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LOUISVILLE WATERFRONT
PUBLIC LIBRARY

1996 THESIS DOCUMENTATION

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My Family

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The concentration of this thesis will challenge the concept of an archetypal public library in hopes of reinterpreting the functional programming and design of the facility. This proposed interpretation is a reaction to the theory that standard libraries have become obsolete in our current technological and cultural context. To disprove this position, I hope to address questions pertaining to the community value of a public library and the validity of a physical library in the digital age.

The premise of this project is not to simply streamline a traditional institution for the technology of the 21st century, but to determine what we, as a society, will carry with us in our constant societal redefinition and evolution. Andrew Carnegie stated that "the very best gift that could be given to a community" was a public library. I hope to extend this statement to be true today.

"The electronic revolution makes human encounters, which are the real basis of community, even more valuable and necessary, not less so." -Craig Hartman, Architecture
The archetypal recipe for library design has traditionally consisted of at least two essential ingredients. The most dominant allotment of area is usually dedicated to the storage of a library's primary attribute: its information collection. The remaining additional spaces are supplied for supportive functions such as reading areas, search catalogs, administrative offices, and circulation desks.

Today however, information is most efficiently stored in the form of digital media. Digitized information, from a physical perspective, is virtually invisible. In an ideal electronic library, there would be no storage shelves or card catalogs, only terminals for information access.

The most revolutionary characteristic of digitized media, however, is its portability. Digitized information is not a site specific entity like the common book. It is very easily distributed at the global scale as long as there is a network in place. Through the linking of millions of networks, any piece of information is theoretically available. To put this in perspective, a simple home computer (given the right connections) has access to every book ever written and any piece of music ever recorded.

Quite understandably, a question becomes "If I can access everything I need at home, what is the need for a public library building?" In the architectural community, perhaps library design will be the first ripple ensuing this electronic revolution. A paradigmatic shift seems almost inevitable. Will libraries continue to be constructed, evolving and maintaining their status as a communal well? Or will contemporary generations of libraries be discontinued, in favor of internet addresses accessible from a home computer.

This thesis makes the assumption that the "physical" library will continue to serve the role of a community resource and just as importantly, contribute a variety of spaces for the public's gathering and activities. This creation of place becomes crucial to the physical library's contemporary existence. It is the attribute which is most likely to preserve the building type for future generations of communities.

In theory, if a purely electronic library were established, the only physical space requirements would be the areas dedicated to access terminals and the typical notions of circulation and "working" space. By dissecting this hypothetical facility, it becomes apparent that the "supportive" space is truly the most unique component of the electronic model.

The perceived quality of the above library is no longer quantitative, or dependant on its collection of resources, since electronic information is universally accessible. Perhaps the new basis for judging a library's essential worth would be in determining how successfully it integrates public gathering and work spaces with the computer terminal.

Therefore, the true function of an electronic library becomes the ability to stimulate encounters and meaningful physical interactions which are not otherwise possible at home.
In describing the physical properties of digital information, Nicholas Negroponte, in his book *Being Digital*, makes the distinction between the existence of an atom and the existence of an electronic bit. Both of these units are similar in the fact that they are fundamental building blocks to a greater whole.

For example, atoms are fused together to form a molecule. These molecules eventually join together to form a unique physical element, such as a drop of water. Very similarly, bits are linked together to form a string, or a series of eight numbers containing either 1's or 0's. These binary expressions are decoded by a computer to give a specific meaning to the user. In other words, the to produce a picture of a drop of water, thousands of binary expressions are linked together to produce a series of pixels which together compose an image.

The difference between atoms and bits arrives when you analyze their physical existence. A bit has no color, size, or weight, and is indistinct unlike the molecule. A bit only has the presence of on or off, black or white. A molecules condition of existence, however, is not as cut and dry. A drop of water may begin to decompose or evaporate, forming "gray" matter, rather than a condition of black or white. A digital bit on the other hand leaves absolutely no "residue" of its existence, and because it can be perfectly cloned and moved at light speed, it is universally accessible. The global accessibility of digital information indicates that all that is needed to connect to the endless sea of information is a canal or distribution channel.
In recent years there has been a noticeable effort to popularize the image of a library within the community. The Public Library Association (PLA) has recently suggested that libraries adopt the image of a "popular merchandised library". In other words, they should offer materials which are appealing to the mainstream. Charles Robinson, a Baltimore Librarian, sees most public libraries as "attempting to be the French restaurant of institutions rather than the McDonald's of information and materials distribution. It is his belief that if a library does not cater to the general community, it is likely wither and die.

The library proposed in this thesis will certainly be electronically influenced, but not dominated. Aside from being a "village of electronic information", the facility should also support the vast array of multimedia materials which the community requests for its enlightenment and entertainment. If the library is successful in delivering popular resources, perhaps patrons may be more generous in their donations, justifying their support compared to the cost of renting from a video store or paying for an on-line commercial service.

The Louisville Public Library System currently does not have plans for building a new branch within the immediate future. However, this thesis proposal is an extension of a fund-raising project which is currently in progress. The Library 2000 project has been pursued in order to raise $3.5 million dollars for the installation and upgrading of computer systems within the library system's existing branches.

The implementation of this project does not wish to replace or detract from any of the existing branches. Rather, the proposed relationship of this library to the others would be associative. The existing main branch of the library would serve as the primary archival location for the more specialized collection of resources.
A librarian's mission statement is often focused on offering a diverse range of resources to a distinct range of people. As a result, a library designer's problem becomes an issue of comfortably fitting a number of distinct areas into one comprehensive and enclosed community, while allowing for almost inevitable expansion in the future.

Perhaps as a related precedent, the retail mall is very similar to the way a contemporary library would want to be patterned. The most revealing feature of this analogous model becomes the concourse, the thread which links the all the distinct zones (shops) together.

This large circulatory vein offers an excellent opportunity for the establishment of strong public volumes. Users can plug in their lap top computer to the library network, drink a cup of coffee, watch the daily news, or converse in groups without regard for disturbing other patrons.
An early decision in my thesis was to connect the project somehow with the Ohio River. After serving my internship within the vicinity of the river, I noticed how drawn everyone was to the water's edge, but yet how little public space was designed to accommodate pedestrian traffic. I soon learned of the Waterfront Development Corporation's plans for construction and decided that their site would be an ideal place for a thesis study.
Proposed Development of Louisville Waterfront
A. Public Components
1. The Parkland
2. The Promenade
3. Festive Space
4. Public Wharf
5. Public Attractions
6. Public Amenities
7. Water Features
8. Recreation Areas
9. Bicycle Trails

B. Commercial Components
1. Housing
2. Retail
3. Entertainment
4. Business and Office
5. Hospitality

C. Support Components
1. Parking
2. Flood Protection
3. Vehicular Access
4. Transportation
5. Pedestrian Access
The land near the river's edge is roughly low-lying and level, sloping steeply from the top of the bank at +440' elevation to the river's normal pool elevation of +420' above sea level.

Louisville has endured two severe floods in recent history: the floods of 1937 and 1967. The "Great Flood" of 1937, reached a level of 460.3' (40' above the normal level). Since 1937, the Flood Control System has been improved by the U.S. Army Corps of Engineers, along with the implementation of construction codes limiting the elevation of habitated spaces. This elevation is currently established to accommodate the estimated 100 year flood level of +451'.

This elevation limitation certainly discourages the construction of a building with expensive resources inside, such as a library. However, I derived a solution by borrowing from the concept of a floating restaurant. By placing a public space in the water rather than by the water, I believe the experiential factor of the architecture would be increased.
The initial studies were seeking to make the building as unobtrusive to the site as possible. Ideally, the architecture, landscape, and waterscape would become one.

The first attempts located the building within the subsurface of the water. A reference to the historic locks would be made by flooding the exterior court with water. This pool of water could be seasonal in occurrence to allow for conductive cooling during the summer months.

The building would be watertight, with a transparent membrane to give the observer a feeling of connection to the river.

After further investigation and reflection, I determined that this approach would be simply unpractical and expensive. Therefore a decision was made to make the building above ground.
After studying contemporary precedents and listening to the dialog of the information resource community, it became apparent that the architectural implications of the "informational transformation" may not be all that paradigmatic. In other words, simply because books can be stored much more efficiently in digital format, does not mean that the printed form will become extinct.

Another hypothesis established in my thesis statement (which was eventually disproven) was that libraries may be economically threatened due to the lack of governmental subsidy.

In an article appearing in Metropolis magazine concerning the state of contemporary library design, the author Robert Neuwirth stated that by 1996, more than $2.7 billion in library construction and renovation projects were completed. This figure is almost 50% higher than the total accumulated throughout the entirety of the 1980's. Neuwirth also clarified that libraries are not in danger of losing money because of federal budget cuts. In reality, the money used to support a public library comes mostly from local sources— with 80 percent coming from municipalities, 12 percent from the states, and just 1 percent from the federal government.

My response to this article was to shift the focus of my design to emphasize the dynamics of public space rather than the renaissance of technology. Karen Muller, the executive director of the Library Administration and Management Association stated that "Libraries are one of the few public institutions that are still truly public." In architectural terms, it seems that the redefinition of the public library can best be described by a shift in the variety of functions which the facility can accommodate. In libraries across the country, auditoriums, children's playgrounds, and even synagogues have been incorporated within a facility. Simply put, the critical intent of my thesis was now to design a large public realm capable of engaging the community in terms of activity and gathering space.
The framing concept from this project stems from a statement by Charles Moore in his book *Water and Architecture*, as he was describing the influence of a waterfront within a city:

"Like veins and arteries, rivers and canals are waters of connection and communication."

The existence of Louisville as a major urban development can be chiefly attributed to the Ohio River. This channel established a significant connection during the Industrial Age, allowing the transfer of physical materials and people throughout the mid-west. If one were to take the position that we are now in the information age, this building could represent an artifact of transformation paying homage to the site which is largely responsible for the creation of the city.

The visual forms and materials are established to be "regional" in character. In other words, one could identify this building as "belonging" to the site either physically or symbolically. These connections are made by references to:

**The Barge:**

The foundation of the conceptual approach is simply putting a building on the water. As a buoyant device, the barge seemed most natural due to the locality of form and craftsmanship. (Jeffboat, Inc., across the river, is the largest inland naval manufacturer in the United States.)

**The Bridge:**

When I was younger, I recall traveling through Louisville in order to visit my grandparents. I believe the only anticipated experience of the five hour drive was passing through the monstrous bridges which link Indiana to Kentucky.

Experientially, I wanted to harness the contrast of traveling over land then water as a means of passage from one place to another. This act, I believe, will allow the user some sense of transcendence from their daily activities.
I initiated the process of building design by considering how the building would perform in pragmatic terms. In order to maximize efficiency in construction and manufacturing, I decided that the majority of the building (structure, envelope, floor, and partitions) would all be constructed of an identical module. This module would consist in its most basic state as a 2'-0" x 3'-0" x 1'-0" metal box frame. Further modification of the box frame would allow for the attachment of cladding, insulation, and/or shading devices. The dimensions of the module system were driven by a 20' structural grid compatibility as well as human proportions.
design process I

Cross Section

Steel Tubing (Reinforce?)
Cost Consideration?
I then began planning how the overall composition of the facility would be organized. My first approach was to divide the functional requirements into two very basic components: functional and circulation zones. The concept was initially to have the two run in orthogonal opposition to one another to emulate the relationship of a gridded street system within a city. The intersections that were created by the two entities could be dedicated to public gathering spaces.

For major expansions, such as the additions of other buildings, I established a pattern of growth related fractal geometric principles. These principles would theoretically allow additions to expand in an exponential fashion while keeping the primary ordering system intact. According to Aaron Cohen, a New York based architect who has been designing libraries for over thirty years and has consulted on over 900 facilities, an average library's facilities doubles every 14 years. In other words, a library designed in 1982 now needs twice as much space. To accommodate this rather troublesome aspect, I made sure to design contingency shell spaces for immediate expansion.
FOURTH FLOOR PLAN
SCALE 1:200

1 ENTRY PAVILION
2 BRIDGE
3 COMPUTER LAB
Entry Corridor

The Entry Corridor is to serve as the welcome mat for the visiting patrons. Activities included in this passively conditioned space include:

1) Checkout desk and information counter

2) A "video wall" containing a variety of multimedia displays concerning everything from local activities to the most recent stock quotes.

3) Community display gallery showcasing artwork or local artifacts.
Resource Display

The Resource Display portion of the facility is the connective element between the Entry Corridor and the Reading Wing. It was established to be circular in order to:

1) provide a central focus and transitionary space for the building

2) simplify the resource categorization into four distinct quadrants

3) define the process of "browsing" as cyclical rather than lineal
Commercial Commons

At the first floor of the reading wing, space has been dedicated to house at least several independently owned businesses. These businesses would most likely consist of a cafe, a copy center, a newspaper stand, and a coffee bar.

The intention of this integration was two-fold. First, I thought that the presence of commercial activity would contribute to the sense of casualness, breaking the stereotype of the quiet, hermetically sealed library which most of us are accustomed to. Secondly, I believe that the businesses would provide a substantial source of economic income for the library foundation.
Communicative Wing

(shown unfurnished)

The Communicative Wing was designed to be the counterpoint of the Quiet Wing. It consists of a variety of conversational seating spaces and group meeting tables placed along balconies overlooking retail spaces below.
Quiet Wing
(shown unfurnished)

The Quiet Wing is adjacent to Resource Display cylinder in order to allow patrons a place of solice to read a book or work at a computer station. Ultimately, the interior space would be broken down into smaller, more intimate spaces using overhead soffits and varying ceiling heights.
In reviewing the outcome of building development, I am somewhat disappointed that I did not have time to produce a completely comprehensive presentation. For instance, I would liked to have reached the stage of analyzing building performance in the categories of daylighting and HVAC dependency as it results to the building's envelope. The other aspect which I wish I could have developed further is the enrichment of interior spaces (seating arrangements, task lighting, etc.) Although these aspects are not yet completed, I believe this building was successful in at least in addressing their significance and implications during the maturation of the design process to allow for a rather painless implementation. My future intentions with this project will be to develop some of the ideas I mentioned above and use the project as a marketing tool for future employment. Overall, I am grateful that I undertook a building of a rather large scale and complexity. It has taught me the importance of establishing a list of priorities during the design process and that these priorities are best attacked using the "multi-tasking" approach of designing both in the micro and macro scales simultaneously.
Phoenix Central Library
Phoenix, Arizona
bruderDWLarchitects

This precedent study represents an example of central core circulation. The atrium formed by this enclosure creates a very active and exciting "heart" to the building. Because of the central void, 4 wings are established, then functionally defined by the designer. I believe this scheme creates a simple and comprehensive environment for the user.

The architect created an interesting solution to systems integration by placing "saddle-bags" or vertical service volumes on the east and west facades, therefore protecting the interior shell from sun exposure.
Library Square  
Vancouver, British Columbia  
Moshe Safdie and Associates

Safdie designed this $125 million dollar facility to shape "a civic place with a sense of civic identity." Integrated with the library are restaurants and a large number of office spaces.

The plan is simply organized by placing the seating areas in an isolated band encircling the perimeter of the building. Catwalks are used in the atrium to connect the libraries "essential core" to the more private reading spaces.
Exeter Academy Library
Exeter, New Hampshire
Louis Kahn

Visiting Kahn's library in New Hampshire made me appreciate a designer's opportunity to manipulate light and spatial hierarchy in order to increase the value of an architectural experience.

I believe the most influential aspect of this building on my design was the use of volumetric contrasting to achieve varying layers of privacy.
ADMINISTRATION / CIRCULATION DESKS

SQUARE FOOTAGE 16,401 sq ft

DESIGN CRITERIA This zone shall serve as the primary hub for staff activity. The reference and circulation desks should seem almost gravitational to the patron.

USERS Staff, Administration, Patrons

ACTIVITIES The staff is present for the sake of answering questions, and is responsible for the circulation and recirculation process. Patrons should approach one of several staff stations in order to check out materials of interest. Private administration offices and classrooms are also present in this zone.

EQUIPMENT 30 stations
30 rolling office chairs
30 circulation processing computers (connected to main network)
20 legal size desk drawers for personal possessions
20 telephones
10 recirculation shelving modules

TIME OF USE available library hours (8:00am - 10:00pm)

ACOUSTICS In order to acoustically isolate this space from conflicting adjacencies, a sound isolation requirement of at least STC 45 will be implemented. Sound resonance should be of a low reflexivity, thereby employing absorbent materials.

LIGHTING Neutral, uniform illumination is encouraged within this service space. Because of possible glare conditions, direct lighting sources should be avoided. The recommended intensity is 22 lux (2.0 footcandles).

THERMAL The HVAC system should maintain a comfortable range between 68-70 degrees Fahrenheit. Because of the electronic equipment to be housed in this department, the humidity level should be kept between 45-50 percent. Therefore passive means of ventilation are not recommended.

CIRCULATION Circulation from behind the desk to the commons mail should be as accessible as possible for the staff. Service access to other departments should be provided via service elevator. There should also be an immediate connection between the circulation desk and main archival area.

ADJACENT SPACES Reading commons area, commercial zone

CHARACTER Although each desk will change employees throughout the day, each station should have the ability to be temporarily customized, then quickly changed back.
CONCOURSE / DISPLAY ZONES

SQUARE FOOTAGE

11,318 sq ft

DESIGN CRITERIA

This circulation zone is the most crucial identifier and link of the library facility. It is modeled after the corridor of a shopping mall, tying various functions together in a uniquely enclosed public alley.

USERS

Staff, Administration, Patrons

ACTIVITIES

Circulation to and between buildings will provide most of the activity within this space. In intermittent areas, comfortable reading and discussion spaces will be defined to allow patrons and staff members to sit and enjoy a book or a cup of coffee.

EQUIPMENT

03 elevators
02 escalators
40 resource terminals
10 modular display panels
08 television monitors

TIME OF USE

available library hours (8:00am - 10:00pm)

ACOUSTICS

The activities contained within this space do not necessitate acoustical isolation. Therefore no sound absorbent materials are needed. The suggested criteria range for background noise is equivalent to 45-60 dBA. Masking may be provided via a hidden sound system or central water element.

LIGHTING

The desirable illumination is by constant color daylight. North windows and skylights are highly desirable. When artificial illumination is required, large semi-indirect fixtures should simulate moderate daylighting.

THERMAL

The HVAC system should maintain a comfortable range between 68-70 degrees Fahrenheit. However, because of the large volume of enclosed space. Passive techniques of solar heating and ventilation should be employed during certain times of the year.

CIRCULATION

Circulation between levels can occur either through public elevators or stairways. Emergency fire escapes should be placed according to existing codes.

ADJACENT SPACES

Entry, all departments, commercial zone, main reference / circulation

CHARACTER

This space should be developed as a successful public commons area, resembling the rich activities found in the corridor of an successful retail mall.
MULTIPURPOSE COLLECTION GALLERY

SQUARE FOOTAGE
10,544 sq ft (four stories)

DESIGN CRITERIA
This department is to house printed books, video cassettes, audio cassettes, compact discs, and any recording mediums to be commonly used in the future.

USERS
Adult patrons

ACTIVITIES
The majority of space will be dedicated for the displaying of recordings in various formats, arranged by type. Browsing would therefore be the most predominant activity. Approximately four television monitors, contained within the architecture, will preview various material from the libraries collection. The purpose of these preview stations is to inform patrons of recently received material and to add to the general ambience.

EQUIPMENT
159 shelving units for VHS format videocassettes
36 shelving units for audiocassettes
16 27” television monitors w/ parallel connection
04 ceiling embedded sound system
96 resource terminals

TIME OF USE
Available library hours (8:00am - 10:00pm)

ACOUSTICS
In order to acoustically isolate this space from conflicting adjacencies, a sound isolation requirement of at least STC 45 will be implemented. Sound resonance should be of a low reflectivity, thereby employing absorptive materials. The suggested background masking noise should approximate 45-60 dBA.

LIGHTING
Neutral, uniform illumination is encouraged within this display space. Because of possible glare conditions, direct lighting sources should be avoided. The recommended intensity is 200-500 lux (20-50 footcandles).

THERMAL
The HVAC system should maintain a comfortable range between 68-70 degrees Fahrenheit. Because of the electronic equipment to be housed in this department, the humidity level should be kept between 45-50 percent. Therefore passive means of ventilation are not recommended.

CIRCULATION
Circulation between display units should allow two way movement as well as handicapped accessibility. A distance of 48 inches is recommended. In order to decrease confusion or disorientation, circulation around the gallery should be organized in an orderly, efficient manner. Entry to this department is via the common mall.

ADJACENT SPACES
Multimedia viewing/listening stations, Multimedia reference and checkout, Reading commons area

CHARACTER
Because of the similarities in function, this space may resemble a successful video or music retail store.
<table>
<thead>
<tr>
<th><strong>COMMERCIAL UNITS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SQUARE FOOTAGE</strong></td>
</tr>
<tr>
<td><strong>DESIGN CRITERIA</strong></td>
</tr>
<tr>
<td><strong>USERS</strong></td>
</tr>
<tr>
<td><strong>ACTIVITIES</strong></td>
</tr>
<tr>
<td><strong>EQUIPMENT</strong></td>
</tr>
<tr>
<td><strong>TIME OF USE</strong></td>
</tr>
<tr>
<td><strong>ACoustics</strong></td>
</tr>
<tr>
<td><strong>LIGHTING</strong></td>
</tr>
<tr>
<td><strong>THERMAL</strong></td>
</tr>
<tr>
<td><strong>CIRCULATION</strong></td>
</tr>
<tr>
<td><strong>ADJACENT SPACES</strong></td>
</tr>
<tr>
<td><strong>CHARACTER</strong></td>
</tr>
</tbody>
</table>
Collection Galleries ................................................................. 42,176 sq ft
Auditorium / Leasible Spaces .................................................. 18,570 sq ft
Circulation Desks/ Administration ........................................... 16,401 sq ft
Primary Corridor ................................................................... 11,318 sq ft
Reading Wing ........................................................................ 44,876 sq ft
Commercial Mall ................................................................... 22,438 sq ft
Expansion and Mechanical Spaces ......................................... 34,971 sq ft

Gross Square Feet .................................................................. 190,750 sq ft
<table>
<thead>
<tr>
<th>Item</th>
<th>Calculation</th>
<th>Sub Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Cost</td>
<td>$(190,750 \text{ gsf} \times $78.26)$</td>
<td>$15,061,620</td>
</tr>
<tr>
<td>Fixed Equipment</td>
<td>$(20% \text{ Building Cost})$</td>
<td>$3,012,324</td>
</tr>
<tr>
<td>Site Development</td>
<td>$(30% \text{ Building Cost})$</td>
<td>$4,518,486</td>
</tr>
<tr>
<td><strong>Total Construction Cost</strong></td>
<td></td>
<td><strong>$22,592,430</strong></td>
</tr>
<tr>
<td>Moveable Equipment</td>
<td>$(15% \text{ Building Cost})$</td>
<td>$2,259,243</td>
</tr>
<tr>
<td>Professional Fees</td>
<td>$(7% \text{ Building Cost})$</td>
<td>$1,054,313</td>
</tr>
<tr>
<td>Contingencies</td>
<td>$(15% \text{ Building Cost})$</td>
<td>$2,259,243</td>
</tr>
<tr>
<td>Administrative Costs</td>
<td>$(3% \text{ Building Cost})$</td>
<td>$451,848</td>
</tr>
<tr>
<td><strong>Total Budget</strong></td>
<td></td>
<td><strong>$26,357,834</strong></td>
</tr>
</tbody>
</table>
### TABLE 3: Library Shelving – Volumes per Linear Foot of Shelf Based on Subject

<table>
<thead>
<tr>
<th>Subject</th>
<th>Volumes per foot of shelf</th>
<th>Volumes per single face section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art (excluding oversize)</td>
<td>7</td>
<td>147</td>
</tr>
<tr>
<td>Circulating, non-fiction</td>
<td>8</td>
<td>156</td>
</tr>
<tr>
<td>Economics</td>
<td>8</td>
<td>156</td>
</tr>
<tr>
<td>Fiction</td>
<td>8</td>
<td>168</td>
</tr>
<tr>
<td>General literature</td>
<td>7</td>
<td>147</td>
</tr>
<tr>
<td>History</td>
<td>7</td>
<td>147</td>
</tr>
<tr>
<td>Law</td>
<td>4</td>
<td>84</td>
</tr>
<tr>
<td>Medical</td>
<td>5</td>
<td>105</td>
</tr>
<tr>
<td>Periodicals, bound</td>
<td>5</td>
<td>106</td>
</tr>
<tr>
<td>Public documents</td>
<td>5</td>
<td>105</td>
</tr>
<tr>
<td>Technical and scientific</td>
<td>6</td>
<td>126</td>
</tr>
<tr>
<td>Average for overall estimating</td>
<td></td>
<td>125</td>
</tr>
</tbody>
</table>

These figures should be reduced by at least 10% to avoid overcrowding and to allow for expansion.

### TABLE 4: Spaces Planning By Building Type (Contd.)

<table>
<thead>
<tr>
<th>Building/Use Type</th>
<th>Sq. Ft. per Unit</th>
<th>Area Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night clubs</td>
<td>25</td>
<td>person</td>
</tr>
<tr>
<td>Bars</td>
<td>18</td>
<td>person</td>
</tr>
<tr>
<td>Hotel</td>
<td>550–800</td>
<td>room gross</td>
</tr>
<tr>
<td>1.5 persons per room w/o</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>extensive conference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>30–60</td>
<td>person</td>
</tr>
<tr>
<td>Cultural</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public library</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stack space</td>
<td>6.08</td>
<td>bound valve</td>
</tr>
<tr>
<td>Reading rooms</td>
<td>20–35</td>
<td>user</td>
</tr>
<tr>
<td>Staff space</td>
<td>100</td>
<td>staff person</td>
</tr>
<tr>
<td>Overall</td>
<td>15</td>
<td>person</td>
</tr>
<tr>
<td>Museum, exhibition areas</td>
<td>7.5</td>
<td>seat</td>
</tr>
<tr>
<td>Theater and assembly areas</td>
<td>15</td>
<td>seat</td>
</tr>
<tr>
<td>Seating area, fixed seats</td>
<td>8–12</td>
<td>seat</td>
</tr>
<tr>
<td>Seating, movable seating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theaters, fixed seating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Does not include stage, lobby,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stagebackstage</td>
<td>100%</td>
<td>seating area</td>
</tr>
<tr>
<td>Performing arts theater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lobbies</td>
<td>3</td>
<td>person</td>
</tr>
<tr>
<td>Lobbies</td>
<td>30%</td>
<td>seating area</td>
</tr>
</tbody>
</table>

### ROUND VOLUME EQUIVALENCIES

All conversion factors have been tested for the appropriateness of their application to Indiana University collections. When the selected factor differs from the Baseline model, an explanation is provided. An explanation also is given when the type of material requires additional definition.

#### TYPE OF MATERIAL

<table>
<thead>
<tr>
<th>Conversion Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roughly Bounded Pamphlets</td>
</tr>
<tr>
<td>Manuscripts and photos</td>
</tr>
<tr>
<td>Microfilm Reels</td>
</tr>
<tr>
<td>Microfiche</td>
</tr>
<tr>
<td>Baseline conversion factor is for films; this factor is based on observation.</td>
</tr>
<tr>
<td>Slides</td>
</tr>
<tr>
<td>Baseline has no conversion factor for slides; use of X and Y</td>
</tr>
<tr>
<td>Sound Recordings</td>
</tr>
<tr>
<td>Visual Materials</td>
</tr>
<tr>
<td>Category includes videotapes, film, strip; factor is based on observation.</td>
</tr>
<tr>
<td>Books and Mixed Media</td>
</tr>
<tr>
<td>Category includes books, cases, conversion factor is based on observation.</td>
</tr>
<tr>
<td>Maps and Charts</td>
</tr>
<tr>
<td>Scores</td>
</tr>
<tr>
<td>Baseline conversion ratio of 15 to 1 changed as a result of actual observation of Indiana University collection.</td>
</tr>
</tbody>
</table>
appendix figures 1

DIRECT GLARE ZONE

VEILING REFLECTION ZONE

BRIGHT, CONCENTRATED LIGHT SOURCES ABOVE AND FORWARD OF THE TASK SURFACE PRESENT THE WORST CONDITION.

EFFECTIVE LIGHTING ZONE

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All seats:
- 27" height
- 16" seat height
- 34" depth

All tables, 30" bench:
- 16" height
- 34" depth

Full arm:
- 27" height
- 34" depth
Books


Articles


Hershberg, Ben Z. “Library is Headed for High Tech” Louisville Courier-Journal December 28, 1994: 04B.


“Library Connections and Directions” Louisville Free Public Library Publication, 1994


