films/ UV filters if

[1] . op.cit., Benjamin Ives Gilman, p.146.

Spot lights illuminate stone sculptures in an appealing way.

Mixed artificial lighting illuminating a showcase.

required, as is done in the case of museum of the department of Museology.

Artificial Light:

The use of artificial light in museums has become almost inevitable; let it be for the scientific, security and aesthetic reasons or a combination of all these. The electricity lamps and their installation have radically changed over the years. Two main flaws are noticed regarding the installation of artificial light. Firstly, it is case of induction of electric lights into museum buildings which were initially constructed to function mainly on natural light or with the help of fuel lit artificial light, say for example lanterns. One such interesting example of this type of museum buildings is the Museum and Picture Gallery, Baroda. Founded in 1894, and induced with electricity in 1930; this museum represents the ill effects of poor installation. In the first place there is inevitable external wiring which comes on the way of exhibition area at places. The lighting of cases, which in majority of the instances is external, is too conspicuous with hanging wires and conduits (tubes through which insulated wires pass) ; to supply electricity to the showcases. Due care should be taken to avoid or subdue the distorting effects caused by such crudity of installation of electric bulbs and tubes. Secondly, it is outdated methods of installation in new museum buildings such as having electricity points and switches at normal height as in other residential and public places (L.D. Museum, Ahmedabad is a case in point). In museums the electric wiring and the connections should be at ground level to avoid wastage of exhibition area and possible pilferage by mischievous visitors.

According to Coleman[1], 'Museum lighting, in its different applications, is much the same as lighting in building of other kinds - except for the lighting of exhibition space. Museum exhibition space sets problems that collectively are unique. The emphasis, not to say the exclusive attention, placed on this branch in writing about museums is betrayed by the currency of loose terms such as 'windowless museum' and 'skylighted museum' which, by their very inexactness, show where the difficult and most interesting part of the matter lies.

Exhibition lighting is practiced very unevenly by museums. Old buildings are bogged down in old equipment that ordinarily cannot be redeemed

[1] . op.cit., Laurence Vail Coleman, pp.73-95.

through alterations. Remodelled buildings show most incongruous mixtures of old and new, the best parts corrupted as a rule by keeping company with the worst. And even new buildings are not free of commitments to yesterday, although among them are many suggestive and some good examples of exhibition lighting.

Museum designers seem on the whole to be victims of the sort of progressiveness that tries to advance by modernizing things of the past rather than by pushing aside the old and making a wholly new start. In fact, even the approach has usually been wrong, because museum planners customarily visit museums here and abroad to see what they show of how things used to be done. In the future, it would be better if observers would spend time making general observations in our leading cities, taking note of latest stores, office buildings, factories, railroad stations, theatres, restaurants, and even homes. Museums might then find some of their proverbially troublesome problems giving way to new solutions in the swiftly moving field of illumination.

Mixed light - that is light coming partly from the sun and partly from lamps-is what we are accustomed to during daylight hours. The natural ingredients does its share of the lighting, and in addition it sets some of our primitive feelings at rest; the artificial ingredient makes up for the fact that natural light is not able to do a fully satisfactory job indoors. Museums as well as other buildings show a recognition of this double requirements.

An art connoisseur's statement: "*Artificial light, even if perfected to the highest degree, has never the strength of sunlight and is more fatiguing to the eyes, as it does not stimulate the retina by a constant change of the intensity and color of the light rays, as does daylight. Every sensitive person will rejoice to see sunlight again when comes out an artificially lighted museum into the day.*" (Valentiner in *New Architecture and city planning*, Philosophical Library, 1944, Page, 660.)

Human factors other than visual perception enter into judgment of lighting and of the relative merits of natural and artificial light. There is, for instance, the trace of ***claustrophobia*** that most of us feel in the absence of windows or other openings through which to look out. *Also, there is a reassurance that comes of having even a little natural light, even without any view.* Such feelings should be understood as distinct from experiences of colour perception, visual acuity, ocular fatigue, and kindred matters of seeing which are capable of measurement in the laboratory.

The Rotary Art Gallery in Surat

Prince of Wales Museum of Western India, Bombay. Nepali-Tibetan gallery. Illuminated built-in cases and Tankas (paintings) framed in aluminium with grey mouldings. General lighting by mercury lamps. (Courtesy- *Museum*, v.XVIII, n.4, Unesco)

"Natural light is erratic. It varies widely in chromaticity and quantity, from day to day, and season to season, and frequently will change in both color and quantity in the matter of minutes".

Room lighting and *object lighting* are different in their purposes, and largely distinct in their means. The purpose of room lighting, aside from keeping visitors from falling over benches, is to make people feel at ease and to provide conditions under which object lighting can be carried out successfully. The purpose of object lighting is to have objects seen clearly and in their full character.

Position of the light source : Sculpture is the most exacting class of material, at least in the art museum, because the delicate modeling and texture of its surfaces must be revealed by the lighting.

Case lighting objects: There are three aims in lighting for case displays - to give the objects greater brightness than their surroundings, to keep the source of the light out of the visitor's sight, and to avoid or override reflections of room lighting sources in the glass of cases.

Lighting of cases for habitat groups and dioramas is a part of the skill of the preparator, maker of these displays. Suffice it here to warn against planning for any use of natural light inside such cases, and to remind the planner not to neglect general lighting of the room in which groups of dioramas are shown. Light that spills from cases of any kind is not enough to light an exhibition room. Neglect of this would result in a dark chamber with rows of overbrilliant artificial landscapes.

Windows are the traditional means of letting air and light into buildings; but for museums they are of limited usefulness since they reduced the valuable exhibition area of the walls besides leaving reflections of light on the exhibits and showcases.

Experience indicates that *ribbon windows* are most useful in rooms with comparatively low ceilings.

Corner lighting - most useful for a room of moderate size - requires only one window, located at or near one end of a long wall. The opening admits a token of light transversely in a way that sets up no serious glare or reflection.

Skylights have long been the principal means of lighting picture galleries.

Skylights came into general adoption for galleries of paintings because of an advantage that was unique in the days before good artificial lighting. They could floor a room with light and yet leave all walls free for display. *Too much light might be in the wrong place, notably on the floor and the visitor*; but windows which were the alternative gave bad distribution also, and they set up reflections much worse than those of skylights.

Even with full correction, skylights still fall short because they do not provide the reassurance that comes of seeing out. They are said to "drown the visitor as in an aquarium."

And lastly, even the skylights virtue, of not using wall space is challenged by other ways of not doing this. Corner lighting is very economical of wall; and high windows, made effective by the aid of artificial means, do not in the least encroach upon the picture hanging zone'.

According to R.C. Chandra[1], 'owing to the use of air-conditioners and artificial lighting techniques, windows in modern times play a less important role in ventilating or illuminating the exhibition halls; specially 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 place to avoid glares and reflections on the display cabinets'

Commenting on lighting, Bose and Agrawal[2] stated, 'light is another factor which accelerates the deterioration of museum objects. The deteriorating effect of light has been the subject of several studies. 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, particularly the tubular fluorescent lamps. Professor Gerald was one of the first to point out to the high amount of ultra-violet radiation emitted by

[1] . R. C. Chandra, Demands on a museum of today and their effects on the Museum Design, *Museum Architecture,* Museums Association of India, New Delhi, p.35.

[2] . A. Bose and O.P. Agrawal, Technological Developments and their utility for museums with reference to lighting, air conditioning and security alarms, *Museum Architecture,* Museums Association of India, New Delhi, p.58.

fluorescent tubes. Since then intense work on the effect of ultra-violet radiation on museum objects has been done.'

The exhibition halls of the Museum and Art Gallery have *top lighting of carefully regulated intensity*, designed to provide flexibility and variation suited to particular types of art material exhibited. However, natural light was intended normally to be employed and is principally admitted from the north-east and south-west sides of the building through openings high in the walls of the first floor. Louvers are arranged to keep out direct sunlight. They are supplemented by a few windows, especially at the front of the building and on the second floor, which provide some variety and a large quantity of light, but which can be tempered also by louvers. These natural-light sources do, however, have to be controlled and supplemented, but the over-all effect is agreeable and there is the considerable advantage of fine, unbroken wall areas to serve as background for installation purposes. In addition spotlights and special lights as required are provided. Many of the cases of small sculptures, for example, are individually lighted.

According to Molajoli[1], 'rooms lit by artificial means rather than by sunlight are best for drawings, engravings, watercolours and textiles. Such rooms may be long and narrow rather than square-rather like corridors or galleries- as the visitor has no need to stand back in order to look at the exhibits, which will be arranged in showcases against the longest walls'.

Discussing about 'Illumination of buildings', Dhar[2] observed,

General aims:-The illumination of buildings is assuming a position of ever increasing importance. The old method of installing a few lights more or less at random has been superseded by the inclusion of lighting as an integral part of the building design. Only in this way is a thoroughly pleasing and adequate installation possible. There has been also a breaking away from the stereotyped forms of lighting fixtures and a great influx of new ideas leading to various types of luminaries and luminous panels. there is also an increase in the use of artificial sky-lights or cove lighting. All these must be built-in and cannot be added readily as an afterthought.

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[1] . op.cit, Bruno Molajoli, p.158.

[2] . B. K. Dhar, Lighting in relation to building and display, *Journal of Indian Museums*, v. XLVI, Museums Association of India, New Delhi, 1990, p.27.

Interiors should be adequately illuminated to minimize eye-strain, reduce accidents, and give a pleasing and cheerful effect. Even more important is the requirement that these shall be free from glare, nothing being more fatiguing than facing a glaring light source, either directly or by reflection in a polishing desk-top. The aim should be to produce a lighting installation which will give soft, well diffused, glarefree but adequate illumination.

Of the result, the eye is the final judge, and on its verdict the lighting system stands and falls. The aesthetic elements are of prime importance in many cases; they are, of course, hardly amenable to calculations. There remain, however, a great many factors which can be calculated easily, and such calculations will often save costly mistakes.

According to Satyamurthi[1], 'the intensity of hot climate of India, coupled with the irritating prevalence of dust and excessive glare-all these conspire to make the task of the Indian museologist extremely difficult and frustrating. In a hot country like ours, if windows are eliminated or reduced, ventilation becomes a problem. Exhaust fans in the walls near the ceiling may be helpful, but air-conditioning would seem to be the ideal solution to the problem especially to the galleries containing delicate material such as textiles and paintings. Carefully controlled artificial lighting is a necessity in modern museums and this is especially so in Indian museums where as much as possible, the intense glare of natural light has to be eliminated. Suitably concealed artificial light may be employed with advantage, sometimes in judicious combination with natural light'.

Ventilation:

Within a gallery the circulation of air is possible by both natural and mechanical means. Windows generally allow circulation of air in a room. But this is not possible with the galleries, as they have to be devoid of windows. So the normal construction of windows in opposite direction s to ensure cross ventilation is not possible in museums. The entrance and exit of galleries can function as passage roots of air. Air can be circulated with the use of fans. Further, exhaust fans can be used to suck out air. Outlets for the air could also be provided closer to the ground. A similar

[1] . S.T. Satyamurti, Museums in Germany and the Netherlands-some observations, *Studies in Museology*, v.5, 1969, Department of Museology, Baroda, p.15

example is found in the exhibition gallery of the Faculty of Fine Arts, M.S. University of Baroda.

Coleman[1] opines, 'ventilation may be natural or forced. Forced ventilation is largely through supply and removal of air by mechanical means, although some forced movement of air is independent of this. Natural ventilation, which goes on to some extent in every building, is not welcome in the presence of air conditioning if only because flow of air from outside means ingress of dust'.

Regarding *Ventilation*, Molajoli[2] stated, 'every care must be taken, while the building is being designed and erected, to allow for the maximum of natural ventilation and for a constant and automatic flow of air, especially when there is no reason to fear that this may bring in dust and smoke from outside. The best method is that of openings in the lower parts of the outer walls, protected on the inside by a metal grid which can be regulated or even completely closed. Corresponding openings should be made at the top of the opposite walls.

If more funds are available, ventilators and exhaust fans may be installed, working either together or separately, the former forcing in air, and the latter drawing it out through the roof - a system which has some cooling effect inside the building'.

Coleman[3] stated, 'air conditioning is the process by which simultaneously the temperature, moisture content, movement and quality of air in enclosed spaces intended for human occupancy may be maintained within required limits. According to Coleman, 'air conditioning is indoor weather control'.

Air conditioning practice varies considerably, but in general the process consists of taking outside air to circulate and recirculate after it has been filtered and treated to correct its temperature and humidity. Although the term is often used loosely to embrace only part of this set procedures, air conditioning is in fact no less than year-round control of the temperature and moisture content of cleaned air that is moved through a building.

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[1] . op.cit., Laurence Vail Coleman, p.203.

[2] . op.cit., Bruno Molajoli, p.181.

[3] . op.cit., Laurence Vail Coleman, pp.199 and 204-205.

There are two ultimate objectives of air conditioning in museums, namely, comfort of visitors and employees, and conservation of collections. Both ends are great, and ever growing, importance. In some climates there are seasons when outdoor air may be about right for museums ; but in most parts of this country the times of such conditions are of short duration. Everywhere, good seasons alternate with seasons in which conditioning for comfort may be very needful, and conditioning for conservation may be truly imperative.

At seasons of problem weather, if not all the time, every museum must face also the modern public's expectation of indoor comfort. This is a complicated matter in human terms, but for the museum it means cooling in summer as well as heating in winter, and equally it means year-round control of humidity and removal of dust and odors.

Molajoli[1] expressing his views on lighting as, *'natural lighting* is one of the subjects most keenly discussed by museum authorities, and is, indeed, of outstanding importance. It was believed at one time that electrical light, being easy to switch on, adaptable and unvarying in its effects and able to give full value to architectural features, might provide not merely an alternative to the use of daylight in museums, but a substitute for it. But experience has forced us to recognize that -especially where running expenses have to be considered-daylight is still the best means of lighting a museum, despite the variations and difficulties which characterize it at different seasons and in different places. The building should therefore be so planned as to make the best use of this source of light.

Daylight may come from above or from the side. In the former case suitable skylights will be provided in the ceilings of the exhibition rooms. In the latter case, one or more walls will be pierced by windows, the height and width of which must be decided according to individual requirements.

Lateral lighting

Windows placed at ordinary level allow pleasant view of the countryside and gardens or architecturally interesting courtyards. This provides a diversion, resting the visitor's eyes and refreshing his mind.

[1] . op.cit., Bruno Molajoli, pp. 149-154.

For this purpose, it may be wise, to arrange a few lateral openings of the passing visitor (pre-historic gallery at the Prince of Wales Museum has such provision)

Moreover, if the lighting system is too rigid, too definitely planned to suit a particular setting and to establish certain relationships between that setting and the exhibits, it will form an impediment by imposing a certain stability, tending to reduce the museum to the static condition from which modern institutions are striving to emerge. The present-day museum should make a lively, dynamic impression.

It therefore seems preferable, especially in small museums, to choose an intermediate system which can be adapted to varying needs and necessary changes, even if it thus becomes more difficult to achieve ideal results'.

Moti Chandra[1] stated, 'Lighting is of utmost importance in a modern museum building. The modern American museum is windowless, artificially lit and air conditioned. This arrangement eliminates the painful effect of sunlight, which in the tropics is even capable of bleaching the fastest colours and deteriorating the wooden exhibits and fabrics. It is also remarkable that Indian paintings and fabrics give out their best in artificial light. Air conditioning regulates the temperature and the absence of windows prevents dust. All this arrangement will, however, cost money and for sometime to come it will not be possible to introduce them in the museums of this country. However, every effort should be made to guard the galleries against strong sun-light, adverse climate conditions and dust. To prevent excessive sunlight, the sky-lights and windows should be glazed with a new kind of glass which cuts off ultra-violet rays, the main cause of damage to exhibits. If, however , the cost of such glass is too much then the architects might consider to raise the levels of the windows so that the light come from above and does not fall directly on the show cases. If such windows were provided, it is also necessary to provide small openings at the floor level to allow free and adequate circulation of fresh air.

The harmful and discomforting effects of the extreme climatic variations should be checked by the provision of suitable double roofing or by some such contrivance without sacrificing the proper lighting and ventilation of the galleries.

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[1] . op.cit, Moti Chandra, p.45.

Satya Prakash[1] stated, 'in providing lights to the building, small museums should use natural light controlled by shades and supplement the same, when necessary, by artificial light. By placing windows or ventilators high, wall space may be conserved, but all windows and ventilators should be grilled nicely. The best lighting is afforded by a row of windows immediately below the ceiling along each of the larger walls. The size of the opening would depend upon the size of the room. The windows should reach the ceiling, the height of which is fixed usually by the size of the room and the area of light openings required. The minimum height may be about 13 feet'.

***Architectural acoustics*:**

According to Coleman[2], '*the science of putting down noise and promoting sounds that are wanted, is an important subject touching museum interiors*. Street sounds can be shut out by well known devices of construction, some of which serve other purposes also. For example, double glazing and tight framing of windows help to control sound, dust, and heat. Reinforced concrete can itself be sound-proofed in foundations, columns, girders, walls, floors and roof ; against rumble, such as city transportation and building activities may set up. Sounds from the museum's own machinery can be stopped by lead cushions or resilient fibre, cork, or rubber mountings under motors or pumps, fans, elevators, and other moving equipment ; and there may be need for measures to keep sound from traveling along air-conditioning ducts. Further, to avoid the click of visitors' heels on corridor floors, one of the softer floorings may be employed. But, apart from all such matters of preventing nuisances, there are two kinds of acoustical problems for the museum architect-first, to assure the spiriting away of the sound of voices and rustle in exhibition rooms and of work noises in offices and other workrooms ; and, second, to provide for the successful delivery of sounds that are made to be heard, notably speech in meeting rooms and music in auditoriums.

Sound-quieting by absorption is accomplished through acoustical treatment of ceilings and walls. The absorption coefficients of the perforated boards and other material used for this purpose range from 40 or 50 percent to

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[1] Satya Prakash, Small Museums . Building and Allied Requirements, *Small Museums*, Museums Association of India, New Delhi, 1975, p.14.

[2] . op.cit., Laurence Vail Coleman, p.226.

nearly 100 percent, compared to six to eight percent for wood paneling and about 20 to 30 percent for carpeting'.

Organisation of Space:

Regarding organization of space Coleman[1] states, 'with new freedom given by recent developments in engineering and with architectural design, the museum planner can approach the problem of organizing space in a direct and practical way.

The type of structure, shaped to the size and nature of the terrain, should be an expression of the individual museum The architect has opportunity to create a form, itself of interest, which will further museum proposes. There is no one modern type of museum.

The natural approach to any problem is through determination of space requirements for the different functions, and choice of the position in the building where each will work best by itself and in relation to other functional spaces. The building committee, with the director, must arrive at needs in square feet of floor space and in storage capacities. But positions and relationships can be suggested by general experience as to entrances and exits, lines of the public's movement and of work flow in the building, and best uses of different storeys.

Attention should be given from the start to requirements of the future and to ways of meeting them within the original scheme of space organization. *Modern style should be helpful in the matter of projecting extensions of space along lines of functional growth.*

It is not realistic to plan for too long into the future, however. Museum buildings that by now have gone out of use have had on average life of less than 40 years. A few may still last, but most of them are to be practically rebuilt. (Examples of new purpose built museums that were found to be unsuitable within five years of their construction were quoted earlier.)

Entrances and exits have to be planned with regard to human frailty. However, considering risk of theft, the safest arrangement for a public

[1] . op.cit., Laurence Vail Coleman, pp.109-127.

museum is to have only one entrance for the public and one for services, with the staff using either at will.

Auditorium crowds should be kept away from having the run of the building when exhibition rooms are closed to the general public.

Toilet rooms are required in number and size proportionate to the size of the building.

Several museums have toilet rooms at stairway landings. (Prince of Wales Museum has similar pattern.) Mechanically this is good. Details of arrangement should not be neglected in planning these facilities.(Where this is not done, it would result in a case like the Museum and Picture Gallery, Baroda, causing acute inconvenience and embarrassment to the visitors. It may be noted that what appears like a trivial matter is in fact an essential public amenity. A public institution which really thinks about its visitors comfort should give a serious thought to basic needs like this.) Equipment used for these should be of certain standard. Forced ventilation should always be provided'. National Museum uses naphtalene balls as deodorants. Toilets should be maintained clean and neat.

Regarding '*Utilization and division of space*' Molajoli[1] expressed his opinion as follows:

'*Museum Services*. Before considering the planning of the museum it is essential to determine the size and location of the various services. But the fact remains that two conflicting needs have to be reconciled: on one hand there must be easy communication between the public rooms and the museum services, since this makes for smooth relations between visitors and staff ; on the other hand it must be possible to separate these two sections, so that they can function independently at any time'.

He further stated, '*arrangement* is any general plan of construction which entails an apportionment of premises is closely bound up with the purpose of the museum and the *nature, quality and principal components of its collections*. Each type of museum has different requirements, which may be met by various architectural methods.

[1] . op.cit, Bruno Molajoli, pp. 156-160.

It is difficult given any exact classification of the different types of collections, but one can indicate the wide range of demands the designer of a museum may be called upon to meet;

Museum of art and archaeology : The size of the rooms and height of ceilings will be determined by the nature and dimensions of the works to be exhibited. It is not difficult to calculate a practical minimum capable either of accommodating old paintings, which are usually large, or medium-sized modern canvases.'

Further expressing his opinion about organisation of space in different museum, he stated the following.

Historical or archival museums : These need less space for the showcases in which their exhibits are placed, and comparatively large numerous storerooms for the documents kept in reserve.

Ethnographic and folk museums: The exhibits are usually displayed in showcases. They are often large and cumbersome, requiring a good deal of space. Considerable space is required for reproducing typical surroundings, it this is done with genuine pieces and properties or full-sized replicas.

Museums of physical and natural sciences, technological or educational museums. Owing to great variety of collection involved, their division into sections and the necessary scientific cataloguing, these museums differ in size and in architectural and functional characteristics. Where the exhibits are arranged in series (minerals, insects, fossils, dried plants, etc.) medium-sized rooms may suffice, whereas reconstruction and build-up displays of animals or plants demand considerable space and special technical features (for instance, means of keeping the special materials and preparations in good condition, unaffected by the atmosphere, or equipment for maintaining aquaria, permanent film displays etc.). This type of museum needs laboratories for the preparation and upkeep of certain exhibits (stuffing, drying, disinfecting etc.)

It thus rests with the architect to decide, for each of these types of museum, what arrangement will best satisfy the particular conditions, purposes and requirements involved.

There can never be any objection to adopting the modern principles of a building so constructed that its interior can be adapted, divided and altered

to meet the varying demands of successive exhibitions. If this is done, the most important thing is that the construction shall be 'flexible', that is, capable of adaptation to the different features it must simultaneously or successively contain, while preserving unchanged its general framework - entrances and exits, lighting system, general services and technical installation. This principle is particularly valuable as a museum must allow for enlargements which are not always foreseeable at the outset.

Symposium[1] on museum architecture in Mexico, observed 'The internal arrangement of the available space, the distribution and style of the galleries can then be either temporary or comparatively permanent'.

Access and circulation

In order to carry out its task and serve its public, a museum must be integrated into its environment, which generally consists of an urban area. That presupposes that the site of the museum shall have been selected with due regard for the significance of the location and its accessibility to the population served.

whenever possible, the siting of the museum shall be considered in conformity with *urban development plans* already approved or being prepared, by consultation on the part of the director and the architecture with the city planning authorities.

Orientation of space:

Regarding orientation of space Coleman[2] opines, 'introducing the museum to visitors - especially to casual visitors who do not know what the exhibits have to offer - is a duty of the museums. They have long performed this job haphazardly in the lobbies of the museums. Orientation undertaken in an earnest way and promoted by special facilities, is something important that planners have begun to take account of.

Opportunity to do something worth while in the way of orientation seems called for by familiar desire on the part of museum workers to give the

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[1]. Symposium on museum architecture access and circulation (at Mexico from 8-14 December, 1968), *Icom News*, v.22, n.1, 1969, Paris, p.40.

[2]. op.cit., Laurence Vail Coleman, pp.129-144.

public more help than they can under present conditions. The arriving public's numerous serious questions call for more response than can be given to them in competition with perfunctory queries about rest rooms and the timings of the museum.

Orientation space should have a close relationship to exhibition space so that people going the rounds would be encouraged to come in often during the visit. It should be visible and easily reached from the lobby, but it should not be a thoroughfare, nor should it be barred by doors.

The requirements seem to suggest that in new buildings orientation space be planned in central position on the ground floor, perhaps with a surrounding corridor giving freely onto exhibits at the same level and onto any exhibits above by convenient stairs. A second floor of exhibits might be further related to the space below by having its corridor look down to the orientation room.

Pattern of visitor behaviour, make the central part of any exhibition area less successful than surrounding spaces. The central part, if developed as a haven for rest and contemplation, could receive the unhurried visitor entering into the museum. Orientation might transform the museum from something hard to get the value out of into something very pleasant and fully satisfying.

Exhibition Space : Exhibition is the characteristic and pivotal function of museums. Public judge the building very largely by character of exhibition space. It is not by accident that modern-looking exhibition rooms have been produced by remodeling within many an old structure.

The right place for temporary exhibition space is on the main exhibition floor, at ground level and giving off the lobby. The rooms are best arranged for cutting off from the rest of the museum; but there should be no fixed barriers between this space and any other adjacent space.

Permanent, or relatively fixed exhibition should take some account of distinct needs for the general visiting public and for other specified groups. This difference is being noticed in some museums with an emphasis on this aspect.

Division of space, carried out with attention to future as well as to present needs, should provide all possible capacity for change.

Supervision of exhibition space is an important maintenance problem which projects itself back into planning. Rooms should be laid out to provide for their being watched effectively by the smallest possible number of people'.

Regarding orientation of space Baxi[1], expressed her opinion as follows: '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-shops or sales room. Object should have independent facility for entrance and exit, adjoining packing-unpacking rooms. The entrance for objects may be adjoining the staff entrance.

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

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

Molajoli[2] stated, 'it is more than ever necessary to plan with a view to enabling the public to circulate and to arranging the collections and services in the most rational and functional manner possible.

The question of circulation must be studied attentively, so that the arrangement and the itinerary will be clear not only to anyone looking at the ground plan of the museum, but also to anyone walking through the rooms. It should be planned to fit the logical order of the exhibition, whether that order is governed by chronology, by the nature of the material displayed, or as in a scientific museum, aims at providing a connected sequence of practical information.

Though a compulsory, one-way route may not be entirely desirable in a large museum, it is satisfactory and might say logical, as it forms orderly movement. Visitors should not have to turn back and return through rooms they have already seen, in order to reach the exit. They should, however, be able to turn off on their way round if they wish cut short their visit or confine it to certain things that particularly interest them.

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[1] . Smita J. Baxi, Exhibition of Museum Architecture- In India and Abroad, *Museum Architecture,* Museums Association of India, New Delhi, pp.73-74.

[2] . op.cit, Bruno Molajoli, p.161.

So, even if a museum is to show a series of selected works of the first quality, we should consider the possibility of arranging them in proximity to one another in such a way that they can be seen without the necessity of traversing the entire building. For example, one may arrange them in a succession of rooms surrounding an inner courtyard. Similar arrangement is found in the National Museum.

If the designers preference or the demands of space results in a series of rooms all set along the same axis, it may be desirable to connect them by a corridor. But this should not be the only means of access to the rooms, for if the visitor is forced to return to it each time, his fatigue and bewilderment will be much increased. (this fault also exists in the lay-out of galleries of the National Museum)

Entrance: However many outside doors may be found necessary for the various museum services (but these should be as few as possible, to facilitate supervision and security measures), there must be only one public entrance, placed quite separately from the others. This should lead into a vestibule where certain essential services will be located - sale of tickets, information service, and sale of catalogues and post-cards'.

The proposals of Symposium[1] on Museum Architecture stated the following about the orientation of space in museums:

The recreation and circulation of the public in a museum should be one of the basic concerns of those who are responsible for the museum programme, the architectural design, the internal layout and the display plan for the exhibits themselves. It is a question of adapting the museum to the public it serves and to the local conditions, and also in some cases of adapting the circulation of visitors to the requirements of the building, especially when the building itself is of a historic character.

Visitors routing problems for which no standard solutions can be planned in advance, owing to differences in the kinds of visitors and local conditions, should be thoroughly examined on the basis of the general topology, that is to say the relation between available space and movement. In order to make these studies fruitful, basic and applied research must be conducted on museums already constructed or in course of construction, with consideration for planning in the fields of :
a) physiological psychology of individual behaviour;

[1] . op. cit., Symposium on museum architecture access and circulation, p.401.

b)sociological psychology;
c)physical psychology.

This type of research requires a broad knowledge based on experience, with full and accurate knowledge of the facts. It also presupposes a wide range of inter-professional contacts.

According to Harrison[1] as quoted by Bedekar in his article, *the basic division of the museum building is between three areas, firstly, where the public is most welcome, secondly, where public is allowed under personal supervision and thirdly space for the duties of the museum staff.* Circuit is a path chosen to follow a circulatory path. Based on the visitors requirements it could of three types. According to Bedekar,[2] on entering through public entrance, the visitors need some minimum service and directions. From the lobby two circuits have to be planned one traversing all of the exhibition galleries including areas for special exhibitions and rest rooms for the visitors. The second circuit should cover library, lecture room, and areas for special exhibitions if these are away from the permanent exhibition galleries. These two circuits are the minimum required for visitors.

Another circuit is required for those who come into museums for many administrative reasons like, communication from other officers, post and telegraph, payments, audit, quotations, inquiries.

In addition to these three, yet another circuit will have to be planned in such a way that museum employees can discharge their duties both in the service and public areas. This circuit will connect both the visitor and staff entrances with all the sub-divisions within the museum building, providing ,at the same time, easy access to every administrative and technical working place, without intruding into or interfering with any one area. With the public areas such as lobby, exhibition galleries, lecture hall can be conveniently connected with each other directly, the service areas consisting of administrative offices, curatorial rooms, technical sections and stores have to be linked up through corridors.

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[1]. R. O. Harrison, *Technical Requirements of Small Museums*, Technical Paper No. 1, Canadian Museums Association,1966.

[2]. V. H. Bedekar, *The small museum*, Museums Association of India, New Delhi, 1975, pp.46-49.

The planning of these circuits is a very creative task because the organisers have to visualise not only the requirements of the different categories of persons who will enter into the building, but the elements of safety or security which an unrestricted or unchecked access may endanger. Theoretically the above circuits can be based on some simple plan. In practice, these circuits become complicated and they compel all categories of persons to adhere to the restrictions of entry and exit which usually irritate many who wish to chose short-cuts (fig). The planning of these circuits must also take into account the changes that will most probably take place in the activities and the additional or new functions in the foreseeable future to provide for space to fulfil them. Yet another consideration which should govern the planning is the determination of the likely sequence of action and movement of persons and objects in connection with the basic and auxiliary functions of the museums. To the extent to which the direction and flow of these movements can be decided and anticipated, the planning will succeed in ensuring maximum operational effectiveness.

A circulation path in a small museum by itself represents an abstract pattern and theoretical possibility. The design of the galleries and other areas, as well as the furniture for display, will create possibly many patterns of circulation.

According to Parmar,[1] these can be described as linear, bilinear, trilinear, quadrilinear, peripheral as well as spinal and meandering patterns. For a small museum a multi-directional composite pattern is required and desirable to combine the advantages of several patterns.

We must remember that the overall design of the museum should be functional and that circulation is only one of the elements of design and it should not become the supreme consideration in arriving at an over-all plan. In practice we must first determine the arrangement of various spaces and then adapt a circulation pattern suitable to the layout so that the final arrangement works smoothly. The pattern should be such that the visitors and staff must become aware of it quickly enough to find out their way without getting confused. The simple geometrical patterns have the advantage that their regularity is quickly known and accepted, which is very helpful in circulation. The overall pattern will depend upon circulation

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[1] . V. S. Parmar, *Design Fundamentals in Architecture*, pp.140-150, Somaiya Publications Pvt. Ltd., Bombay, New Delhi, 1973.(particularly for further circulation patterns such as centrifugal, spinal, circular, multistoried, diagonal and spiral.)

requirements of these different categories of entrants and the nature of their specific intentions and duties. In view of these we can list some of the basic circulation requirements for a small museum:

-Entry of (a) objects acquired by the museum, (b)objects which have to enter temporarily into the building for approval, for examination, for conservation, in the case when this service is offered to an outside person or agency, (c) a variety of material for use in the workshops, galleries, or for the staff.
-Movement of the objects from the stores to the galleries and back; from the curatorial offices to the galleries and technical sections and back; from the curatorial sections to the technical sections and back. All these are required for routine checking, photography, repair, etc.
-Entry and exit of the visitors at the end of their tour of galleries and/or other public areas. This needs a circular or an `on-going' kind of circulation so that visitors do not have to retrace their steps through areas they had already seen. Yet some museologists feel that in a small museum it will not be a bad idea if visitors do that. While retracing his steps he will pursue pause to see what he liked initially and he will refresh his mind about what he had seen earlier, as a part of the images and ideas sinking in.
-Entry and exit of the staff and their movements within the public and service areas.
-Entry and exit of people other than employees and visitors for special business with the staff in the service areas.
-Special group of the public who visits museums to use special facilities, voluntarily or by invitation, such as the library, audio-visual equipment, archive, cultural and educational exhibits, film shows, scientific or technical demonstrations.
-Temporary labour in technical sections.
-Circulation planned in the case of fire or accident so that equipment from different fixed points can be quickly carried to the place of fire or accident. This has relevance also to the arrangements to be made to close off areas in case of fire when it is detected so that precious objects are shifted to safety without loss of time . This is possible only when there is a predetermined plan of action.

Understandably each of the above courses need not be separated from others, because some of the functions can take place through identical circuits. In planning a small museum, where the supervisory and the watch and ward staff is limited, we have to find out some central or `spinal' rather than `peripheral' at least in the reserve areas, though peripheral

paths are more convenient in the public areas to avoid disturbance in public galleries.

Secondly, we must think of controls and barriers to prevent any possible intrusion by any one of the categories of persons moving into the museum in relation to the movements of other persons.

Certain broad alternatives can be suggested for circulation network..

It is possible to imagine small museums in which a single central activity dominates and other related activities are subordinated to it. A university museum with a strong bias for interpretative and research-oriented work will have such a central focus not to be found in any public exhibition room but in a work-study area where discussions, seminars and assignments originate or proceed. In such cases the building as a whole is to be planned around this central activity. The suggested ground plan for small museums in the Unesco handbook 'Organization of Museums - Practical Advice' also confirms this emphasis since in it, all the subdivided areas surround a central lecture room. Naturally in such plans the circulation pattern as well as the various subordinate or auxiliary areas tend to fall on the periphery.

But on the other hand many small museums may have different and more complex layouts. In some, the exhibition spaces may form two foci, the other being any special group of appropriate activities such as encouragement to antiquarian interest, science or hobby clubs, school service, community participation in arts and crafts, children's leisure time activities. The curatorial-technical staff may be as much concerned with these twin aims as with the other museum work. Depending upon the extent of use by people involved in the group activities, the building and the circulation pattern will be grouped around the two foci for exhibition and activities.

As far as the lay-visitors are concerned, the pattern of the circulation should be unidirectional from the entrance to the exit traversing the exhibition areas. This circuit will develop additional loops in the case of others who will be required to step into special-purpose areas like library, administrative officers or other service areas. The circuits for the administrative and technical staff may even be circumscribed in comparison with those of the curatorial and ward and cleaners who are required to move about in the whole of the museum. The circuits for the staff may not become rigid if each has to perform a conglomeration of

duties ranging between the most trifling and the most vital from security view-point. In this contingency, no rigid sequence can be planned delineating the different functional areas. Only a minimum concern may be shown in juxtaposing areas so that employees can contact their superiors, co-workers or visit frequently areas to execute their work, e.g., those whose concern is more with stores, galleries, technical sections, administrative offices have to be nearest to them. Those who have to work together should also find themselves together. Also those whose work creates noise have to be placed as far away as possible from the auditorium, galleries, and others who are primarily concerned with security are placed next to the entrances'.

Gilman[1] states, 'by following the circuits, the whole museum is visited by simply keeping on from the start. Nevertheless, the visitor is not forced to go on, but may cut his visit short and return to the main entrance, without retracing his steps. Hence the scheme, while putting no obstacle in the way of visitors who wish to see the whole museum, invites also the more rewarding habit of confining a visit to a single branch of the collections'.

Distribution of space:

According to Coleman[2], 'distribution of space between the principal museum functions is an important consideration at every stage of planning. A list of desired floor areas for different uses is an early requirement of the architect and this list is useful to the committee whenever it has to struggle with adjustments.

A familiar rule of thumb is that in a new building there should be *at least* as much space for curatorial, administrative, and service purposes as there is for exhibition. As museums grow and add to their buildings there should come better provisions for curatorial work including storage, and therefore there is a tendency to allow more space in the first place for non-exhibition functions.

Neglect of the need for storage space, planned to be adequate and to continue to be adequate as collections grow and the building is enlarged, is one of the commonest mistakes of museum planners. Storage space is thus

[1] . op. cit., Benjamin Ives Gilman, p.153.

[2] . op.cit., Laurence Vail Coleman, p.37.

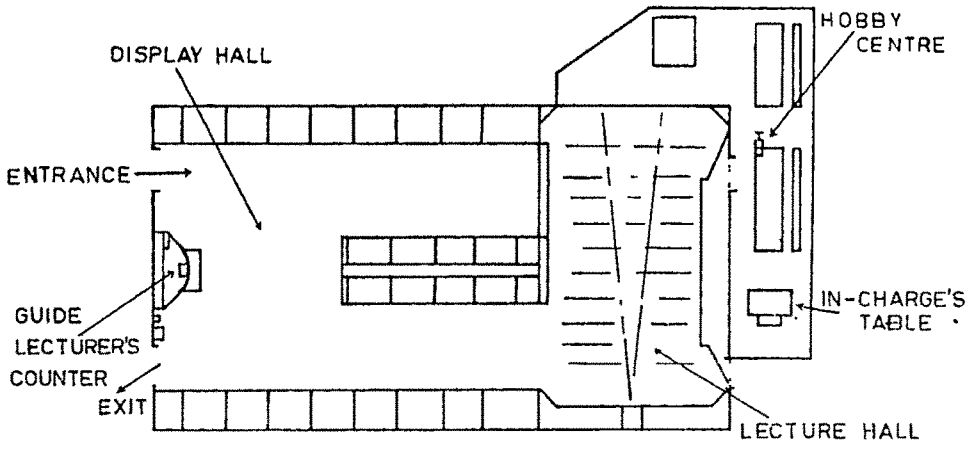

Fig. 1 Plan Scale = 1 : 120

Lay-out Plan Showing Display Hall, Temporary Exhibition-cum-Lecture Hall, In-charge's Room, Hobby Centre & Guide-Lecturer's Counter, in a Small Museum at Malda.

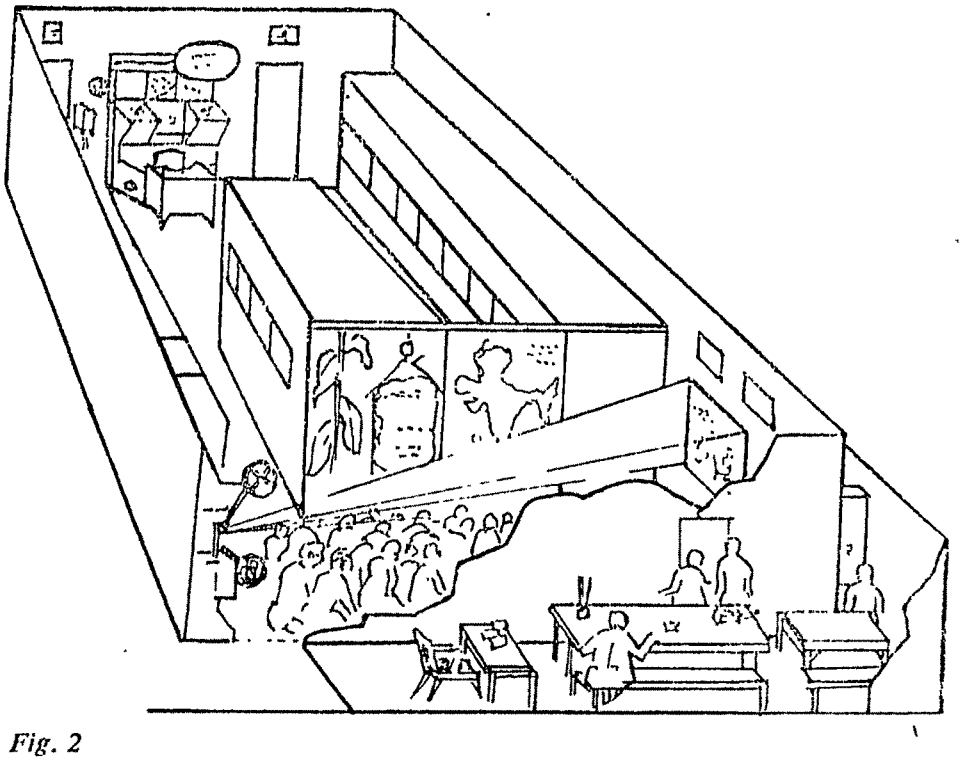

Fig. 2

Isometric view showing how the Small Museum at Malda is utilized by the Students (Courtesy-Shri S.N. Dutta, Art Section, BITM)

often relegated to the basement or the attic, where it cannot function or grow. This arrangement cripples the institution once and for all'.

Bose[1] while stating 'Special Characteristics' of museum buildings noted, 'In a small museum, which comes up after years of efforts one cannot afford to loose large areas which are not directly utilizable. In such museums, efforts should therefore be made to cut down to a minimum space allotted to corridors, lobby, foyer, etc. The public may enter the museum directly. Information to the public and the sale of publications or post-cards can be handled from a counter placed inside the gallery.

Thus, small museum materially differs from other museums in one particular aspect, viz. in a small museum there should be possibilities of utilizing or adopting an existing space for a number of uses. A few illustrations may be useful. In the exhibition hall or display hall of a small museum, where the display cabinets are arranged (figures given on this page are photocopied.)against the wall, the height above which objects are placed is usually three to three and half feet. The lower portion of the display cabinets and pedestals can be judiciously utilized for built-in storage space in the depository, at least for small objects. Alternatively some of the bottom racks could be utilized to house books, periodicals and films which are required by the museum authorities from time to time.

Similarly the hall for temporary exhibitions can be utilized for other purposes. If the exhibits are arranged near the wall, the open space at the centre can be used as a lecture hall or as a film-show auditorium. If there is a wall space, the projection screen can fitted there when there is a film-show or one can manage with a hanging type of screen which can be pulled down at the time of the film-show and rolled up at other times. A useful location for curators has been suggested inside the stores, where they can even have their work room, or inside the galleries. The storage and the office could be linked. In a small museum we can have further innovations. the room for the curator or in-charge can be used as a multipurpose room; a reading room can be arranged for the student visitors. in the afternoon, after school hours or during the holidays it can function as a place where hobby centre or science club activities can be conducted. In (fig.1) and (fig.2), are illustrated similar arrangements adopted in the Science Museum Centre set up at Malda in West Bengal'.

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[1] . op.cit, A.Bose, pp.69-71.

In conclusion. the author would repeat what Grace Morley[1] has once said in her talk, namely that in planning his building the museum professional should not fail to visualise in concrete terms what 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, possibly in reduced size, without giving thought to how his museum differs form the model, but specially forgetting how times have changed and the whole concept of museum as well.*"

Regarding distribution of space in a small museum, Smita J. Baxi[2] opined as, 'if an auditorium is built on a levelled floor rather than a sloping one, it can be used for temporary exhibitions or seminars. If a gallery is spacious and has no island exhibits, it can be used for small meetings or cultural performances in spite of walls lined with paintings or showcases with exhibits. But for this purpose advance planning is required. If an auditorium is planned as a multipurpose hall, its lighting and ventilation, level of the floor, finishing of the walls will need consideration right from the beginning, as a multipurpose space. If a library room has to be utilized as a lecture room or as an "activities room," or for a film show, then its furniture should be planned and placed in such a way that alterations in arrangements can be undertaken quickly, windows could be opened or closed without much difficulty and there is arrangement for projecting slides and films.

Use of library for special meetings and small gatherings is a common feature at Museum and Picture Gallery, Baroda. This arrangement is made by temporary closure of library for its normal use.

If a series of small galleries are built with flexible partitions, these partitions can be easily removed for making it look like a large uninterrupted space for installing a large single exhibition for short period.

It will also be possible to use open area for purposes of exhibitions or cultural programme if they are located internally and are well secured. If the galleries are inter-connected, and if the verandahs are planned of greater width in advance, they can be utilized for small exhibitions. Internal courtyards, if planned can be used for out-door short-term

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[1] Grace Morley, *Proceedings of All India Museums Conference,* (Museums Association of India, New Delhi, 1971) p.16.

[2] . Smita J. Baxi, Building for a small museum, *Small Museum,* Museums Association of India, New Delhi,1975, pp. 72-73.

An open air film programme organised by the Bangalore Museum (Courtesy- *Museum*, v.XIX, n.4, Unesco)

A museum compound can be used to accommodate a workshop by artisans as seen in the case of previous site of Saputara Museum. A similar practice exists at Crafts Museum, except during monsoon.

exhibitions for display of sculptures and such objects that are not affected by the weather'.

The other public areas are likewise important for this concept of museum friendly and devoted to its service. Comfortable, attractive areas for sitting, resting and waiting, must be provided to the extent possible. An entrance lobby, where an enquiry counter and sales desk may be combined, some benches for the public, if possible enough space for a group upto 50 students to assemble before a tour, would fit requirements of economy of space, yet provide convenient, almost indispensable services for even the smallest museum. An auditorium or even modest lecture room may not be possible as space especially reserved for purposes of assembly in the small museum. A multipurpose hall would obviously be convenient, but also might be too wasteful of space. But, with movie and slide projectors on a movable stand, a movable screen, folding chairs, an exhibition gallery can be transformed into a reasonable efficient lecture room. Here reference to the "Indian context" is pertinent. A good number of Indian museums, limited in space, habitually use an exhibition gallery as a setting for lectures. There is another Indian circumstance to mention: in the climate of this country a garden setting is expected and is often provided even for small museums, indeed is frequently reserved for later units to be added to the initial small building. This garden increases the possibilities of provision for special events overflowing interior accommodations. After dark of a summer night in many places cultural and instructive programmes can be presented or movies can be projected against the building wall for an audience seated on the lawn (fig). The shamiana or pandal in the garden can serve a special large meeting or cultural programme. Wide verandahs are likewise usual in India and they provide extra space for public comfort, in shelter from sun and rain. They may even provide space for workshop or hobby groups to meet and work. In short, use of the outdoors to expand the enclosed space, to supplement it, but without risk to security of exhibitions or of storage is an Indian advantage.

Certain amenities are indispensable even for the smallest museum. Clean, cool water in a convenient but unobtrusive place. Public conveniences as well as staff facilities for locker and wash rooms must be arranged. They may all be modest in area but they have to be specific in purpose, and they must be well maintained. Prince of Wales Museum, Mumbai (though not small museum) has these facilities. Given the humid climate of the place, it is easy to understand and appreciate the need the lower rank staff feel for a good and immediate bath after working hard for a day.

The smallest museum must have some space behind the scenes for storage and for work. Well organized space for storage of the collections not on view is essential. Part may be storage in the usual sense of a place for safe keeping of material. Part may be what one might call "study" storage or "visible" storage, that is, space in which objects may be systematically arranged, probably quite closely spaced as compared with exhibited material, but easily seen, whether on stands for larger objects, or in glassed cases for smaller ones, all at least summarily labelled, so that for reference purposes the material is easily accessible. All storage areas must be secure and well maintained.

A small library open to the public for reference reading, with some of the leading periodicals on the subjects the museum serves would be highly desirable. Usually for a small museum a separate room may not be possible. It must then be in the Director's office, possibly open to scholars by arrangement, but always available for staff reference. If staff are generally too preoccupied by daily practical activities to be able to do much research they nevertheless have labels and exhibition guides or catalogues to prepare, they must study, identify and compile information on the reserve collection. Thus the standard reference books are needed. The author had come across the pathetic state of defunct and disfunctional libraries specially at small museums all over the country, right from Darjeeling in the east to Saurashtra in the west. It may be one of the earliest casualty that occurs in a museum due to shortage of resources. It is unfortunate if this important museum arm faces a closure, as it impedes or restricts the complete learning that has to take place through a museum.

Then there must be work areas: probably at least two small private offices, for the curator in charge and an assistant, whether called deputy or guide lecturer or education officer; space for several office workers (clerk, accountant, typist, the minimum) and for the storage of files; workshops, space at least for a carpenter and helper, who would be expected to be able to carry out all sorts of odd jobs of simple repair and maintenance, as well as gallery work. Studio space where mounting may be done, where objects may be examined, for referral if necessary, to a Conservation Laboratory, a dark room is needed for the photographer.

Obviously to be emphasized is the need for maximum flexibility of as much of the space as possible and ingenuity in planning for its often multiple uses as efficiently and conveniently as possible.

Behind the scenes, but of basic importance , would be the workshop, staffed by a carpenter and an assistant, and furnished with a few basic machine tools.

It was worth noting that the somewhat festival feeling of an outdoor evening event , at which a large attendance is possible, has wide public impact and promotional value'.

Discussing about distribution of space, Morley and Puri[1] stated, 'collections present many technical problems for exhibition and safe and convenient storage, as well as in connection with the plans for programmes and activities of an educational and cultural character. These affect the building in general and the immediate arrangements within it. Possibly a review of some of the technical aspects of installing the new building and of how problems have been met so far and what solutions are planned for the future, may have value for those concerned with museum planning and operation elsewhere.

On the positive side, too, is the auditorium which has fine acoustical qualities, seats 240 people and is provided with projection equipment for 16 mm film and slides. In the library adequate provision has been made for growth for many years to come, and it has the facilities for making both scholars and general readers comfortable. Both have been happily included in the first unit of the building. In other words, the means are already at hand for the functioning of the museum as far as research and public services go, even though, at present, workshops and offices are to some extent improvised.

One technical necessity that could not await a permanent allotment of space in a later phase of the building is the Conservation Laboratory. Because of its importance for day to day care of the National Museum's collection as well as its contributions to conservation for other museums and collections in India, it has been thoroughly installed and equipped in provisional quarters in the present unit.

Careful plans have been made for accommodating all that needs to be still added to complete and perfect its facilities for every type of conservation, care of oil paintings of the Western traditions.

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[1] . Grace L. Mc Cann Morley and K. N. Puri, The National Museum, New Delhi, *Museum*, v.14, n. 1, 1961, Paris, pp.70-72.

The housing of study collection, making them safe yet available to scholars and even to casual visitors interested enough to give the time to examine them, in view of limited storage space, is a major problem here.

Problems of detail, like that of devising safe and suitable lighting for the different kinds of materials, or of sacrificing ceiling height to air-conditioning ducts, are perhaps better explained in connection with illustrations. More than one error of detail can be attributed to lack of visualizing - from the time of the designing of the building more than five years ago- the character, size and speed of growth of the collections ; such errors serve to indicate where improvements can be made in the units of the buildings to follow. Meanwhile, the present building can be made to work ; it lends itself to the adaptations that have had to be made in order to show to advantage the varied material it accommodates.

The galleries are of good proportion ; the lighting, which had fallen into some confusion, is being revised according to the requirements of each gallery. Storage and work space can be improved even before additional units are added. As in all museum buildings the staff has found ways of providing the interior arrangements required by the collections, in all their variety, within the shell provided by the architects. The museum can therefore look forward with confidence to fulfilling the role foreseen for it as a national museum in the domains of exhibition, research, cultural and educational activities and service to the community and the nation'.

According to Mookerjee[1], 'the proposed new building of the Crafts Museum will have twelve main components, including display rooms and open-air arrangements; auditorium to seat 600; with stage and dressing rooms; lecture, demonstration and class-rooms; library and reading rooms; special exhibition hall; juvenile section; lobby, reception, sales counter; storage , laboratory and workshops, etc. It is becoming increasingly apparent that the philosophy which motivates exhibition and display in modern museums is that of creating a hospitable, relaxed environment, in which the visitor is encouraged to identify himself with the exhibits'.

[1] . Ajit Mookerjee, Crafts Museum, *Marg,* v.XIX, n.1, Marg Publications, Bombay, 1965, p.18.

Storage area of Natural History specimens, Bombay Natural History Society

Reserve Collection Area:

The surplus exhibition material of a museum is to be preserved in a proper area with appropriate conditions. This material may be of exhibition, education, exchange and of research value. So this area is equally important as an exhibition area. It should be properly classified, lighted, ventilated and maintained. It is not a mere dump godown as material preserved away from view is not prone to damage as the chances of its coming into notice is comparatively less. So, due care should be taken in safeguarding the upkeep of reserve material. Different types of material require different climatic conditions, security provisions and storage furniture and accessories. Hence, storage areas should be located at different areas in a museum. The sensitive and valuable material requires checking at frequent intervals of time and the layout of these areas should facilitate this. The storage areas in different museums of India are as follows. Museum and Picture Gallery Baroda has a store room adjacent to the office of the curator of Art section. Prince of Wales Museum has its storage areas dispersed at four places. The valuable collection is located at a reinforced place. The most sensitive objects such as paintings are located in board room and are provided with air-conditioning. The other objects excluding stone sculptures are located in a separate room. This room is spacious, properly classified and suitably furnished and is adequately ventilated and lightened. The stone sculptures are stored in basement, slightly away from the main museum building, but within the premises of the museum compound. This storage area is also properly classified and furnished with suitable furniture. Majority of the museums surveyed were reluctant to show their store rooms for reasons of security. Employees of some museums pleading anonymity admitted that the storage areas of those were inadequately unclassified and unscientific.

The purpose of a store differs according to the subject discipline it serves in a museum. In museums of art it preserves and protects the rare and valuable exhibits. Here the concern is mostly safety against theft The nature of material to be stored also posses certain limitations. Unlike the art objects wherein a textile can be folded and a carpet can be rolled, majority of the natural history specimens, for example anatomical, thematic and mounted exhibits have to be stored as they are. Insect specimens are stored in drawers, whereas skin and hides are placed in trays which in turn are kept in drawers. This arrangement is found in the Bombay Natural History Society (fig.), the country's premier institutions on this subject. However it may be noted here the emphasis is protection

against pests and other agents of destruction and deterioration. Contrary to the above two priorities of concern the objective of store in a science museum is altogether different.

In science and technology museums work shops are the areas of importance next to exhibition galleries. Since most of the exhibits of science and technology museums are assembled storage area is of little importance.

According to Hebditch[1], 'related to the storage of collections are a number of other important areas. These comprise the archives and other records related to the collections are stored. These may be either recently generated, such as material related to archaeological excavations, or original records, such as business records linked to objects in the collection'.

According to Molajoli[2], 'every museum, whether large or small, must set aside one or more rooms for its reserves.

These storerooms need not be on the same level as the exhibition rooms ; they may be in the basement, in premises set aside for them in the general plan of the building, in separate rooms, or-in old buildings-adjacent to or on the floor above the museum offices. The essential thing is that they should be dry, safe, easy to inspect and adequately lit.

They will be permanently equipped for their purpose. Science collections need a great number of capacious wooden or metal cupboards, and the space in those must be put to the best possible use by dividing them in accordance with a systematic classification.

He further stated, 'in addition to the space set aside for the permanent storage of materials and supplies needed for the normal functioning of the museum, it is advisable to include and allocate sufficient space for the necessary packing and temporary storage of packing cases when temporary exhibitions are held.

This part of the building might also house the 'guard room' and other arrangements needed for rightly supervision of the museum. When the

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[1] . op.cit, Max Hebditch, p.500.

[2] . op.cit, Bruno Molajoli, pp.176-177 and 180.

Passage at Indian Museum.

Corridors of Salar Jung Museum.

museum is large enough to make such a measure possible and justifiable, this service section may also include living quarters for a custodian'.

Receiving Areas:

Every prominent museum should have a special loading and unloading platform for the receipt and lending of objects by the institution. It should be located away from the main public entrance of the museum, so that the transactions should not interfere with the movement of people during visiting hours. Further, it ensures better safety to objects both in terms of handling and physical security. This area should be provided with a projected and elevated platform, so that it would be easier to load and unload objects from the trucks. It would be ideal if a ramp is constructed attached to it. Salar Jung Museum and the National Museum have separate entry points for the movement of objects. Similarly Prince of Wales Museum also has a separate entry zone for transaction of objects. This area should function as a temporary store room as objects procured from outside should be verified, recorded and sent for treatment if required; for removal of pests or restoration etc. The objects lent to other institutions can be packed and dispatched from this area. In brief, this area should facilitate the inward and outward movement of the objects, without interfering with the normal routine activity of the museum and ensure the physical security of museum objects by being a protective zone.

According to Coleman[1], the reception area should comprise of the following features:

Lobby and adjuncts

The *check room* and the information desk are two ever-present features of the lobby. The latter also serves as a sales place for publications and postcards.

The check room is usually close to doors but not so near that a waiting-line might sometimes block the way. The checking counter should be long enough for several people at once if use is active.

For a building of any given occupancy, the required checking capacity naturally varies according to its location and the type of visitors it serves.

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[1] . op.cit. Laurence Vail Coleman, pp.122-125.

The information desk is usually the place where the business caller asks about his appointment, the visiting group leader finds out what to do and the general visitor asks some of the questions that only he can think of. It should be closer to the starting point to exhibits, staircase and passenger elevator.

The business of the information desk can be simplified by having a bulletin board with a directory and a calendar of events. And there should be a floor plan of the building on view nearly, as elsewhere at various points.

Control of offices is an important function of the lobby; arrangements should facilitate the exercise of this function from the information desk. The business caller ought to state his business immediately upon entering the museum. If a caller proceeds to an administrative office, his route should show good relationship of offices to lobby.

Public telephones should be provided for the use of visitors. Telephone booth may be located nearby the lobby. It is important to make some tasteful arrangement of phones in order to keep the lobby from later being marred by in appearance by having unsightly telephones'.

Laboratory:

Laboratory is the place where museum objects and specimens are treated for pests and for damage. As conservation of objects, especially of art objects is of paramount importance due to their irreplaceability, a place for their treatment is essential in any large museum. The scope of having a laboratory even in a small museum was discussed by experts of that field in Indian context like N. Harinarayana[1] Many prominent museums in India have laboratory/ies of their own. An account of them is as follows. The Museum and Picture Gallery at Baroda has two laboratories. One is situated in the basement and the second is located next to the European Art Gallery. Besides this the Department of Museums of the Government of Gujarat has another laboratory at Rajkot to treat the objects of the museums in that region. It is a pity that Prince of Wales Museum lacks this facility though it has some expertise to do the preliminary treatment by

[1] . N. Harinarayana, A Lab for a small museum, *Journal of Indian Museums*, v. XXXII, 1976-77, Museums Association of India, New Delhi, p.58.

makeshift arrangements. This may be because of the reason that the building is not fire proof in design, coupled with shortage of space.

Government Museum, Madras has a full-fledged laboratory. The Indian Museum, Calcutta also has an adequate laboratory (fig). It was under renovation when the author visited it during fieldwork The Victoria Memorial Hall also has a laboratory of its own. Similarly the Salar Jung Museum also has a laboratory. The National Museum Laboratory is one among prominent ones in the country. It used to function as a central laboratory of the country, earlier to the establishment of National Research Laboratory for the conservation of cultural property. The later is a central facility with advanced equipment and expertise to treat the objects which are beyond the capacity of museum laboratories.

The location of these laboratories in most of the museums is confined to upper floors of their buildings. The location of the laboratory over there is justified based on the nature and purpose of this area. It is advisable for a laboratory to be located on a upper floor so that the harmful or pungent gases and fumes that emit out of the chemicals and chemical reactions of the experiments, may easily be exhausted from there. But at the same time it is advised that it should not be located at a very upper height because it would be difficult to fight and extinguish fire in case of accident. The laboratory should be a well planned area, furnished with fire fighting equipment. It should be properly lighted and ventilated. The laboratory of the Department of Museology is an ideal example for lighting and ventilation. This could be clearly noticed in comparison to the gallery located in the ground floor, on how the lighting and ventilation arrangements of a laboratory are different and distinct'.

According to Molajoli,[1] 'the laboratories, too, must be proportionate to the size of the museum. In every possible case there must be a room for restoration work and for all the various technical operations required for the 'consideration' of the museum's possessions, whether these be chiefly works of art or objects of many different types. The premises set aside for this purpose must be reasonably spacious, well lit and well ventilated, equipped with every possible precaution against theft and fire, easily accessible from within the museum and from outside, so that any exhibit brought for restoration (which may be of considerable size and weight)

[1] . op.cit., Bruno Molajoli, p.178.

will not have to transported by a complicated route, so that any new acquisitions can be deposited there when they arrive and undergo any protective treatment, restoration, cleaning or disinfecting, before being taken into the museum and displayed'.

Moti Chandra[1] expressed his views regarding *'Laboratory and Preparation Rooms'* as follows: 'Preparation rooms and the laboratory should be accommodated on the first floor at the back of the museum. They should have north-lighting and should be equipped with facilities for heating and running water. Their situation at the back of museum would enable easy transport of exhibits to and from the galleries. They should also be provided with easy passage to the nearest street for the receipt and despatch of materials'.

Bose[2] stated, 'in museums of art and archaeology restoration of antiquities and works of art is a big responsibility as sometimes without restoration an object cannot be put on display. While major restoration work will be difficult to handle in a small museum the comparatively minor conservation work can certainly be attended to and for this purpose it is necessary to set up a small chemical laboratory. Restoration of equipment and apparatus of scientific interest also requires special facilities. Small museums should also have a workshop to handle minor repairs'.

Workshops:

Workshops are important fabricating areas in a museum, let they be of objects and accessories like dummies, mannequins, armatures, supporting frames, boards, showcases etc. There should be a provision in a museum wherein the craftsmen could keep their materials, tools and can also do their work. The Museum and Picture Gallery has a carpentry workshop at it basement. Similarly, there is a cabin for the electricians to keep their equipment and tools. There is also provision of space for them to sit and work so that they could fabricate and repair the furniture there. The location of these areas should be away and obscure from public circulation but easily accessible to galleries and other areas of a museum; in case of need.

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[1] . op.cit., Moti Chandra, p.47

[2] . op.cit., A. Bose, p.68.

It is extremely useful for a museum to have a photographic laboratory for records and studies which are a daily necessity. This may be situated in the 'service' section.

The air in the dark-room should be kept in circulation by mechanical means.

According to Molajoli,[1] 'a properly equipped workshop, kept in a suitable place, for carpentry and small mechanical and electrical repairs, etc. is most useful, not only in dealing promptly with urgent repairs and matters connected with the normal upkeep and satisfactory functioning of the museum building and its equipment, but also as an adjunct to the work of the restoration and photographic laboratories. It should therefore not be too far from these. However, it is equally important that the sounds of the work done there, and of the machines employed, shall not penetrate to the exhibition rooms. Both these conditions can be secured by a careful choice of position and cellar or basement rooms may consequently be preferred. In any case, there should be separate entrance, reserved for supplies and staff, placed at distance away from public entrance to the museum even if within sight of it, and giving access to the storerooms, reserves, main switches of electrical system and various controls. This will facilitate the co-ordination of general supervision.

Studios:

Artists of different kinds need studios for their work. Photographic studios have become an indispensable part of all leading museums for the importance of photography involved in various aspects of museum work. These studios should have proper facilities and equipment. Museum and Picture Gallery, Baroda has a photographic unit. Prince of Wales Museum, Mumbai also has a photographic section. Similarly, National Museum and the Salar Jung Museum also have photographic units. Smaller museums which may not need a full fledged photographic unit and may hire the services of photography from leading museum in proximity.

Modelling studios are also desirable in museums as they can serve a dual purpose. They can make replicas for the exhibition and educational purposes of the museum. They can as well prepare reproductions for sale to the visitors.

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[1] . op.cit., Bruno Molajoli, pp.179-180.

Taxidermy studios are unique with museums having natural history as a subject. The earlier notion regarding the position of studios is to located them away from the public eye so that the artist can work in isolation without disturbance. But with the modern concept of making museums more and more public oriented the idea is to bring them closer to the public view. Still the modern concept is virtually not found in practice in any of the museums surveyed. As per the old principles of museology the modelling studio at the Museum and Picture Gallery and the National Museum are located away from the public view.

Coming to the taxidermy studios, the one at Saputara Museum at its previous location was in row with the galleries. This is of course more due to limitation in the adapted building, than out of choice. Though public are not guided and expected to visit it they are not discouraged from doing so if they are interested. This kind of flexibility is virtually not existing in majority of museums of India. The practice of having public access to studios should be a welcome trend and worth emulating by all prominent museums. Of course, where the attendance of public is immense, the studio should be provided with glass windows there by visitors may not be allowed to enter the studios and disturb the work but can view and appreciated the activity. This would serve to give an idea to the public on the nature of work that goes on behind the scenes in a museum.

In Museum and Picture Gallery, the taxidermy studio is away from the galleries. The taxidermy activity at the Prince of Wales Museum also takes place behind the screens.

This is same at the National Museum of Natural History also. This premier institution on this subject also has a freeze-drying chamber at the basement. This is a technique that involves both artistic and mechanical work.

Library:

Museum libraries are predominantly reference libraries unlike the public libraries which are lending in nature. These are used mainly by the staff of museum, scholars, research fellows and the students. There are a few exceptions to this rule wherein the museum allows its visitors to use the library. National Museum Library is an example to this. Similarly, the Salar Jung Museum also allows the general public to use its library. Whereas the reference libraries are existing at Museum and Picture

Gallery, Prince of Wales Museum, National Museum of Natural History, Indian Museum and at some small museums such as Junagadh Museum, Natural History Museum at Darjeeling etc. At Indian Museum, different sections have separate libraries of their own .

Based on the nature and scope of their purpose their location in the museum varied at the above museums. The National Museum's library is prominently located adjacent to the entrance hall. But, though opened to public, the library of Salar Jung Museum is not distinctly placed. The library of the Museum and Picture Gallery of Baroda is located in a remote corner of the building. Similarly, the 'reference library' as it clearly states, at the Prince of Wales Museum is located in the first floor. The libraries at National Museum of Natural History, Junagadh Museum and the Natural History Museum, Darjeeling are also away from the public areas. It is advisable for the reference library to be located near the offices of curatorial and educational staff.

The library has to be well lighted and ventilated either naturally or artificially as in the case of the Prince of Wales Museum and the National Museum. Of course, even in the case of Prince of Wales Museum, the natural light and ventilation is supplemented by artificial means, in case of need. A library like that of the Museum and Picture Gallery, Baroda; needs special care as it is located in the ground floor unlike majority of the museum libraries, with a few exceptions as the library of National Museum. Looking at the logistic and technical aspects of load bearing, it is ideal for a library to be located in the ground floor. The century old museum building at Baroda might not be pest and termite proof and further the climate at this place is of dry weather, which favours the growth of silver fish. Infestation of rare books and valuable documents by termites (white ants), silver fish and other pests is neither uncommon nor unknown at libraries and archives; museum libraries are not an exception to this. Keeping these factors in view, the location of the library has to be duly selected and properly treated before it is put to museum use.

According to Coleman[1], 'the library is an important museum arm for both public service and the work of the curatorial staff. It is a reference department. In addition, the library may lend slides and photographs. The library's place in the building is best determined by considering the two

[1] . op.cit., Laurence Vail Coleman, p 161.

principal forces that pull upon it - that is, the demands of public convenience and of staff convenience. Public use calls for a location not too far from the entrance and under control of the lobby, and this points to either part of the ground floor or the front part of another floor convenient to the main stairs and elevator. Staff use indicates the second floor if curatorial quarters are above exhibits. Several large museums have departmental branch libraries. Some museums look upon the library as hardly more than a tool for the staff - available to visitors only on special request, and placed accordingly. But the best arrangement is to put the library in the best position considering both of its uses'.

According to Hebditch[1], 'the use of both classes of data, objects and records, demands the provision of adequate study areas for use by visitors. *Unhappily, many museums still do not provide the facilities to be expected in any reference library.* This space, or one closely related to it should also accommodate the indexes to the material held, ideally in a way which permits consultation directly by the user rather than through the curatorial staff'.

According to Molajoli,[2] requirements of *'Library, photographic collections, prints and photograph records'* are as follows:

'In every museum, the purpose to be served by the library must be carefully determined in order to provide it with the right amount of space and with suitable furnishings. A library which is to be open to the public has very different requirements from one used only by the curators of the museum. The latter case, however, is open to public as well. We shall, therefore, consider the requirements of the library in terms of its use, actual or anticipated by the specified group of people.

Here, too, much depends on the character as well as on the size of the museum. In selecting or designing the premises, the architecture should take all the normal structural precautions for library buildings, like anticipation of the growth of the library, which may end by filling the entire room with bookshelves.

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[1]. op.cit., Max Hebditch, pp.500-501.

[2]. op.cit., Bruno Molajoli, p.177.

The walls, doors and floors should be lined with some substance which gives adequate protection against fire and as far as possible keeps out sounds coming from the rest of the museum.

It is naturally preferable for the library to be close to the administrative offices. If it is to be used by visitors and students it must be readily accessible from the entrance hall of the museum'.

Regarding 'Lecture Room, Hobby Centre, Library', Bose[1] stated, 'The educational activities of a museum cannot be overlooked, whether it is a small or a large museum. For the benefit of the students in the community, the museum has to organize lectures with or without demonstrations, slides, etc. and periodically conduct film shows. A small lecture room will therefore be an useful adjunct.

Similarly museums have to set up hobby centres and art workshops for students so as to encourage and foster their creative abilities. In the summer and pre-winter holidays these hobby centres will always hum with activities if properly organized. A small library or reading room with popular books of interest to the student should also be added to the museum'.

Auditorium:

An auditorium is an essential requirement in a museum, to organize public functions. It should be located at such a place in a museum building that the audience who want to attend only the functions without visiting the museum, should be able to do it without disturbing the general public on museum visit. A review of the auditoria of different museums is as follows: National museum has an auditorium adjacent to its entrance gallery. The Museum and Picture Gallery, has an auditorium at the basement. It is located next to a gallery and is connected to it through a window. Because of this reason, the visitors movement in the gallery cause considerable disturbance to the programmes organised in the auditorium. Moreover, the small auditorium also have intersecting supportive pillars. Of course, this is a limitation of the structural design of the old building. Whatever may be the reasons, it distinctly falls short of an ideal modern museum - auditorium. The National Museum of Natural History has an auditorium at the grand floor of the building. Perhaps this

[1] . op.cit, A. Bose., pp.68-69.

is the most active auditorium of all the museums in terms of usage as it organizes regular film shows. Even the Museum and Picture Gallery also use to have such a daily programme earlier. Salar Jung Museum also has an auditorium but even this falls short of modern requirements. It is more lamentable situation as it is comparatively a recent museum building (fig.). The arrangement of seating, lighting and sound (acoustics) etc. were not properly envisaged. Strikingly appealing auditoriums are present at Nehru Science Centre, Mumbai and the National Science Centre, New Delhi (both constructed by the same architect-Kanvinde). It slopes towards the stage and is carpeted. The seating is comfortable, spacious and adequate. All other requirements are also taken care of. It is situated slightly away from the main entrance of the museum building and could be traced easily. The Prince of Wales Museum also has an auditorium-cum-special exhibition gallery by name Coomaraswamy Hall with a separate entrance to it. At the same time it is accessible from the key entrance gallery of the museum also. It only has a dais and no permanent seating arrangement because of its dual purpose.

It is suggested in museum practice that auditorium of a museum could be leased out to public. This is in practice at the Prince of Wales Museum. But, it should be conditional lease that safeguards the security and ideological interests of the museum. So, its construction is desired in such a way that it could be kept opened even beyond the regular visiting hours of the museum. This means that it should have a separate entrance, away from the main museum building and galleries.

However, it is advisable to have a separate auditorium, instead of the dual arrangement existing at the Prince of Wales Museum; as it forces a makeshift auditorium elsewhere in the museum if a function is to be organised when a special exhibition is installed in that area (fig).

In Coleman's[1] opinion, 'the auditorium, whether or not accessible from the main lobby, requires an entrance of its own and may need separate checking and lounge facilities. A separate entrance makes the auditorium available for independent use at any time. Another route to the lecture hall from the main lobby is highly advantageous'.

[1] . op.cit., Laurence Vail Coleman, p.111.

Further, Coleman[1] stated, 'many activities, educational and recreational, call for provision of assembly rooms in museums. Lectures, musical programmes, motion pictures, public meetings and other occasions for the gathering of sizable audiences are in the regular line of museum business. Practically all leading museums have a lecture room, or its equivalent in space that can be used for seating groups.

The floor of the lecture hall may be even or pitched, depending upon what uses of the space are allowed for. A level floor with portable chairs gives a room of possible usefulness alternatively for receptions and perhaps even exhibits; but a pitched floor means a room that might as well as fitted out with fixed seats and the other specialized appointments of an auditorium in any setting. There should be self flooring -acoustical treatment, ventilation and special lighting arrangements.

Lighting must be under ready and complete control, which means that it should be entirely artificial. Audience expect this; people are not always at ease in a hall with windows - which, by the way, is a good illustration of how largely our reactions to lighting of the hall is usual.

Seating arrangements must meet the requirements of comfort, which specify the distance between rows of seats, 32 inches or more from back to back, the number of sets ordinarily in a row should be fourteen.

The platform or stage, in most museums is arranged for lectures and motion pictures only; but some museums have the stage fully equipped. An equipped stage can be used for educational activities as well as for music and dramatics.

The arrangements of an auditorium should include a projection booth, voice amplifier and a filter screen'.

According to Moti Chandra,[2] 'in designing a lecture-theatre the following points are worth consideration:
(a) Entry and exit to the theatre should be separate from the main building so that the public may have access to the theatre when the museum is closed.
(b) Proper acoustics and,

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[1]. ibid., pp.167-170.

[2]. op.cit., Moti Chandra, p.47.

(c) Control of light'.

Offices:

These are the working areas of staff of the museum belonging to administrative, curatorial, educational and security divisions.

The administrative offices invariably have to be located far away from public areas. But, they have to have an easy accessibility for both their staff as well as business visitors. The arrangement of offices at Museum and Picture Gallery, Baroda; the Prince of Wales Museum and the National Museum are satisfactory.

One has to traverse through a very negligible exhibition area to reach there. At the Prince of Wales Museum, the administrative office is located at a place adapted for this purpose.

The offices of the curatorial staff consist of director's office and the cabins of the curatorial staff. The criteria of easy accessibility for visitors and staff is applicable to the director's office also, as for being the administrative head; his/her office is frequented by both the staff and the visitors for various purposes. Thus the location of it at Museum and Picture Gallery, Baroda and the Prince of Wales Museum are satisfactory'.

According to Coleman[1], 'the place in the building that is best for curatorial space follows necessarily from the general organizations scheme. One arrangement suggests to keep curators in contact with each other and within the ambit of the director, rather than at far points where they can entrench themselves in comparative isolation. This also suggests that the curatorial rooms be placed where visitors can get to them easily'.

The location of the office of the Director of the Indian Museum is at a very remote place in the museum building and is not in keeping with the importance of the position of the director. The location of the director's office at the National Museum and the Natural Museum of Natural History are far away from the galleries, which is not a very ideal situation as the mere presence of administrative head nearer to the galleries and his movement in their vicinity facilitates supervision on his part even on en route to his work place, as well as easy communication. The arrangement

[1] . op.cit., Laurence Vail Coleman, pp.187-188.

of director's office at the National Council of Science Museums is very ideally built. It is a glass cabin adjacent to administrative offices, facilitating the director to watch the working of staff occasionally without any special effort.

A Boardroom can be constructed attached to the Director's Office. An arrangement of this type is found at the Prince of Wales Museum. An opinion in favour of this was expressed by Coleman stating, 'the offices of the director and business staff form a category of space that sets problems quite distinct from the problems of curatorial offices and other special work rooms. The number, size and nature of the needed administrative offices will naturally depend upon the particular institution; but every museum, whether large or small, should have adequate and well placed space for its administrative personnel. The building that fails so to provide is obsolete in that respect before it is put into use.

Location of administrative space in the building is a matter of very practical concern since business visitors should not have to be sent exploring through the building (least of all before and after the public is admitted) in order to reach a member of the staff. The route from the main entrance to the office should be under control in the lobby. This is partly for convenience and efficiency. The path to offices from entrance should be short and direct. In a small museum the space for staff - often a consolidated space for the person who is all functionaries in one - has to be where it can give the best possible command of different parts of the building.

Rooms required for administrative work begin logically, with a board room for meetings of trustees; but practical considerations in all, save the largest museums, suggest that the *board room be made a part of the director's office.* Where the board room is separate it should communicate with the director's office, and should be planned with a view to its general use as a room for meeting. An institution staff structure gives a prescription for office space'.

According to Molajoli[1], 'the space set aside for the offices of the management and administration will vary according to the size of the museum, the extent of its cultural activities and the size of the staff. The minimum would be an office for the director, space for curatorial offices a

[1] . op.cit., Bruno Molajoli, p.178.

third for administrative services and such extra premises as they may require.

Large museums, which have an independent administration are controlled by a board of governors or trustees, will need a room for board meetings.

The office section should be connected with the museum, preferably through the main entrance hall so that there is a single channel of communication with the public.

Moti Chandra[1] stated about 'Offices, Library, etc.'- For the effective working of a museum the following items are essential to its architectural plan.

(1) Administration offices.
(2) Accommodation for research collection as distinct from public galleries.
(3) Rooms for the convenience of those engaged in the study of those collections.
(5) Lecture theatre equipped with modern stage which could be used for dramatic and film shows, lectures and other cultural activities.

About 'Office, Public Facilities, Etc.' Bose[2] stated as'

'Working space for Curator, where he can attend to administrative matters and his curatorial responsibilities, is surely necessary. Similarly toilet facilities or provision of drinking water will have to be thought of '.

Curatorial Cabins:

The location of these has no understandable relevance to the nature of curatorial duties in many of the museums surveyed during field work. There are a few exceptions to this. In the Museum and Picture Gallery, Baroda these are located nearer the respective sections. The office of the curator of art is situated adjacent to the art gallery. Similarly, the office of the Curator, Natural History is positioned at the entrance of bird gallery. As curators are the sectional heads, this type of arrangement would facilitate better supervisors and academic activity. The location of the

[1] . op.cit., Moti Chandra, p.46.

[2] . op.cit , A. Bose, p.69.

curatorial office of the Natural History section at the Prince of Wales Museum is adjacent to the galleries displaying that subject. Similarly, the office of the curator of art is nearer the art gallery. But, the location of this office is at a very remote corner. The position of office of keeper, public relations section near the entrance of the National Museum is location-wise justified.

Laurence[1] stated, 'The position of the curatorial office overseeing the respective gallery/ies was suggested by experts (fig.). Wherever possible, such an arrangement should be followed. The author agrees to this opinion and differs with the contrary view expressed by others that this arrangement would not allow serious research work that needs to be carried out by a curator, because of the disturbance caused by the visitors movement. It is a well known fact that the curator has to be a 'jack of all' and need to undertake a wide range of diversified tasks in a day at his office. A curator's office could always be constructed in such a way that it allows supervision of the gallery, as well as allows him to concentrate on a serious work, by use of material such as glass, which is transparent and sound proof'.

According to Hebditch[2] 'wherever possible and required, an 'open storage' area is to be constructed next to curatorial offices. This place can be used for study and research activities both by curator and the scholars, research fellows and students who approach museums and request for close accessibility to the objects. The term 'open storage' is thus self-explanatory as it denotes that objects will be provided with all the security measures required in storage whereas at the same time they are accessible; unlike the objects kept in storage areas which are accessible exhaustively by the concerned museum staff. No provision of this type is noticed at any curatorial office. It is often forgotten that curators are supposed to be accessible to the public.

Offices of the Educational Staff:

The cabins and offices of the guide lecturers, educational officers and the liaison/public relations officers should be located close to the curatorial offices as these staff members need to work in close association for various museum activities. The coordination would be easier if the offices

[1] . op.cit., Laurence Vail Coleman, p 179.

[2] . op.cit., Max Hebditch, p.501.

are located close to each other. The location of the cabin of guide lecturers is very ideally situated near the entrance at the Museum and Picture Gallery, whereas the office of the liaison officer is at a very odd place. It is on the recessed area of stairs leading to galleries, with no relevant office nearby. In that way it is not only awkward and isolated, but is also very congested. This mars appearance of a museum and affects the efficiency of its work.

Service Quarters:

According to Coleman,[1] 'housekeeping services of the museum are a varied lot of activities having to do with supply, maintenance, shop work, and with the arrival, movement, and departure of museum objects and exhibitions. The artisans and laborers of the service force engaged in these, work under supervision are expected to use a service entrance, which leads to workrooms and other parts of service quarters. The service entrance is expected to have elevated to facilitate truck deliveries and pick-ups. As a rule this entrance is at the back or side of the building. The rooms of the registrar and photographer should be grouped with service quarters since recording and photographing of museum objects that come and go can best be carried out near the service entrance.

The service entrance leads directly to the receiving room with a packing and unpacking area. This is the distributing point for the entire building.

The loading platform should be designed to take account of the sorts of material and the sizes of trucks that are destined to make calls upon it. It should give handling space at the tail. The platform should be horizontal, and it should have a narrow flight of steps leading to it from the ground for the use of people on foot.

The receiving room is a focal place to which incoming and shipments come for unpacking and distribution within the building, and outgoing shipments go to be packed and sent away. Other rooms having to do directly with these functions, that should connect are the temporary storage room for crates that are saved for return of their contents, and the registrar's and photographer's quarters in which museum objects coming and going are recorded and perhaps kept for a time for the purpose'.

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[1] . op.cit., Laurence Vail Coleman, pp.189-190.

Hebditch[1] stated about 'Supportive services'as,'in support of the collections space must be found for conservation laboratories and studios, the reception (and decontamination if necessary) of incoming material and facilities for staff involved in fieldwork, research and collecting activities. In support of the presentation of the collections must be workshops, photographic facilities, design studios, offices for editorial staff, publications storage, information and public relations activities.

The relative proportions of each supportive service may vary substantially. For instance, the space required for library and store depends on the extent of a museum's involvement in research and collecting programmes in the field'.

Changing Rooms:

For the household staff, changing rooms are to be provided, where they could wear the uniform when they join duty. They should also be provided with cupboards to store their belongings and carriers of food. Further, there should be enough space to store their tools and implements.

Besides the above facilities, that a museum provides to its collection and its employees; it also has to cater to some basic facilities to the visitors, being a public institution. The facilities are enlisted as below:

Security Office:

This should be located at an area where from the counter action to any activity involving vandalism, theft and any other disaster could be easily initiated. In most of the museums it is oriented towards the entrance. At Museum and Picture Gallery, Baroda; though there is no security office as such, the security systems are installed at the entrance of the museum, located outside the building. At the Prince of Wales Museum, it is distributed at two places. The security alarm is located near the inquiry counter, whereas the television screens connected to closed circuit cameras are located in the office of the Assistant Director of Administration (fig.). At National Museum, there is a special security room where from the security measures could be monitored.

[1]. op.cit., Max Hebditch, p.501.

PUBLIC FACILITIES:

Parking:

According to Coleman[1] 'parking is a problem of varying seriousness depending upon the location. For the staff at least there may have to be a private parking space. the staff size gives the clue to the number of places required. Some museums have parking space for public. Some have vacant land nearly, where it is easy to park'.

According to Molajoli[2], 'Part of the surrounding grounds may also provide space for a car park'.

Reception:

According to Hebditch[3] 'the most essential requirement is an entrance hall in which the visitor can orient himself. The entrance hall should include space for waiting, sitting and the assembly of parties of visitors, with clear access to other reception areas. These may include toilets, public telephone, refreshment facilities, educational facilities, lecture theaters and shops. To service these public reception areas there must be supportive offices such as information facilities, ticket issuing arrangements and cloak rooms. It would not be unreasonable that these spaces plus the necessary corridors for communications within the building should take up perhaps 25 percent of the space is a museum'.

According to Yani Herreman,[4] 'the reception area is especially important as it outlines the different opinions open to visitors and gives them the opportunity to get into the right frame of the mind for their visit'.

About *The Museum Entrance,* Moti Chandra[5] stated, 'the entrance to a museum building is expected to meet two-fold needs: (1) Control of visitors, and (2) Convenience of the public. Control implies the taking in

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[1] . op.cit., Laurence Vail Coleman, p. 50.

[2] . op.cit., Bruno Molajoli, pp. 146-147.

[3] . op.cit., Max Hebditch, p.499.

[4] . op.cit., Yani Herreman, p.199.

[5] . op.cit., Moti Chandra, p.46

or removal of objects from or within the museum. For this reason it is essential to have only one museum entrance for the entry and exit of the visitors. The museum entrance should also be large enough to prevent over-crowding and proper counters should be provided for storage of the personal effects of the visitors such as umbrellas, sticks, cameras, etc., and for the display and sale of museum publications.

Ticker Counter:

If a museum charges entry fee from the people, a ticker counter is to be located near the entrance. In that case, there should be some space for the visitors to form a queue (fig.). The Museum and Picture Gallery, Baroda; the Prince of Wales Museum, the Indian Museum have their ticket counters right at the entrance of the building. It causes inconvenience due to crowding of people in large number. So, considering this aspect, the location of ticket counter in the entrance hall would be ideal, as it is the case with the National Museum.

Check-in-Counter and Cloak Room:

Till recently, the check-in-counter and the cloak rooms used to be located near the ticket counters. But, with the spurt in terrorism in the country during recent past, it is no more advisable to situate these in the main museum building. These should be at a considerable distance away from the museum building as it is in practice now at the Prince of Wales Museum, Mumbai. The check-in-counter is right at the entrance of the National Museum building. This practice is the second best option.

Telephone Booth:

A public telephone is a basic amenity to the visitors. A museum should provide it at the entrance of the building, situated in a corner. As a booth in an exhibition area would be too obtrusive, all prominent museums provided a public telephone at a remote place at the entrance as it is in vogue at the National Museum and the Prince of Wales Museum. However, Museum and Picture Gallery, Baroda has a booth as such at the entrance of the museum.

Water Cooler:

In a tropical country like India, drinking water facility should be an essential requirement at all public places. So, a water cooler should be

Ventilated lavatory

provided, preferably at the entrance of the museum. At Museum and Picture Gallery, Baroda it is situated on the way to the entrance and very near to it. At the Prince of Wales Museum, it is near the key gallery and at the National Museum, it is adjacent to the entrance hall. In the museums, where it is slightly away from the entrance position, a pictorial signage should indicate its direction and location.

Toilets:

These are another compulsory requirement in a public space. At Museum and Picture Gallery, Baroda these are located far away from the building and are too primitive in design. At the Prince of Wales Museum, they are at the basement, below the stairs. These are poorly ventilated. Even at the National Museum of Natural History also they are in a poor state. The National Museum has sufficient number of toilets, which are proper both in design and maintenance. This is an example worth emulating by other museums. Of course every museum cannot afford to have such modern and sophisticated toilets. But, even a simple design and accurate construction can be properly maintained. The condition of toilets of Indian Museum is sub-standard and that of the Salar Jung Museum, is average.

Regarding *Sanitary Arrangements* Moti Chandra[1] stated, 'very few museum buildings in India are provided with proper sanitary arrangements. It should be impressed upon the architects to provide a modern museum building with proper sanitary arrangements which should be within easy access of the visitors. The offices should also be provided with such arrangements'.

Cafeteria:

As visitors spend considerable time during a museum visit, an eatery is an indispensable requirement in a museum. Museum and Picture Gallery, Baroda has a canteen at its entrance outside the building. Similarly, Salar Jung Museum also has a restaurant at its entrance outside the building. In addition, it has a restaurant inside the building. National Museum has a restaurant at its basement. The Prince of Wales Museum has no restaurant of its own on its premises or inside the building. As mentioned earlier, the design of this museum building is not fire proof.

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[1] . op.cit., Moti Chandra, p.46.

Moti Chandra[1] further stated, 'the restaurants to be located in the premises or in the museum building should operate under the controlling authority of the museum or else they would cause legal problems of different kind as it was the case with the Museum and Picture Gallery, Baroda.

Provision of a Refreshment Room.- For the convenience of the visitors a modern museum building should be provided with a refreshment room, preferably on the ground floor or even in the museum garden, on modern lines.

Moti Chandra[2] further sated, 'the museum buildings are totally unfit for the purpose of exhibition, their furniture poor, and we have yet to see a museum with a lecture theatre and the modern amenity of a restaurant in which a tired visitor could get refreshing drinks. This is a dismal picture indeed and unless the question of the importance of the museums in the national life is not thoroughly discussed by the competent authorities and their place recognised in the scheme of national reconstruction the museum activities are bound to languish for years after the war is over.

[1] . op.cit, Moti Chandra, p.46.

[2] . Moti Chandra, National Reconstruction and museums, *Journal of Indian Museums*, v.1, Museums Association of India, New Delhi, p.16.

The degenerating facade of a centenary building.

Portion of a tower falling off.