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Library Buildings

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CONTENTS

Anders C. Dahlgren 261 INTRODUCTION
Raymond M. Holt 267 TRENDS IN PUBLIC LIBRARY BUILDINGS
Nancy R. McAdams 287 TRENDS IN ACADEMIC LIBRARY FACILITIES
Elaine Cohen 299 TRENDS IN SPECIAL LIBRARY BUILDINGS
Aaron Cohen
Jim Bennett 317 TRENDS IN SCHOOL LIBRARY MEDIA FACILITIES, FURNISHINGS, AND COLLECTIONS
Bradley A. Waters 327 ON THE VERGE OF A REVOLUTION: CURRENT TRENDS IN LIBRARY LIGHTING
Willis C. Winters
Fred Dubin 351 MECHANICAL SYSTEMS AND LIBRARIES
Lamar Veatch 361 TOWARD THE ENVIRONMENTAL DESIGN OF LIBRARY BUILDINGS
John Vasi 377 TRENDS IN STAFF FURNISHINGS FOR LIBRARIES
Nolan Lushington 391 OUTPUT MEASURES AND LIBRARY SPACE PLANNING
B. Franklin Hemphill 399 ALTERNATIVES TO THE CONSTRUCTION OF A NEW LIBRARY
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Page</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marlys Cresap Davis</td>
<td>411</td>
<td>REUTILIZING EXISTING LIBRARY SPACE</td>
</tr>
<tr>
<td>Richard B. Hall</td>
<td>423</td>
<td>TRENDS IN FINANCING PUBLIC LIBRARY BUILDINGS</td>
</tr>
<tr>
<td>Richard L. Waters</td>
<td>455</td>
<td>THE LIBRARY BUILDING TOMORROW</td>
</tr>
<tr>
<td>Walter C. Allen</td>
<td>475</td>
<td>SELECTED REFERENCES</td>
</tr>
</tbody>
</table>
Introduction

ANDERS C. DAHLGREN

It's almost twenty years since Library Trends last devoted an issue to buildings ("University Library Buildings," edited by David C. Weber, October 1969). Since then, library facilities planners have responded to their share of trends and new developments in library service and construction techniques. But at the same time, many fundamental planning practices have been reaffirmed again and again. The literature on space planning reflects this. For the smaller public library, Rolf Myller's The Design of the Small Public Library (Bowker, 1966) is still a useful introduction to key concepts. Keyes Metcalf's landmark Planning Academic and Research Library Buildings (McGraw, 1965) served the same function for academic libraries, even though it has recently been updated and revised by David Weber and Philip Leighton. One of the authors in this issue notes that "most of our best current thinking in that area [library architecture] is a result of those expansion years [1960-1972]."

So why a buildings issue of Library Trends? From my perspective, the passage of twenty years is reason enough. It was simply time to take a look around the field. It would be useful to report on the ways that space planning has been affected by new technologies and to explore other areas where our current thinking seems to be in transition.

Obviously, the introduction of computer technology has changed the way we deliver library services and the facilities we create to house those services. Automated equipment imposes specific electrical and

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environmental demands on our library buildings. Lighting the automated work space to avoid glare poses a new sort of challenge. Power distribution becomes a concern. Static control, temperature controls, the list goes on and on.

Fiscal concerns have prompted increased interest in energy efficiency (which has its own effect on environmental planning for library materials and automation). Tight money has also led to a decrease in the number of new building projects nationwide for libraries of all types. A larger and larger proportion of expansion projects take the form of an addition to an existing building or converting and remodeling existing space for library purposes.

This issue is divided into two parts. Four introductory articles focus on trends in library facilities planning by type of library. Readers will note some trends that are common among all types of libraries, while each author makes some observations that are peculiar to a given type of library. These introductory articles are followed by a series of articles on specific topics: library lighting, mechanical systems, ergonomics, funding trends, and so on.

Ray Holt begins by summarizing trends in public library buildings based on his observations as a library building consultant. He comments on cycles in building activity (most recently spurred by the availability of Library Services and Construction Act Title II funding), trends that seem to draw into question the conventional wisdom regarding public library site selection, and, perhaps most important, an apparent trend to build somewhat larger buildings today than was the case twenty years ago. He also reviews the impact of changes in lighting, power, automation, fire protection, security systems, and more.

Nancy McAdams describes seven broad trends in planning academic library buildings: greater differentiation between storage and user space (accepting less overall flexibility in favor of greater environmental control), retention of existing facilities (more building conversions), incremental growth (more additions), tighter programming (caused by funding agencies' challenges of accepted library planning premises), increased protection of life and property, dispersal of formats and equipment (greater integration of microformats, for example), and accommodation of nonlibrary functions in the library building.

Elaine Cohen examines special library facilities, noting the impact of corporate or organizational structure on how a special library is organized. She notes that many special libraries are comparatively new and subject to rapid change caused by growth of this new department or shifts in the organization's research goals. Speed of response and the


**Introduction**

ability to adapt quickly to the changing information needs of the organization are keys to successful special library facilities planning.

Trends in school library media centers are described by Jim Bennett. In media centers, perhaps more than in other types of libraries, planners often face problems associated with expanding to occupy space within the existing building. Bennett reviews the impact of behavioral use of space on media center planning and a trend toward consolidating certain services. The impact of educational use of technologies (the school library as a center for broad-based media services, the growing application of satellite reception and broadcast capabilities) is also reviewed.

Following these introductory articles, Brad Waters and Willis C. Winters offer the first of the articles on specific topics, focusing on trends in library lighting. After a brief discussion of the physics of light, the qualities that affect light and how people respond to light, Waters and Willis describe trends in the application of light (daylighting v. artificial light; incandescent v. fluorescent v. HID lamps, and so on) and provide some case studies of successfully-lit library buildings.

Fred Dubin discusses mechanical systems and libraries. Automated services and energy efficiency in particular have prompted changes in the way a building’s mechanical systems (e.g., the heating, ventilating and air conditioning systems, and the electrical systems) are designed. In turn, these changes must be examined from the standpoint of their effect on how people respond to space. This article is adapted from a paper delivered at the 1986 preconference, “The Humane Electronic Work-space,” sponsored by the Building and Equipment Section of the ALA Library Administration and Management Association (and their cooperation in the production of this article is greatly appreciated).

Lamar Veatch summarizes key issues in environmental design as they apply to libraries. People tend to approach the use of public and work spaces in certain ways, and an understanding of this behavioral use of space can enhance a planner’s ability to design an effective, useful library.

Next, John Vasi looks at trends in staff furnishings in libraries. One byproduct of automation is an increasing proportion of “shared” work stations and an increasing concern for the physical requirements of individual users. Many manufacturers tout furnishings and equipment that can be readily adapted to meet the needs of different individuals, and Vasi identifies some of the features to look for.

Since Output Measures was published in 1982, the Public Library Association has promoted their use as one means of gauging a library’s
ANDERS DAHLGREN

performance. Nolan Lushington draws some initial connections between library performance measures and library space planning and offers some suggestions regarding the use of performance measures as they affect building use.

Several articles in this issue suggest that proportionately fewer new library buildings are undertaken. The next two articles explore the options when a new building is not a realistic possibility. B. Franklin Hemphill discusses alternatives to new construction, what he calls the “3 R’s”: rearrangement, retrofit, and rehabilitation. Marlys Cresap Davis concentrates on one of those alternatives, rearrangement of existing space, and provides two brief case studies of small public libraries reassigning existing space to better use.

Richard B. Hall studies trends in financing public library buildings, reviewing the balance of federal, state, local, and private funding sources since the Carnegie era. While local public monies have traditionally been a library’s primary source of capital funding, and all indications are this trend will continue, the balance of other sources of funding (between federal and state and private) appears to shift from time to time, and the availability of funding from those other sources often spurs the availability of local funding.

Richard Waters examines the library building of tomorrow, speculating about the impact of trends like an aging population, privatization, and the “paperless society” will have on the library facilities that will be built in the future. His assessment is more positive than some might expect.

The issue concludes with a bibliography by Walter C. Allen, adapted from the syllabus used for the “Library Buildings” class at the University of Illinois Graduate School of Library and Information Science.

In this issue we have hoped to address only some of the trends facing library facilities planners today. There isn’t room in a single issue of Library Trends to explore all of the ramifications of changing use patterns, new technologies, and all of the other factors that affect the type of library building that is required to respond to a community’s needs today and in the future.

Partly this is so because each community—whether a city, or a university, or a corporation, or a school—is itself unique, and the library serving that community must be designed in response to that uniqueness. Even the stock answers to library space planning concerns should be reexamined in the context of a given situation. Planning a library building is something that’s done from the ground up, and the process is a little different every time it’s undertaken.
Introduction

So in this issue we have tried to identify some current concerns and some helpful sources that may direct local planners to a solution to the challenge at hand. Each reader must determine whether or not our goal was met.
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Trends in Public Library Buildings

RAYMOND M. HOLT

Warning: trends, like beauty, may be in the eye of the beholder rather than a demonstrable fact. Therefore, the trends discussed here are those the writer perceives from his own vantage point, rather than conclusions rooted in a comprehensive survey of current public library construction such as Harry N. Peterson made to support his article “Developments in the Planning of Main Library Buildings,” published in Library Trends in April 1972. Instead, evidence, such as it is, has been derived from participation in numerous building projects and discussions with peers. Whether the trends described here are of more than passing significance we leave open for the reader—or history—to decide. Let us begin with a few general observations about trends in public library buildings. Then we can look at what appear to be more specific trends and their causes.

Building Activity

Public library building activity has gone through a period of ups and downs since Library Journal began recording the number of projects reported in its annual survey published in the December 1 issue each year. This record is shown in table 1. Unfortunately, the record does not go back into the decades of the 1950s and 1960s when building activity seemed to be even higher. Nonetheless, the table clearly indicates the swings in numbers of projects. To some extent these must be related to general economic conditions. A case might also be made for

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RAYMOND HOLT

the impact of LSCA Title II funds which has certainly sparked the hope for many library projects. In some instances construction may have been triggered when available funds became sufficient for remodeling and/or expansion but not enough for a new building—especially when site costs have to be considered. What other forces may be at work and whether there is a natural cyclical rhythm will be left to others to decide.

### TABLE 1

**Record of Public Library Building Projects, 1968-1985**

<table>
<thead>
<tr>
<th>Year</th>
<th>New Buildings</th>
<th>Additions &amp; Remodeled</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>191</td>
<td>68</td>
<td>259</td>
</tr>
<tr>
<td>1969</td>
<td>214</td>
<td>84</td>
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<td>1970</td>
<td>191</td>
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<td>276</td>
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<td>1971</td>
<td>148</td>
<td>60</td>
<td>208</td>
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<tr>
<td>1972</td>
<td>139</td>
<td>52</td>
<td>191</td>
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<tr>
<td>1973</td>
<td>96</td>
<td>47</td>
<td>143</td>
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<tr>
<td>1974</td>
<td>121</td>
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<tr>
<td>1975</td>
<td>125</td>
<td>87</td>
<td>212</td>
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<tr>
<td>1976</td>
<td>187</td>
<td>90</td>
<td>277</td>
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<tr>
<td>1977</td>
<td>142</td>
<td>69</td>
<td>211</td>
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<td>1978</td>
<td>135</td>
<td>85</td>
<td>218</td>
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<td>1979</td>
<td>168</td>
<td>112</td>
<td>280</td>
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<td>1980</td>
<td>94</td>
<td>65</td>
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<td>59</td>
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<td>92</td>
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<tr>
<td>Totals</td>
<td>2315</td>
<td>1323</td>
<td>3638</td>
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</tbody>
</table>

Source: Compiled from data in the annual "Architecture" issue of Library Journal. The data has been taken from the summary table appearing in recent years as a five or six year cost summary. These tables are not entirely consistent year to year due, perhaps, to corrections or other modifications.

Whether the sudden rise for 1985 data from the depressed figures of the early 1980s will be sustained remains for future statistics to prove. The fact that there is a major backlog of demand for adequate public library facilities has been well documented in recent years with such figures instrumental in reinstating LSCA Title II funding. Surveys such as that made by Richard Hall in 1981 and reported in various places including the *ALA Yearbook 1982*, place this pent up demand at more than 2900 projects for the years 1981-85 with a construction cost of
$2,337,628,040. At the current rate of construction, the potential number of public library building projects is being increased annually, rather than lessened.

**Financing Public Library Buildings**

Not too long ago, most public library building projects were funded from local tax sources through referenda or other means. The trend for the last decade or more has been away from this single source. For one thing, legislation fixing tax limits has been passed in many states which makes financing by referenda difficult or impossible. Creative financing, with all the variations such innovative efforts produce, is increasingly employed. Reading through the reports on “Buildings” in the *ALA Yearbook* for the past decade reveals that numerous ways have been found by communities to fund library building projects. And still the search goes on.

Perhaps no single factor has had greater impact on making library building dreams come true in many communities than the availability of LSCA Title II funds. After a lapse of several years, the Title II funds were reinstated in 1983 as one means of combating unemployment in construction across the country. Though funds were limited and provided in most states on a matching basis, the stimulation was immediate. Since the initial entitlement of $50 million, succeeding years have seen the funding reduced to $25 million—but still sufficient an incentive to encourage active planning for library facilities in many communities which would otherwise have had little or no hope.

There has also been a gradual trend toward the provision of library building funds at the state level. Though still a part of only a few state budgets, more states are added to the list annually. Further, the results in these states has been such that in several instances funding has been steadily increased. Barring severe economic disruption, this trend may continue with profound effect on the rate of public library construction. Parenthetically, the introduction of state funds has been accompanied by renewed interest in programming and planning procedures. To manage the surge in construction, state library agencies dispensing state funds for library buildings have formulated regulations and employed staff to make certain that specific guidelines and standards are followed. This will also have a long-term effect—it is hoped a beneficial one—on the quality of new public library buildings in those states.
The Post-Carnegie Design

Perhaps the most easily observed and universal direction in public library architecture is the continuation of the post-Carnegie library building trend away from a ubiquitous, easily identified styling for public library buildings. Whereas the Carnegie library building, with its half-story basement and broad exterior staircase, was once synonymous with the public library building in hundreds of towns and cities across the country, contemporary public library structures come in all shapes, sizes, and designs.

In contrast to the familiar library building of the Carnegie era, many of today's public library buildings share with other types of structures the architectural vogues of the day including atriums, water features, and skylighted areas. Nor does there appear to be any visible force present or on the horizon to reverse this trend to an increasing diversity in architectural styling. In part, this may be due to the fact that no national standards or guidelines have been formulated to take the place of "Notes on Library Buildings" that James Bertram, Andrew Carnegie's indefatigable private secretary, wrote to guide a generation of librarians and architects in library building design.4

Whether today's architectural styles are more satisfactory than those of yesterday may be open to some question. Most new public library buildings claim to be "inviting" and efficient. However, since these terms are applied to such a variety of styles, it seems unlikely that all have attained these goals equally. A broad survey of user opinion on public library buildings might be indicative of the elements most appreciated. Of course many library users are familiar with only the one or two public library buildings they frequent and have a limited basis for comparison. Even a post-occupancy building survey of librarians and architects might be illuminating, provided such a study were to be initiated after enough time had passed to allow for reality to set in and mistakes to surface. At this point the merits of architectural design must be based on the evaluation of individual library buildings rather than on the genre.

Locating Public Library Buildings

To begin with, is there a recognizable trend in the locating of public library buildings? Has Joseph Wheeler's admonition been followed to place public library buildings in areas of high foot traffic or prime commercial use?
Trends in Public Library Buildings

The importance of foot traffic for main public library buildings seems to have been replaced almost universally by the need for off-street parking. Few public library building projects are proposed today without some provision for parking. In fact, convenient vehicular access and parking stands high on the list of priorities for selecting a public library building site. For many library users, this may, indeed, be the most significant factor affecting their use of a public library facility. However, foot traffic remains important when locating a branch library in or near a shopping center or a main library in a downtown area.

The issue of location, especially for main library buildings, has been compounded by factors such as traffic, parking, competition for commercial property, and the limited availability of suitable commercial locations in many communities. A few libraries have succeeded in acquiring a commercial site by becoming a part of an urban renewal project. However, this is far from a trend. Making public library buildings part of a civic center complex continues to be the siting determinant for some public libraries. Again, librarians lack evidence as to the effect—good or bad—that such locations may have on library usage.

During Joseph Wheeler's career, most downtown areas were retail centers and placing the public library building in the midst of stores which attracted a large portion of the population for shopping seemed to make sense. However, with the movement of retail businesses into suburban shopping centers, downtown is more likely to be either dying or converted to office use—and much less a magnet drawing the general population to the urban center. In other words, the logic for Wheeler's premise appears to have changed. Locating the main public library building is no longer the relatively simple chore of finding a suitable downtown site. More important today, it seems, is finding a location which is convenient for access by automobile.

When an entirely new site must be acquired, the choice is likely then to go to a location that is on the fringe of the business area where sufficient land for building and parking can be purchased for whatever is deemed to be a suitable price. Finding such a location which also provides easy access to automobile traffic and high visibility appears to have emerged as primary site selection criteria in many situations. If there is a trend in public library location, perhaps this is it.

Perhaps it should be noted that the development of the suburban shopping center has had somewhat the opposite effect on the location of branch library buildings. Whether housed in separate structures or in storefronts within the shopping center, many libraries find that the neighborhood shopping center is a choice site for branches. In a way,
Wheeler's advice on location seems to still have validity for branches if not for the main library buildings.

**Expansion and Remodeling of Existing Buildings**

One of the most pronounced trends in recent years is that of expanding existing library buildings rather than constructing new facilities—especially main libraries. Looking at the preceding table it is interesting to note that in spite of the variation in numbers of total projects, there has been a gradual swing toward the expansion and remodeling of existing buildings. In the late 1960s and early 1970s, expansion and remodeling projects generally numbered less than 30 percent of the projects reported. This ratio grew over the last decade, and for the past two years remodeling and expansion have accounted for slightly more than 50 percent of the projects.

A number of reasons can be offered for this trend. Many of the buildings in question were designed in the 1950s or 1960s with provision for expansion. Having run out of space, they are now exercising this option. With building costs now several times that of the original structure, this is an attractive course to follow, especially if there was foresight to acquire the necessary property needed for expansion and for any additional parking.

Building costs alone are dictating the choice in some instances where space needs can be met—at least temporarily—with an addition and remodeling that represents a fraction of the cost of an entirely new building. Occasionally this alternative is selected because an equivalent site is unavailable—or moving the library to another location might provoke public outcry. Whatever the reasons, it is almost certain that this trend will continue for the foreseeable future.

**Conversion of Other Structures to Public Library Use**

A definite trend has emerged in the past few years to conserve existing buildings by converting them to new uses. Public libraries in serious need of space are often deemed good candidates to rescue such structures from oblivion. Buildings converted to public library use represent a wide variety of previous occupants ranging from post offices to schools, garages, banks, and retail stores. Some of these conversions have resulted in reasonably effective quarters for public library service. However, the cost is not always much less than that for an entirely new structure. This is especially true where the existing structure must
Trends in Public Library Buildings

undergo major change to meet current building codes. Still, by taking advantage of the opportunity to better their situations, some public libraries are enjoying buildings that may be somewhat larger and better suited to their needs than their former quarters. As the number of structures available in many communities for such conversion increases, and as the cost of new construction continues to rise, it is expected that public libraries will more frequently face the prospect of converting a building that was designed originally for an entirely different purpose.

The Size of Public Library Buildings

Perhaps one of the more significant trends that seems to be emerging in recent years is related to the size of the public library building. Whether a main library or branch, the new structure is apt to be somewhat larger in terms of square foot per capita than its predecessor. This in spite of the continued presence of the “Wheeler-Githens Formula” and the .55 square feet per capita rule of thumb that has been so influential over the years. Many public library buildings now range from .75 square feet to more than 1 square foot per capita.

Obviously, there are many reasons for an increase in this ratio of space to population. Book collections grow faster than before as the publishing output increases to cover all the facets of life affected by the continuing knowledge explosion. And make no mistake, books and other printed matter are still the public library's primary commodity and are likely to remain so for the foreseeable future. Microform has had a limited effect on reducing space needs and in many libraries constitutes a separate resource supplementing rather than replacing printed copy. New media and the equipment to utilize these nonprint formats are taking up additional space. Automated systems have shuffled work flow and procedures but have not reduced overall staffing requirements in most libraries. To the contrary, automation has resulted in larger and more complex workstations with sophisticated space and environmental requirements.

Public libraries tend also to provide a more relaxed environment in their new buildings by emphasizing individual seating and lounge furniture rather than the regimented study tables of yore. Such arrangements require more space. Further, public library buildings frequently include meeting rooms ranging from a simple conference room with seats for a few people to multipurpose and theater type rooms that seat several hundred for library programs.
RAYMOND HOLT

Additional space is required also for equipment that is a product of today's technology—copy machines, personal computers, and video-cassette players, for instance. (Incidentally, we have yet to see what the optical disc in all of its applications will do to space requirements. While there are still advocates of "the bookless library," it seems doubtful that such a thing will become a reality within the next several decades.) As the evolution in media and communications technology continues, the trend toward larger per capita allotments of space is apt to continue.

Public Library Architecture

Turning to public library architecture itself, what trends can be detected there? As noted in a preceding section, there is no single, distinguishable architectural style emerging for public library buildings, even in cities and counties where a number of branches have been constructed over a short span of years. Instead, there is the continuation of a great variety in public library architecture. This has resulted in buildings ranging from very good to extremely bad—with far too many of mediocre quality. Only a few public library agencies have experimented with a standard functional layout. Most seem content to rely on the architect's ingenuity in designing each structure.

While architectural styling sometimes is in response to the library building's neighbors and to the community it serves, all too often the designer's goal seems to have been the creation of a modern architectural "statement" (more commonly known as a monument). Such buildings are apt to incorporate the design fads of the moment which all too quickly become the wearsome and redundant clichés of tomorrow; glass block seems "in" this season, for example. Sometimes this styling is the result of a desire to be among the first in a given locality to employ new materials or structural systems, forcing the library functions to adapt as best they can.

Flexible Space

Then there is the long-desired trend toward flexible space. For several decades now librarians have been admonishing architects to create buildings designed for the future with large, open, and flexible spaces. Use of a modular structural system combined with a minimum of walls, especially load bearing walls, seemed to guarantee achieving this goal. What has happened?
Trends in Public Library Buildings

In the early post-World War II era, Angus Snead MacDonald along with others, argued for greater use of modular design in library buildings. The module, or "bay" was a major point of conversation wherever library buildings were discussed. This is no longer the case. In the intervening years, the modular building has become commonplace. The trend in this direction is now a reality for all but the smallest library buildings. However, this is more likely due to the fact that modular construction has become the keystone to efficient construction methods rather than a result of urging on the part of librarians.

The structural module has increased only slightly in size as the years pass. Based on the three foot shelving section, modules are usually dimensioned to accept ranges of shelving without wasting space. However, structural factors and the cost of structural members seem to limit how large a module can be while remaining cost effective. Bay dimensions in the twenty to thirty foot range seem fairly standard; larger modules usually require a premium to be paid in construction costs. Any further breakthrough in modular design awaits development of new construction materials and methods that make a longer span economically feasible.

The trend toward greater flexibility has resulted in fewer load bearing walls in public library buildings. However, this has not resulted in space entirely free of barriers. Stairwells, elevator and duct shafts, if not properly located, may limit the freedom to rearrange library functions. Although larger modules reduce the amount of space lost to columns, librarians occasionally find this benefit diminished by oversized columns designed for architectural enhancement rather than limited to supporting the building.

Meanwhile, the word flexibility has taken on new meaning as public libraries attempt to provide appropriate space for nonprint media and replace manual operations with automated systems. Today flexibility means more than the ability to rearrange the contents of the library and to shift functions from one space to another to keep up with collection and user growth.

Flexibility is more apt to be defined as the capability of rearranging space so as to add new services, equipment, and collections in keeping with technological advancement. Thus the trend is seen toward public library buildings that have enhanced electrical and communications capacities with easy access to wiring for terminals and other equipment. Various systems for providing this capability are being used—each with its pros and cons. The substantial costs of these systems are contributing, incidentally, to the rising costs of public library buildings—a trend...
RAYMOND HOLT

that is not likely to be reversed barring a wholesale reduction in construction costs. A look at any issue of a major architectural periodical will show a variety of systems that public libraries might use ranging from underfloor conduit systems to flat wiring concealed under carpet tile. There is no clear front-runner at this time.

Lighting

Few aspects of library buildings are more important than lighting. This has been dogma for many decades as any reader of the literature on library architecture can attest. Yet neither the standards for library lighting nor the methodology have been stabilized. Candlepower per square foot had risen gradually until the energy crisis of the 1970s prompted the lighting engineers to substantially lower standards. Libraries had graduated from the bare bulb and pendant lighting to more sophisticated systems with greater output. The fluorescent tube had largely replaced the incandescent lamp. In the 1960s the luminous ceiling that provided a general distribution of light at a common footcandle level regardless of the task beneath was frequently employed.

Now public library buildings, like other structures, are subjected to the whims and fashions of lighting that include many of the previous types plus HID (High Intensity Discharge) lights which employ various elements such as sodium and mercury. Incidentally, because of its dispersion characteristics, HID lighting requires higher ceilings. This requirement, in turn, has had an impact on structure and the heating, ventilating, and air conditioning (HVAC) system. It is sometimes questionable whether the economies claimed for HID are offset by the higher structural and HVAC costs. Many library installations now blend incandescent, fluorescent, and HID lighting with each type serving a designated purpose. There is even a resurgent interest in using neon for certain purposes, though not for illumination.

In the guise of energy efficiency, lighting levels have been lowered by half or more in the past few years by the Illuminating Engineering Society of North America which sets lighting standards. General reading rooms, for instance, were once thought to require 100 footcandles; they are now said to need 50 footcandles, or even less in some instances. Workrooms and offices have had similar downward revisions in lighting.

One of the more interesting developments has been task lighting to provide illumination appropriate for a given job supplemented by low levels of general or ambient lighting. Among other things, task lighting
Trends in Public Library Buildings

has been incorporated into many of the office furniture systems and forms an integral part of the workstation concept. While there are alternatives, the trend toward task lighting, at least for offices and workrooms, seems well established.

More controversial are the attempts to adapt task lighting to bookstacks. (This is not a new idea, by the way—merely one that seemed unnecessary when general lighting at the ceiling level could be elevated sufficiently.) One of the reasons librarians have given in the past for increasing levels of illumination is to avoid the uneven lighting in bookstacks and especially on the bottom shelves.

Architects, interior designers, and lighting engineers have devised a variety of task light solutions for the stacks. Generally speaking, the results have proven good except for two or three major drawbacks.

1. Task lighting of stacks usually requires some sort of structure to be attached to the top of each range of shelving. This reduces the flexibility needed in some libraries to relocate shelving and/or to respace aisle widths.
2. The structure used to attach stack lighting to the ranges of shelving tends to be either unsightly or so overwhelming in its design that it dominates the area.
3. Electrical power for each stack range must be channeled through the floor or from the ceiling. In either case, flexibility in rearranging shelving is inhibited and costly.

Because of these drawbacks, it remains to be seen whether task lighting in stacks will become a general trend—or just another fashion that runs its course.

Windows seem to have taken on a new importance in many library buildings. This seems to stem more from human need to see in and out than to enhance lighting—though claims for the latter are frequently heard. The admonition of yesteryear to preserve walls for wall shelving and to eliminate windows except for those above wall shelving height seems to carry less weight nowadays. Many buildings feature large areas of glass now made possible by varieties of glazing which reduce glare and noise. Clerestory windows appear frequently in today’s public library building because of their ability to provide light to interior spaces without interfering with interior functions.

Perhaps the trend toward a greater use of skylights is one of the most evident fashions in current design. The values of the well-placed and carefully installed skylight are many and obvious. Unfortunately, not all are properly engineered with results ranging from glare and heat penetration to persistent leakage.
RAYMOND HOLT

From the skylight and window to the atrium is but one step, admittedly a large one. This symbol of current architectural design has found use in public library buildings as well as in other types of structures. Letting light in is one of its vaunted qualities; controlling that light source is one of its headaches. While the atrium and all of its ambience is likely to persist for some time, it may be too early to call this feature a trend in library design.

Power

The public library building has proven to be an almost insatiable customer for electrical power. Virtually every improvement in the delivery of contemporary library service seems to call for more equipment. Making even an educated guess as to what the power requirements may be ten or twenty years hence taxes library building planners. Meanwhile, electrical engineers are at work devising new ways to deliver power including various kinds of electrical grids beneath the floor, flat wire, power poles from the ceiling, and other solutions. While many librarians enter the building planning stage with the assumption that a system is needed which can be tapped into wherever, whenever, and whatever the need, they are often stunned by the prohibitive costs associated with this kind of flexibility.

The alternative, which may be considered a trend, is careful planning to determine the areas most likely to be changed or expanded for staff and for such activities as circulation, bibliographic access, microform readers, use of nonprint materials, copy machines, online reference services, and other operations requiring power. The problem becomes much more manageable when bookstack area, which will probably constitute a third or more of the building, and reader space, which may amount to another 25 to 30 percent of the interior, have been eliminated. This kind of planning usually includes space for additional, future electrical panels as well as empty conduits stretching into all parts of the building.

Automation

Perhaps the move toward automating library operations, services, and resources is the most obvious trend in the contemporary public library. Regardless of size, main libraries and branches alike are apt to have a computer of some sort and, increasingly, are involved with automated systems for cataloging, circulation, and other routines.
Trends in Public Library Buildings

Technical service operations have been most heavily impacted by the growth of automated bibliographic utilities which have revolutionized acquisitions and cataloging procedures. The equipment required for such automated operations makes new demands on space and environment as well as power supply and telephone lines. Looking at the potential for automation, it is probable that the public library is scarcely over the threshold of adapting this new instrument.

The computer terminal, regardless of its purpose in the library, requires power and its screen must be shielded from glare. Many terminals require access to dedicated telephone lines as well. Librarians must determine whether terminals for staff use will be clustered or provided at each workstation—the trend seems to be toward the latter. Most terminals to be really useful need to be tied to a printer. With the introduction of relatively inexpensive and versatile printers, there is a trend to provide a higher ratio of printers to terminals than was first thought justified. This development means more space must be available at each workstation. Despite all of its advantages, the computer has not entirely replaced the typewriter in every work situation. Therefore, there is a tendency to assume that many workers will continue to require immediate access to both typewriter and terminal—a further expansion of staff space needs.

The advent of the public access terminal as a replacement for the card catalog is having a further effect on space and space planning. For those libraries which must retain their card catalogs until conversion is complete, extra space will be required with terminals eventually taking their place in the card catalog area. Additionally, the flexibility of online public access systems makes it possible for terminals to be placed wherever they can be useful to public and staff. This trend is apt to be much more evident in the years ahead as online systems become the rule rather than the exception.

The use of automated databases for reference and automated indexes for bibliographic searching has resulted in more space being required for reference services and for index access. In some libraries, database searching has been considered a somewhat private exercise requiring a separate enclosed space either adjacent to the reference area or in the staff work area. Whether or not this remains the rule may be questioned as some libraries begin experimenting with direct database access by the public rather than through the librarian intermediary.

Public libraries are also adding stand-alone personal computers—PCs—for public use. This has proven to be a very popular service requiring more PCs in many libraries than originally thought necessary. These PCs may run software supplied by the library or by the user.
To be effective, the PCs must be connected to printers. Facility planning for PCs requires attention to supervision, acoustics, and lighting.

For the library with its own mainframe, a sophisticated space must be provided for the central processing unit (CPU) and the staff that is responsible for its maintenance. Such rooms are new to public libraries and involve an investment in environmental control systems as well as additional space. Libraries which have shared mainframes with other agencies seem to be happier when this equipment is housed in the library building thus allowing full control.

**Telephone**

The continuing evolution in communications technology has resulted in a greater demand for telephone lines in public libraries. This trend toward more phone lines has been hastened by computers and facsimile transmission as well as increased use of telephone for traditional library services. Where one telephone once served the entire staff workroom, it is more common now to see a multiplicity of phones. In planning library buildings, it is generally recognized that it is much cheaper to provide for future telephone service at many spots rather than to incur the expense of such installations at a later date. Provision of telephone service has been further complicated by the recent divestiture which, among other things, has prompted new telephone systems that libraries may purchase and operate for themselves rather than rent from a utility company. Usually the public library will follow the lead of its governing body in this matter and no distinguishable trend has emerged.

**Heating, Ventilating, and Air Conditioning and Energy Conservation**

As with lighting, the energy crisis of the 1970s affected heating, ventilating, and air conditioning because of its enormous consumption of power. The result was the development of more efficient HVAC equipment and the lowering of HVAC requirements by more careful selection of building materials, architectural design, and reduction in lighting requirements. New codes now govern energy utilization.

Energy conservation efforts have given rise to greater consideration of both active and passive solar energy systems. This has been influential in the design of a number of library buildings as a check of reports on library construction for the past decade will show. However, solar
Trends in Public Library Buildings

energy systems have hardly become universal and the current reduction in fuel costs seems to have lessened the major motivating factor for such systems.

While still anathema to many mechanical engineers, the use of operable windows has increased, especially in staff areas. No matter how much more efficient HVAC equipment may have become, it would be too soon to say that a trend toward HVAC systems that please a majority of the people—let alone all—has yet to be established. The wide variation in personal perception of what is cold or hot, what is drafty or stuffy remains despite improved HVAC equipment.

Fire Protection

Fire protection through use of sprinkler systems is still feared by many skeptical librarians unconvinced about the fail-safe improvements claimed for sprinklers. Nonetheless, it is becoming a reality in many library buildings because of more stringent building code requirements. These requirements are the result of increasing concern, of fire marshalls and building officials, with the threat of fire to libraries. Recent fires, including the two that have devastated the Los Angeles Public Library, have focused even greater attention on the potential danger and risk of loss to fire.

In most situations, the requirements are so mandatory that protesting them is futile and may be interpreted as lacking in good judgment. Better it seems to understand the variety of systems available and their individual merits so that the system with the least risk to collections can be selected. Fortunately, sprinkler systems continue to undergo significant improvement and offer many safeguards not present in earlier versions. Incidentally, the hope of some librarians that halon or some other gaseous suppressant might replace water has not materialized. Halon systems, particularly, are best used in small spaces with closed environments such as computer rooms and rare book storage areas.

Security Systems

Vandalism and other forms of crime are causing librarians to look at various security systems for protection. This trend is still too young to be described in much detail. However, when a new library is being planned or an existing structure expanded and remodeled, the added cost for most security systems is negligible.

Fire alarm systems with a combination of heat and smoke detectors are perhaps the most common form of security. Many of these are wired
directly to the responding fire station to avoid wasting precious moments in notification. Motion detection and other types of systems are being installed in some libraries to call guards or police when intruders break into the building. With the increase in incidence of life threatening situations for library staff, some libraries are installing silent alarms and other systems at public desks and at other vantage points. The public library building can no longer be considered to be immune from the fire bug, vandal, thief, or terrorist and the installation of appropriate security systems appears to be a trend whose time may have come.

Workstations

Comments in preceding paragraphs have alluded to the changes that are occurring in library operations which are altering the workstations for library employees. Most obvious is the incorporation of the computer terminal. A wide variety of specially designed workstation components are available from office furniture manufacturers to house this equipment in an efficient way. As a result, there is a trend to use these special pieces in addition to or in place of the traditional desk and typing station. These workstations tend to take more space than their predecessors, so the percentage of space devoted to staff will have to increase.

Circulation desks, reference desks, and other public service desks must also be designed for automated equipment. The acceptance of this fact will undoubtedly establish a new trend in the design of these desks.

Interior Design and Furnishings

The interiors of public library buildings seem less predictable than formerly. There appears to be a trend toward improved interior design in many libraries. Libraries often appear to provide a better atmosphere with more attention given to the needs of users. Furniture design has changed, not only that offered by the traditional library furniture manufacturers but also furniture supplied by other firms and adapted to library use. The result is greater comfort and better appearance. Incidentally, carpeting has become almost universal in its application, providing better acoustics as well as other advantages such as color and texture, lower cost of maintenance.
Signage

Within the last decade it seems, librarians have become more aware of the need for good signage. While the hand lettered sign has not yet disappeared from public library buildings, there is a gratifying trend toward improved signage and graphics. The inclusion of programs on signage at state, regional, and national library conferences is evidence that librarians have an increasing interest in providing signs which are attractive, well-worded, and properly located to assist readers.

Branches

While most of the trends discussed earlier are equally applicable to branch libraries, certain trends in branch libraries deserve special mention. Like main public library buildings, branch libraries are growing larger as they attempt to accommodate more materials, users, and equipment. The 2000 to 3000 foot branch which was common following World War II no longer seems adequate in many situations. In urban areas especially, branch libraries are more often in the range of 5000 to 7000 square feet with larger branches of 10,000 to 15,000 or more square feet not uncommon. Larger service areas and collections of greater size and complexity seem to be more cost effective in many cases. From available evidence, it does not appear that the trend toward larger and more widely spaced branch library buildings has yet been reversed even though there are proponents of such a change.

Branch location, like the location of main libraries, is affected by many factors. However, the overriding consideration still seems to be placing the branch for maximum accessibility to the potential group of users. As noted before, such sites often are the same as those chosen for shopping centers. Therefore, it is no surprise that numbers of branch libraries in urban areas are located in storefront buildings in neighborhood shopping centers or on premises adjacent thereto. As long as branch libraries in such locations are superior in their performance to libraries located elsewhere, such a trend is apt to continue.

Space needs of some branch libraries have been further affected by the fact that they attempt to offer a cross section of the collections and services provided at the main library. In part this is due to the resistance of users to accept the branch library as merely a collection of popular reading matter. Instead they have grown to expect the branch library to offer a diversified collection—if not a comprehensive one—covering many subjects and containing a variety of formats and the equipment for their use. Thus in a growing number of branches, collections of
RAYMOND HOLT

audiovisual materials are being provided as well as access to personal computer terminals.

Although there are no statistics to offer as proof, observation would seem to indicate that more branch library buildings are including meeting room space for library programming. Both small conference rooms and larger multipurpose rooms are provided in some cases. Sometimes these spaces are constructed as part of the library's strategy to cope with expansion in the future.

Conclusion

That there are trends in public library buildings seems evident. Unfortunately, space does not permit discussion of the many possible topics which may be of interest, if not concern, for the reader. However, it is hoped that this brief review will alert librarians and others as to the direction that seems to be taking place in the planning and design of the contemporary public library building. Many of the trends discussed here are positive and bode well for the future. A few may be considered as a warning that the librarian planning a new or expanded library building may encounter stumbling blocks on the way to the perfect public library building. In any case, like dipping the cup into the running stream, the trends discussed here will change with the passage of time as new events and forces beyond today's horizon play their role.

References

2. Various methods of funding public library construction were usually covered in the article “Buildings” published annually in the ALA Yearbook.
Trends in Public Library Buildings

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Trends in Academic Library Facilities

NANCY R. McADAMS

Introduction

NEARLY TWENTY-FIVE YEARS AGO, futurist Alvin Toffler wrote in a publication directed toward architects and academic administrators:

Some argue forcefully that the library and the book itself are mere relics of an inefficient past, that the job of storing, retrieving, and transmitting information will, in the future, be accomplished without either. They point out that there is nothing inviolable about the book or its storehouse, that cuneiform tablets gave way to papyrus rolls, that medieval manuscripts gave way to books, and that books are already sharing the job of communicating information with other carriers. Already most libraries store records, tapes, films, slides and other non-book materials. The rise of the computer and the development of a whole new technology of information, these prophets charge, will inevitably transform the role of the book in modern society.¹

Toffler raised the question of the impending demise of the book while standing on the threshold of "a library-building boom of unprecedented scope and thrust," amounting to 121 new campus libraries constructed between 1958 and 1961 with another 504 predicted between 1961 and 1965. In fact, the boom continued through at least 1971 when Jerrold Orne, compiler of the annual Library Journal survey of library construction,² reported in a statistical cumulation that 445 library buildings had been completed in the five-year-period 1967 to 1971, at a

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total cost of nearly $1 billion. (By way of comparison, the number of academic library building completions reported in subsequent five-year periods totaled 202 for 1972-76, 143 for 1977-81, and 133 for 1982-86.)

The 1960's surge in library construction represented only one aspect of mushrooming growth in academic facilities of all kinds throughout the country, resulting from a bulge in the college-age population coupled with increased access to, and demand for, higher education. Supported by massive federal and state funding, institutions were experiencing not only growth but change—i.e., modernizing old subjects and adding new ones, expanding junior colleges into colleges, converting colleges into universities, and forming regional and statewide systems.

In 1963 there were just over 4 million students enrolled in American colleges and universities and it was projected to reach 8.5 million by 1975, an increase averaging 8.5 percent per year. By 1985 the number of students had reached 12.25 million, slowing the average annual increase to 4.4 percent for this ten-year period. During the first half of this twenty-two-year period, library collections grew at exponential rates, but growth leveled off after about 1973, at least for the member libraries of the Association of Research Libraries (ARL). Since library planners of the 1960s were advised by the experts of the day to build for at least twenty years after occupancy, it is not surprising that the driving principle of library planning during this period was flexibility of interior space.

In his 1976 essay on American academic library buildings, Orne characterized their development in three stages: (1) the “primitive” period before 1900 when most libraries shared a building with classrooms, administrative offices, or other uses; (2) the “evolutionary” period of 1900 to about 1945 with its separate buildings designed in historical styles for fixed library functions; and (3) the “postwar” period (i.e., World War II), when ornamentation and monumentality were eschewed in favor of flexible modularity. The latter period and the attendant problems of its transition from simple uncluttered “boxes” through the “romantic module” to the complex shapes of the 1980s were described in 1984 by David Kaser in “Twenty-Five Years of Academic Library Building Planning.” A decade earlier Kaser wrote:

[a] review of the literature of academic library buildings leads one, foolhardedly perhaps, to speculate that the profession may be approaching the end of an era in building design. Just as few really new concepts were incorporated into academic library buildings for three decades following the opening of World War I, so has there been little that is truly innovative in the three decades since World War II.
Trends in Academic Library Facilities

Just as the former period was one of refinement and perfection of the concept of service areas wrapped one-on-two around multitier structural stack cores, so has the latter period been one of finding the best way of utilizing the loft space made available by flexible, modular construction. Some excellent buildings have now been built in both styles—so good, in fact, that substantive improvement in library building quality may now have to await the conceptualization of a whole new revolutionary theory of interaction between library function and structure. It is challenging and tantalizing to ponder just what that might be.10

As if in response to Kaser, Orne wrote in late 1977 that the new concepts, rather than being physical planning concepts, might be service concepts—library as learning center, library as information utility, the sharing of resources, all working together to change the emphasis from collection space to user space. Orne also anticipated new architectural expressions deriving from new building materials, better engineering, and respect for the environment.11

Instead, the recent decade has brought a regression to architectural historicity, to reinterpretations of traditional forms which, by their shapes and materials, allude to the surrounding structures and environment and are distributed around an internal organizing element which defines the spatial composition.12 At their best, such structures lend a dignity and importance to the library building which the plain “boxes” of the 1960s failed to provide. In less skillful hands, the quasi-traditional forms and spaces intimidate the user and constrain library functions as severely as their 1930’s collegiate Gothic predecessors did.

The hundreds of academic libraries constructed during the building boom of the 1960s and 1970s are now nearly full or overfull. Their staffs have typically coped with growth and change by expanding collections into user space and imposing automated functions on spaces intended for manual operations. Many institutions missed out on the building boom, and their libraries still occupy pre-World War II buildings which are incapable in every respect of meeting contemporary library standards. Having endured for so long, typically by ignoring needs and dispersing collections to other facilities, many institutions are now trapped in their obsolete structures. For librarians in both situations, library planning now involves seeking ways to intensify space use, finding short-term solutions to the most immediate problems, and in a few cases projecting long-term requirements in hopes of new space.
Seven Trends

American academic libraries serve widely diverse constituencies that encompass community and junior colleges, technical schools, private and public four-year colleges, universities, and research institutions. They are rural and urban, small and large, rich and poor, but most fall somewhere in between—small-to-medium-size moderately funded libraries in smaller cities. Their diversity of purpose makes it difficult to characterize the library building. An urban community college with 20,000 or more students may have fewer than 100,000 volumes; its library is primarily a place to accommodate people. A prestige research university with millions of volumes may enroll only a few thousand students; the bulk of its library space holds collections. Generalizing about academic libraries, and more specifically about changes in their buildings, is therefore problematic. Certain of the trends in academic library buildings discussed later may be more pronounced for large research libraries than for smaller settings, and some trends will have more impact on new construction than on existing space, but each of the trends applies to the whole realm of academic libraries in varying degrees.

The perceived trends in academic library building planning can be expected to affect the overall size, the physical form, or the architectural character of the facility. The most significant changes in academic library facilities planning might be categorized as:

- Differentiation of storage and user space.
- Retention of existing facilities.
- Incremental growth.
- Tighter programming.
- Increased protection of life and property.
- Dispersal of special formats and equipment.
- Accommodation of nonlibrary functions.

These categories are not exclusive; rather they are often highly interdependent and sometimes contradictory.

Differentiation of Storage and User Space

A major objective of the modular buildings developed after World War II was interchangeability of space use—i.e., maximum flexibility in the placement of library functions. Floor plans were made as open as possible, clustering permanently enclosed building elements at the outer edges so that interior space delineators could be changed as needed. Floors throughout the building were constructed to carry book-
Trends in Academic Library Facilities

stack loadings so that stacks could be used anywhere. Lighting and air conditioning systems were made uniform throughout the building so that users or staff could be located anywhere.

Modular planning developed partly out of the prevailing belief in open-ended growth for all libraries but partly as a reaction to the rigidity of older fixed-function buildings with central multitier bookstack structures surrounded by high-ceilinged reading rooms and offices. The open arrangements of modular libraries continue to meet established educational objectives of easy access to materials as well as library management objectives of response to changing needs. However, these buildings present structural and operational problems because they compromise between optimum conditions for books and people. Constructing an entire building for bookstack loading when only part of it will be used for that purpose is uneconomical just as lighting an entire building to reading levels is wasteful of energy and destructive of books. The lighting excesses are compounded in larger buildings containing masses of infrequently used materials, and the structural excesses are greater in those libraries with large seating requirements and small collections such as community colleges. Consequently, in programming new facilities for libraries with extensive collections of older materials, consideration is again being given to the separation of collection storage and user space so that the appropriate conditions for each can be constructed and maintained at more reasonable cost. An outstanding example is provided by the Walter Royal Davis Library at the University of North Carolina with its very conventional reading/reference room at entry level, and a six-story stack element with clustered studies articulated on the exterior of the stack floors.¹³

Libraries which continue to occupy traditional library buildings with multitier stacks have had to recognize the essential vulnerability of these structures to fire, water, air pollution, and earthquake hazards. For many libraries, the provision of alternative collection storage space to replace these unsafe structures is an urgent problem for which there is no immediate solution. Some of them are even caught between conflicting conservation goals—preservation of library collections, preservation of historic architecture, and conservation of natural resources—which make it impossible to stay in the building and equally impossible to leave.

Retention of Existing Facilities

Most academic functions are accommodated effectively in rectilinear buildings designed around stacked layers of double-loaded
corridors—i.e., windowed rooms of varying sizes arrayed along both sides of lengthwise halls linked vertically by elevators and stairs. This configuration works well for classrooms, offices, laboratories, and dormitories but not for functions requiring larger spaces such as auditoriums, gymnasiums, dining halls, museums—and libraries. Most library buildings, therefore, are difficult to convert to other academic purposes. Open modular library structures typically have more interior space than perimeter space, a forest of interior columns, relatively low ceilings, and few external openings. Partitioning them for office or instructional uses can result in many windowless interior rooms and a maze of corridors. Older library buildings with fixed-function stack towers and monumental lobbies and reading rooms are suitable for almost no other academic purposes except perhaps records storage in the stacks and exhibition halls in the public rooms.

This inability to recycle the library building has become a major deterrent to consideration of new facilities for the growing academic library. When the library building is also historically important because of genuine architectural merit, local significance, or institutional sentiment, there may be additional pressures, even preservation mandates, to keep the library in the historic facility.

Other factors which may prevent serious consideration of a new library building include: (1) the lack of an appropriate and available site; (2) competition from other academic entities for space and funds; (3) uncertainty about the course of institutional development; (4) continuing debt from previous construction including libraries built in the 1950s and 1960s; (5) diversion of capital funds to building repairs or renewal; (6) inability of campus utilities to support additional buildings; and (7) constraints intended to foster campus dispersal.

In general, library administrators lack an understanding of the property investment aspects of institutional management partly because such matters tend not to be discussed outside the central administration. Widening the gap in understanding, academic administrators form their opinions of the future of the library from publications which address it in the larger context of academic planning. The questions raised by Toffler in 1963 about “the death of the book” are still unanswered, but every college president knows that it will happen—someday soon. The widely distributed 1984 research report Academic Libraries: The Changing Knowledge Centers of Colleges and Universities concludes with four recommendations:

1. All libraries should be planning now for the changes that will be necessary to meet the demands of the information age.
Trends in Academic Library Facilities

2. Both faculty and administration should assist in this planning if it is to be successful.
3. Universities must be willing to make the financial commitment necessary to allow libraries to retool.
4. Institutions of higher education should support the efforts of academic libraries to join in more cooperative ventures.¹⁶

It is significant that none of these recommendations deals with facilities, but taken together they suggest that change—not growth—will occur. This might easily be interpreted by an academic administrator to mean that the physical growth of libraries, much to the administration’s relief, is at an end.

Incremental Growth

Given the difficulty of exchanging obsolete and/or outgrown library buildings for new ones, large and small libraries are settling for expansion of existing facilities. The concept of incremental growth is certainly not new; many libraries constructed during the building boom, especially on evolving campuses, were designed for planned expansion. One example is the library built in the early 1970s at North Texas State University with a multistory central element equipped structurally and mechanically for lateral extension to each side as populations and collections grew. More recent examples differ in that the addition typically is smaller than the original building. Examples illustrated in the architectural press include the 12,000 square foot below-grade reading room added to the historic Uris Library at Cornell,¹⁷ the 17,000 square foot wraparound addition at Gwynedd-Mercy College,¹⁸ and the 11,000 square foot upward expansion and refurbishing of the 1959 library at Grinnell College.¹⁹

Incremental growth at the larger scale of the research library is currently being planned for the central libraries of the University of California campuses at Berkeley and Davis, both driven by required demolition of their hazard-prone multitier bookstacks, and at the University of Washington, which constructed previous additions to its original 1925 Gothic-style building in 1937 and 1963.

Tighter Programming

During the period of the library building boom, it was generally accepted that libraries should plan for at least a doubling of the collection and at least twenty years’ occupancy. At that time, the typical academic library was adding materials at a geometric rate which would indeed double its size in eighteen years. Many library planners followed
Metcalf's advice to allow for continual growth of collections, anticipated growth in enrollment, and a percentage factor for unanticipated change over a twenty-five-year period. As a result, many of these libraries were less than half filled at occupancy time, and many continued to have empty space for another decade.

At today's construction costs and energy rates, this planning approach is not acceptable. Administrators and funding agencies are challenging all the library's planning premises and promises concerning: (1) efficiency in staffing, (2) number of user stations, (3) effective use of collection storage space and equipment, (4) alternative locations for existing collections, (5) alternative formats and their relative costs, and (6) participation in networks and shared resource systems. For institutions with predictable futures and established missions—such as private liberal arts colleges—library planning often requires negotiation of an acceptable "cap" to collection size which is appropriate to the institution's long-range planning for enrollment and programs. For medium-size institutions with more volatile futures, like state-supported sunbelt schools, library programming must take into account the probability of change but be politically defensible. For those libraries in state systems with legislated space standards imposed by funding agencies, programming for new space requires creative manipulation of the amounts of space allowed by state guidelines.

Every library planner should expect today's proposals for library facility improvements to receive sharper scrutiny and be met with informed questions about "needs" and "wants," sophistication about options such as compact storage or electronic formats, and awareness of the higher costs to construct, equip, operate, and maintain the "smarter" buildings which libraries now require. Despite the greater need to justify the library's space projections, however, there is still little guidance for the library planner by way of accepted norms or standards for many now-commonplace library space uses. The revised ACRL "Standards for College Libraries" provides a formula approach for determining the basic space needs for traditional print collections, readers, and overall staff space. However, there are no comparable aids to determine space requirements for audiovisual media collections, user stations, or staff support areas; for online catalog stations; for networked technical services activities; for staff service points with or without computer terminals; for dedicated terminal stations for electronic reference tools; for self-service copiers; or for archives, manuscripts, map, or microform collection storage. The library planner is forced to derive his or her own space allowances from measurement of existing conditions, observation
Trends in Academic Library Facilities

of other libraries, guesswork, or imagination, none of which carry much credence with funding authorities.

Increased Protection of Life and Property

Library buildings constructed in the first half of this century considered the secure storage of library materials as a primary concern. Access to collections was limited, egress from the building was channeled past a central control point, and public spaces were large and open so that staff could monitor activity. Libraries were regarded as "safe" places to be, and there was little concern for hazards of any kind: fires, windstorms, floods, earthquakes, toxic air, explosions, vandalism, or crimes against persons. Times have of course changed, and the reported incidence of such events has resulted in greater awareness of risk followed by increased regulation of the techniques for limiting such risks in buildings.

The library planner of twenty years ago, following Metcalf's carefully phrased advice, was more concerned with the disastrous effects of water than of fire and sought to provide fire protection without the use of sprinklers. Preferred alternatives such as fire-resistive construction, detection systems, gaseous fire suppression equipment, and separation of building elements tended to protect the building and its contents more than its occupants. However, developments in the recovery of water-damaged materials have lessened librarians' fear of sprinklers at the same time that more stringent building codes, life safety codes, and insurers' conditions have sometimes made sprinklers a requirement and not an option.

Another aspect of life safety which is still a problem for libraries is rapid egress from the building which conflicts with the library's need to control departures for prevention of theft of library property. Libraries have tried to protect emergency exit doors with a variety of silent and audible alarms, delayed-action locks, television cameras, and other devices, but an effective control mechanism has not been found. The electronic linking of door alarms with computerized monitoring of the building's environmental systems can provide better records of illicit exit activity but does not contribute to the prevention of such events or to the recovery of lost materials.

The provision of access to facilities by the handicapped population has by now become a given in library planning. Virtually all existing library buildings have been modified, or services provided, to permit participation in library programs by handicapped individuals. However, the requirements for minimum dimensions for building features
and equipment clearances are by no means uniform nationally. In planning new space, these clearance dimensions can be a determinant in the spacing of library bookstack ranges, a spacing which in turn may determine the dimension of the structural module for the entire building. The long-established "standard" range spacing of fifty-four inches center-to-center is no longer viable in some jurisdictions.

**Dispersal of Special Formats and Equipment**

As libraries have become more and more mechanized and equipment has become less "foreign" to their operations, such equipment has tended to be decentralized instead of being concentrated in special rooms or areas staffed by technicians. Microforms and their readers and printers have been integrated into the reference rooms, periodicals stacks, documents areas, or technical services offices to which their content and use related. Similarly, computer terminals and microcomputers have migrated out of systems staff offices to administrative and reference offices, to acquisitions and cataloging workstations, into card catalog areas and online search rooms, and onto public service desks and counters everywhere. The next few years will probably see the conversion of many public typing rooms into word processing stations, as well as further movement of public-use computer equipment into general reader seating and collection storage areas. An exception may be the treatment of CD-ROM access devices and data discs which will probably be located near staffed service points until their costs are significantly lower.

**Accommodation of Nonlibrary Functions**

The redefinition of academic libraries into broader-based information centers as suggested by Battin, Moran, and others may result in the physical integration of the library and the campus computing center.\(^{23}\) Indeed, such a partnership can be an incentive to the development of a new facility for the improvement of both agencies.\(^ {24}\) Other libraries may find themselves fulfilling broader roles of a more traditional nature however. Community college libraries are sharing their facilities and in some cases assuming direct responsibility for such instructional support functions as classroom media production and delivery, tutoring, testing, career guidance, and language laboratories. College libraries on small campuses may find themselves involved in the merchandising of textbooks, supplies, and software, or the management of duplicating services. Larger libraries sometimes are responsible for institutional records management or provide space or support for such development
Trends in Academic Library Facilities

activities as fund-raising, cultural programs, promotional publications, and student or faculty recruitment. The variety of experience, knowledge, and skills represented by library staffs constitutes a resource which institutions can utilize in many ways. Incorporating such nonlibrary functions into the library can introduce unexpected factors and priorities into library management as well as into space planning for existing or new library facilities.

Conclusion

Whether concerned with existing space or new, library planning continues to follow the well-established principles of centrality of the library to its clientele, access to services and collections, protection of library materials through environmental and egress control, spatial and operational efficiency, and accommodation of growth and change. Of equal importance to current planners is compliance with governmental and regulatory requirements (codes and standards) and fiscal prudence. For those libraries fortunate enough to be planning new, expanded, or upgraded facilities, these principles are expected to continue as primary determinants even though their expression and interpretation in building forms will inevitably change in response to changing library services and roles and changing institutional policies.

References


Trends in Special Library Buildings

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Introduction

SPECIAL LIBRARIES TEND to have small physical facilities. There are major exceptions to this rule, such as the Linda Hall Library, the National Resources Library, Upjohn’s Corporate and Technical Library, 3M’s Technical Library, etc., but by and large most of the facilities take up a small corner in a corporate, not-for-profit, or governmental complex and function as information-gathering support for certain, circumscribed groups. A unit’s allegiance may be to research, marketing, or law. Occasionally the scope is wider; there are general corporate libraries and general technical libraries, but more often than not, most patron groups are small and the manager of the library reports to a department head.

Of course reporting structures being what they are, from time to time library managers find themselves answering to the chief of facilities (along with the cafeteria and janitorial services), head of word processing (in tandem with office automation groups), and general office groups (as do purchasing and supplies). In situations such as these the organizational attitude tends to be that support groups are all facilities that work for the good of the organization but do not make any money. In other words they are cost centers. Often the directive is to keep

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them "mean and lean"—i.e., keep the overhead down by limiting the "head count" (the number of employees) and size of the facilities.

Since special libraries, indeed all libraries, tend to be object intensive facilities, a directive such as this can be adverse to their mission. To perform their jobs, library staff members depend upon print and media resources and equipment. In this day and age, access to a variety of information materials is a necessity. The installation of good electronic equipment is also a necessity.

Recently, however, there has been a perceptible movement toward a new and more beneficial reporting structure. Some managers now answer to vice presidents of information resource management (IRM). As IRM groups begin to show an interest in information as well as the interfaces of equipment and cables, more and more special libraries are being taken under their wing. For the libraries the benefit is obvious. IRM groups tend to have money and power. This allows the libraries to tie into general information transfer within the organization. The inference is that when this occurs they tend to grow larger and more professional—but more about this later. Let us get back to the setup of special libraries.

One of the keys to a special library is that its professionals usually belong to the Special Libraries Association or similar educational associations, but, as with everything else, there are major exceptions. Corporate law librarians, librarians in law firms, not-for-profit law agencies, and governmental law libraries, tend to belong to the American Association of Law Libraries. A similar situation exists in the medical library and military fields; hospital librarians tend to belong to the Medical Library Association and military librarians to the Military Librarians Association. Indeed, there are a plethora of educational associations with a majority of members who are in the special library rather than the academic, public, or school library sectors. This may explain why so few people are aware of the explosive growth of special libraries over the past twenty-five years. Association membership is quite fragmented.

This explosive growth is extraordinary. Whereas the vast majority of academic, public, and school libraries that are in existence today were in existence twenty-five years ago, the opposite is the case in the special library field. Granted, many of the other libraries were small entities. Twenty-five years ago a public library's facilities may have consisted of one Carnegie building while today its board of trustees may oversee a main library, eleven branches, and a museum (the original Carnegie building). The point is, however, that the public library was in existence. Twenty-five years ago most special libraries were little more than
an amalgam of books and a variety of shelves scattered throughout the organization.

There are several reasons for the growing special library phenomenon. The primary reason, however, can be directly attributed to the changing national economy. Agriculture and manufacturing are shrinking as percentages of the gross national product and the United States is turning toward service and information to enhance its wealth. As long as the trend continues, the total number of special libraries will expand and a portion of those already in existence will not only broaden their scope but substantially increase their physical size. Several developments are already in place that appear to be accelerating the pace:

1. a growing reliance upon online and telecommunications systems and the collateral impact: the development of the previously mentioned information resources management;
2. the growth of corporate and governmental "campuses";
3. the development of special library systems and with it, in-house standards as well as the growing professionalism of special librarians.

These developments imply vast changes in the way people work and use library facilities. Special libraries, once relatively passive places, are becoming busier and busier. In the discussion in the pages that follow, the excitement that is flooding the field can only be hinted at. It can only be described as fantastic.

**Online and Telecommunications Systems**

Although special libraries were not necessarily the first to use online and telecommunications systems, today the proactive ones tend to be among the most “wired up.” Some special libraries—particularly those in the defense and scientific research sectors—have formidable cabling and wiring requirements. It is not unusual to find a very busy facility with four parallel telecommunications cabling systems in existence simultaneously: hardwires to in-house mainframes, direct datalines to far distant in-house facilities, dial-up datalines to a myriad of commercial online services, and direct dial voice and intercom lines for voice communications. Several of the same facilities are beginning to experiment with satellite send/receive systems that include televideo.

This reliance on online and telecommunications systems is rooted in their modus operandi. As a group, special libraries tend to be very patron and service oriented. Although a facility might be tiny, with a
small circumscribed collection and few patron seats, at the same time it may field an incredible number of reference questions each day. It is not unusual to find a busy 8000 square foot research facility with upward of fifteen in staff. The idea is to get relevant and timely information to patrons as quickly as possible. Speed is of the essence. Information that arrives two or three days late may have no significance at all—the proposal may have already been sent or the contract signed. Professional service of this type requires a very labor-intensive operation.

As the complexity of the information services grows, the number of professional and nonprofessional staff also tends to grow—and so do the variations in online and telecommunication requirements. It simply is not possible to keep all the needed source materials on site if for no other reason than real estate limitations. At a rental figure of perhaps sixty dollars a square foot (in midtown Manhattan), or construction costs in excess of two hundred dollars a square foot (for some high security projects), one does not store large back runs of materials unless they are absolutely required. Instead, the library in question

Figure 1. Special libraries—like all other libraries—are growing. They contain more of everything: books, equipment, furniture and media.
Figure 2. Some special libraries are among the most “wired up” in the nation. Video management is becoming a major concern.

relies on online and telecommunications systems of one sort or another and a very fast system of interlibrary loan with, if at all possible, a twenty-four or forty-eight hour turn around time. Patrons demand the latest information and refuse to wait for a hard copy that will arrive several weeks or months hence.

Here it must be underscored that the operations of special libraries tend to be tied to the operations of the groups to which they report. In other words, if a patron group is a relatively expensive operation, and it can be demonstrated that costs can be reduced or profits achieved through the efforts of the library, then the library’s operational costs are rarely at issue. Indeed, the facility may be encouraged to subscribe to as many commercial services as it needs. To some extent, this explains the rise in “top down” situations in which higher management paves the way for the installation of online and telecommunications systems. Even though the systems are more expensive than their hard copy counterparts, they are perceived by the patrons of the library as supplying the competitive edge. The patrons can accomplish their work much faster and thus finish a project in record time. Record time equates to lower overhead in salaries paid that must be charged back to the project—and therefore more profit.
The competitive edge is a major impetus to the constant expansion of online and telecommunications systems throughout the workaday world. A major midwestern hospital, for example, recently decided that information management is one of its prime corporate directives. Because of this the total number of online services in the library have been dramatically increased and the library is about to move to new quarters that quadruples its size. The idea is to provide attending physicians with the latest clinical information enabling them to spend less time on their patients' cases. For the attending physician, less time equates to more disposable dollars. For the hospital the benefit relates to more referrals which in turn causes more beds to be occupied—in other words, more profit.

Providing a wide variety of online services, however, causes a whole series of facility problems. They revolve around the proliferation of and interface requirements for equipment, workstations, voice lines, data lines, electric power, and similar paraphernalia. To make sense out of this chaos, organizations have been creating new wrinkles in their reporting structures—the aforementioned information resource management groups.

When an IRM group is first formed, its modus operandi tends to be very equipment, word processing, and records management oriented. The people involved care first about purchasing and interfacing the equipment and second about a steady flow of "short bursts" of in-house information—e.g., sales, inventory, accounting, or personnel data. Since special libraries tend to be: (1) more hard copy oriented; and (2) interested in someone else's copyrighted information (prepared out-of-house), they are left out in the proverbial cold. They may not even be served by the group except perhaps as petitioners for a new personal computer or telephone line. This is unfortunate for, as previously noted, IRM groups tend to have money and power. Eventually, however, IRM groups begin to develop policies that encompass the dissemination of information—any type of information—throughout the organization as their raison d'être. After all, information is information regardless of where or how it was developed, who owns it, how big it is, and in what format. As soon as this occurs the libraries begin to join the fold.

Once a library becomes part of the information resource management effort, there are organizational questions that must be answered. For example, who controls access and passwords to the various commercial online systems—data processing or the library? In most engineering firms the engineers want their own passwords so that they can speed up
their work. Most of these people tend to be comfortable with computers. Obviously without some sort of control too many passwords will soon exist. Here an overlap exists between the rules developed by data processing and those developed by the library. Furthermore, one department has an equipment orientation while the other has an informational one. This potential conflict has to be sorted out.

The overlap becomes even more pronounced in the case of a company that has set up its own education department. Which group is in charge of training employees to use online systems—data processing, education, or the library? Which one should demonstrate the various types of microcomputer software on the market? Which one should have a computer library and display within its four walls?

The answers to these questions affect the size of a special library’s physical facility—as does the level of participation in the information resource management effort. Implicit are requirements for search areas, training rooms, microcomputer and software displays, as well as workstations for patrons and staff. Implicit also are requirements for bigger and more expensive facilities which contain more of everything—hard copy, media, equipment, and staff.

**Corporate and Governmental Campuses**

The number and type of corporate and governmental campuses are on the rise. There appear to be two major reasons for this trend: (1) the high cost of land in the country’s most dynamic cities, and (2) a university or collegial mind-set in many board rooms. Although most people recognize the first reason as valid, they often are surprised at the second one and query the logic behind such a statement. This, however, is the Age of Information and the nation’s larger corporations and governmental agencies are demanding that their new employees be chosen from a pool of well-educated people. In the technical and professional arenas a substantial percentage of new employees have spent four, six, perhaps ten years of their lives on college campuses of one type or another. These people like to work on campuses because they are used to working on them. The result is an increasing architectural spillover. Indeed, it has been observed that in certain fields creative and effective endeavors tend to come from corporate and governmental facilities located in campus-like quarters.

The implication is that special libraries located on campuses can be compared to their counterparts in university settings—and that is the case. Where the average special library contains only a few patron seats,
those located in campus settings tend to feature patron lounges, browsing areas, carrels, and a variety of tables and chairs. Where special libraries in buildings in our larger cities tend to occupy very workmanlike spaces, it is not unusual to find attention paid to the architectural aesthetics of a similar facility on a campus setting. Floor to ceiling glass, skylights, mezzanines, and other design features are becoming commonplace. Indeed, their designers consider them to be intellectual community centers. The architecture is such that employees are encouraged to use the library facilities on their breaks and during lunch hours. The facilities are placed in close juxtaposition to the company cafeteria or on some major route that must be passed several times a day.

A landmark special library of this type was designed by the late Eero Saarinen for IBM’s Thomas J. Watson Laboratory. The complex opened as far back as 1959. Although the laboratory building has been expanded two times since and a companion structure is about to be constructed, the original library still stands. One cannot walk from one end of the building to the other on the second floor without literally walking through the facility.

The same concept was used by the authors of this article in their design of the library at Oak Ridge National Laboratory. In this case the major walkway through the library is also a major entrance/exit route for one area of the laboratory. After the renovation occurred, circulation and reference questions rose dramatically. Indeed, the use of the library rose dramatically.

Special Library Systems

Today, public and university libraries commonly are organized into systems. If the systems are large enough they may consist of one or more flagship facilities, regional branches, local branches, small satellites, and even off-site storage. Systems imply standards and requirements to which all the facilities must adhere. Systems also imply the pooling of staff and resources. For example, technical processing may be centralized. Although a small percentage of processing may be performed on site to accommodate local needs, a portion of newly acquired books and materials may be processed by one central group.

The systems concept is successful and continues to gain ground because of economies of scale. Then too it makes sense for one group to oversee the operations of all the libraries within a particular organization. Here the surprise is that the systems concept has taken hold in the corporate, not-for-profit, and governmental sectors. For example, the
Veterans Administration and Department of Interior consider their libraries to be part of national systems with headquarters in Washington, D.C. The Department of Interior libraries range from the National Resources Library to school libraries on Indian reservations. In the corporate sector, at least one major high-tech company has more than thirty-seven facilities linked together in a national and, yes, international system which crosses divisional lines. A yearly conference is held as are regional meetings at which networks, policies, and standards are discussed. The conference and meetings are also used for educational purposes. Seminars, workshops, and training sessions are commonplace.

Since libraries are such object intensive facilities, square foot requirements are an integral part of the standards discussed at these conferences and meetings. The publications that result may encompass everything from the floor space required for staff and user workstations, to the minimum width of aisles between stacks and the space needed around copying machines.

At this juncture it must be noted that most major corporations, not-for-profit agencies, and governmental organizations usually have general space standards overseen by their facility planning departments. These standards tend to be based first upon grade level (e.g., clerk, technician, professional, executive) and then upon workstation needs. For example, a technical employee may be entitled to a desk and a swivel castered chair in a space no larger than eighty-five square feet. A professional employee may be given a desk, a credenza, two file cabinets, a coffee table, a swivel castered chair, and four guest chairs in 180 square feet.

Happily, libraries tend to be considered "special"—that is, there is leeway for them to deviate from the general standards. The facility planners recognize that libraries have different needs than the majority of groups and departments. However, workstation sizes must adhere to the general space standards which in turn means that a library system's standards must also adhere to them unless special dispensation has been given.

Space standards tend to be very political. In our society, space is equated with power. The more space one controls, the more powerful that person tends to be. It would be very foolish for a library system to publish a space standard for its library managers that provides them with workstations the same size as those for senior vice presidents. On the other hand, a library manager could have a 125 square foot office—in tandem with other managers in the organization—adjacent to which
are storage areas amounting to 65 square feet and a specialized search area of 60 square feet.

Space standards have many positive aspects, not the least of which is the implication that library managers are on a par with other managers in the organization. Although the majority of special librarians have their masters degrees—and quite a few hold two masters degrees—and some their Ph.D.s, it was not so long ago that library staffs were looked upon as glorified clerks. Indeed, the senior author of this article was a
special librarian about twenty-five years ago. She became a special librarian because her desk just happened to be situated in the library. No special training was required.
Figure 5. A free standing computer terminal workstation for staff and/or patron searches often requires 60 square feet.

While this situation still exists, the trend in the field is toward a more professional staff. In one corporation, the technical library employees (thirty-two people) are evenly divided between professional librarians and clerks. In another, seven with Ph.D.s work out of the library. Their main assignment is corporate intelligence—i.e., perusing the technical journals and second guessing the competition. Law libraries increasingly are managed by lawyers who may or may not have their MLS.
A more professional staff means more professional facilities—e.g., staff and user workstations that adhere to the standards mentioned earlier, search areas outfitted with the latest electronic equipment, and bookstacks maintained in a neat and orderly manner. Professional facilities tend to be well appointed. Furniture and equipment have finishes, surfaces, and textures that are durable and attractive. They are maintained on a regular schedule and often there are service contracts.
on them. That means that broken pieces are replaced as soon as possible, and new systems furniture configurations are set up "as-needed."

Furniture and Equipment

Probably the most important furniture and equipment trend in the special library field is the growing reliance on systems furniture for patron as well as staff areas. The trend is continuing unabated because: (1) most large corporations, not-for-profit organizations, and government agencies use systems furniture to furnish their office facilities; and (2) systems furniture tends to be more relevant to constantly changing multimedia/electronic environments, which are exactly what the "best" libraries tend to be.

Systems furniture is exactly what the name implies—a "system of furniture." Parts fit together, like those in an erector set, to create anything from individual workstations to entire offices. Since every piece of furniture is either a simple module or made up of components that integrate with one another, work surfaces and enclosing panels can be rearranged at a moment's notice. A simple standard shaped desk can quickly be changed into an L or a U configuration. Desk tops can be raised or lowered and run-offs added or removed at will. Pedestals complete with drawers and file cabinets can be replaced as can wall shelving, cabinets, closets, panels, blackboards, bulletin boards, etc. by utilizing the appropriate sockets. Hollow spaces are available to run wiring. A system of electrical and telecommunication extension cords and receptacles can handle nearly all needs.

Most systems furniture components and modules are produced by office rather than library furniture manufacturers. Although the office market is larger than the one for libraries, office furniture can rarely meet the durability requirements of patron areas in academic, public, and school libraries. It is not uncommon to find public library furniture installations which are up to fifty years old. Indeed, quite a few libraries, particularly those in the northeast, contain several chairs, tables, and freestanding cabinets that are more than 100 years old.

In large corporations, however, most office furniture installations tend to be less than twenty years old, and facility planners see to it that they are "refreshed" every eight to ten years. Yes, here and there the old gray "army" issue desks manufactured in the 1930s and 1940s can still be found. These desks are so durable that they are ubiquitous in the library field; they can be found in any number of technical service departments. The trouble is, they are more relevant to a bygone era and certainly are not relevant to multimedia facilities.
Trends in Special Library Buildings

To meet patron area durability requirements, library furniture companies vend tables and carrels that are extremely wear resistant. This furniture tends to be heavy and made out of wood. Extremely hard plastic finishes cover tabletop veneers of maple, oak, or birch—or substitute for them entirely. The cores of the same tabletops contain poplar, densiwood, or some other solid materials. Top-of-the-line items almost never hide fiber or composition board in their cores.

Special libraries, however, rarely have the same patron area durability requirements as their public, academic, or school counterparts. They do not have to contend with 500 students in their facilities each day. This means that they can use systems furniture wherever it is applicable whether it be for patrons or staff.

Here it must be noted that systems furniture tends to be even less durable than standard office furniture. That is because standard office furniture is screwed, bolted, or somehow glued together and systems furniture is not. Some systems furniture lines are made out of varying size panels. As indicated, the idea is to facilitate change. Manufacturers claim that initial purchase prices can be paid back in labor cost savings once workstations are moved 2.5 times. Because the emphasis is on moving and rearrangement, the assumption is that parts will break or be lost in the process. Of course new parts are easy to get, but this means that all except the “best” system furniture lines begin to show wear within the first few years of installation. They are not made to last.

For libraries the happy news is that the library furniture manufacturers have begun to enter the fray. Although their products are heavier and not as easy to move or change, they seem to be more durable—and one manufacturer’s line appears to be very ergonomic indeed.

In a multimedia environment, the furniture must be ergonomic—designed with a human-machine interface in mind. Chairs, tables, and carrels should provide comfort for any number of people no matter whether they are tall or short or fat or thin. Comfortable furniture helps to eliminate backaches, neck strain, and yes, even eyestrain. Lighting requirements, for example, for reading print on hard copy are quite different than those for reading similar print on a green or amber video display screen. In one case, the eyes have to contend with dark lines on a white background, and in the other case, light lines on a dark green or amber one. To cope with this problem, bright overhead lights can be reduced and staff and patron workstations outfitted with swivel and/or gooseneck task (desk) lamps.

Another example concerns desktop heights. Desks used to process hard copy typically stand twenty-eight to thirty inches from the floor. Since keyboards are about two inches high, to type comfortably, the
keyboard should rest anywhere from twenty-four to twenty-six inches from the floor. Many systems furniture lines offer special adjustable drawers that clip underneath desks to provide the correct keyboard height. Some people prefer workstations in an L configuration—a desk for paper processing that is 2-1/2' x 5' with a run-off at a right angle that is 1-1/2' x 2' to hold a microcomputer or terminal. Systems furniture catalogs are filled with options such as these.

The fact that parts are so easy to install enables special libraries to use systems furniture transaction desks in their circulation and information areas. Actually, the smaller special libraries do not have circulation desks at all. Circulation is not that high; materials are checked out only by a small group of people. The major focus is on the information desks. That is where all the "action" is. This explains why so many special librarians prefer to call their facilities "information centers." The majority of their work concerns gathering and disseminating relevant information accurately and quickly.

In addition to standard reference tools, any number of patron-oriented search stations or scholar’s workstations may be located near the information desk. (A scholar’s workstation has space for reading and writing, terminals, videodisc players, etc.) In a multimedia environment, help must be only a step away. After all, for each user friendly database a patron can access by him or herself, there may be ten which are difficult to use. Then too the plethora of equipment—e.g., tapes, compact discs, microforms, etc.—may be unfamiliar to a patron. On-off switches may be difficult to find, microfilm may have to be threaded, lenses may have to be changed, and so on and so forth.

In the smaller special libraries, staff workstations often are located in close juxtaposition to the information desk. Since the facilities tend to be small and the staff are required to supply high service levels, it is not uncommon to find workstations in these libraries out in the open. The difficulty here relates to quiet and concentration; constant interruptions make it difficult to accomplish daily work. The trend is toward enclosed offices with windows which afford a good view of the entrance and the patron areas. In larger facilities, most professional librarians have their own enclosed offices.

In addition, the larger facilities often contain compact shelving because floor space is in short supply and information services are growing by leaps and bounds. Although a hard copy collection may be circumscribed—it may not be allowed to grow, say, beyond 30,000 volumes—its square footage allocation may need to be compressed. Things such as scholar’s workstations, media collections, and laser
printers eat up space. While the traditional patron station takes up twenty-five to thirty square feet, a scholar's workstation needs at least forty square feet and an individual dictating room—perhaps as much as fifty square feet. One way to gain space is to condense the hard copy collection's area by utilizing compact shelving.

This type of shelving can be purchased on a variety of types and sizes. Some systems are manual and some electronic. There are small units and very large ones. Several types of compact shelving are made to be used for materials handling, others for records management, and still others specifically for libraries. The one problem they all have in common is floor loading. The buildings in which compact shelving is to be installed may have floors that cannot bear their weight once they are fully loaded.

Compact shelving requirements notwithstanding, office building floors are not constructed to carry ordinary bookstack loads—i.e., 150 pounds per square foot. They usually are made for lighter weights—fifty, sixty, seventy-five, or one hundred pounds per square foot—which correlate to local building codes. Where one city may require only fifty pounds per square foot live load carrying capacities, another may require seventy-five pounds per square foot. Although some office buildings have live load capacities higher than local codes require, most do not. This means that the area in which a special library is to be housed may need to have the floor reinforced. Whether it does or does not depends upon the construction of the building and where the traditional bookstacks can be located. In some buildings, for example, the area near the elevator is particularly strong. In others, the strength lies close to the outer walls. A note of caution, however: only a structural engineer should make this determination. If questions exist, one should be called in immediately. Overloaded floors can collapse and kill.

As far as compact shelving installations are concerned, they nearly always require reinforced floors. Here fully loaded weights escalate to 300 pounds per square foot, far in excess of most office building codes. Furthermore, librarians rarely depend upon compact shelving unless their traditional shelving is full and they either are faced with off-site storage or breaking their collections into little pieces and storing them in bookstacks all over the building. In other words, the traditional bookstacks in the area surrounding compact shelving are filled to the brim and the compact shelving in due time becomes as heavily loaded.
Trends

In the preceding pages a variety of trends concerning special library facilities have been discussed. Since so many of these trends are tied to managerial decisions, it is difficult to talk about one without discussing the other. As consultants who work in many different types of libraries each year, we see all trends converging—i.e., academic, public, and school libraries becoming more like special libraries and vice versa. Everyone is more information oriented and service is the key. Entrepreneurism has just begun. Indeed, libraries in every field are selling their services. They sell them to other departments, libraries, organizations, and even individuals. At the same time, special library facilities are becoming larger and more handsome. They appear to be metamorphosing into intellectual community centers just like their counterparts in other fields. Yes, the majority of special library facilities will remain small, but a substantial minority will rival the square footage of a good size public library.
Trends in School Library Media Facilities, Furnishings, and Collections

JIM BENNETT

For many years school library facilities have been the stepchild of the family. As they were hurriedly built in the 1960s and 1970s, very little interaction took place with the architects and administration concerning philosophical and behavior outcomes that were to be expected in the media center. Planning was seldom done with the anticipation of change or expansion. These attitudes are changing today. To paraphrase Winston Churchill, the school libraries we shape in turn shape us. What happens today and tomorrow will have lasting effects on the way school library services are perceived by the total school community, just as the developments of the last twenty-five years shaped the school media centers of today.

In 1983, a survey by Tony Schulzetenberg noted that: (1) school library construction decreased during the preceding decade, (2) remodeled school libraries were more common than new, and (3) most new construction occurred in areas of high growth and economic stability.1

We can expect these broad trends to continue, at least for the near future.

Any time a school library media facility is examined, questions must be asked regarding what the future warrants in a given building or a given situation. There are three essential options that can be considered for remodeling or expanding a media center. First, a school can refurnish the existing library. If only minor changes are needed and the media center has been successful then minimal change may be needed. If it meets the present and projected usage then only minor refurbishing

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should be requested. The second option is contingent upon an acknowledgment that the existing space is dysfunctional or inadequate. Renovation, which can include expansion, is the most common avenue taken today. The most prevalent mistake in this type of decision is to just add another classroom to the existing center by knocking out a wall. An awkwardly shaped area often results, and the syndrome of elongated (rectangular) media centers still persists. The third option is when school officials acknowledge that the current facility cannot be expanded or altered to meet the needs and a relocation is sought, either by renovating another part of the building or building an addition. Many recently rebuilt school libraries have very successfully taken outdated cafeterias or gymnasiums as their new homes.

The past decade has seen an addition to the basic components of school library planning. Historically, the function of the school library facility has come first and foremost, often to the exclusion of everything else. In the last twenty-five years, however, school officials have become more aware of the aesthetic values that must also be in place to make the library media center a more pleasant place to be. The atmosphere that is created by the style of furnishings, color schemes, lighting, and many other enhancements have revolutionized schools. A stark warehouse mentality can no longer be accepted. Function and aesthetics, then, have long been key components of school library design.

A third component has been expressed only recently, with very little acknowledgment and even less implementation. There must be a very clear understanding of the behavioral expectations of students and staff. These expectations can change daily. Layouts should encourage the behavioral patterns expected from users, both faculty and students (for this reason the planning team for a school library should include student representation). Given recent observations about behavioral understanding, it could be concluded that it even ranks above the aesthetics of the media center and is as important as function in contributing to a successful design.

A model for future planning should include all three components. If the thinking is unified then truly a school can have a FABulous operation that will enrich the learning process of students. Each component must be considered and reevaluated periodically.

Use of Library Space by Students and Staff

Traffic patterns must be continually studied and reexamined to increase the usage of the facility and materials. Carefully planned
Facilities, Furnishings, and Collections

![Venn diagram](image)

**Figure 1. Design**

Allocation of collections and furniture will lead to a smoother running service-based information center. Rockwood and Lynch pointed out that "layout is a potent tool for increasing circulation and interlibrary use of materials. A good layout can increase (1) the quantity and frequency of use traffic, (2) the time per visit a user spends in the library, (3) the number of materials a user is exposed to on any visit, (4) the examination and comparison of materials by users, (5) the number of unplanned impulse selections, and (6) self-service by users." They further noted that users of school libraries have different objectives that can change from one day to another. If we think as retailers of merchandise, we will increase the "volume of sales."

One vitally important observation brought out in the earlier mentioned study is the location of the circulation desk. Because we are a "walk on the right" society, the desk should be on the left as patrons enter at the center. This allows the exiting students to stay on the right side. The front of the circulation desk should also be studied to determine whether it impedes traffic. With the addition of security systems that slow down exit from the center, the staff should be aware of the adverse feelings of those who are standing at the desk checking out items while behind them assembles a "cattle drive" of their classmates. Recently, high schools have installed security systems with two exits for
each entrance. Circulation could be moved a short distance away from the exit or new designs should be applied to traditional straight modular desks; arrangements that allow people to step out of the flow should be considered (see figs. 2a, 2b).

Figure 2a. Designs that Assist Traffic Flow

Taking a cue from the marketing perspective in retail bookstores, the library circulation desk should be attractive and eye-catching. It should draw a person to take one more book along. School libraries are becoming more aware of strategies to increase lending of materials. Leaving the returned books cart out in a public area draws people to see what others have just brought back. New items nearby also attract potential usage.

Unified collections and services are developing, and this is a long overdue trend. Too often in the past, collections have been placed by their size rather than by their potential use. Many schools today still house periodical microfilm/fiche in one area, back paper copy in another area, microform readers in still another area, indexes in the reference collection, and current copies of magazines in another location. Yet all five of these functions could be logically grouped in close proximity. Schools that have grouped their collections according to anticipated use have found that this increases use and cuts research time by staff and students.

Another area of consolidated service functions revolves around the circulation desk. Traditionally, many schools have either separated this function from other staff functions or allowed it to be staffed by student
assistants. Today's technology is changing the traditional approach. Computerized circulation as well as electronic security systems require a more thoroughly trained staff. Microcomputers located at the circulation desk lend the area to cataloging, word processing, and bookkeeping. The concentration of automated equipment at the circulation desk leads to a concentration of staff at the desk; what once was done in the relative isolation of a workroom may now be done at the desk. The size and shape of the workstation(s) at the desk will change even more in the next decade. Flexibility must be considered as this expanse grows.

**Impact of Electronics in the School Library**

Electronic technology has forced planning for new workstations that can handle varied tasks depending on the immediate needs. A bank of terminals can now be used one period as the classroom instructional program (from a database vendor) to teach online retrieval skills. The second period the same terminals can be used for interactive instruction from optical laser disks. The third period, CD-ROM products like
JIM BENNETT

electronic encyclopedias could be used with the same terminals and so on through the day. Space and costs will likely force the use of multitask terminals for the foreseeable future (although online catalogs will demand separate installations). How many terminals will be needed? How much can be spent? How much space must be dedicated to this? How much time for installation and operations must the staff incur? These questions will have to be answered by each individual school.

Security systems are being installed in increasing numbers. Rarely acquired in the lower grades, this "necessary evil" is a must to protect collections in many secondary facilities. They have changed the appearance of entrances and circulation desks, although today's units are attractive and very inconspicuous. One serious concern that has been encountered by staff is the ability of microcomputer monitors to radiate a signal that can often defeat the security system's ability to detect theft. This can be corrected by filters on each system and by increasing the distance between the microcomputer and the security sensor.

Satellite access is opening the way to sundry possibilities. The use of many public broadcasting channels permits wider selection and often live viewing. Foreign language broadcasts have already strengthened the school library's interaction with language instructors and students. Viewing French broadcasts from Canada or Spanish broadcasts from Mexico have expanded our ability to meet the needs of the curriculum. C-SPAN and the NASA channel are fine examples of broadcast programming for school use. School libraries may receive live broadcasts from NASA, for instance, with students asking questions to the presenter via conference phone lines. The possibilities are unlimited. From authors doing live interviews to school to school competitions (like Battle of the Books), the use of satellite channels is increasing.

In some areas dedicated channels are being used for shared instruction. Library channels that are opening up via state networks will assist the continuing education of all teaching staff. Facilities for viewing must be provided either in individual carrels or a large viewing room. Beam projectors or rear view large screens are becoming fixtures in larger media centers. Acoustical control of these areas is a major concern in many school library facilities. In large library media facilities, the need to change the television studio from just an in-house unit to that of a transmitting studio will increase; districts are sharing more of these services with surrounding districts.
Other Trends in School Media Centers

Space saving efforts take many forms, particularly when additional square footage is not forthcoming. Compact shelving is gaining acceptance in schools. High density storage is useful for items in low demand yet worthy of continued maintenance. One high school very wisely installed such a unit behind the circulation desk. In half the space otherwise needed, they are able to house the back periodicals, prepackaged media kits, small audiovisual equipment, and little used supplies. All are quasi-secure behind the desk.

In many elementary and middle schools, nonprint collections have been integrated on book shelving. Special clips and boxes assist in this process. By not separating types of media, the users retrieve materials faster and are also reminded of the different formats that information may come in.

A continuing trend in elementary libraries is the story area (either sunken or raised) that can be used for multiple purposes. Storytelling, dramatic productions, and puppet shows are only a few of the numerous possibilities that a “little theater” offers.

As Cohen and Cohen point out, color and signs are highly important factors often overlooked in the design process. Color coordination in either renovated or new libraries has recently down-played the bright, bold colors that were the fads of the seventies. There was a trend to use too many vibrant colors next to one another and therefore create optical vibrations. The eighties are predominately colored in earth tones with a few splashes of brighter color. Dark wood or wood-like formica have added a richness and warmth to the learning environment. Signs are being improved to make the school community less dependent on staff who otherwise would be answering questions like “Where is the biography collection?” Time savings to the user and staff result when large floor diagrams and large lettering are installed. More awareness to the height of visuals (especially in the lower grades) and their ability to be viewed (i.e., perpendicular mounting) is needed. The colors used in signs should complement the other tones in the area.

Lighting has changed over the last decade. From what was rows of fluorescent bulbs and some natural light from a few windows, the trend is to increase outdoor lighting if possible, return to some incandescent fixtures, and move to a newer type of fluorescent tube that reproduces a normal spectrum of light more accurately (these newer fluorescent tubes can bring out truer colors in their surroundings). By providing varied types of light in the library, people can pick and choose the area that fits...
their needs. Candle power reductions from previously recommended levels have been implemented. Lighting in areas that involve computers, reader-printers, and the like has been softened to reduce glare.

Handicapped services have been recognized as a viable obligation of school libraries in the sense that in design or redesign of new or remodeled media centers, access to all areas must be attempted. No more tight stacks, no more balconies unless elevators are provided, and no more steps without ramps. In some schools special carrels have been installed with reading machines, enlargers, and now the newest technology includes microcomputers with voice activation and voice simulation devices to assist special students. If the rest of the school is being used for mainstreaming then the learning center must conform to the needs of all the students who use the building.

Aesthetic accessories that make the media center a more pleasant place can run the gambit. Large foliage plants and trees are adding beauty and a feeling of affectionate care to what is often an instructionally sterile environment. Aquariums and terrariums are adding a touch that brings tranquility to students. Even sandbox tables in elementary schools are being used to make the students feel that the center is theirs. Private nooks or cubicles for the serious readers have helped make the centers the place to be. One elementary school has large bean bags made from king size bedding.

**Conclusion**

We are constantly changing the appearance, the types of collections, and the space to handle students and materials. Examples of this transformation are: (1) paper copy data to 35 mm microfilm to microfiche to CD-ROM storage, and (2) slides and videotape data that is now stored on optical laser disk. What was once a large collection stored on shelves has been reduced, and yet electronic workstations have occupied the space freed by reduced collections.

Flexibility to change is imperative in the design of school libraries. When a change occurs, the foremost thought should be how this alteration will either help or hinder future alterations. Fixed function, built-in equipment discourages flexibility.

If there is one common theme to keep in mind, it is that change is here to stay. "The inability to change and the inability to think beyond the present can have drastic effects on the actions that affect area environments today and in the future." We must plan now for flexible
Facilities, Furnishings, and Collections

physical plants that will allow alterations or modifications as the technologies force us to incorporate the newest information media. Charlie Lou Rouse points to the problem that befalls the library media specialist: "Many new technologies are finding their way into the school library media center. Careful planning of facilities is needed to ensure that they are used to their maximum potential." This maximum potential is denied if the space is not right and if the staff is not on top of what is happening. This final point is an absolute. No facility even with the finest technology and furnishings can be self-sustaining. It is the motivated staff that makes the distinction. The most FABulous library media center facility must have appropriate collections to support the curriculum and highly qualified personnel.

References


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On The Verge of a Revolution: Current Trends in Library Lighting

BRADLEY A. WATERS
WILLIS C. WINTERS

Historically, too little regard has been given to lighting in the design of many buildings. This results in part from the attitude among facility planners who see lighting as something to be engineered but not designed. Two forces, however, that have begun favorably to change this attitude are energy consciousness and the belief that better design brings lasting added value to architecture.

Consequently, lighting technology has made rapid progress in response to energy efficiency and has improved the quality of the interior environment, promising to revolutionize the common perception of lighting in buildings.

The architectural aspects of effective library lighting present a somewhat unique problem when compared to other building types. Diversified functions, with very distinct needs for quantity and quality of light, have precluded a uniform application of one type of lighting from being totally effective in typical library design applications. Only recently has available technology been coherently incorporated into building design. It is the intention of this article to further advance the integration of technology and functional requirements by assisting in library planning with respect to lighting.

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In an attempt to give the reader an overview of some of the available tools in lighting design, this article begins by touching very briefly upon the technical aspects of light and light sources currently being utilized. The article also investigates the options available in utilizing these lighting tools through a survey of library buildings that have successfully integrated recent technology with function in one or more applications. Finally, the article concludes with specific recommendations for the various functional requirements of a library. With the advent of technologies that enhance the dissemination of information—as well as the distribution of light—there is every reason to believe that through conscious planning, an environment can be designed to accommodate specific tasks with optimum quantities and qualities of light while enhancing the architectural expression of that environment.

The Physics of Light

The fundamental elements of physics that allow an individual to experience light—that is, to see—are too complex to comprehensively delineate in this limited space. So, for the purposes of this discussion, only those aspects critical to facility planning will be emphasized. Foremost of these fundamental aspects is light intensity, or quantity. A byproduct of intensity is visual contrast which is enhanced by the brightness of a given object. One of the most annoying byproducts of light is glare. These four items should be understood before effective planning and design can commence.

Intensity

While the most commonly known measurement of light quantity is the footcandle, it is only a two-dimensional criteria and needs to be viewed in relation to other issues. The lumen is the unit that is the true fundamental standard for measuring light energy. In physical terms the lumen is defined as the amount of luminous energy radiating from one square foot of surface area of an imaginary sphere, two feet in diameter, surrounding the light source. In essence the lumen measures light at the source. A footcandle is a measurement of luminous energy at the surface upon which it falls and is defined as one lumen of light energy incident upon one square foot of surface area. Hence, a footcandle measures the density of light, and since light is a radiant form of energy, the further light travels the more area it covers and the less density it has.
Current Trends in Library Lighting

Brightness

In terms of performing general tasks, such as reading and writing, the brightness or luminance of the subject surface is obviously affected by light intensity. It is generally considered that the higher luminance an object has the greater the visual performance is enhanced. It is this philosophy that in the past has led to an inappropriate response of virtually showering reading areas with large quantities of light with the
at hand.) While in many instances quantity of glare may be directly related to quantity of light, location (viewing angle) and size of the light source have obvious contributions to the amount of glare one perceives.

An index for calculating total glare source contributions is known as Visual Comfort Probability (VCP). Somewhat an inverse to the sum of glare quantity, the VCP rating of a lighted environment, ranging from zero to one hundred, is based on the number of people finding that environment comfortable. A VCP of seventy is considered good, meaning seventy of one hundred normal viewers would find the given visual environment comfortable. The criterion for calculating the VCP of various sources has been established by the Illuminating Engineers Society (IES) and contains a list of conditions too extensive to include here. It is important to note, however, that the IES criterion is somewhat limited in that it tends to take into account a certain degree of uniformity and presumption, and so tabulated VCP values tend to reflect the worst case in an environment.

Another gauge of lighting quantity developed by the IES is a criterion known as Equivalent Sphere Illumination (ESI). Virtually replacing the raw footcandle as the standard measurement of light at the task surface, ESI footcandle values compare contrast rendition based on optimum, laboratory test-condition light. This optimal lighting is based on a theoretical illuminated sphere that surrounds the task from which emanates a uniformly distributed light similar to light of the semispherical sky dome during daytime. Like VCP values, calculated ESI values have limitations since they are based upon a set of constant assumptions, and they are therefore inclined toward the worst condition in a given situation.

Light Sources

With this abbreviated overview of the fundamentals of light, attention will be turned to light sources commonly utilized in building design. The primary characteristics that differentiate one light source from another are basically threefold: initial cost, operational efficiency, and color rendition. Since long-term operational costs far outweigh first-cost of any type of light fixture, consideration will be given to efficiency (quantity per unit of energy) and color characteristics (quality related to the full spectrum of light energy) of these light sources.

In order to measure the efficiency of a light source, the amount of lumens produced by each watt of electricity is determined and is called lumens per watt. Artificial light sources have varying lumens per watt average ratios ranging from 7 to over 180.
Current Trends in Library Lighting

The types of light sources utilized today can be categorized in several different ways, but for the purposes of this discussion they will be divided into groups of traditional and nontraditional types as follows:

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Nontraditional</th>
</tr>
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<tbody>
<tr>
<td>Daylight</td>
<td>Metal Halide</td>
</tr>
<tr>
<td>Incandescent</td>
<td>Mercury Vapor</td>
</tr>
<tr>
<td>Fluorescent</td>
<td>Pressurized Sodium</td>
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</tbody>
</table>

One of the aspects reinforcing this division is the performance characteristics of each of these two categories. The nontraditional sources are also known as High-Intensity Discharge (HID) sources and will be discussed in more detail later.

Daylight

Daylight is the baseline against which the quality of all other light sources is judged. It is accepted that the color rendition of daylight is as accurate as is physically possible, though dusk and dawn daylight tend to appear more orange. It is also generally accepted that the price of daylight is free, but in a comprehensive energy analysis, heat losses and gains through glass and air infiltration around window frames generate some energy costs that may begin to offset the savings of using natural light to augment artificial light.11

By nature, daylight is generally an indirect type of light in that it is usually reflected off or through many surfaces by the time it reaches a task surface. This characteristic, coupled with the quality of color rendition, is what makes natural light so attractive. However, there are problems that daylight presents as well. Certainly daylight is not as readily controllable as an artificial light source. And because the sun itself, even when filtered through thousands of miles and many layers of atmosphere, is such an intense source of light, brightness caused by even diffuse sunlight greatly exceeds that produced by artificial sources. This differential is commonly controlled by window blinds or by the location of the window aperture, but it must be addressed if successful application of daylight is to be achieved.

Incandescent

The working concept of the incandescent light bulb has not changed significantly since the days of Edison. Incandescent light is produced by sending electrical current through a filament element in order to heat it to temperatures high enough to make it glow. The color rendition of incandescent light is close to that of daylight yielding a yellow to white light on neutral surfaces. But while the initial cost of a
traditional light bulb is relatively low, the energy costs of operating an incandescent light are high, thereby making it the least efficient light source on the market outside of candle power. Only 10 percent of power input into incandescent bulbs is converted into visible radiation or light.\textsuperscript{12}

The most efficient type of incandescent light is the tungsten-halogen lamp. A tungsten filament is regenerated by halogen gas inside a small tube, which enhances efficiency. Projector and reflector lamps are other types of incandescents that focus light into a beam (much like an automobile headlight) with the use of a reflective directional surface built into the lamp itself.

**Fluorescent**

The introduction of fluorescent lighting fixtures to modern architecture occurred about twenty-five years ago. Much more efficient than incandescent light, the fluorescent fixture utilizes an electric ballast to energize gas within a tube to produce light. Although early fluorescent tubes did not match incandescent light in terms of color rendition, recent developments have virtually color corrected fluorescent lighting, albeit at a cost of some reduced efficiency. In general, 22 percent of total energy input into fluorescent fixtures is converted to light.\textsuperscript{13}

**High-Intensity Discharge**

Like fluorescent light, HID sources are ballasted energized gasses within a tube. Unlike fluorescent light, these HID tubes tend to be much smaller in size while producing larger quantities of light in higher intensities—hence the term high-intensity discharge. A drawback of HID lighting is a prolonged warm-up time. Unlike incandescent and fluorescent luminaires which reach full capacity luminance almost instantaneously after switching them on, HID lamps can take several minutes before reaching full intensity. The significant differences between the various HID sources are their gaseous medium and their performance characteristics. Because of their intensity, HID light sources tend to be much more efficient but also may require different types of applications from traditional sources.

**Mercury Vapor**

The least efficient of the HID sources, mercury vapor lamps, tend to be less efficient than the most energy efficient fluorescents, converting only about 15 percent of input power into visible light. Clear mercury vapor lamps yield a predominantly blue-green light. However, color
Current Trends in Library Lighting

corrected lamps in mercury vapor have been developed by coating the inside of the lamp like fluorescents. These lamps result in lower operational outputs. Warm-up times for mercury vapor lamps span five to seven minutes.14

Metal Halide

Highly efficient and good color rendition, metal halide lamps convert almost 25 percent of input power into visible radiation. While metal halide lamps take only five minutes to warm up, they are extremely sensitive to burning position and must be installed correctly to achieve their full potential.15

Pressurized Sodium

Even more efficient than metal halide, these lamps can be categorized as two types: high-pressure and low-pressure sodium. High-pressure sodium lamps tend to give off a golden-white light rendering red objects orange and blue and green objects gray. Warm-up time for these lamps is about four minutes, while they yield almost 30 percent visible light energy. Low-pressure sodium lamps have the highest efficiency, converting over 35 percent of power input into light. However, these lamps emit a monochromatic yellow light and are generally only suited for exterior applications. Like metal halides, low-pressure sodium lamps are also very sensitive to burning position. Starting time to full lamp brightness can range from seven to fifteen minutes.16 Table 1 provides a summarized comparison of these various light sources and cites the efficiency and life expectancy of various types of lamps.

Lighting Applications

Having reviewed the characteristics of light and the various sources available for use, attention can now be turned to the choices in application. There are two extremes of lighting application—direct lighting and indirect lighting—with various combinations in between. While these describe the direction of light itself, consideration must also be given to the mounting of the light fixture. These possibilities include recessed, surface mounted, pendant mounted, track lighting, and free-standing luminaires. Mountings can be on ceilings, walls, floors, and even integrated into furniture, with varying possibilities of the quality and amount of direct and indirect light produced. In general, a fixture includes a lamp and its housing and may include some type of a reflector.
and a lens to control light distribution. Light distribution characteristics depend not only on the fixture itself, but also on the color and texture of the surfaces surrounding the fixture.

**Direct Lighting**

For years the primary application of incandescent and fluorescent light in libraries has been in direct lighting. Usually achieved by fix-
tures mounted at the ceiling, these applications often serve as general lighting as well as task lighting by supplying enough light intensity to the work surface to accommodate most any task. As energy consumption has become more scrutinized in facility planning, this strategy of lighting, or by integrated or luminous ceilings, has given way to more direct lighting at the work surface itself. The ability to switch these types of remote lights on and off as use dictates results in potential energy savings.

Indirect Lighting

Possibly because of uncertainties of either how to measure quantities or of its behavioral characteristics, indirect light has not been widely utilized until recently. By its very nature, indirect light is diffused as it is reflected off surrounding surfaces and therefore tends to reduce glare and brightness contrasts. Almost by default, direct lighting produces indirect light as it bounces around an environment. Indirect lighting is the intentional application of light that is to be controlled by reflecting it off surfaces whose color and texture are also controlled. As stated earlier, almost any functional utilization of daylight is in an indirect fashion because direct sunlight can have uncomfortable or even damaging side effects. Indirect lighting, especially when using artificial sources, is often referred to as ambient lighting.

The pleasant characteristic of indirect light is that it is reflected off surfaces and actually comes from many directions. This multidirectional aspect, also known as diffusion, tends to reduce shadowing. Diffuse light can come from direct light sources too, providing a louver or lens covers the light source and diffracts the light into many directions. Most fluorescent fixtures currently in use have some sort of diffusing lens that aids in reducing direct and reflected glare and severe shadowing. The following considerations should be addressed in the planning of any facility:

1. Different quantities of light are appropriate for different types of tasks.
2. The quality of light, more than the intensity, has a direct bearing on the functionality of that light.
3. Quality is affected by many conditions including:
   a. Brightness ratios between the task surface and immediate surroundings as well as background surroundings.
   b. Direct glare caused by direct light quantity, brightness, and viewing angle.
c. Reflected glare caused by the angle, color, and texture of the task surface.
d. The directional characteristics of the light, being either singular in origin or diffuse and multidirectional.

Libraries with Successful Lighting

Quality of light is as much a concern, if not more so, than quantity. Planning quality lighting of a library takes time, and it is a part of the design process that has often been neglected or eliminated altogether. There have been many successful attempts to integrate quality lighting design with the diverse functional requirements of a typical library. A brief examination of a few significant library projects will yield a clearer concept of successful lighting applications in recent library design. The manner in which each achieves satisfactory results may differ—a testimony to the technology available and to the ingenuity and conviction of their architects, lighting designers, and clients.

Daylight plays a significant role in most of these libraries. When it is combined with other artificial lighting types in mutually complementary ways, the result is often a memorable and functional interior space. The range of applications spans from decorative custom task lighting, to highly specialized stack lighting, and finally to general ambient daylighting of the primary public spaces.

The San Juan Capistrano Regional Branch Library

The San Juan Capistrano Regional Library in California employs both daylight and incandescent light sources in subtle ways. The incandescent fixtures, custom designed by architect Michael Graves, solve a variety of functional needs. These include general room illumination from suspended pendants and decorative wall sconces, in addition to task/reading lighting from table lamps. Daylight is introduced into the interior spaces primarily from above via light monitors and clerestory windows. These monitors are a major design element in that they create distinctive pyramidal ceiling coffers that give a soft, diffused illumination from both the artificial and natural light sources (see fig. 1). The handling of light recalls the Mediterranean tradition of introducing light to interior spaces indirectly and sparingly.

Opened in December of 1983, the San Juan Branch consists of 14,000 square feet on one level. The library was designed by architect Michael Graves who won the commission through a design competition.
Another project which uses light sparingly—this time artificial light—is the Seeley G. Mudd Library at Yale University. Daylight is confined only to a small number of perimeter study carrels which are separated from the larger reading rooms by near ceiling-height shelf partitions. These shelf units are lit by unique fluorescent fixtures with parabolic lenses which extend from the top of each unit on two metal arms. Light is distributed evenly over all the shelves, from top to bottom, as the fixtures are designed and located so as not to cast a shadow from anyone selecting a book.

The reading tables and study carrels in the Mudd Library also provide a unique solution to the requirements for task and general lighting. Both light sources are located in the same fluorescent fixture suspended eighteen inches above the center point of each table (see fig. 2). The task light shines down onto the tabletop while the ambient room
light shines from the top, casting a soft warm glow on the exposed concrete ceiling above (there are no light fixtures mounted on the ceiling). The effect is a very sophisticated reading environment with only the shelves and table tops brightly lit and the remainder of the space being subtly rendered as a neutral background.

Figure 2. Reading Table Cross-Section, Seeley G. Mudd Library

The Mudd Library was designed for Yale by the firm of Ross and Moore Architects. Housing 1.6 million volumes on four levels, the 75,000 square foot library was open for operation in 1983.
Current Trends in Library Lighting

The Conrad Sulzer Regional Library

By contrast to the preceding projects, the Conrad Sulzer Regional Library in Chicago is an exuberant expression of light, from the oval entry lobby to the double-story reading room—both lit from above by a continuous skylight. The reading room also boasts a perimeter wall that is so evenly distributed with windows as to dispense with the need for artificial lighting on most days (see fig. 3). Suspended HID metal halide uplights and task lights at the reading tables provide lighting at night. The interior color scheme of lightly accented ceilings, walls, low partitions, and furnishings greatly reinforce the character of the interior spaces by reflecting this indirect light throughout the space. And, despite the open airy feeling of the interior, only 24 percent of the exterior wall is given over to windows—a relatively low percentage.

Located in Chicago, the Conrad Sulzer Library includes 65,000 square feet on three floors and a mezzanine. Architects for the project were Joseph W. Casserly, city architect, and Hammond Beeby and Babka, Inc., consulting architects.
The Frances Howard Goldwyn Hollywood Regional Library

The Goldwyn Hollywood Library, located in Hollywood, California, opened for operation in June of 1986. Designed by Frank O. Gehry & Associates, the library contains slightly over 19,000 square feet of space on two levels.

Similar to the Sulzer Library, the most striking aspect of lighting application in the Goldwyn Library is the abundance of natural light. An extensive number of exterior windows, particularly in the second floor reading rooms, creates a pleasant, spacious environment. Most of the window area, outfitted with tinted glass, is located at the front of the building. The double-story reading rooms, and the clerestory windows integrated there, allow for the light to be reflected off the white walls and ceilings, penetrating into the stack area toward the rear of the building (see fig. 4). The overall effect is of an abundance of diffuse sunlight, negating the need for task lighting during daytime hours.

Figure 4. Building Cross-Section, Frances Howard Goldwyn Hollywood Regional Library

Another successful characteristic of the Goldwyn Library's lighting design is the provision for stack lighting. Since these areas only partially benefit from the extensive daylight found in the reading rooms, they are lit with indirect HID metal halide fixtures mounted on top of the shelves, reflecting light off the white ceiling down between the shelves below. The effect here is again a good diffuse light, certainly ample for a stack area. These fixtures are staggered on top of the shelves.
Current Trends in Library Lighting

in a checkerboard-like pattern to facilitate even distribution of light throughout the area without shadows being cast by the stacks. And because they are mounted on the stacks themselves, when the stack moves the light moves thereby facilitating the flexible spacing of shelving.

One aspect of the Goldwyn Library that is particularly disappointing, however, is the apparent lack of consideration given to the function and location of the microfilm readers in the library. Located in an opening between the reading room and stack area, the reader screens are washed with sunlight, creating glare on the screen. The inability to control the light shining upon the screen vs. the brightness of the screen itself, as well as the light on task surfaces around the reader, create a problematic work area lacking the functional and aesthetic quality of the majority of the other spaces in the Goldwyn Library.

University of Michigan Law Library Addition

A similar attitude toward abundant daylighting in library interiors is shared by architect Gunnar Birkerts in his 77,000 square foot addition to the Legal Research Building at the University of Michigan, completed in 1981.21 The addition is underground and the major source of daylight is a V-shaped moat that stretches along two sides of the older existing building. Light rebounds from limestone panels on one side of the moat through reflective glass on the other side and into the new library. Short-term study carrels are located continuously along this glass perimeter. The remainder of each open floor consists of ceiling-mounted fluorescent fixtures over reading tables and stacks. The significance of this project lies in the successful introduction of daylight into an underground building—a design challenge which could easily have resulted in an oppressive sense of burial for the building users.

The Folger Shakespeare Library Additions

The Folger has long been the site of one of the most extensive rare document collections in the world.22 Located on Capitol Hill in Washington, D.C., the Folger began an architectural expansion program in 1975 culminating in the opening of a second reading room in January of 1983. The additions, in two phases, added over 22,000 square feet to the renovated 68,000 square feet of the original building. The firm of Hartman-Cox Architects served as the designers of the additions which are comprised of two floors below ground and two floors above.

In contrast to the Sulzer and Goldwyn libraries, the daylight sources in the second reading room, the primary space of the Folger
additions, are mostly obscured from view. This strategy stems from both practical and artistic concerns in that the fragile nature of the documents and art utilized in the space must be protected from direct sunlight. Therefore, the long walls and the barrel vault that stops short of spanning between these walls are bathed in light from tinted glass clerestory windows and skylights located behind and above the vault respectively (see fig. 5). This light is augmented by incandescent lamps mounted between wall and vault and by task lamps at the reading tables. The effect is probably the most dramatic use of diffuse light cited in these case studies, a drama certainly appropriate to this Shakespearean setting.

![Diagram of Reading Room Cross-Section](image)

Figure 5. Reading Room Cross-Section, Folger Shakespeare Library Addition

**Daylight as a Resource**

In summary, the characteristics exhibited by this group of facilities can be distilled into three general categories. First, each library was chosen to be represented here because of the quality of light demonstrated in one or more applications in the facility. Second, most were
Current Trends in Library Lighting

relatively small in size, averaging 12,000 square feet of area per floor. Third, this size factor enabled each to use daylight to some degree of effectiveness—if not extensively—because of the ability of that light to penetrate the building. Daylight contributes to the perceived quality of most any working environment. It is granted that larger, centralized, urban libraries may not enjoy the opportunity to deploy typical floors of 10,000 square feet, but the opportunity always exists to employ daylight, a strategy that is apparently as cost effective as it is pleasing.

For these reasons, the authors highly recommend the use of daylight to the largest extent possible in any facility design and not solely for reasons of quality, but because utilizing natural light can reduce the number of fixtures required in lighting a building while dramatically impacting operating costs. Studies have shown that, when properly introduced, daylight can save over 50 percent of the energy required to light a building with standard lighting techniques. This savings results not only from a reduction in energy used directly for lighting, but also in the reduced heat load experienced with the utilization of fewer luminaires.

Specific recommendations for the incorporation of natural light into a building have architectural implications that involve aspects such as building configuration, exterior window placement and shading, and climate and solar orientation—items not exclusively related to lighting the interior. Related issues that should be addressed when planning to utilize daylight in a facility are:

1. Multiple, smaller openings are desirable over few, larger apertures.
2. Light should be introduced high on the exterior wall or at the ceiling.
3. Direct sunlight beams should be avoided by using building elements to diffuse the light, preferably prior to entering the interior.
4. The color and texture of all surfaces in the interior should be coordinated to balance reflectance, contrast, and aesthetic considerations.

When properly planned, daylight can provide task lighting as well as ambient light, but in any case it should be utilized whenever and wherever possible.

Planning Light

With concern for natural or artificial lighting, the authors recommend that the planning strategy for the deployment of light should be to utilize low levels for general, ambient lighting while directing higher
levels to task-specific areas. Again, energy savings of over 15 percent can be realized by directing light to where it is needed rather than relying on general lighting systems to provide levels sufficient for task performance as well. The key to this strategy is giving the user and the librarian more control over the switching of light fixtures. This, coupled with flexibility of light placement, can reduce the number of lamps and the duration of their use.

Flexibility is also key in the planning of most any new facility constructed today or in the future. The need to change interior configuration to meet expanding technology and related user sophistication is critical in long-range planning of library systems as well as individual buildings. Hence, it is paramount to maximize building lifetime through planned flexibility.

With respect to lighting, fixtures that are movable are obviously more flexible, but since furnishings and displays are also movable, we would tend to recommend luminaires that are both task related and ambient in quality and that are incorporated into furniture. This type of consolidation has obvious benefits but also implies the unlimited placement of power cabling within the facility, a requirement that must be carefully considered. Current technology of trench ducts, energized floors, or under-carpet flatwire certainly makes this power connection possible, however at a cost presently higher than conventional power distribution. In the overall process of facility planning, these considerations must be weighed with appropriate value for the given situation.

In a holistic approach to lighting, all of the issues raised in this article, as well as numerous other technical and aesthetic considerations, bear upon final decisions on how to light a given space. However, cost and function tend to take on the largest order of magnitude in the majority of facility planning scenarios. Since HID lamps prove most efficient, and metal halide renders the best color, this combination seems a logical choice to utilize for general lighting purposes. Furthermore, since indirect light yields a more diffuse light with lesser associated problems of glare, indirect applications should be deployed wherever possible. Additionally, since luminaires that can be directed toward specific needs enable a reduction in the quantity of fixtures and the energy to light and to cool, flexible, adaptable lighting is both functional and cost effective. So, for reasons of energy efficiency, quality of light, and flexibility, we make the following recommendations for artificial lighting of specific functional areas of a library.

**Book Stacks.** Metal halide lamps in HID indirect uplights reflected off a light colored ceiling at least two feet above the fixture can
provide a good diffuse light distributed evenly throughout the stack area. Books on top shelves are not subjected to direct light that might discolor or damage them. Also, if the fixtures are mounted on top of the shelves, spacing of the shelves is not predicated on the spacing of light fixtures, rather vice versa.

Office or Work Areas. With the advent of modular, open office systems furnishings has come a problem with fixed location lighting at the ceiling. Utilizing luminaires mounted on movable partitions that incorporate both a downward task light, as well as an upward ambient light, can free the ceiling of inflexible light distribution while providing light where it is needed. This combination task/ambient lighting application has proven effective from a flexibility standpoint, as well as for energy savings, by taking advantage of the characteristic of light projecting radially in all directions. However, since most partitions are equal to or below eye-level, a diffusing louver is recommended for the upward opening in the fixture in order to eliminate direct and indirect glare. 24

Microfilm Readers and VDTs. 25 Similar to generic workstations, VDT stations require specific task lighting and can utilize a task/ambient fixture. Because these areas require a greater control of contrast of surroundings, however, a second fixture should be introduced to wash the vertical surface behind the terminal (see fig. 6). This lighting application yields good task light along with a general lighting level that relies upon diffuse indirect light, virtually eliminating the possibility of glare upon the screen. A secondary consideration to glare concerns the VDT screen itself. Although various add-on devices have been manufactured to eliminate glare, the most effective procedure is to utilize what is known as a positive presentation screen. This produces dark characters on a light background—similar to standard book text—rather than the more common negative presentation of light on dark. Positive presentation reflects less direct glare by eliminating the contrast between the reflection and the dark background. It also relieves the strain associated with the eye fluctuating between light and dark backgrounds of hard copy and screen.

Study Carrels. Virtually identical to office cubicles in terms of lighting needs, care should be taken in selecting the color and texture of the finishes on study carrels. Light colors with matte finishes can provide a surface with good diffusing qualities for task/ambient lighting. 26

Reading Areas. If ceiling heights in these areas are so high as to preclude the effective use of combination task and ambient fixtures,
Figure 6. Task/Ambient Lighting at Video Display Terminals on Open Office Work Stations
Current Trends in Library Lighting

small desk lamps are recommended. Current availability of low-wattage, highly directable, compact incandescent lamps offer the user maximum control of the task light in a more efficient manner than traditional incandescent lamps while maintaining optimum color rendition.

Circulation Desk. If ceiling heights of a minimum of ten feet are achievable over the circulation desk, then HID indirect uplights are recommended. Lower ceilings do not allow the efficient reflection of HID light off the ceiling surface. Therefore, standard four foot fluorescent fixtures with parabolic louvers to diffuse the light are recommended since specific task lighting can conflict with staff interaction with users at the desk work surface.

Exhibits, Displays, and Art. For purposes of color rendition, incandescent light is the best artificial source to utilize in display lighting. Adjustable track lights using high-intensity, low-wattage tungsten halogen lamps can be highly flexible and effective as directional spotlights. These fixtures have been developed as quite compact (some fitting in the palm of one’s hand) so their use in limited or inconspicuous space is enhanced.

Storage Areas. Spaces affording the ability to switch off lights when not in use should utilize incandescent fixtures for limited application or fluorescent fixtures for larger areas. Warm-up time for HID fixtures precludes them from frequent switching. For fluorescent applications, parabolic louvers are recommended when affordable as they emit a pleasant, diffuse light with minimal glare.

Emergency Lighting. To enhance life safety, emergency lighting should be incorporated throughout the facility but most importantly in areas utilizing HID general lighting.

The Future of Lighting

Only the surface of the available physical and technical knowledge of lighting has been touched by this article. Before this publication goes to press, new advances will have been made in the field of optics and lighting that can only be chronicled through constant survey of technical and trade publications. Already, reconciliation of energy efficiency and color rendition of most lamps is being achieved and constantly improved. Lamp sizes are becoming more compact. Low-wattage HID lamps are being introduced. And computerized controls that allow automatic integration of artificial light in direct inverse proportion
with daylight or that switch lights on and off as people enter and leave a room are available at increasingly affordable prices.\textsuperscript{31} Even psychological research has spurred the development of lighting schemes that provide functional illumination while reinforcing positive environmental response with a sparkle effect.\textsuperscript{32}

Given all the technology in the world, however, it is still up to those persons responsible for planning a library to implement this technology and implement it wisely. Time must be budgeted into the planning and design processes to adequately integrate the design of the lighting with the design of the architecture. Input and participation needs to come from not only the architect, but from the librarian, the user, as well as the facility maintenance manager. Possibly most important, the early involvement of a lighting designer is critical as project goals are set and spatial concepts are developed. Through this involvement and interaction, the optimum use of ideas and technology can be incorporated into any facility to make it the best it can be.

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Mechanical Systems and Libraries

FRED DUBIN

Introduction

The advent of the printing press brought a revolution, a continuing flood of printed material and audiovisual material—books and magazines, microfilm, tapes, and more—that affects every library. There is another well-known revolution affecting our culture and libraries—a technological revolution. As these changes affect our libraries, they also affect our library buildings. New conditions have developed today that give rise to some of the current approaches in mechanical, electrical, structural, and spatial design.

In this context, total building performance is crucial. Any building must be seen as an interrelationship between systems, between systems and the building, and between the building and the program. The challenge of design is to look at an integrated approach.

It is generally understood that a library is a multiuse building. It is not only a resource facility but also an educational learning center for all ages, a media center, a museum, a communications center, and more. This must be kept in perspective in order to address total building performance of mechanical and electrical systems that meet these various programs and needs which include browsing through books, papers, and periodicals to serious reading, listening to music, audiovisual presentations, electronic data transmission, data storage and retrieval, word processing, duplicating processes, clerical functions, office procedures, special events, and the list goes on and on.

Occancy patterns affect mechanical and electrical systems. Libraries are occupied year-round—throughout the day and at times well into the night. Generally staff members are in the building for an extended period of time whereas most users are there for only short time periods (some users do remain for longer periods). All ages, sexes, physical and mental capacities are there and the facilities must accommodate this variable occupancy and use.

It is a tough design job to take care of all of these multiple requirements and activities. It is difficult to create distinct environments within a building while retaining adaptability. However, each activity has a distinct requirement—thermally, visually, acoustically, spatially—and the challenge is to look at the distinct environmental requirements and how they interface.

The Library Planning Team

Any building project, of course, involves a planning team. The library planning team usually includes the librarian, representatives from the library's governing authority, an architect, an engineer, and a library consultant. Today it can also include a lighting consultant, an electronics consultant, and a physiologist. These added participants can help to address the great variety of technical and ergonomic issues raised by a building project.

The team develops a functional program and, although the planning may be largely a task for the librarian and the consultant, the entire group can contribute to developing a functional building program. It is a team effort (we talk about total building performance, but there is total team performance, too). The written building program should include a spatial environmental program. This part of the program describes what has to happen with the temperature and environmental controls in each individual, discrete portion of the building for each hour of operation.

The final program should describe not only what should happen in the building, but what you think is going to happen in the future. Since it is hard to be a soothsayer, a building must be not so flexible as adaptable.

I take issue with the use of the word flexible because flexibility suggests redundancy. If mechanical systems are put on a grid—the lights, the air diffusers, the speakers—the building will have the flexibility to do just about anything, any time, but some of this is redundant because much equipment is installed and never used.
Instead, adaptability should be encouraged. Insist on a building that can accommodate change—even change that is unknown today. When we were designing the mechanical and electrical systems for the Salk Institute, we asked the client what was going to happen in the building and to give us a program and he replied that if he knew what was going to happen in the building he wouldn't need it. What he was saying was inherently the very nature of the building changes; design a building to accommodate whatever is going to happen in the future, but don't spend any money now doing it. This is a good trick.

In writing a functional program for present and anticipated use, the prognosis must be very modest. We can project five or ten years ahead, but it is harder to see twenty or thirty years into the future. On the other hand, an adaptable building can allow for change, and it is the building's mechanical and structural systems that are called upon to accommodate change if and when it occurs.

Part of the planning team's duties will be to examine whether to build new or retrofit (add onto the existing building or convert an existing structure). Certainly there are other important issues, but this one always comes up. Everybody loves a new building. It's a clean slate—a new piece of ground, a new building, a new program. You can do almost anything you want (if there's money), and you have a lot of freedom of choice to do it. On the other hand, when retrofitting a building, constraints are built into the program, and a serious evaluation of the existing facility must be done before a decision is made to go ahead with a retrofit.

An inventory should be made of structural, mechanical, and electrical assets and liabilities. The building must be evaluated for its condition and conformance with current codes and standards (for access, energy use, etc.) or its ability to be brought into conformance with code. Are the ceiling heights able to accommodate ducts, pipes, materials, and cables? Can the building accommodate programmatic, environmental, and spatial requirements? What are the liabilities?

There are always economic issues involving not only initial costs but life-cycle costs—what will it cost to own and operate the building over its lifetime? It is often possible to raise funds to build a library, or retrofit an existing building as a library, only to find that funds are not available for operations. Government support programs have been cut down tremendously, and it can be very hard to get funds to operate these buildings. Other things to be considered include:

—Infrastructure. Are the needed services available? Is there sufficient power, water, sewage disposal capacity delivered to the site?
—**Scheduling and staging.** How do you schedule the changes within the existing building so that you don’t have dust, dirt, noise, and interference with the continuing activities? It may be beyond what the building can accommodate.

These are among the questions that should be answered before a decision is made on whether to build new or retrofit. As an aside, I must also note the importance of acceptance testing and postoccupancy evaluations.

The architect and engineer are responsible for specifying the acceptance tests to be run on a building before it is occupied. Acceptance tests are intended to pick up any differences between what was designed and what was built, but typically, when the final testing for occupancy is done, there is insufficient environmental testing.

Mechanical systems in buildings almost never run at full capacity—a full load occurs maybe 2.5 percent or 5 percent of the time during these evaluations. But acceptance tests are usually specified as a full-load test and I have never seen a thorough part-load test of a building.

What happens at part load? The air distribution pattern changes, the lighting effect is different, and the energy consumption and loads are different. As a result, equipment operating at part load may have lower efficiency than at full load.

A post occupancy evaluation is equally important and unfortunately it is hardly ever done. This evaluation asks does the building operate the way it was conceived? Does it meet its functional needs? Does it meet the environmental need? Does it use the amount of energy that was predicted?

Beyond the building itself, the planning team must also consider external influences for change. Change is happening in telecommunications and mechanical and electrical systems. There are changes in energy management systems and in building materials.

Energy issues may appear to be on a short-term hiatus, but another cycle will surely come around and hit us. Like a hurricane, we are in the eye of the storm. When the next energy cycle comes around it is going to be worse than before because of the finite nature and progressive costliness of mining and using energy supplies.

Libraries are not static any more than any other kind of building. There are changes in programs and services, and there will be changes in the building itself. A raised floor offers one design strategy to help libraries adapt to change.
Raised Floors

The raised floor consists of metal panels, usually two feet square, mounted on pedestals to form a continuous duct eight to twelve inches above the base floor to the underside of the raised floor. The ribs which act as stiffeners for each panel are filled with lightweight concrete to deaden sound and decrease deformation. Carpet squares are then put down on top of each panel. Any panel or group of panels can be lifted for access to ducts and cables which are placed in the void created by the raised floor.

Initially, this system was designed for computer floors installed in a generally limited area. Today entire buildings are designed with raised floors. The raised floor was originally for cabling for both power and communications. A raised floor permits the relocation of electrical and data transmission services in support of changing work patterns.

In some new installations, duct work is run through a raised floor too. The air supply might be in duct work with the return in the plenum surrounding the duct work, or the return might be in the duct work and the supply might be through the floor plenum.

Is a raised floor necessarily the best option? There is no one good answer. For a very small area, I would say no. Flatwire installed under removable carpet squares is less expensive. Flatwire is fine if extended out from the wall ten to twelve feet, but it has a limited applicability in a large area. If you want to cross an entire room, flatwire is not necessarily desirable because you have to disturb everything in the way to do it, and capacities are limited.

Another consideration to be made is that raised floors appear to be costly. It does cost about six to eight dollars a square foot more for this type of floor. In a multistory building, however, floor-to-ceiling height is saved because you do not need a full hung ceiling, and the savings in construction costs as a result of the building's lower overall height more than offset the cost of the raised floor. Also, future changes to power and communications cabling and ducts can be accomplished at much less cost than extending these services in hung ceilings or other types of distribution.

The raised floor also has the advantage that mechanical and electrical systems can be installed or relocated while working on the floor. This arrangement is a lot cheaper than working overhead on scaffolding, so there are actual savings in the installation costs with a raised floor. So for any area where change is anticipated, a raised floor system is worth analyzing.
Lighting Considerations

Another consideration in planning for a new library or a retrofit is new developments in lighting—indirect, direct lighting, and more use of daylighting. People react physiologically and psychologically more positively under daylighting. Natural lighting is increasingly popular again, and there are many ways of bringing daylight into a building—e.g., an atrium, toplighting, a clerestory with clouded film to cut down glare (it is crucial in all cases to cut down glare) and now in development, fibre optics to bring daylight into building interiors. As part of total building performance, one must look at consequences of natural daylighting other than glare. For example, the ultraviolet radiation in daylight can be detrimental to materials. For this reason, too, natural light should be filtered.

The current building design may or may not be able to constructively accommodate the use of daylight. The building design may not allow the projection of daylight deep enough into the space for natural illumination and may not have a bright spot at the perimeter which means the interior will look dingy no matter how many footcandles you have (you can have 100 footcandles or more in the interior and 500 around the perimeter where the windows are but that space may still look dingy because of contrast). Handling natural illumination effectively is very important.

Air Quality

Another building consideration is air quality. Indoor air quality is a serious concern with many existing buildings. Today there are problems with the “sick building syndrome” due to out-gassing from synthetic materials used in construction. The problem existed for a long time without being diagnosed. Many of the synthetic products used in construction give off significant quantities of toxic gasses—called out-gassing—which contaminate the atmosphere. This condition is exacerbated because buildings have been designed to be air tight in order to save energy by reducing air infiltration to the building, and thus reduces the amount of fresh air brought into the building. The out-gassing situation is compounded when fans are turned off at night to save energy time so that the concentration of contaminant build-up produces almost a lethal atmosphere in many of these buildings.

Working with the Canadian Department of Public Works for four years on the indoor air quality problem (among other things relating to total building performance), we found one building in Canada where
over a period of a few weeks 600 people had to go to the hospital because they were seriously affected by the indoor environment; many other buildings were experiencing indoor air quality problems.

This is not meant to suggest that a tightly sealed building is a bad goal. On the contrary, by minimizing air infiltration, you reduce heat loss, heating and cooling loads are reduced accordingly, and the size of the mechanical equipment needed is reduced as is the amount of space the mechanical equipment requires.

The space for mechanical equipment is parasitic space. It does not contribute directly to the program; it just has to be there in order to make the building work. By reducing the space devoted to mechanical equipment, a more efficient design results.

One solution to the stale air problem is to employ a heat exchanger to temper or cool, depending upon the season, the outdoor air. Air from outdoors is brought in for ventilation and the stale air is expelled from the building. In this way fresh air can be brought into the building in accordance with physiological and air quality requirements (but without the penalty of higher energy use and operating costs). These competing values of improved fresh air circulation and minimal air infiltration must be weighed as part of the total building performance.

Indoor air quality interrelates closely with the air distribution system. It is not solely dependent upon that, but there is a very serious and important connection here.

There are conflicts between indoor air quality and air distribution. Variable air volume systems are often used to control space temperature, and are energy efficient. When the space temperature becomes satisfied under a cooling load, the system's mixing boxes close down, less air is circulated into the spaces, and less fresh air comes in. Also, when the temperature settings are satisfied, the air distribution pattern within the room changes. Instead of getting fresh air down to the workstations, down to the study carrels, and down to other work areas, the supply air is up at the ceiling where it bypasses the occupants. This situation short circuits supply air to the returns, and the indoor air quality problem is exacerbated. Air temperature is typically the controlling factor for air delivery; rarely is the indoor air quality monitored and then the outside air dampers operated according to the indoor air quality. Provisions now include sensors to monitor indoor air quality and then operate fresh air doners accordingly.

Furthermore, large workstations, full-panel study carrels, and furniture with skirts can interfere with air distribution. Too often there is little air movement where people are. Ventilation is put in primarily for
people, but too often the people are not getting the ventilation because
the structure, the physical fitting-out of the building, and the control
systems prevent proper air distribution within the space. So there is a
serious relationship between indoor air quality, air distribution,
temperature, and humidity.

**Acoustics**

Acoustical problems present a different challenge. A library is the
focus of many distinct and sometimes interactive activities. The acousti-
cal separation of spaces is important. Acoustical ceiling panels are
installed routinely. These ceiling panels are bound to be inadequate
because the noise is not generated up at the ceiling but by noisy people
down at the floor who are operating keyboards, talking, sneezing,
playing music, scraping chairs, rustling papers, and using printers—
the noise is generated down in the work area. We have some acoustical-
absorbent furniture, but it is often inadequate.

Noise should be absorbed at the source, and planners are moving in
that direction. More sound absorbent material is being located down
closer to where it originates rather than having sound travel to the
ceiling where it is absorbed. This was accomplished in buildings in
which we designed mechanical and electrical systems by stringing verti-
cal sound baffles on wires well below the ceiling.

At the same time, care must be taken that the solution to acoustical
problems does not interfere with air distribution. When sound patterns
are interrupted, air circulation can be stopped as well, and another
problem is created. So while these problems must be addressed as they
occur, planners must anticipate the types of new problems the solutions
can create within the framework of total building performance. This
happens time and again in facilities planning and management.

**Climate Controls**

There is increasing sophistication in the design of climate control
systems for all types of buildings, and designers are responding to these
microclimate conditions. California, for instance, identifies thirteen
specific climatic zones in their energy code. Where we used to consider
the climate of New York City as that of New York State, we are now
interested in the climate where that particular building is built rather
than at some remote air station or airport where the data happens to be
available.
Environmental control in a library is different from many other buildings because it requires air conditioning and air quality control both for people and contents. People tolerate a rather narrow range of comfortable temperatures and humidity. Most library material lasts longer when the temperature and humidity are in a certain range; if it is too moist mildew forms on books, and if it is too dry materials crack and dry out. Also wide swings in relative humidity are undesirable. Steady indications, even though not at optimum relative humidity for the contents are preferable to variations in relative humidity.

Unfortunately, the preferred environments for people and material are not identical. Some rare material may pose especially stringent environmental requirements. For one recent project in California, we responded to those special requirements by putting those materials literally in a separate air conditioned and carefully controlled environment. The entire building did not require such extensive controls, and it would have been wasteful to install this system throughout the building.

In other words, do not install the most sophisticated and costly system unless the entire building needs it. Segregate the part or parts of the library that need special care. Note where there is a need for humidification, air cleaning, or other unique environmental controls.

Likewise, some equipment—computers particularly—have special temperature and humidity requirements. Some automated equipment is especially prone to malfunction unless the air has been heavily filtered and cleaned. Vendors can detail the environmental needs of specific equipment. Electronic equipment also generates a heat load which the building’s mechanical systems must compensate for. Even though electronic equipment is sure to be miniaturized further, there will be more and more of it so the heat loads in libraries will continue to escalate. As a result, there will be more and more heat islands within the space that will need attention. This creates another type of special environment that may require separate controls.

So there is actually a three-part problem which consists of taking care of the people, the contents, and the equipment. The key here is to be discriminating. A broad-brush approach is not effective. The definitive requirements for each area must be examined as part of the total building performance.

Is a centralized or decentralized air conditioning system best? There is no controversy here. In a large building, the type of building most likely to develop truly specialized environments for certain collections and functions, a primary system where heating is centrally generated in
a boiler and cooling is generated centrally as well is the best alternative. (It is hoped that energy consumption does not exceed 30,000 or 35,000 BTU per square foot per year although not so long ago it used to be 200,000 or 300,000 BTU per square foot per year. One of our recent designs, the New York Botanical Gardens in Millbrook, New York, operates at 19,000 BTU per square foot per year, which means that it is a very low-cost building to operate.) This main, centralized system should then be married with a decentralized system or systems in individual, discrete areas that require special environmental conditions. The decentralized system may be a heat pump, a fan/coil unit, or a miniature condensing unit in the particular area it serves. If a centralized system is connected to a decentralized system, then local control can be provided with the accompanying economies of the central, efficient equipment.

It is important to give people individual control of their environment. It does not mean that every user that comes in the library has an individual control that follows him around, but giving people control over their environment creates a great deal of user satisfaction. It gives them some stake in what they are doing—they feel that they are in control and are not subject to higher authority. This arrangement can be done more readily with a centralized/decentralized system.

Summary

Looking ahead, buildings can accommodate alternative energy sources quite readily if these energy sources are conceived as part of the initial environmental program. Coal and nuclear power certainly have their drawbacks, so we are looking at alternative energy sources. We're getting into some new developments with photovoltaics and solar thermal energy. Photovoltaic solar cells convert sunlight directly into electricity. Photovoltaics are going to be the power source of the future, and the building must be designed now to accommodate these future technologies. Other developments include fibre optic light transmission, energy storage systems using phase changing materials, organic walls and glazing that change their properties to meet specific environmental conditions.

In summary, facilities design must be an integrated effort between people, materials, and systems. Adaptability is the key in designing a building that can handle anything that might arise in the future. But it is not necessary to spend large sums of money doing it.
Toward the Environmental Design of Library Buildings

LAMAR VEATCH

Introduction

Since the beginning of the modern library era, librarians and other library planners have been concerned with developing better library facilities. Through the years many architectural solutions to problems of storage, location, and service have been proposed, utilized, changed, and discarded.

During the past several decades an interdisciplinary approach to the study of humans and their built environment has been developing. This inquiry seeks to investigate the often subtle and complex relationships that exist between people and buildings...those environments where we spend the great majority of our lives. Information regarding these relationships is beginning to emerge from a number of branches of the social and physical sciences. Further, this information is beginning to be applied to the process of building planning.

Environmental design is the aspect of architecture and building planning concerned with the proper planning and design of built environments to accommodate the social, physical, psychological, and behavioral needs of people. Findings and methodologies from environmental design can be applied to library planning to contribute to the continuing process of providing better library environments.

This article will provide an overview of environmental design in an attempt to provide conceptual and exemplary information pertinent to

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library building planning. The intent here is to furnish an awareness of the possibilities for and the implications of applying the concepts of environmental design to library buildings.

At the very least, the designer will acquaint himself with the current thought in the human sciences that applies to the man-environment equation. With even a limited background, a designer at least acquires the capability of questioning some of his easy assumptions about the purpose his design is intended to serve. Indeed, if he can't make this basic breakthrough in his own mental system, more elaborate processes won't help him anyway.

Libraries exist to provide free access to information and to support lifelong learning. The fulfillment of these purposes rests primarily upon usage which provides that interface between materials and people. With very few exceptions, the more libraries are used the more they fulfill their missions.

Information from environmental design can be used to make libraries more useful and functional. This is accomplished by making library environments more "human oriented," allowing people the opportunity to avoid many stressful situations and permitting both users and staff the opportunity to be as effective as possible in whatever activities they choose to pursue within the library building. Although much has been made of the adaptability of humans to less than ideal situations, this adaptation requires energy that could be more profitably utilized in other ways.

Environmental Design

As used here, "the term environmental design has come to connote a technical commitment to the evolution of the environment as an integral aspect of human biological and non-biological systems." The objective is to accommodate these two systems "through the appropriate organization of relevant variables in the designed environment." Environmental design, then, is that discipline which seeks to manipulate those variables through proper planning to create the built environment sensitive to human needs.

Environmental design is the planning profession's response to the growing concerns of the environment and its interrelationship with human behavior and the quality of life. It has been described "as an art larger than architecture, more comprehensive than planning, more sensitive than engineering." It is based upon two fundamental and interrelated ideas.
Environmental Design of Library Buildings

1. The designed environment affects human experience in direct and important ways. It does not determine experience, yet in combination with social influences, designed environments can support satisfaction, happiness, and effectiveness.

2. Despite their potential, designed environments often do not "work" with respect to their impact on human experience. They are awkward, even destructive, rather than being supportive of personal competence and growth.4

As it has developed, environmental design has begun to utilize the output of two closely allied fields of study—environmental psychology and human factor engineering. These disciplines, having emerged from widely disparate sources, have begun to be focused in a stereoscopic effect upon man and his built environment. Environmental psychology deals primarily with perception and behavior while human factors engineering concentrates upon performance. Together they form a more complete picture than either could separately.

Environmental Psychology

Until recently the built environment has been a relatively neglected factor in the study of human psychology. During the 1960s psychologists began to investigate the many facets of the relationship between the environment and human behavior.5

Environmental psychology is a relatively new field of scientific inquiry which is concerned with the interrelationships between man's physical environment—particularly the built environment—and human experience....What distinguishes this field from others concerned with man's environment in relation to human behavior and experience, is its focus on the natural, on-going physical settings that define and guide human interaction. It is problem oriented, interdisciplinary in its conceptual and theoretical orientations, and eclectic in its methodological approaches....What must be noted is that its interdisciplinary emphasis is rooted in its need to have a close working relationship not only with environmental sociologists and anthropologists, but with designers, architects, planners, and other practitioners responsible for designing man's built environment.6

The developments in this field are evidenced by the number of major publications issued in recent years. The proliferation of specialized journals also is an indication of the expansion of environmental psychology. Among them are: Environment and Behavior, Human Ecology, Psychology and Nonverbal Behavior. In addition, The Associ-
LAMAR VEATCH

atation for the Study of Man-Environment Systems and the Environmental Design Research Association, the principal organizations in this field, are quite active in terms of publications and meetings.

Within environmental psychology there are a number of topical areas that point out the variety of aspects within it. Human spatial behavior is one of these areas and this aspect is discussed in terms of privacy, personal space, and territoriality.\(^7\)

Privacy

The concept of privacy, as it relates to environmental psychology, does not refer to being alone or to completely shutting oneself off from others. Instead, it is understood as the "control of others' access to oneself."\(^8\) It is the "control" aspect that is important and not a self-imposed isolation. "Privacy can be defined as an individual's freedom to choose what he will communicate about himself and to whom he will communicate it in a given circumstance."\(^9\)

A.F. Westin, in his book *Privacy and Freedom*, suggests four states of privacy: solitude, intimacy, anonymity, and reserve.\(^10\) Each refers to a particular degree of privacy depending upon the amount and type of information about oneself that one is willing to share with others. For a number of writers this concept forms the "basis of most human spatial behavior."\(^11\)

To translate this viewpoint into practical environmental designs is not easy. However, a general principle is that we should attempt to design responsive environments, which permit easy alteration between a state of separateness and a state of togetherness. If privacy has a shifting dialectic quality, then, ideally, we should offer people environments that can be responsive to their desires for contact or absence of contact with others.\(^12\)

Because privacy involves the control of access to oneself by others, it has implications for library designs. In public areas this means providing different types of seating and study areas so that individuals may make choices depending upon their needs and desires at the time.

It is futile and economically wasteful to search for the "ideal reading area" with the hope that this will satisfy all patrons. There is no single reading station...that will satisfy the needs of everyone. The only feasible solution is to provide a variety of reading spaces that differ in important respects and let users discover the area most suitable for them personally.\(^13\)
As related to library staff, privacy can become an important consideration especially in open office plan situations. Such furniture may either support the sought-after level of privacy, or it may prove to be a source of stress if the layout impedes privacy-seeking behavior.

It has been observed that pursuit of an adequate level of privacy includes freedom from unwanted eye contact. This apparently involves intrusion into one’s personal space, thus requiring a response. The reaction might result in conversation, or it might take the form of some defensive behavior. Either of these would take time and energy away from the task at hand.

Unwanted eye contact has been noted to increase discomfort and stress since eye contact demands acknowledging the presence of the other person. Aaron Cohen and Elaine Cohen suggest that it is, in part, the need for visual privacy that led to the open office plan. The partitions reduced the lines of sight and helped eliminate unwanted eye contact. These authors also propose that patrons select reading room seats, partly to avoid unwanted eye contact. It follows that care should be taken in the layout and furniture selection in order to support people’s natural tendency to minimize unwanted eye contact.

**Proxemics and Personal Space**

Among the mechanisms that are used to regulate privacy are the two closely linked concepts of proxemics and personal space. Proxemics, a term formulated by anthropologist Edward Hall, is concerned with the “interrelated observations and theories of man’s use of space as a specialized elaboration of culture.” Derived in part from the studies of animal behavior regarding territoriality, proxemics deals primarily with the ways that people space themselves in different social situations. In his book *The Hidden Dimension*, Hall describes four culturally defined distances used by Americans. Each distance has a close and far proximity phase.

**Intimate Zone:**
- Close phase—touching
- Far phase—6 inches to 18 inches

**Personal Zone:**
- Close phase—1 1/2 feet to 2 1/4 feet
- Far phase—2 1/2 feet to 4 feet
Social Zone:
Close phase—4 feet to 7 feet
Far phase—7 feet to 12 feet

Public Zone:
Close phase—12 feet to 25 feet
Far phase—Beyond 25 feet

Each zone carries with it certain social and behavioral implications. Violation of these, particularly the closer ones, can result in various types of offensive and defensive behavior. This is demonstrated by the "cocooning" effect, or temporary withdrawal induced on crowded subways and elevators where people are forced into the intimate zone in inappropriate situations. It is obvious that proxemics has implications for interior planning, but as Hall has pointed out, "it can never tell the designer how to design, only some of the things he should consider."

Personal space extends proxemics to include the study of human-spatial behavior involving not only distance but "angle of orientation." Robert Sommer, whose name is most closely linked with the concept of personal space, says it "refers to an area with invisible boundaries surrounding a person's body into which intruders may not come."

Personal space is the basis for a large number of studies involving variables such as personal factors (age, sex, etc.), interpersonal factors (social relationships), and situational factors (particular types of places). Settings for these studies have included hospitals, nursing homes, offices, and libraries. Gülten Wagner summarized personal space studies in libraries in a recent ERIC document.

Another aspect of proxemics and personal space is the area of "small group ecology." This is the study of interaction of small groups in social and business settings and is important to library design. For instance, observational studies have noted that between 92 percent and 97 percent of all informal groups in public places consist of only two or three members. This presents implications for the layout of public spaces in libraries. Even though conversations might be discouraged in most areas of the library, groups who come to the library together will want to sit together, whether at reading tables, study carrels, or in areas designed for casual seating. On the other hand: "There is hardly a point in having conversational areas for groups of eight or ten unless there is some sort of structured activity involved."
This is because so few informal groups consist of more than three people.

Two terms are of note regarding personal space and small group ecology. Humphry Osmond, in evaluating psychiatric ward design, originated the terms sociofugal and sociopetal. The first term sociofugal refers to those aspects of design which tend to discourage social contact, and the second term sociopetal "is that quality which encourages, fosters, and even enforces the development of stable interpersonal relationships such as are found in face-to-face groups." Furniture layout is a manifestation of these concepts. An extreme example would be two lounge chairs, first placed face to face and then back to back. The first would definitely encourage social interaction (sociopetal) while the second would discourage it (sociofugal). There are of course no positive or negative connotations inherent in these terms. In some situations—study areas for instance—sociofugal arrangements would support the normal quest for solitude. In other circumstances, benefit would be derived from social intercourse encouraged by sociopetal design.

Problems can arise when sociopetal arrangements of furniture are placed in areas where privacy is sought and/or intended. Conversely sociofugal layouts would be inappropriate and counterproductive in settings where conversation and interaction is intended.

One study indicated that arrangement of furniture in a one-to-one counseling situation can have a measurable effect upon the anxiety level of those being counseled. There was a significant reduction in anxiety where students were interviewed in an informal "knee-to-knee" arrangement as opposed to a more formal "across-the-desk" one.

This is applicable to library environments as personal interviews and other counseling functions are conducted in the daily business of administering libraries. Further, this type of information would be applicable in the design of spaces and furniture intended for all interaction with the public. Reference interviews, learners advisory services, online searches, and other one-to-one situations could be more effective and productive if patron anxiety were reduced through more appropriate furniture arrangement.

It is here that the value to library design of proxemics and personal space can be seen. When a particular environment is planned, the expected behaviors can be taken into consideration and the types of arrangements may be properly chosen which support those behaviors. This is, of course, an oversimplification of the process, but it is provided to establish the concepts of human-spatial behavior within the processes of environmental design.
Territoriality

Territoriality, along with privacy and personal space, is also an interrelated component of environmental design important to library planning. The study of human territorial behavior owes much to the work of Konrad Lorenz and Robert Ardrey who have popularized the topic utilizing animal analogies. However, this approach has been criticized by environmental psychologists who have pointed out the limitations of attempting to apply the elements of animal territoriality to human situations.

Much of what is termed territorial behavior in human context concerns personalization and private property. Irwin Altman proposes the following definition:

Territorial behavior is a self/other boundary-regulation mechanism that involves personalization of or marking of a place or object and communication that is "owned" by a person or group. Personalization and ownership are designed to regulate social interaction and to help satisfy various social and physical motives.

It has been observed and theorized that an aspect of privacy and territoriality is personalization. A feeling of security is obtained when one's environment is marked or identified as his own. J. Douglas Porteous, in his book Environment and Behavior, says that "Personalization is necessary for the individual's self-identity." Albert Mehrabian's concept of environmental psychology includes what he terms high and low load environments; those settings which are in themselves either stimulating or nonstimulating. He suggests that when certain monotonous tasks are performed, a high load environment might be required to counter the nonstimulating task. On the other hand, certain tasks which are high load, and are therefore stimulating, would require an environment which is not stimulating. An employee's ability to personalize his work space would allow him to make some adjustment in the environmental load to accommodate the particular tasks he had to perform.

In addition to high and low load tasks, there is an aspect of personality that is important. Mehrabian discusses personality differences in terms of the ability to screen stimuli. This is "how much a person characteristically screens out the less relevant parts of his environment, thereby effectively reducing the environmental load and his arousal level." A nonscreener would filter less of his environment and would therefore be affected by the stimuli by a greater degree than would a screener. Some people can tolerate noise and activity (high load) around
them as they work (screeners), while others must have quiet and solitude (low load) (nonscreeners). Screeners may in fact prefer a high load environment in order to achieve a balance with their immediate surroundings. Therefore, it follows that people be allowed to adjust their near environment to their own preferred levels of stimulation. Mehrabian suggests that in an office environment:

"Workers at all levels should be permitted to have and play desk radios, since these provide one of the few means available for manipulating arousal and pleasure levels within the office context. And of course employees should be permitted to personalize their work spaces as individual differences dictate: some might prefer or need a more (or less) loaded environment than others."

This suggestion about radios may not, of course, be applicable to all library employees, but it serves to point out that "personalization" extends beyond visual items to other aspects of the immediate environment. "The quest for stimulating and attractive work places, the right to personalize one's own spaces and control temperature and illumination and noise are not academic issues to people who must spend eight hours a day in these settings."38

These concerns, of course, apply not only during the design and planning phases of a library but whenever administrative rules and regulations are formatted which govern the freedom employees have in adjusting their environment to meet their personal needs. These human tendencies are obviously of consideration in environmental design since they could help determine both how and how well a building functions.

Altman sums up the concerns of the foregoing concepts and their application to environmental design:

"What I speak of here is not only design for "task" or "resource" functions but design for control over social interaction and stimulation. If privacy and its associated mechanisms are ignored or rigidly incorporated into designs, or if the meaning of different levels of personal space and territory are not recognized, then people will have to struggle against the environment to achieve what they consider to be appropriate degrees of interaction. And, conflict, stress, and other costs are likely to the extent that people have to struggle with inappropriately designed environments. Thus the principle I am trying to state is that environmental design should take into account the dynamics of privacy as a changing process in which people open and close themselves to others, to different degrees, at different times, using personal space, territorial behavior, and other mechanisms to achieve a desired degree of privacy."39
Implications

There are many implications for library design and furniture layout arising from these interrelated aspects of environmental psychology. Some have become axiomatic such as in the area of public seating. Robert Sommer observed a very high preference for corner seating at library reading tables. He attributed this to a quest for privacy and a securing of one's personal space.\(^{40}\) The design recommendation stemming from this and other similar observations is to use four-seat rectangular tables. This will not only provide more of the preferred types of seats but will help ensure a more effective utilization of available floor space.

Round tables (four to six seats) tend to encourage conversation. It has been noted that the most effective angle of orientation for two people engaged in conversation is between zero degrees and ninety degrees.\(^{41}\) Seating at round tables provides the angles that are most conducive to conversation. In areas of the library where socializing is discouraged, round tables may not be appropriate since they support interaction. However, in areas such as small group meeting rooms and staff areas, socialization is a desired activity and would be supported by the presence of round tables.

There are also implications for casual seating that have arisen from environmental design research. There are reasons why couches would not be desirable in library settings. First, for two people who wish to converse, a couch is not conducive to this activity. This is because it places the pair at a 180-degree angle, an angle that was found to inhibit affiliative behavior.\(^{42}\) In addition, such a pair, sitting at each end of a typical six-foot couch, would be at the outside edge of Hall’s “personal zone.” This zone of one and one-half feet to four feet is generally reserved for close friendships and would exclude business related conversations. A two-seat couch would force the pair into the “intimate zone.” This would produce a stressful situation except with couples where a “love seat” would be appropriate. This also helps explain why the center of a three-seat couch is rarely used.

An administrative reception area may also be better designed using information from proxemics and personal space research. Typically, a secretary may be required to serve also as a receptionist. Stress may result if this secretary is forced to converse with those waiting. However, adequate spacing can eliminate this problem.

As previously noted, an important aspect of proxemics is the distance for conversation. Hall observed that the social zone (four to twelve
feet) is the range in which almost all business and social discourse is conducted. Further, the far phase (seven to twelve feet) is usually the setting for more formal conversation.

A proxemic feature of social distance (far phase) is that it can be used to insulate or screen people from each other. This distance makes it possible for them to continue to work in the presence of another person without appearing to be rude. Receptionists in offices are particularly vulnerable as most employers expect double duty: answering questions, being polite to callers, as well as typing. If the receptionist is less than ten feet from another person, even a stranger, she will be sufficiently involved to be virtually compelled to converse. If she has more space, however, she can work quite freely without having to talk.

A distance of less than ten feet would constitute a sociopetal arrangement which encourages interaction. Beyond ten feet the arrangement would be more sociofugal, discouraging conversation. “Within certain distances, most people make an effort not to talk. Beyond certain other distances it is virtually impossible for them to talk.” In an atmosphere of a typical office reception area, conversations extending longer than a few minutes can become awkward and stressful. These particular strains may be reduced or eliminated by observing the proper distances when designing the arrangements of the furnishings. In addition to these examples, environmental psychology should continue to produce information of use to designers and planners which will assist in the development of structures that are more human oriented.

**Ergonomics and Human Factors**

“Human factors in built environments assume major importance if we are concerned with human efficiency, safety, comfort, morale and general usability associated with interior-design features of built facilities.” While environmental psychology deals with the built environment as it impacts the relations of people, ergonomics is concerned with the individual and his direct relationship with the physical aspects of the built environment. Originally called human factors engineering—or simply human factors—the term *ergonomics* has now been applied almost universally to this aspect of environmental design. Of late, ergonomics has even begun to pertain to elements previously regarded as social and psychological. However, ergonomics is primarily concerned with the “continuing quest for an optimum relationship between people and the physical things that they have created and make use of....”
There is hardly a component of the built environment that does not, in some way, have an impact upon the success of the individual. From the approach to the building, to the door, and throughout the space, the structure and its contents will either support the individual in his task or they will be an interference. Good ergonomic design will not, in itself, improve performance or productivity. It will, however, remove impediments. If a person is forced to expend time and energy in overcoming environmental stumbling blocks, then there is less time and energy available for the meaningful, productive work. “Since people come in a variety of shapes, size, and abilities—all of which are difficult if not impossible to change—the focus of ergonomics is on the design of products and environments that adapt to the user rather than vice versa.”

Although ergonomics has been applied most conspicuously to automated workstations, the implications for ergonomic considerations exist with all aspects of the built environment. The building can be viewed as being similar to the idea of a prosthetic device, supporting and extending the physical capabilities of those who would work there. Wherever one contacts an element of the structure, there is an opportunity to apply ergonomic criteria to see that the interface is supportive. If the element supports the task, it is ergonomic; if it inhibits the task, then it is poorly designed.

If the theory of ergonomics is simple, the application is not quite so easy. Even a single environmental space contains a myriad of components each having a different impact upon each individual who uses that space. Additionally, different tasks performed by one individual in the same space may require different sets of ergonomic considerations.

Since ergonomics is not the science of the readily available answer, each situation must be analyzed individually, using research at hand as a guideline and to provide a basis for comparing results. Many people contend that ergonomic offices are easy to design by following ready-made guidelines and standards. This is not entirely true, however.

Guidelines can provide initial ideas, but they do have some shortcomings and should be used with caution. In some cases, ergonomics provides answers, while in others it offers only a method for deriving answers.

Ergonomics must not only be concerned with the task to be performed, it must also take into account limitations and abilities of those being designed for. This is especially true in libraries where the span of age is as great as any public institution. Children who lack the height and strength of adults as well as older people who have lost the strength
Environmental Design of Library Buildings

of their prime must be considered. Providing barrier-free design for the handicapped is simply ergonomic design for people who are at the higher end of the physical limitation continuum.

In the past few years, "ergonomics" has become a buzzword of the office furniture industry. It, along with the term user friendly, has been applied to anything that happened to be adjustable, whether it is truly ergonomic or not.

In spite of all these obstacles to achieving an ergonomically correct environment, solutions to pieces of the problem are being proposed. These solutions take the form of new workstations, new hardware, new chairs, new lighting fixtures, etc. Only use will determine which of these solutions satisfy the requirements of ergonomics and which are merely design fads.

Conclusion

It may be argued that the considerations of environmental design are more properly within the realm of architects and interior designers. It is equally important that librarians and library building consultants be as knowledgeable. Environmental design information is most needed long before the architect is retained to design the library building. During the programming phase, this information will help provide the tools with which the library planners can make design choices. These decisions will involve, in part, the translating of the library's policies and goals into concrete terms that architects can deal with. Utilization of environmental design information by the library planners will help ensure that planning decisions specifically consider the needs of the humans who are to occupy those library spaces.

The library architect must rely upon the librarian-consultant for input regarding user behavior and activity. The more the library planner is able to utilize environmental design information the better able he/she will be to provide relevant information to the architect. Otherwise, the architect, working without sufficient direction, might make incorrect assumptions about library user behavior and activity, or worse, ignore such information, which would adversely affect the usefulness of the new structure.

The education of architects has begun expanding to include elements of environmental design. Architects so trained will expect and require more detailed building programs which specify the proposed behaviors and activities of the users of the building. "Never forget that the program is addressed primarily to the architect. This program is
intended to be the means by which the desired library building in all its complexities is conveyed from the mind of the program writer to the architect. The consultant or librarian who writes the building program should be aware of the implications of environmental design in order to provide as correct and unambiguous information as possible.

Information regarding environmental design will be of value to librarians and consultants in evaluating architects' plans. Library planners who can think in terms of human-building interactions will be able to more effectively evaluate a proposed library in terms of its impact upon users. By using environmental design information, many potential problems can be corrected before the final working drawings are made, when changes are much less expensive and when they are certainly more likely to be implemented.

Existing libraries may also benefit from environmental design information. Evaluations can be made of libraries to determine ways of improving their usefulness through renovation or rearrangement. By applying environmental design research techniques and methodologies, information about existing libraries can be gathered which would help improve those libraries' environments.

There has been and continues to be an active interest, on the part of the library community, in improving library buildings to enable them to better serve the functions for which these structures are intended. It is evident that the field of environmental design, along with its major components of environmental psychology and ergonomics, has application to library design and planning.

Much in the way of conceptual and theoretical—as well as factual—information is readily available. It would be of great value to librarians in understanding the importance of environmental design not only in terms of initial building planning, but also in terms of the many aspects of administering facilities to help ensure their most profitable utilization.

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Trends in Staff Furnishings for Libraries

JOHN VASI

THERE IS PROBABLY NO ONE who would disagree that the work librarians and library staff perform today is significantly different from the library work of twenty years ago. Almost no one would disagree that it is different from ten or even five years ago. Indeed, in most library workplaces, there are pieces of equipment that did not exist last year or computer-based activities that have assumed greater importance within the past year. The automation of library tasks and the proliferation of terminals and microcomputers in the library are the most visible indicators of recent changes. Although these changes have been accepted as routine by librarians and library managers, the new methods of handling bibliographic files and general office work have not always produced the appropriate furniture, equipment, and environment needed by library staff to work productively and, one hopes, comfortably in the increasingly automated settings of today's libraries. Therefore, the relationship between staff furniture and efficient use of computer equipment needs to be addressed.

While no profession has been immune to the technological future shock of the past two decades, consider the great impact of automation on library furniture and equipment. Only recently, there were no alternatives to manual catalogs; typewriters provided almost all the office "automation"; and manual files for circulation records, shelflists, and order files were in place. When computerization began to alter the
manner in which library workers processed records and provided information, the changes brought new equipment that library staff needed for automation. Moreover, it also affected to a great extent the work patterns of staff and the manner in which the library interacts with its clientele. The essentials for these changes are the computers, the word processors, and the now ubiquitous VDTs (video display terminals). Falling into the category of nonessential—but perhaps highly desirable—equipment are the public and office furnishings required to make best use of the new hardware and its capabilities.

In addition to the new functions and equipment introduced into libraries, there is increasing awareness of the psychological and physiological needs of workers and how furniture and environment address those needs. There are surely those who would argue that library staff were highly productive and happy before anyone ever heard of ergonomics or office landscaping. The correlation between physical or psychological comfort and staff productivity will not be discussed here, but it will be assumed to be a valid relationship.

Therefore a combination of factors, including new technology, different relationships between library staff and patron, and increased awareness of the "human" needs of library staff, dictate the need to examine the immediate work environment of the staff. What are the furniture and equipment items that library staff need to work comfortably—and presumably productively—in a contemporary library setting?

Service Desk Areas

Chairs at Service Desks

It is important to remember that service desk workstations are used by many library staff during the workday. The most basic consideration is the type of chair provided for use. An ergonomically designed chair might be considered as the most important purchase for a service desk. Service desk personnel may be on duty for extended periods of time standing up, reaching, moving, and returning to the desk often. An ergonomically designed chair with firm, comfortable back support will have the dual benefits of easing potential fatigue and encouraging service personnel to sit in upright and alert postures. It is difficult to slouch in a chair with good back support. Most important, chairs at service desks should be easily adjustable to accommodate multiple users with their varying physical characteristics.
Basic considerations: does the seat height adjust so that users can be comfortable at the desk? Is the height of the back support adjustable to allow the lumbar support to be positioned properly for users of differing heights? Additionally important: can the attitude or angle of the seat and back be adjusted to accommodate individual body sizes or user preferences? A change in seating posture can be refreshing after a long stint at a service desk, just as it is in the driver’s seat of a car. Of prime importance, how easy is it to adjust the chair? Older chair designs seemingly put great stock in hiding adjustment knobs under the seat or designing height adjustments so unobtrusively that some users never found them or had to bend, kneel, rotate the entire chair, or perform arm contortions to attempt adjustments. Consider instead today’s pneumatically adjustable, ergonomic chairs for library workstations with multiple users. The controls are easy to reach and they work quickly. These chairs may be slightly more expensive than mechanically adjustable ergonomic chairs, but the ease of adjustment will be appreciated by the staff, and the feature will be used—which is why it was purchased in the first place.

Other considerations for chairs at service points are:

1. Does the chair need to be of the “secretarial” type or would it be more comfortable with armrests? Will the armrests fit under the desk?
2. Consider fabric over vinyl for appearance and for comfort. Treated fabrics can be cleaned easily. A blend of synthetic and natural fabric will give extra life and durability. It may or may not last as long as vinyl covering, but an extra few dollars at the time of purchase, amortized over five or ten years, is not a lot to pay for the added comfort. Would you rather sit on a vinyl or fabric-covered chair?
3. Do the service personnel need to move with the chair to reach materials, telephones, catalogs? The chair should be equipped with hard or soft wheels, or casters or glides, appropriate to the floor surface so that it can move easily and safely.
4. If a high stool is required at a stand-up height counter, is there a foot ring for the comfort of the user? Wheels might be dangerous on higher stools, which may also be difficult for shorter people to get on or off.
5. Newer chairs have a star-shaped, five-leg base rather than a four leg pattern. The five leg arrangement greatly improves stability, especially on the higher stools.
Terminals at Service Desks

The use of computer terminals and VDTs in public areas of libraries continues to evolve and expand. Terminals have become commonplace at circulation desks where they are used most often as staff-operated equipment, but occasionally these terminals are used by the public. Similarly, public catalog terminals have become commonplace tools for library users in many library settings. These types of terminal installations are relatively straightforward, requiring a single user to be able to query the terminal, perhaps jot down search results, or find the status of a volume. There are no requirements for privacy nor any need for sound abatement.

What is evolving in public areas, however, is the terminal or microcomputer installations at service desks. Here library patrons get assistance through library personnel using computer equipment to search online files and databases. Most research libraries and many public libraries make available to the public computerized access to information. When computer-based searching became available, its use was limited by its expense and by the number of machine-readable files available. Searches were done in offices or areas specially designed for database searching and remote from reference desks. As more and more data files are now available, and as searching techniques have become more specific and sophisticated, librarians are increasingly using terminal access to datafiles as part of general reference service. This change in the manner that information is obtained has altered the librarian/patron interaction and dictated the need for different furniture and equipment for both patron and librarian. This transition is spurred by the growing size and comprehensiveness of databases as well as the relatively recent ability to download and manipulate search results, custom-tailoring searches for users. These search sessions may involve both librarian and patron simultaneously viewing the terminal screen.

This transition in the location of computerized searching not only changes the capability of library staff to provide information, but also alters the type of interaction between librarian and patron—requiring consultation at the service desk and immediate search results, perhaps in hard copy. Some searches will be of the short duration, ready-reference type, but others will require more extended interaction. Therefore, there is a need to create “private” consultation areas with computer terminals in public areas of a library. The furniture and equipment required for this type of workstation are only now being considered.

A sample computerized reference workstation might include the following:
Staff Furnishings for Libraries

1. A separate segment of the reference or service desk where patron and librarian can converse and conduct the search in relative privacy: The librarian cannot conduct this reference interview and search while attempting to handle questions from other patrons or even while other patrons are standing in line waiting for reference service. A possible solution to several of these considerations would be a section of the service desk devoted to computer searches and defined with freestanding screens similar to those used for office landscape. The screens need not enclose the area completely but should be sufficiently high to provide some degree of privacy and to prevent as much distraction as possible from other reference desk activities.

2. A sit-down height workstation housing a terminal or microcomputer which can be viewed by both the librarian and patron: Having the librarian and patron sit side-by-side is a possibility, but a display terminal on a turntable which can be rotated, when required, for the patron to see would take up less staff space behind the desk and would preserve the integrity of the reference desk as the physical boundary between the staff and public. The sit-down height station makes more comfortable any extended searches and also shows other patrons that a separate activity is taking place. Easily adjustable chairs similar to those described earlier should be provided to allow multiple patrons and librarians to sit comfortably and read the screen easily. In addition, there must be enough desk surface space to accommodate the patron’s books or notes, searching manuals or thesauri, space to write, and perhaps some nearby area where software diskettes or other computer supplies can be stored.

3. A fast, quiet printer to transmit the results of the search to the patron: This avoids the time-consuming and possibly inaccurate copying of information on the screen. Letter quality printers are not necessary since most search results have a short life expectancy, and soundboxes to cover printers are a good solution for existing printers which may make too much noise for a public area.

4. A security device for the searching equipment: It is probable that there will be times when the library is open that the service desk is not staffed or times when staff leave the desk area for short periods of time. There are several types of security cabinets or locking devices that can be purchased to protect the equipment from vandalism, theft, or unauthorized use when no one is at the desk. While there is little incentive for library users to walk off with unintelligent video
terminals from public catalog areas, microcomputers and their peripheral equipment or software present more inviting targets. Consider a solution that will prevent vandalism and theft at the same time—perhaps a roll-top cabinet or other lockable device that can secure all the equipment with minimal time and effort.

Staff Work Areas

Terminals in Staff Areas

Even more than in public areas, computer terminals have proliferated in staff areas in all types of libraries. Some terminals function as remote access points to a host computer located in another area of the library, across the campus, or even across the country. In addition, libraries are now using microcomputers for a variety of types of work, in some cases replacing simple terminals. While microcomputers have different space and power requirements than simple terminals, both types of equipment present similar needs when furniture is being considered for staff work areas. In fact, the distinction is becoming increasingly blurred as microcomputer equipment is now being used to replace former terminal hardware to take advantage of the computers to access and manipulate data, as well as to avoid the cost of mainframe computer time charges by downloading information to the microcomputer and processing it there.

Both the microcomputer and the terminal require similar types of staff furniture because both are used through a keyboard and video display terminal. The basic furniture for both is a work surface to locate the terminal and a chair for the staff user. What is important is not just the furniture itself, but the relationship between the chair, work surface, and user. This relationship is a much more complex one than that which exists for library staff using typewriters and desks. The tasks done at a terminal workstation in a technical services area, for example, provide insights into the needs of the users.

There are staff who use terminals similar to the way terminals are used at public service desks—for relatively short duration activities which search for brief, specific information. However, a much larger percentage of use is the type where library staff are assigned to a terminal station for a longer period of time (some libraries believe that two hour stints are perhaps the maximum limit for productivity and efficiency). The work may involve searching a list of items or inputting information from cards, worksheets, or files such as shelflist drawers. These activities often involve repetitive tasks: keying in of data from paper files
for an extended length of time, viewing the terminal screen to copy information, entering data in appropriate spaces, or proofreading the information just entered. Another factor, and perhaps most important, this type of terminal workstation needs to be adaptable to fit the needs of perhaps five or more workers each day. What are some of the furniture and equipment considerations that might make work of this nature easier, more pleasant, and more accurate?

**Chairs.** The pneumatically adjustable, ergonomically-designed chair described earlier for service desks is of prime importance for staff health and comfort, and it would be particularly appropriate in this multiuser situation. The chair must be easily adjustable to accommodate the differing body types of users as it does at the service desk, but it also should allow the user to easily adjust the seat or back to change positions and avoid the fatigue that will occur after an hour or two of repetitive activity.

**Work Surface.** Although there is great variety in the types of VDTs and microcomputers used in libraries, almost all have a keyboard detached from the terminal screen. Workstations should provide a two-level surface with the keyboard comfortably positioned at the lower level for easy typing and the terminal screen at the higher level for comfortable viewing. This arrangement reduces possible muscle fatigue, disability, or actual injury to the wrist of the terminal user. The problems of Carpal-Tunnel Syndrome, caused in part by the raising of wrists to reach keyboards, are well documented. Similarly, problems with a VDT screen height that is too low can cause eyestrain or neck and shoulder fatigue from continuous head and neck movements and adjustments to read the screen. A common furniture solution for this situation is a "bi-level" workstation which drops the level of the keyboard to a comfortable typing position while keeping the screen at eye level. Another solution is a simple stand to raise the height of the terminal screen.

The work surface should also be large enough to accommodate the materials that the terminal user brings to the workstation as well as the peripheral equipment needed to do the work. Aside from holding the keyboard, computer, or display screen properly, the work surface should have room for the paper copy the user brings to the terminal—e.g., worksheets, card files, books to be cataloged. Computer installations have definitely not eliminated paper. Is there space needed for terminal reference manuals, for diskette storage, for commonly needed information such as logon procedures, computer directories, problem-solving routines? Is there enough free surface to open a book easily or to write?

Some of these needs can be met by a desk-size work surface (perhaps thirty inches by sixty inches), but some of the less frequently used items
needed at the workstation might easily be stored in drawers or cabinets that are built into the workstation. There is no need to think of a computer workstation as a specialized table; it could just as easily be a specialized desk which provides the needed work surface as well as storage possibilities. Since terminal workstations are actually temporary desks for a variety of workers during the day, storage compartments also can provide space for personal items (such as handbags) which staff may not want to leave unattended at their own desks.

If possible, consider a terminal at a stand-up height workstation which could be devoted to short searches. Staff who have been sitting all day will appreciate the change in routine and the chance to stretch muscles and stand up straight.

Panels. Another major consideration is whether staff terminal workstations should be enclosed or partially enclosed by panels for acoustical reasons or merely to provide some privacy. A survey of office environments showed, not surprisingly, that workers believed the single most important physical attribute of the workplace should be the lack of distractions to allow staff to concentrate on work. A simple type of office landscaping for terminal workstations can provide a variety of benefits for those libraries that can afford the investment.

An easy, flexible solution is freestanding panels that are positioned to give privacy to terminal users and reduce distractions from the rest of the office area. Panels can be purchased in varying heights, can be joined to allow easy redesign of work areas, and can be used to assist in improving the environment of the terminal workstation. Panels can be purchased to help absorb the noise of printers and can also be used as tacking surfaces to display information sheets that need to be consulted frequently. More elaborate panel systems can be used to help integrate the workstation into the office area. Some panel systems provide the framework to which work surfaces, storage modules, and lights are attached and also are designed to handle the telecommunications and electrical power cabling safely, attractively, and efficiently. Such a panel system might be the solution many libraries would choose if a new area were being built for a bank of terminals, but many libraries, creating terminal work areas from existing office space, have relied on more traditional desk-like stations for reasons of economy or simplicity.

A question to discuss prior to implementing a panel arrangement or system is how the panels will integrate with the existing ventilation, heating, and lighting of the work area. A fully enclosed workstation with high panels would give a maximum degree of privacy but might cause lighting or air circulation problems that a less elaborate panel
Staff Furnishings for Libraries

arrangement would not. Perhaps libraries might consider the desired end to be an elimination of distractions for the terminal user rather than a need for absolute privacy and select a panel arrangement accordingly.

Peripheral Equipment. There are a number of other peripheral items that can be added to a terminal workstation to create a more healthful or comfortable environment for the staff. Some may be used to improve a less than ideal physical environment while others may make the user more comfortable or productive.

Desk Lamps. A common source of concern for users of terminals is the lighting of the terminal area. General lighting considerations are covered elsewhere in this issue, but there may be occasions where task lighting for a terminal area can be used effectively to accommodate individual needs or preferences. As in other situations where detail work is important, a light source close to the copy may be helpful if overhead lighting is insufficient or too far from the work surface. A light source that can be directed on the copy (from a small adjustable lamp with a spring-balanced suspension or similar method of adjustment) will provide the needed task lighting for the hard copy without flooding the work surface or illuminating the terminal screen. Lamps of this type can be used or swung out of the way as desired by individual users in a multiple-user terminal setting.

Antiglare Screens. Another related lighting problem is reflected glare on the terminal screen, which makes the screen difficult to read and is a potential source of eyestrain for the user. The reflected glare can come from overhead lights or exterior light from windows adjacent to the terminal screen. Repositioning the terminal might be a possibility, of course, but antiglare screens are an easy and relatively inexpensive solution. There are a variety of types to choose from, including mesh as well as the newer and more expensive Polaroid screens. They are a worthwhile investment for most terminal locations.

Copy Holders. If work surface space is at a premium, consider a copy holder which clamps to the desktop or privacy screen. Not only will a copy holder free up surface space, but it may be a more efficient or comfortable way to position copy for the users of a terminal. A common problem or complaint of users is neck or shoulder stiffness resulting from repetitive head movements from the copy to the screen. The copyholder can be used to position documents at eye level to ease this problem for some types of terminal work. It has a secondary benefit of allowing the copy to be positioned at any comfortable distance from the eyes of the inputter rather than at the work surface level, which might cause the inputter eyestrain or require the inputter to bend down to read...
the copy. One must remember that terminal users, inputting from copy, must refocus their eyes from copy to screen. Consistent light levels and viewing distances reduce the need to refocus. As with other furniture and equipment that comprises the terminal station, the ability to adjust the copy to the specific needs or requirements of the various users will eliminate some potential problems.

Footrests. A simple and inexpensive—but effective—piece of equipment for the terminal workstation is a footrest that users may elect to use, not use, or use only part of the time. Aside from providing a generally comfortable arrangement for the user, the footrest allows another point of adjustment which can be provided to accommodate the individual user of the workstation. The footrest, similar to an adjustable chair, gives the terminal user the opportunity to alter his or her position during a work session and relieve potential fatigue or stiffness resulting from maintaining one position for too long a time. Consider a free-standing footrest with a surface angled toward the chair, not anything fixed to the workstation itself or to the chair.

There are a variety of other items that one might want to consider at the workstation depending upon the specific tasks being performed. Most computer supply catalogs or major library supplier catalogs offer many more items than one could use profitably at any one workstation. Some fall into the category of furniture, some are equipment, and some might best be called gadgets to customize the work area. One should remember that the computer workstation in a general staff area presents a new kind of situation—a work space specifically intended to be shared by a number of users each day.

The items described earlier offer the possibility of making the user more comfortable and productive by being adjustable to the individual user’s needs. This type of equipment should be considered when the staff work area is being designed. Too often the major expense of the terminal hardware itself strains the available budget, and the relatively small amounts needed to purchase appropriate accessories are not there. However, there is greater efficiency for the user who can read a terminal screen easily and clearly over one who must squint at a screen clouded by excessive window light or perhaps by reflections of banks of fluorescent ceiling light. The investment in those furniture and equipment items that customize the workstation will pay dividends in staff comfort, health, and accuracy of work. Rather than being added expenses, they are cost-efficient components of an efficiently and humanely designed computer workstation for multiple users.
Office Areas

Some of the same considerations that apply to multiple-user workstations also apply to the traditional single-user desk for librarians and other library staff working in large office areas. Where microcomputers and terminals are a part of the individual’s workstation, chairs, terminal surfaces, and accessories appropriate to the work and environment should be provided. Some of the extra costs for ease of adjustability may be saved by substituting perhaps a manually adjustable chair rather than a pneumatically adjustable one. The need still exists for adjustability, but the single user will need to adjust table and chair heights or spatial relationships between user and screen less frequently than would be done in a multiple-user work area. One needs only to look at typical library office settings to see more inappropriate integrations of personal computers with traditional desks than ones that have been added with appropriate space and equipment. In many instances the lack of funds or the lack of space reduces the library’s ability to provide an ideal environment. It is probably only in new library space that one may find an office area designed and furnished to integrate traditional and computer operations in a functional and aesthetically pleasing system. Few administrators could have predicted the growth and availability of personal computers for office settings even several years ago, which makes the planning for office furniture systems a truly difficult task. Moreover, the steady growth in numbers of personal computers each year, compounded by the changes in technology and hardware, leaves the office planner with an ever-transitional office setting where the physical planning implemented for this year’s office must be changed again next year.

Just as the computer workstation needs to be flexible to adjust to the changing needs of different users, the library office ideally needs similar flexibility to adjust to demands for more or different equipment and changing staffing needs. The simplicity of adding or removing a desk with a typing stand to accommodate changing office patterns is forever gone. Is there something available for library office areas which: addresses functional needs for automation? can grow or reduce to meet changing demands? provides flexibility for individual users? is not exhorbitantly expensive? and perhaps is aesthetically pleasing to the workers?

There is surely no solution that is perfect for every situation, but an option that meets many of the requirements outlined earlier would be a modular system of office furnishings with panels that define the individual work spaces and that also serve as the skeleton which supports
the basic furniture and peripheral equipment needed by the office worker. Such systems are not a new idea. The concept of "office landscaping" with furniture panels providing privacy and some degree of sound abatement has been common for many years in libraries and other office settings. A common term for today's version of office landscaping is "panel systems." The panel systems available today combine the inherent flexibility of the basic landscape concept with the design features permitting easy integration of the needs of the automated office.

Virtually any feature of a standard desk can be hung from a panel—including bookshelf space, lockable drawers, file drawers, hanging files, work surfaces, tacking space, and even lighting. In addition, the panels are designed to accommodate the specialized needs for personal computers and terminals. They support bi-level monitor and keyboard surfaces, specialized accessories to store and organize personal computer materials such as diskettes, and even work surface height adjustments. Specialized work surface shapes take advantage of previously hard to use space such as deep corners which can be put to good use supporting computers and monitors. A further great advantage of panel systems for today's offices is their ability to accommodate a variety of wires and cables in an unobtrusive and safe manner, producing the desired electricity or telecommunications connections just where the user needs them. Internal cable distribution systems in the panels "manage" the wiring needs and should eliminate the unsightly and dangerous coils of excess cable that all office personnel have encountered at times surrounding computer installations or even some traditional desks.

Panel systems can be rearranged to accommodate changing space requirements, can be modified with changing accessories to meet new technological requirements, and can be expanded quickly for one or ten additional workstations. What is immediately apparent is the convenience of this almost unlimited adaptability in an era of rapidly changing office and equipment needs. Less apparent, but equally appealing to library administrators and budget officers, is the ability to add pieces to the system as budget permits. The "total office" does not need to be implemented all at once. As funds permit, the library can add functional and up-to-date equipment to meet specific needs, being assured that the latest additions will match and integrate with the original system. The panel systems available today provide attractive—as well as functional—surroundings with softer, less formal lines than some of the angular office landscape designs popular in past years.

Finally, at a more human than technological level, panel systems provide a reasonably inexpensive method of giving some degree of
privacy and individuality to office work areas where such features are needed or desired. How many libraries still have reference personnel who need to confer with users, or catalogers who would benefit from a lack of distractions, working in the familiar "bullpen" setting with rows of desks in an open office, altered only by file cabinets or bookcases used as barricades by staff who wish to gain some measure of privacy? Most libraries were not designed and cannot afford to provide private offices for each librarian. Some administrators might even question whether private office space, if available, would be desirable for most staff. Today's panel systems provide an added degree of privacy with some amount of noise abatement. However, they will not provide total privacy, security, or sound control because they most likely will not be floor to ceiling installations nor are they as substantial as walls. Some systems offer special acoustical panels (at higher cost), but one should consider whether the added expense is worthwhile for a specific installation. Despite its inherent limitations, a panel system may be a good compromise economically and at a human level; it is clearly an efficient method of adapting to the space and technology needs of today's rapidly changing office environment.

Summary

In looking at furniture and equipment for today's library settings, an old adage applies perfectly: "The only thing constant is change." What may be particularly applicable to today's library environment is that the rate of change is much greater than it has been in the past. This changing scene is best represented by the degree of automation in bibliographic and general office functions. It has changed the way libraries do business and has required libraries to adapt their methods and equipment. Even those same automated systems which have increased libraries' capabilities become inadequate when they are unable to adapt to changing requirements.

A key to providing furnishings and equipment for library staff is this same flexibility. Two types of flexibility should be possible. First, library operations which have become automated very often will have several library staff members using the same workstation and the same equipment. This requires that workstations be easily and quickly adaptable for the comfort, productivity, and even the health of employees. Consider the number of adaptations and changes an employee makes to his or her permanent work area to personalize the space and customize it to individual needs and preferences. The shared
automated workstation should allow as much of this individualization as feasible, especially in adapting to the physical needs of the staff. Second, workstations in general should offer the flexibility to adapt to changing equipment needs, utility requirements, and function changes. An analogy may be drawn to library architecture, which has evolved from designs which defined functional spaces by immovable walls to the current modular construction which recognizes the inevitability of function changes and provides the flexibility required for such changes. Similarly, offices being equipped for automated activities should provide for today's requirements while offering the capability of changing for next year's new equipment.

References

Toward Output Measures

For half a century dating from the work of Joseph Wheeler as a library building consultant, public library planning has depended almost exclusively on population as the basis for determining book and seating capacity which in turn are the main determinants of building area requirements. This system on which the old American Library Association and most state library standards are based is an excellent one because it makes the democratic assumption that every community should have equal access to information and that equal access to information is based on providing books and seating in proportion to the service population.

At its most sophisticated, this standard even provided for increased seating and book proportions in smaller communities. For example, towns of under 10,000 population would have ten seats per thousand population instead of the five per thousand standard for larger towns. Similarly, five books per capita might be the standard for towns of under 10,000 while three books per capita were recommended for larger communities.

In the 1950s, public library leadership decided to promote library systems. Any town smaller than 150,000 was urged to group with other communities so that they could benefit from the optimum library services that would be available to 150,000 population library systems.
with the staff expertise, book collections, facilities, and services that could be organized, financed, and administered with such a population base.

Community analysis as the basis for library planning emerged in the 1970s, culminating in the publication of *A Planning Process for Public Libraries*. This was an elaborate manual in which a community planning team composed of citizens and librarians studied the demographics, economics, educational background, and geography of the community as well as its library use to come up with a long-range plan for the library.

In the early 1970s, several public library practitioners with the help of some library school faculty members began studying the new public library systems to measure the effectiveness of library services. It became clear that book circulation, although predominant, was by no means the only measure of service.

Library program attendance; the answering of reference questions by staff; and the reading of newspapers, magazines, and books in the library are significant ways to measure library performance. Ernest de Prospo, Ellen Altman, and Kenneth Beasley, in their 1972 study of library performance, found that of people using various size libraries, the percentage of people entering libraries in order to borrow books was smaller in larger libraries. This suggests that larger reference libraries should provide more seating than do smaller libraries, since library users were staying in the larger libraries to use large reference collections in the library.

ALA published *Output Measures for Public Libraries* in 1982. Output measures were developed to gather data on "what a library gives to a community (OUTPUT), rather than what a library receives from a community (INPUT)." Output measures are use and user oriented. However, neither in *A Planning Process* nor in *Output Measures* is there any indication as to how these studies can be used to plan library buildings beyond a vague indication that facilities should relate to community needs.

**Facilities Planning**

How then can *Output Measures* be used to plan facilities? It will probably be several years before we know enough about the output measures relationships within libraries and among libraries. However, a place to begin is by asking some questions—e.g., given a number of
Output Measures and Library Space Planning
different library facilities, will the ones with the most seats attract the highest use?

Circulation per capita and its corollaries—title, author, and subject fill rates—could be affected by the book capacity of a library, so that, for example, a library with a per capita circulation of ten and a present subject fill rate of 70 percent might require an additional 20,000 book capacity to reach an 80 percent fill rate at that intensity of book circulation.

Intensity of use and fill rates are probably closely related. That is, libraries with a high percentage of their books out in circulation probably will have lower fill rates than libraries with lower circulation. It will cost more in book budget dollars to raise these fill rates than it would cost to increase fill rates in lesser-used libraries.

Standards recently issued by one state do not acknowledge this problem. By requiring libraries to reach certain fill rates they are requiring much greater effort and cost of those high intensity of use libraries than they are of lesser used libraries. Public libraries with five books per capita circulation can much more easily have 80 percent title and subject fill rates than libraries circulating ten books per capita. A brief and far from conclusive study by the author of some recently completed buildings suggests that increased seating even has the effect of increasing book circulation.

Perhaps an even more beneficial use of output measures in public library facility planning will be in adopting service objectives for the building program. Statements of goals and objectives are notoriously vague in most library planning documents. Yet in a building program, these goals and objectives are often quickly transformed into very concrete terms calling for substantial numbers of book shelves and reader seats that will cost millions of dollars.

Output measures provide an opportunity for directly relating service objectives and building program sizes. In-library use of seven per capita in a library that currently has a four per capita use figure may be achievable only by increasing seating from its current three per 1000 population to six per 1000 population. This is not to say that facilities changes alone will lead to increased use (although there is some evidence that this is the case) but facilities improvements may be a necessary part of the service plan to reach that objective.

Postoccupancy evaluation has been desperately needed by library planners for decades. Now that output measures provide a reasonably uniform and broad form of measurement, this kind of evaluation will go a long way toward developing correlative measures of service and...
facilities. Future studies may document how doubling seating capacity affects in-library use.

**Book Capacity**

Output measures can be applied to suggest directions for collection development given a library's goals for service to its community. Collection development strategies affect collection size, and that in turn affects the gross area needed.

With the advent of high circulation, small book collection libraries with rapid turnover and heavy duplication of popular titles, the question of how large a public library to build for a given community becomes a more open one than in the 1950s and 1960s.

In the late 1970s, the Baltimore County approach of concentrating on the traditional role of libraries as book circulation centers coupled with the introduction of display shelving resulted in a circulation emphasis but with a display twist that success in circulation depended on buying and displaying many popular books. Baltimore County suburban libraries with book capacity of less than 100,000 circulate over 1 million books a year—a turnover rate of ten. The implication for sizing library facilities in this instance is that attractive display shelving makes more books go out, keeping a large percentage of books circulating, so less shelving is needed.

A recent *Library Journal* summary of library construction shows a wide variance in book capacity of recently completed libraries serving similar size populations. How did the planners arrive at their recommendations? Public libraries, from this author's viewpoint, serve two primary functions—information and knowledge. Information may be as brief as a telephone number or as complex as a financial prediction, and knowledge can help shape people's lives, give them comfort, joy, and understanding. It is difficult to draw a hard line between the two functions, but libraries are useful in helping users with both. Understanding users' wants as well as their needs is a vital part of the helping process. This understanding helps planners determine key measures like projected collection size.

What do users want as evidenced by their behavior and how are these wants related to the library use process and its statistical and building implications? Users want:

—*Convenience*. The library must be in the main traffic flow, and parking must be convenient. Books displayed with front covers
emphasized by zigzag display shelving and lighting contrast and in the traffic flow of the library building.

_Browsing._ Fifty percent of the users come to browse—not to find a particular subject or title—so display space for browsing must accommodate many people and books. Much more space is needed than is presently assigned in most buildings.

_To find books easily._ Finding books easily means no hard-to-reach top and bottom shelves, no oversize books in a separate location, no catalog that leads you to books already checked out.

All of these factors affect a library's space needs.

Popular book display libraries such as those exemplified by the Baltimore County branches and the Que Bronson bookstore display techniques look at library users as a group of clones that statistically use libraries in a predictable pattern. Baltimore County studies show that patrons come to libraries to browse (50 percent), or to find subjects (35 percent), and few are seeking a specific title. Those not finding a particular title can be served by interlibrary loan depending on library systems or on more extensive regional or urban library collections. Depending on the nature of the population served and the location, response, and size of the larger library resource center, this kind of library service may be a reasonable approach.

However, library use patterns are not uniform in my experience. In many communities a much larger percentage of users may be seeking specific titles and, if so, the collection should be responsive to this need. This may result in a larger bookstack and a wider variety of bookstack environments including compact high density storage.

In the perception of the user, title availability may well have a higher value than browsing or subject availability. Finding a specific title may have a greater effect in perceiving that the library is useful and in encouraging repeated use.

In addition, there are some important cost and use factors to be considered before determining a policy on collection management. Costs must be considered from various points of view:

1. Housing a book and increasing library size is costly from an initial building and operational view and may make the library more difficult to use.
2. Discarding books is costly, and changing location symbols in a card catalog is even more costly.
3. Professional weeding routines are most costly of all.
4. Interlibrary loan is costly both to obtain the book and to maintain the system. It is much less costly for the user to get the book directly.

Well-known maxims about library use can also affect the size of a collection needed by a given library. Eighty percent of the people are coming to the library to use only 20 percent of the book collection, while the other 80 percent of the books are only used by 20 percent of the people. With computerized circulation it is easy to identify which books are most used, assure that these books are available in sufficient quantity, and, with an online catalog, to make them easy to find. The present public library practice of shelving both popular and less used books in the same area may not be what the public wants.

How are lesser used books found? Are the 80 percent of lesser used books located by users browsing on the shelves or by users using the catalog? If we knew that lesser used materials are seldom picked up by browsers in the stacks but more often by using the catalog, then a major argument against their separate location would be eliminated.

**Frequency of Use**

We know that even in small libraries the majority of books may not circulate in a given year. In these libraries we could discard or relocate these books elsewhere in the building on high density stacks or remotely in a different building. This arrangement could greatly improve access to the books people want more frequently by:

1. making the building smaller,
2. eliminating hard-to-reach top and bottom shelves,
3. interfile oversize books with the regular collection, and
4. providing wider aisles for browsing.

The disadvantages might be:

1. even less use of the classics,
2. complex shifting of the collection,
3. inconvenience of high-density storage, and
4. confusing arrangement of *two* subject sequences.

**Technological Developments**

Some libraries such as the Portland (Maine) Public Library with high density storage stacks for public use are already experimenting with some of these techniques. New technological developments call in
question the implied relationship between book collection size and the notion of equal access opportunity on which per capita library standards were based.

Compact storage of materials, a promise for thirty years, is finally becoming a reality. CD ROM discs, inexpensively duplicated, await only the complex negotiations among disc vendors and information database owners to make masses of full text integrated periodical holdings available with incredibly flexible search indexes. Online searching of massive bibliographic databases with consequent dramatic increases in interlibrary loan hit rates (from 60 percent to 90 percent for a medium-sized library) and the rapidity of delivery (less than a week) transform small- and medium-sized libraries into the equivalent of huge ones and should make the construction of new million volume bookstacks about as relevant to good library service as the brontosaurus was in the evolution of intelligent mammals. What will be even more important to equal access will be the ability of the librarian to gain electronic access to the resources and the ability of libraries to create networks of service. Here are some alternatives that need further study and experimentation:

1. Shelving lesser used books in high density shelving removed from regular book shelving.
2. Relocating lesser used materials to regional high density storage libraries.
3. Online catalogs designed for hierarchies of use
   (a) only display books on shelves
   (b) display books on the shelves in bold print
   (c) secondary display of books in other locations.

In collection management, the effect of discarding based on book circulation is an important issue. What percentage of a circulation is represented by books that have not been used for a specified period of time? Librarians tend to wait for three to five years before discarding books. If we can determine that only 1 percent of a library's circulation comes from books that have not been used in a year, then the discarding process can be speeded up and space requirements reduced. If on the other hand books unused for a year represent 10 percent of a library's circulation, more shelf space will be needed.

Automated collection management information is now available from many circulation system vendors. This means that the system will generate lists in shelf order of all titles that have not circulated so that discarding is much easier to accomplish. Alternately, these books can
even be temporarily relocated to compact storage with an automatic indication of the new location.

Hierarchies of Use

Hierarchies of use is an idea found in architectural solutions to several building needs. It is especially applicable to libraries and to libraries designed with output measure objectives. A hierarchy of use based on circulation frequency would result in four environments for housing the collection:

1. reference books used daily would be housed at stand-up use counters;
2. best-sellers and other new material used weekly would be housed on face-out display shelving spread out for access by many users;
3. books used at least once a year would be on conventional shelving; and
4. less frequently used materials accessed by catalog only would be stored in compact, high-density stacks, or in a remote location.

In-library use hierarchies would suggest environments for: stand-up reference counters, seated terminal searching locations, study carrels, and study rooms. Output measure surveys could suggest the relative demand for these varieties of in-library use environments.

Summary

This article suggests that over the next decade library performance measures—such as output measures—can become the basis for library space planning programs that will determine the quantity and relative location of user hierarchies for each type of public service.

References

Alternatives to the Construction of a New Library

B. FRANKLIN HEMPHILL

When I began to consider this business as a career in the early 1960s (along with many of the rest of you), I did so primarily because libraries were beginning to be recognized as important for the country beyond a handful of big cities and established universities. There was federal money then (hundreds of thousands, can you believe?) for regional library projects all over the place. Most of us who did not grow up in big cities were seeing our one or two room "Carnegies" moving to magnificent new quarters at least three times the size and at least three blocks away. My plan was to get my degree (at Rutgers) and go back to Nebraska to build libraries like that all over the state.

Some of that actually happened in Nebraska, but without me because I never got home. I stayed in Baltimore County where we built some twenty-two libraries of all kinds and sizes during the next twenty years.

During the sixties and early seventies, that kind of expansion was taken for granted in the library world. Mostly all of that expansion was into new buildings because many libraries were housed in facilities at least thirty years old. It was also during that time that library architecture began to be considered as a specialty of its own and most of our best current thinking in that area is a result of those expansion years.

At least two conditions were the cause of that time coming to a close around the end of the seventies. The most obvious and probably most
important condition was the combination of inflation and the end of free flowing federal financing for new library construction. The cost of a new library building had nearly tripled in little more than ten years and matching or "coming up" with those funds on the local level seemed less and less attractive.

A second and more subtle condition was the result of evolving library technology and philosophy. It was beginning to be considered that more space on a new site was not necessarily the answer. Many libraries began to opt for computerizing their operation, retrofitting their furniture and equipment, rehabilitating their facilities and their mechanicals, and rearranging the available space in the existing building for more judicious use, all at a fraction of the cost of a new building. Other libraries, finding that their present location was the best one in town, planned for additions on that site in addition to the "3 Rs"—rearrangement, retrofit, and rehabilitation—still for less than half the cost of new construction.

Still others, of course, blessed with not adequate space to rearrange, adequate location, or adequate physical facility, were forced to consider alternatives to new construction. Many tried conversion of structures intended for other purposes or, failing that, some portable or prefab structure. Through all of this we have learned enough to know that some alternative to new construction may actually be the best solution to many current facility problems for all kinds of libraries in all parts of the country.

No matter which of the basic alternatives is considered—rearrangement, conversion, addition, portable or prefab structure—none should be pursued without, at the very least, a space needs analysis. Without that kind of study, a perceived space problem may be the result of poor original planning and arrangement. Requests for more space by staff or public may not be justified at all in light of the library's operations, demographics, and circulation.

Important conclusions can be made from the application of relatively simple criteria when deciding upon a course of action in the absence of an elaborate study. The easiest way (and I hate to give this away free) to determine your relative space requirements is to simply get a pad and pencil and tour your facility. Look carefully at each of the major areas of operation (both public service and behind the scenes) and write down for each its present size, the percentage by which it is too large or too small, and whether or not it is in the best location in the building. Total them all up and consider moving some. Does it balance? Would it if some functions were moved? By what percentage are you
Construction of a New Library

over or under? Could some operation be deemphasized and diminished in size? If so, would that provide room for the most cramped areas? How much unused or improperly used space is in the building? Is there space for new services if the space was used properly? When you add it all up, if the results are more than 20 to 25 percent space needed over what is available, you ought to consider a move or an addition. If the figure is less than that, a rearrangement and more advantageous use of your existing space plus new better scaled equipment will probably buy you at least five years in the present facility.

All of that, of course, to be done properly, requires the factoring in of many other elements of your operation, but basically that is the stuff of which space needs analyses are made and you will be more than halfway home by performing this little exercise.

Having decided, then, that the necessary space for your library's needs has at least a 25 percent deficit, the question is now what to do to alleviate the problem. The following brief discussion of five alternatives is intended to aid in that endeavor. Each alternative has been intentionally generalized because each case is different and each solution necessarily must be customized. In some cases a combination of alternatives is desirable. Whatever the application, it should be obvious from this discussion that there are indeed ways to ease your library's space problems without the expenditure of a minimum of $3 million and three years' time.

Rearrangements

If your guesses show less than a 20 to 25 percent deficit in space needs, a rearrangement may be your best solution. The most important elements of a rearrangement are the repositioning of essential services (sometimes the movement of a service to a space of higher quality is as good as gaining more space for that service), the elimination of unnecessary corridors and aisleways, the elimination of unnecessary fixed partitions (that alone can add an amazing number of square feet), reemphasis and deemphasis of selected functions, and the use of new equipment (improved in both efficiency and size). An additional important ingredient in all of this is, of course, redecoration. Such a rearrangement will not only provide at least temporarily adequate space for those currently crowded operations and services but quite often will also liberate enough space for the addition of some functions that previously could not be housed.
Obviously, rearrangements are the least costly and least difficult to accomplish of the alternatives being considered here. Generally, a rearrangement can be done for the cost of some new equipment plus the necessary redecorating costs (painting walls and possibly adding new carpet in some areas). In some cases where a multilevel operation is unavoidable, an elevator must be added as part of the project. Even then, this alternative is far and away the least expensive of building a new facility or addition. A recent proposal for rearrangement of a 20,000 square foot facility at Summit, New Jersey was priced at about $80,000, including considerable new equipment and an elevator, as opposed to about $500,000 for a 5000 square foot addition (note that most rearrangements assume in-house labor for the actual moving and painting, etc.). Many rearrangements may be accomplished for practically nothing and still return enormous benefits in the library's ability to house and dispense its services.

Assuming, however, that the deficit of adequate space in the library, as determined by our quick study or some other (more costly but more reliable) method, is more than the 25 percent mentioned earlier as a somewhat arbitrary outside limit, the answer now as to what to do is narrowed to: (1) a move to another building, (2) an addition to the present structure, or (3) the construction of a new facility. Since the third alternative is outside the scope of this article, only the first two will be discussed further.

Additions

In the logical progression from least to most expensive, the next most economical method for the acquisition of additional space (as opposed to expansion to a branch) is an addition to the existing library. The choice of this alternative assumes a "yes" in response to a number of very important questions:

1. Is the existing building structurally adequate to continue to function as the library and to accept an addition?
2. Does the site contain adaptable space for an addition of the appropriate size (determined by the space needs study) and for proportionate additional parking?
3. Is the location adequate to the point that numbers 1 and 2 even apply?
4. Is an addition architecturally feasible?
Construction of a New Library

If these four criteria can be satisfied, an addition is probably your best solution. Once the square footage necessary in the addition has been established and the other criteria satisfied, the most important next step in this situation is the careful preparation of the architectural program. A program for an addition is every bit as important as it is for a new building. In this case, it must convince the staff and the board and it must instruct the architect that the addition will both gain square footage and allow space in the existing building to be reused almost as new space by the library. Not only is that kind of planning enormously beneficial economically, but also it allows an almost complete reorganization of the library's operations if that is indicated.

Consider the benefit to the library economically from an addition as opposed to the construction of a new building. A 20,000 square foot, thirty-year-old library needs a 5,000 square foot addition. It meets the four previously listed criteria. Such an addition should cost less than seventy dollars per square foot. Even if the figure is $70, that is $350,000 for the construction of the addition alone. Depending upon the degree of renovation of the existing space (using $35 per square foot for rehabilitation, $15 per square foot for renovation, and only $5 for redecoration), the total for renovation of the existing 20,000 square feet would be between $175,000 or $25,000. This translates into a new library of 25,000 square feet for $525,000 (assuming the use of new and reusable space and using the higher figure for the total cost of rehabilitation including mechanical, energy conservation, etc. rather than just renovation or redecoration). The square foot cost for that new space is twenty-one dollars. Obviously, some additional project costs would have to be added (architectural fees, permits, furniture, equipment, miscellaneous) so that the final cost per square foot might increase to $25. Nonetheless, there is simply no comparison between getting a virtually new 25,000 square foot library for $25 per square foot ($625,000) as opposed to a brand new building of the same size at $70 per square foot plus site costs of at least $200,000 ($1,950,000). That is why additions are such an attractive alternative if the four criteria mentioned earlier apply. If only one or two of the criteria apply, however, and this alternative is undertaken under those conditions just because of its economic advantages, an unsatisfactory compromise may well be the result.

Conversions

Faced with the kinds of figures just discussed for new construction when an addition is just not possible, many library boards and local
politicos turn to the apparently next most economically feasible alternative—i.e., the conversion of some existing building into a new library.

The conversion of a building built to serve some other purpose into a library is a very tricky undertaking. The path is full of pitfalls and the result is sure to be even more of a compromise than when an addition which has been specifically designed to house the functions of a library is the chosen alternative to a new building.

Situations for and subjects of conversions are different in each case. Almost every kind of building has been considered for a conversion to a library. The list includes historic old houses, churches, banks, stores of all kinds, hotels, filling stations, barns, warehouses, train stations—among others—and in one case (I promise it’s true) an unfinished mausoleum. Unfortunately, many of those projects were completed and in most cases the only thing they were better than was no library at all.

The situation to avoid and the one which most often seems to occur is the following: The library finally convinces the local authorities that its quarters are woefully inadequate. The mayor’s brother-in-law has just gone out of business (gone broke) downtown and has an 8,000 square foot building available to sell to the city for use as a new library. Of the 8000 square feet, 4000 is in office space on the upper level but, no matter, the present library quarters are only 2500 square feet. Not that anyone ever really asks the library whether or not they think it is a good deal, but even if they did, the idea of almost doubling the space seems too good to pass up. Never mind that the building is in the wrong part of town (which is partly why the business failed) and has no parking and leaks and is ugly. The local architect is only too glad to redesign the inside for the local contractor to renovate. The new front doors, of course, will remain the center of the building (to match the other stores in the block) so there will be no chance for circulation control with workroom backup. Finally, the local furniture store owner will be all too glad to fill up the space with a furniture store version of what a library should look like (I’m sure you’ve all seen at least one) and the deed is done. I know of a number of situations like that, but I trust they are few and far between and that those who are able to avoid the scenario just described may find a conversion project altogether satisfactory to their needs.

If that is to be the case, there are certain criteria which must be applied and a number of pitfalls which must be avoided. The criteria for choosing a conversion are basically the same as those used for a new
Construction of a New Library

building. The best way to choose an appropriate candidate for a conversion is to be able to compare at least two buildings against each other. The major considerations should be:

1. **Size.** It must meet the library's analyzed needs for the next twenty to thirty years.
2. **Location.** It must be as good as or better than the present one. If there is presently no library, it must be in an acceptable location—as though it were for a new building.
3. **Structural conditions.** It must be sound in foundation, walls and roof, and floors must be rated at least 150 lbs. per square foot or be modifiable to that figure (without this criterion none of the others matter).
4. **Cost.** What will be the cost of conversion based upon a professional estimate which must be added to the cost of the building itself?
5. **Availability.** How soon could renovation begin?
6. **Aesthetics.** Can the building ever be made to "look like a library" or will it always be thought of as "the old First Methodist" or "the old Hutzler's Department Store?"

Seldom will any one conversion candidate score a "10" in all six categories, but a high score overall probably means you are on the right track to a successful project.

Many of those same criteria just listed are also the names of the pitfalls in the process:

1. **Location** can be deceiving. The library must consider why the building is available in the first place. What is happening to that neighborhood and what are the future plans for that area? What is the condition of the surrounding structures? What is the access to the building (day and night)? Is there parking?
2. The **structural condition** must be carefully analyzed. This should be done by a qualified engineer. Many an older building which appears to be structurally sound couldn't meet today's codes—especially for public buildings. Some things to look for are: (1) unreinforced masonry walls over ten feet high, (2) types of construction which will not allow the addition of electrical (data lines, etc.) or mechanical chases in ceilings or walls, (3) in the case of multilevel buildings, types of construction which will not allow the installation of elevators and stairways, and (4) large glassed-in areas which will never be energy efficient.
Many older buildings in which these conditions exist would otherwise pass an inspection not predicated upon the particular needs of your library.

In addition, the mechanical system is almost always one of the major problems in a conversion. Whatever is there was probably adequate for whatever the building was doing. The problem is that libraries need a much more sophisticated heating, ventilating, air conditioning system than many other kinds of buildings. The cost of upgrading to an adequate and energy efficient system will be a factor given it can be done in the first place.

It is the cost of the whole project though that is really the crux of the matter. This is where most otherwise acceptable conversions go awry. Most proposed conversion projects meet the majority of the six “suitability criteria” mentioned earlier and are implemented—using as the cost the basic cost of the building v. the cost of a new building of the same size. It is the total project cost which must be considered if an accurate comparison is to be made. Besides the cost of the structure itself, which to be viable must not exceed a little less than half the cost of new construction, there are the less popular costs of mechanical rehabilitation and upgrade, the costs for interior alterations (most buildings need to be essentially gutted first at considerable cost), and the upgrade of the entire building to meet handicapped and fire codes (usually necessitating the addition of either ramps or elevators; but certainly that of entrances, restrooms, conveniences, etc., and probably a sprinkler system)—which may add as much as 25 percent to the cost.

The cost of all of that added to the cost of the building itself may very well approximate or exceed the cost of new construction and still be a compromise. If the total cost is within several hundred dollars of say a $2 million new building project, unless it is a superb, otherwise unobtainable location, it is obviously not the bargain it appeared to be.

Unless that total cost is less than 75 percent of the cost of new construction, a conversion is probably not the proper alternative. If it is still the only one available, it will have to be handled in the best way possible.

None of the foregoing considerations of conversions should be undertaken without the preparation of at least a basic outline for an architectural program. Necessary elements for costing out simply cannot be included without that kind of planning. Even with funds expended proportionately to new construction, the conversion of existing space as an alternative to new construction must generally take its
Construction of a New Library

place up the scale in cost and down the scale in desirability from an addition as a method of improving a library service facility.

Probably the best application for a conversion is a slight variation on the type just discussed. That is the use of an existing space in a shopping center or similar project for a small or “mini” library. These spaces are usually from about 1500 to 3000 square feet and entirely nondescript in their design. Mostly rectangular or square, these store-like areas are less a conversion, in that sense, than they are just reuse of an adequate space.

“Store front” operations of this kind can be leased for five, ten, or fifteen years with great advantages to the library. While they are technically temporary, they allow the library to lease a space for its library needs at minimal cost without the commitment of a permanent building. If the guess was wrong, the operation can be moved to another location and because the space is so simple, usually only some paint on the walls, some furniture, and possibly carpet are necessary to open up for business.

Operations of this type are, of course, only adequate for small branches or minis, but quite often they are enough to relieve the strain on a single or central library to the extent that the perceived crowded conditions will disappear for a number of years. This alternative should be seriously considered if expansion of the library’s overall operation is a possibility.

Prefab and Portable Structures

A final, but by no means least desirable, alternative to a new building on a new site is the prefab or portable structure. Portable structures are, by their very nature, temporary. Their purpose may range from serving as temporary quarters while a new library is being prepared to serving as the library in an area until use patterns can be determined or a more adequate facility can be found. Whatever the requirement, in situations where less than three service locations are necessary, the “portable” is probably considerably more economical than a bookmobile. A portable can be about twelve feet by forty feet and may indeed be as large as many little one room rural libraries all over the country.

The more substantial and obviously more desirable (if more than 500 square feet is required) type of this alternative is the prefab structure. The two most notable versions of this type of small library are the octagonal peaked-roof wooden building in use in several rural areas of
the country and the expandable metal structure popular in many cities and metropolitan areas.

These structures (and other prefab buildings of varying size and shape) are most advantageously used when expansion of the library's operations is indicated rather than as a solution to a space problem within an existing library facility. These small buildings (approximately 1200 to 2000 square feet) may be the best answer to an expansion program when leased facilities are not available and when a larger and more permanent building is not required.

The decision to use this type of building must be based upon most of the same criteria as those used for any small library or branch library. In this case, the size must be adequate to the projected needs, the location must be the best available, there must be parking and good access to the building, and the building should fit into the surrounding area or neighborhood. The bail-out feature here is that these buildings are literally, though quite often with considerable difficulty, movable, and an initial mistake in location can be corrected at a believable cost.

Generally, these structures are a little less expensive than conventional library buildings. Their size limitations, however, make them a little less desirable than the conventional building or store front conversion in most cases. But, where conditions are right for a prefab building, they may very well be the most desirable alternative in many situations in which modest library expansion is indicated.

Conclusion

Whatever the reasons a library may consider alternatives to the construction of an all new facility as an answer to their building problems, the results may be every bit as effective a solution as a new building would have been. Many legitimate arguments are currently being forwarded as reasons to opt for other than totally new construction. They range from preservation of a historically significant building to a location which just cannot be improved upon, to aiding in the rehabilitation of a particular neighborhood. Such arguments, when properly applied, mitigate against using cost of the project as the only criterion for choice and in many cases, ought to be the central issue in that choice.

Alternatives, therefore, of the five types discussed here must be seriously considered as the best choice when libraries in the next decade and beyond are faced with expansion of their operations and service capabilities without the emptying of the local coffers. Whatever the
situation, those alternatives offer an attractive flexibility in dealing with the almost universal condition of the need for more space in almost all kinds of libraries in almost all parts of the world today.

Construction of a New Library
Reutilizing Existing Library Space

MARLYS CRESAP DAVIS

Introduction

The problem of finding additional space in which to house materials and conduct public and technical service operations is a continual one for most libraries. Because there is a constant drive to improve collections, expand services, and in general do more for the public, libraries are always outgrowing their facilities. Just as humans begin to age from the moment they are born, so library buildings begin the process of “shrinking” as soon as they are occupied—despite all efforts to plan ahead for this contingency. There are several options open for libraries to investigate when searching for a solution to this perennial problem.

There is of course the possibility of constructing a new library facility or building an addition to the present building in order to expand the space available. These solutions nearly always seem, at least on the surface, to be the only way to overcome space limitations. However, they are not always possible because both have at least one major drawback—i.e., cost. Another option, one which many libraries may find more feasible at least in the short run, is reutilizing the existing space to better advantage. Most of the ideas and suggestions contained here are put forth with public libraries in mind. However, most—if not all—should prove adaptable to other types of libraries as well.
The most pressing reason for making a decision to reutilize existing space rather than undertake a building project, is usually the cost factor involved in building. In the current economic climate (or at any time for that matter) the expense of new construction, whether of a completely new facility or of an addition to an existing building, is daunting. Often library boards and city officials feel that the money simply is not there to pay for such a major project. That may or may not be true. Nevertheless, the decision is often made to compromise by assessing the current use of space and finding ways to better utilize it in order to serve the library's needs and those of its patrons. The word *compromise* does not necessarily imply a negative view of this decision. In many instances this may actually be a better route to follow than that of new construction.

There are a number of arguments in favor of reutilizing existing space. One might be that the current library is housed in a historic and/or aesthetically pleasing building or location, and that it is preferable to preserve those aspects. In some cases the design to reassign space may represent a temporary measure aimed at maintaining quality library services while other alternatives are explored or necessary funding is acquired in order to pursue more attractive options.

In any case, libraries facing the problem of limited space should always consider how their existing facilities could be better utilized, at least as a temporary measure. Three things to keep in mind when reassigning library space are: (1) use common sense, (2) think big, and (3) avoid preconceptions.

**The Decision Process**

Making the decision to reassign space in an existing facility is obviously not one to be arrived at haphazardly. A great deal of time and effort may need to go into this decision process in order to ensure that the decision is the correct one, and, if so, that its implementation goes smoothly.

Common sense is an invaluable tool for use in decision-making. For one thing, you may have to justify your needs to governing and/or funding bodies. Going about the preliminaries in an organized manner and being able to show that your solutions to the problem are sensible and workable will go a long way toward assuring approval for the project from those in positions of power. It may also garner future support at a time when a new building or addition has become the only alternative.
Reutilizing Existing Library Space

Several ways of determining why and how to reassign existing space are available to librarians facing this problem. It is hoped that a combination of these would cover all bases and provide the information needed to make implementation decisions as well.

First of all an inventory of current space and how it is being used is essential. This might be accomplished by studying the building’s original construction documents if available and by conducting a “walk-through” of the building, taking notes on which areas are used for what purposes and how they might be rearranged or their uses changed in order to improve access, the availability of space, or workflow.

This examination is often recommended as a regular duty of the librarian and the library board as a check on the general physical condition of the building. There is no reason not to consider space needs and alternatives at the same time with a view toward better utilization of existing spaces.

In conjunction with this first step, the librarian may conduct formal or informal use studies of the various areas of the library. This could provide valuable information regarding such things as whether existing tables or lounge seating are used to capacity. There is no formal “output measure” from the Public Library Association for determining usage of furniture and equipment, but the In-House Materials Use Survey from Output Measures for Public Libraries¹ might be adapted for this use. In smaller libraries where most functions and areas are within sight of the circulation desk, this process would be simpler than in a large library where public seating areas—both lounge and study—are more likely to be scattered over the buildings perhaps even over several levels. However, it is possible to construct a method for collecting this information with a minimum of trouble for all concerned.

A check on the current demographics of the community may give insight into possible changes which could be made due to changes in the population. For instance, if the number of children in the community has dropped significantly over a period of years, the library may want to consider rearranging its space to reflect at least a temporary lessening of the need for room in the children’s area.

Finally, a survey of the community can prove valuable. Determining residents’ perceptions of the library’s role, their reasons for using the facility (or not), and their views on the accessibility of materials, arrangement of equipment and service areas, and/or the need for more or fewer seating areas can provide insight for making decisions on space needs. Such a survey might, for instance, uncover a need for changing the library’s plan of service to introduce a new collection or format in
order to meet the community's information needs. This in turn could 
have bearing on the question of how best to utilize the current space 
available.

**Implementation**

Thinking big is essential to the process of reutilizing space. By this 
we mean that you must try not to let the walls close in on you. The 
parameters of the building should not be a deterrent to uncovering more 
usable space than currently exists. It might prove helpful to picture the 
interior space—as a whole and as separate areas—without any furnish-

So far this discussion has assumed that the library's collections are 
adequate but not "fat." That is, that an ongoing weeding program is in 
place in order to either maintain the collection at a given size or ensure 
its quality and viability. If this is not the case, then a first step to take 
when attempting to make more space in the library is to weed out 
materials which are outdated, not used, and/or in poor physical condi-
tion. This might apply in some instances to furnishings and equipment 
as well.

Shelving books two-deep or by size of volumes or in other space-

More and more libraries are attempting to attract their patrons to 
materials by use of ingenious methods of shelving and display which 
show off books and other items to advantage. This is not always the best 
way to save space, but in some instances it can provide a solution to the 
space problem and at the same time promote the use of materials by 
displaying them to advantage. For instance, if the library's collection of 

The introduction of spinner racks will not only free shelf space with a 
relatively small cost in floor space (since they can be placed in areas 
otherwise often underused such as at the ends of stacks) but will also 
allow the front covers of these materials—graphically designed to 
attract readers—to be shown off to best advantage. The library gains in 
several ways: increased availability of standard shelf space, limited 
additional use of floor space, and attractive display of materials.
Reutilizing Existing Library Space

Another way in which many libraries have created space while at the same time improving work flow is by integrating some sections of the collections. Shelving the adult and juvenile nonfiction materials together, rather than in two separate sections of the library, may free up space in the children's department without inconveniencing patrons. A second benefit may be to allow access to materials written at lower reading levels to adults who may be hesitant to enter the children's area. In addition, the librarian may find his/her work flow improved by eliminating the need to search in two separate locations for information on a topic. This solution works well in many small libraries where staff is limited and the adult and children's areas are not distinctly separated from one another. Even in larger libraries this shelving method has been implemented successfully.

Once everything possible has been done to create space without moving furniture, the real decision-making begins. Perhaps the first step should be to make a scale drawing of the existing interior spaces and of all pieces of furniture which are currently in use and which can be moved around within the building. Cut out the pieces of furniture and use them to experiment with different layouts. Try moving the furniture around into various configurations—both within the areas where the pieces are currently and to other places in the building.

Remember—avoid preconceptions. You need not necessarily be shackled by past practices. No rule says that the functions of the library must remain in their currently appointed places.

There may, of course, be some factors which should be considered before you indiscriminately start moving things. Floor loading capacities or other structural limitations, for instance, may dictate that certain functions must remain where they are. On the whole though, if it is possible—and works better—to switch things around, do it.

Examples from the Field

Morningside Branch Library, Sioux City, Iowa

The Morningside Branch of the Sioux City Public Library was built in the late 1960s. Its architecture is typical of the time period—a one-story building which, while the interior appears to be long and narrow, is actually nearly square. The branch serves approximately 30,000 residents of the Morningside neighborhood.

The Problem: During eighteen years of service at the branch, no renovation had been done although several services had been added such as videotapes, a public-access microcomputer, and large print books.
used in the homebound delivery program (formerly housed in the main library but moved to Morningside in 1986).

By 1986 it was obvious that the library needed a rearrangement of its equipment, not to mention a face-lift. The library board approved expenditure of funds for new carpeting and other minor renovations, and a consultant from the Northwest Iowa Regional Library System was asked to revise the existing space plan to improve the look of the library as well as increase the available space in some of the public service areas.

One of the problems with the existing space arrangement was that the magazine lounge area was extremely small and crowded. There was not adequate display shelving for current subscriptions, and the photocopier and paperback exchange rack were also located in this area.

Because an ongoing weeding program existed, it was not necessary at this time to create additional shelf space although it was desirable to allow for that contingency in the future. Consultation with the branch manager indicated that all of the existing study tables were used heavily, and so it was decided that it would not be expedient to remove them at present in order to expand the lounge area.

The Solution: Since expansion of public service had apparently been taken into consideration when the branch was built, the wall at the back of the lounge area was originally installed as a temporary wall which could be removed in order to expand the public areas of the library. Behind this wall was the staff workroom, staff lounge, entrance to the librarian's office, and access to the mechanical room and bookmobile garage. A secondary entry to the public meeting room was also located in this area.

In most cases it is not necessarily the best solution to a space problem to decrease the amount of staff work area. In fact, it is this nonpublic space that is often the problem rather than the solution since many libraries seem to be built with inadequate space for technical services and other staff functions. However, in consultation with the branch manager it was determined that the workroom was perhaps as much as twice as large as it really needed to be. This resulted in its being used as a catchall storage space. It was decided that the space could better be used by moving the temporary wall back, creating additional public space while precluding the use of the workroom as a place to store junk. Additionally, the door to the librarian's office, previously not visible to the public, would now face this newly expanded lounge area. This would allow patrons easier access to the librarian as well as allowing the librarian a view of the public areas which was not possible before.
Reutilizing Existing Library Space

In order to further open up the public areas of the branch, it was decided to explore the possibility of rearranging the book stacks. This would allow a different configuration of study tables, relocation of the ready-reference area, and ease of location of public-access terminals for a planned online catalog.

After exploring several alternative floor plans, it was decided to implement a staggered arrangement of freestanding stacks which would provide the same amount of linear shelving in a smaller area of floor space. By concentrating the stacks in one end of the building, the "front" of the room was expanded visually and there was space to relocate some of the study tables which had previously been located in the center of the building due to lack of flexibility in the furniture arrangement.

Because all of the furniture and equipment had to be moved in order to lay conduit for the future computer terminals and to install the new carpeting, both projects were implemented simultaneously in order to minimize inconvenience to patrons.

This project was not cost-free. However, it certainly was considerably less expensive than new construction. The only suggested purchases of new equipment were additional slanted display shelves for current magazines and a rack on which to display current issues of newspapers (formerly housed on a tabletop for lack of any other place). The cost for moving a wall was relatively minor; paint and carpeting came to somewhat more but were needed even more than the additional space created by the expansion project. The branch library now sports a whole new look, and both staff and patrons are pleased with the result. The following figures 1 and 2 are "before" and "after" illustrations of the interior space plan of the Morningside Branch Library.

Aurelia Public Library, Aurelia, Iowa

Aurelia is a farming community of approximately 1150 people and located in Cherokee County in northwest Iowa. The Aurelia library is in two-thirds of a city-owned building, the other one-third houses the local historical society. The building is situated on Main Street at one end of the business district and is sandwiched between two other structures. There is no room on the present site for expansion of the facility.

The library is housed in one large room with an office and restroom at the back. Behind the main part of the library is a good sized room used for story hours, library meetings, and occasional public functions.

The Problem: The library's children's area was located to one side of the main room. All of the children's materials were shelved here and
space for materials was at a distinct premium. There was no practical way to expand this area into other parts of the library. In early 1986 it became obvious that the need for expansion of the children’s area was too great to ignore or to solve through constant weeding.

The Solution: Since the meeting room at the back of the library was rarely used for public functions (and other facilities were available in the community for this purpose) it was decided to convert the meeting room into a place where the preschool and lower-elementary materials could be shelved. It would still serve as a programming space for story hour and the summer reading program.

A space plan was devised which would allow adequate shelving for primary materials as well as the addition of some child-size study tables. Because a bright mural depicting characters from nursery rhymes had been painted on two walls of this room previously, one object of the project was to preserve this artwork; therefore single-face shelving could not be placed on these walls.

Taking into consideration the current and projected size of the primary collection and the need for reading tables as well as chairs for program use, a space plan was devised. A grant was requested from the Kinney-Lindstrom Foundation of Mason City, Iowa and the request was granted in the summer of 1986.
Reutilizing Existing Library Space

Figure 2. “After” Floor Plan of the Morningside Branch, Sioux City Public Library, Sioux City, Iowa

Following receipt of equipment and furnishings, the primary collection was moved into the new “children's room.” Materials for upper elementary and junior-high students were left in the area which had previously housed all children’s materials; however, due to the removal of the other items, this area has been visually expanded and now has additional shelf space available for books on this higher reading level.

Again, this project was not cost free (although the grant paid for new furnishings and needed equipment). But for a relatively small amount of money the library’s services to children were enhanced by the creation of an area especially for the use of young children, the upper elementary and junior high collections can now be expanded, and better use was made of a space that was previously underutilized (see fig. 3).

Conclusion

New buildings are not always the only solution or the best solution to a space problem. A little creative thinking can go a long way toward alleviating the problem without creating a whole new set of problems to deal with.

What this article has tried to show is that libraries facing the problem of inadequate space do not necessarily have to embark on a
Figure 3. Floor Plan of the Aurelia Public Library, Aurelia, Iowa, After Reorganization.
Reutilizing Existing Library Space

construction project immediately. In fact, such an undertaking may be delayed for some time if enough thought is given to the problem of how to better utilize the existing facilities.

There are ways of expanding space without creating new buildings. And there are ways of determining which of those ways might work best in any given situation. Librarians who follow the three rules mentioned earlier—use of common sense, thinking big, and avoiding preconceptions—should find the task of reassigning space less onerous than might be expected.

Reference

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Introduction

Since the generous contributions of Andrew Carnegie around the turn of the century, it has been the dream of most communities in the United States to have a public library building to educate and enlighten its citizens. Carnegie did more for the development of public library facilities than any other individual, and his legacy will not be forgotten. "Within three decades Carnegie had donated $56,162,622 for the construction of 2,509 library buildings throughout the English-speaking world. More than $40 million of this amount was given to build 1,679 public libraries in 1,412 communities in the United States."¹

It is unfortunate that there is no comprehensive data like that available from the Carnegie Corporation for other public library building projects built during this early developmental period for public library buildings. In 1968, Hoyt Galvin reported that: "Henry T. Drennan of the Library Services branch of the U.S. Office of Education tabulated data for the fiscal year ending 1962 on public library buildings in the 50 states and the District of Columbia by date of initial construction. He received reports on 4319 central library buildings and 5707 branch buildings as follows:"²

---

Richard B. Hall is Library Building Consultant, State Library of Georgia, Atlanta, Georgia.
Unfortunately, there are no comprehensive figures for the different types of funds spent for public library buildings during this time period. The only source of this kind of information for this time period was reported in 1966 by Nathan M. Cohen of the U.S. Office of Education to the Subcommittee on Economic Progress of the Joint Economic Committee of the Congress of the United States. Table 1 shows the data tabulated back to 1945 and broken down into the four main sources of funds: local, state, federal, and private.

The data show a tremendous growth in capital outlay funds for public library buildings increasing from $1.2 million in 1945 to $103 million in 1965. To a large extent, this increase is accounted for by the rise in local funding from $1 million in 1945 to $70.9 million in 1965. The increased growth rate for all funds was further accelerated by the introduction of $29.9 million in federal funds in 1965.

Private funds were 12 percent in 1946, but only 1.6 percent in 1965. In 1946, 88 percent of construction funds were local, while in 1965 local funds were 69 percent. Of the total $70.9 million in local funds in 1965, approximately $15.2 million (or 21 percent) came from local bond issues. The remaining local funds came from other kinds of local bonds and local direct tax appropriations. State funds for public library construction during this time period were negligible.

Around this same mid-1960s time period, there was a nationally sponsored survey of public library buildings resulting from the inclusion of Title II, Public Library Construction, in the expanded Library Services and Construction Act (LSCA) of 1964. Figure 1 is based on the
Financing Public Library Buildings

### TABLE 1
**CAPITAL OUTLAY, PUBLIC LIBRARIES, BY SOURCE, FOR SELECTED YEARS 1945-65**

[In Millions of Dollars]

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Local</th>
<th>State</th>
<th>Federal</th>
</tr>
</thead>
<tbody>
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<td>1965</td>
<td>103.0</td>
<td>70.9</td>
<td>29.9</td>
<td>1.7</td>
</tr>
<tr>
<td>1964</td>
<td>61.3</td>
<td>60.1</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td>27.7</td>
<td>26.8</td>
<td>.9</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>12.3</td>
<td>11.7</td>
<td>.6</td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>4.4</td>
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<td>1.8</td>
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<tr>
<td>1945</td>
<td>1.2</td>
<td>1.0</td>
<td>.2</td>
<td></td>
</tr>
</tbody>
</table>

1Data for local funds for 1945-62 are derived from reports of local libraries submitted to the U.S. Office of Education in various nationwide surveys of public libraries, with the exception of data for 1946 which are estimated. Data for 1964-65 local expenditures are based on extrapolations from partial returns from the Office of Education's Survey of Public Library Facilities, 1963-64. Data for endowment and other private sources are estimated except for 1965.

2Includes outlay for land, site development, architects' fees, construction and initial equipment.

extrapolation of unpublished data from the U.S. Office of Education's Survey of Public Library Building Facilities, Fiscal 1963-64. In this survey, reports from local libraries to the U.S. Office of Education indicated that 38 percent of publicly owned public library buildings were more than forty years old. The largest percentage of buildings (48 percent) were built from 1925 to 1960 with only 14 percent having been constructed in the early 1960s.

This survey showed that in 1965, local public libraries occupied approximately 55 million square feet of space and further reported the need for an additional 40 million square feet at an estimated cost of approximately $1 billion. An extrapolation of this data revealed an overall need of $1.9 billion in capital outlay funds for an additional 68 million square feet of public library space from 1966 to 1975.

Shortly after the publication of the U.S. Office of Education's reports, which supported the continuation of LSCA Title II federal funds for public library construction, the library profession began to report statistics covering recently built public library buildings. Since
1968, the main source of information has been the architectural issue of *Library Journal* which is published annually in December.

While the *Library Journal* source does not give the total picture of what has occurred in recent history, it is certainly a statistically significant sampling of reliable data collected from local library administrators. Any article addressing future trends in the financing of public library buildings must review in detail what has happened in the past nineteen years that *Library Journal* has collected data.

There is much information to be gained from analyzing the overall expenditure of funds for public library construction as well as individual sources of funds. Table 2 gives a summary of total dollars expended for public library construction along with a breakdown by source of funds (state, federal, local, and private). This table was developed from numerous "six-year cost summary" sections of *Library Journal*'s construction statistics. It chronicles major trends in public library construction expenditures since 1968.

Figure 2 is essentially the same information as table 2, but the data have been put into line graph form to make items easier to visualize. By looking at these illustrations, it is quite easy to see that the amount of money going into public library construction has varied significantly
Financing Public Library Buildings

TABLE 2
PUBLIC LIBRARY CONSTRUCTION FUNDS BY SOURCE*
(In Millions of Dollars)

<table>
<thead>
<tr>
<th>FY</th>
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<th>Federal</th>
<th>Local</th>
<th>Private</th>
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<tr>
<td>86</td>
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<tr>
<td>Percentage:</td>
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<td>17.6</td>
<td>68.9</td>
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</tbody>
</table>

*As reported in six-year summaries of the architectural issue of Library Journal.
**A State Library Building was deleted from data in 1982.

over the years. What is more interesting is that with a few notable exceptions the overall percentage of participation by each source has remained relatively stable.

It is important to note from the outset that 90 percent of all capital development funds have come from the public sector, with the majority of funds (over two-thirds) coming from local public funds. On the average, state funds have accounted for less than 5 percent and private funds less than 10 percent of all sources of funds for construction. Federal funds have varied significantly over the years but on the average have accounted for less than 20 percent of all funds expended.

It is interesting to compare how these capital outlay percentages relate to percentages for all income for public libraries: “In terms of actual dollars, approximately 12% of public library support nationwide is from state sources, 79% from local sources and 9% from federal sources.
These figures have remained relatively stable throughout the 1970's, although there have been some state-by-state variations.5

The most significant discrepancy is in funding from the private sector. While private funds for capital outlay amounted to less than 10

Figure 2. Funds for Public Library Buildings by Source
percent, they do account for an important amount of funding for public library buildings when compared to the negligible amount of private sector funds for all public library activities. Overall, almost 80 percent of public library funds come from local public funds, but for this time period only 69 percent of capital outlay funds came from local public sources.

Further, it is interesting to note that the percentage of federal funds for capital outlay is approximately twice what it is for all public library purposes. It appears that with the advent of the LSCA Title II program as well as other federal capital outlay programs, the availability of federal funds has to some extent helped to reduce the amount of local participation necessary for capital outlay for public libraries.

While this is the case, it will also be demonstrated that these federal funding programs are responsible for the stimulation of large amounts of local, private, and state funds for capital outlay that might not have otherwise been available for the development of public library facilities in this country. In addition, there is evidence that state funds have also been responsible for the stimulation of local, public, and private funds for capital outlay.

State funds typically have been used less frequently for capital outlay than for ongoing operating expenditures in public libraries. The state funding percentage (4.6 percent) for capital outlay is between one-half and one-third the percentage of state funds used in all public library activities. While this has been the case in recent history, it will be shown in an upcoming section that this situation may be changing and that a new trend of higher levels of state funding for capital outlay for public libraries may be starting.

**FUNDING SOURCES**

**Federal Sources**

Federal funding by its very nature tends to be unstable from year to year for many programs, and public library construction is no exception. In the Library Journal statistics, this category has had the widest range (4 percent to 42 percent) of funding percentages over the years of any of the funding sources. There have been some very significant anomalies during certain years.

The figures for 1979 are the most unusual. This is the year that saw the greatest expenditures for public library construction of all time. Nearly $200 million was expended in total with an astounding $81.8
million (42 percent) coming from the federal government. This latter figure is particularly interesting because it is approximately four times the normal amount coming from this source. This unusual level of federal spending was the result of two federal funding initiatives. The first was the appropriation of $6 billion in federal funds from the Local Public Works Program of the Public Works Employment Act of 1976 and 1977 (P.L. 94-369 and 94-447 respectively). These funds, which had a ninety day start-up requirement, were administered through the Economic Development Administration (EDA) at the end of the Ford administration and into the beginning of the Carter administration. Of the $6 billion of public works funds, public library building projects received in excess of $133 million.6

For those communities which were prepared to begin construction immediately, this federal program was a bonanza which to date has not been repeated. The program required little or no local matching funds, and public libraries were reasonably successful in competing at the local level for these funds. This Local Public Works program coupled with the ongoing Federal General Revenue Sharing program provided a major stimulus for public library capital projects in the late 1970s. In addition to public works funds, congressional approval of an extension of the State and Local Fiscal Assistance Act (P.L. 94-488) provided an authorization of over $25 billion of federal revenue sharing funds during this time period.

Federal revenue sharing funds have always accounted for a substantial amount of federal funds going into public library construction, but unfortunately there is no source of consistently collected data to show the exact amount or percentage. Hoyt Galvin7 did report in 1976 that approximately 73 percent of all federal funds came from local general revenue sharing during that year.

This level of federal participation experienced in the 1970s may never be seen again. The data show that after this record level of expenditures, the federal percentage dropped consistently until 1985 when it recovered somewhat with the revitalization of LSCA Title II funds transferred from the federal FY 1983 Emergency Jobs Act (P.L. 98-8) appropriation of $50 million.

It should be noted that the federal expenditures recently reached a nineteen year low in 1983 and 1984, dipping as low as $4.5 million (approximately 4 percent of total expenditures). These years represented drastic reductions for federal capital improvement funds and threatened to return public library construction to a time where it languished for
Financing Public Library Buildings

close to fifty years between the end of Carnegie's philanthropy and the advent of the LSCA Title II program.

The importance of federal funding over the last twenty years should not be underestimated as is shown in the 1978 publication Public Library Construction 1965-1978: "A retrospective review of the impact of Federal assistance through LSCA Title II on public library construction notes the following accomplishments: 1917 library construction projects completed. $174,318,366 from Title II with $21,469,975 from other Federal sources stimulated the investment of $528,893,615 in State and local matching funds."8

Since this publication, the U.S. Office of Education in its 1986 Annual Report on LSCA Special Activities9 has updated these figures and indicates that 2850 public library buildings have been administered through the LSCA Title II program utilizing almost $265 million from federal sources. Of these funds, 72 percent were appropriated from LSCA, 29 percent came from the Emergency Jobs Act, and 9 percent were from the Appalachian Regional Development Act.

Much of the $50 million in federal Emergency Jobs Act funds is recorded in the 1985 and 1986 Library Journal statistics, and there will be more federal funds shown in upcoming years due to federal LSCA Title II appropriations of $25 million for FY 1985, $21,102,000 for FY 1986, and $22,050,000 for FY 1987 respectively. This resurrection of federal public library construction funding is most welcome since a review of the statistics in the 1986 Annual Report on LSCA Special Activities further demonstrates that federal funds usually stimulate more than twice the amount of state and local matching funds.

While federal funds through the LSCA Title II program, or from any federal program, have provided a significant share of public library construction funds over the years, perhaps the greatest impact of federal funding has been the stimulation of both state and local funds for capital development. There is ample evidence that in the early years of LSCA Title II, the federal funds stimulated much of the local matching funds which probably would not have otherwise been spent for public library buildings.

Further, there is evidence that many state construction programs were stimulated by either the demise of the LSCA Title II program in 1973 or by its resurrection in the early 1980s.10 The fact that the LSCA Title II program has been administered through the state library agencies contributes to this interrelationship between state and federal construction funding.
It is little wonder that state library administrators look annually toward Washington, D.C. with concern. The greatest problem that currently confronts federal funding for public library construction is the impact of the Balanced Budget Control Act of 1985 (P.L. 99-177), commonly known as the Gramm-Rudman-Hollings bill. Unless there is a turn-around, the potential impact of this continued budget cutting on the LSCA Title II program, along with the loss of the Federal Revenue Sharing program, will likely create a trend toward decreasing levels in funding for federal public library construction in the near future.

Over the years, there have been numerous federal agencies (EDA, ARC, HUD, DOD, etc.) which have contributed funds toward public library construction, but in recent years these sources have been drying up at an increasingly accelerated rate. The question is whether any other funding source can substitute for this decrease in federal funding.

The federal LSCA Title II program has been, and is, a tremendous capital development tool for public libraries, but as the past has shown, there is no guarantee that it will be in effect from year to year. It may well be that the only effective substitute for this program, or for federal funding in general, is the development of an ongoing state grant program for public library capital outlay.

State Sources

In order to determine if state sources for public library construction are capable of at least partially supplanting waning federal funds, a comparison of expenditures during the last few years is necessary. Table 3 shows the average number of dollars expended each year by source as well as the respective percentages of the total for the first nine years of Library Journal data compared to the last ten years. This division of the data does illuminate what appears to be a possible trend in the state sources category.

There appears to be little significant variation in the percentages of the various funding sources except for the state funds category. While this category is the smallest percentage in terms of overall funds for public library construction, it has doubled its percentage of participation from the first time period (3 percent) to the second (6 percent). State funds increased from $24.4 million in the early years to $76.4 million in the later years. This represents over a 200 percent increase for state funds. In looking at figure 2, it appears that the state funding line is on the increase over the long run, but the question remains whether this is a
Financing Public Library Buildings

TABLE 3

COMPARISON OF EARLY YEARS DATA TO LATER YEARS DATA
PUBLIC LIBRARY CONSTRUCTION EXPENDITURES
(Average Dollars Expended per Year in Millions and Percentages)

<table>
<thead>
<tr>
<th>Years</th>
<th>Total Funds</th>
<th>State Funds</th>
<th>Federal Funds</th>
<th>Local Funds</th>
<th>Private Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968 to</td>
<td>95.2</td>
<td>2.7</td>
<td>16.7</td>
<td>67.7</td>
<td>8.8</td>
</tr>
<tr>
<td>1976</td>
<td>100%</td>
<td>3%</td>
<td>17%</td>
<td>71%</td>
<td>9%</td>
</tr>
<tr>
<td>1977 to</td>
<td>131.6</td>
<td>7.6</td>
<td>23.1</td>
<td>88.3</td>
<td>12.5</td>
</tr>
<tr>
<td>1986</td>
<td>100%</td>
<td>6%</td>
<td>17.5%</td>
<td>67%</td>
<td>9.5%</td>
</tr>
</tbody>
</table>

Trend that will continue and whether it will turn out to be significant enough in the future to replace lost federal funds.

In surveying various state library agencies, it seems to be a safe assumption that this trend toward increased state funding for capital development is in fact not only going to continue but will even increase dramatically. Table 4 shows recently appropriated state funds which should begin to appear over the next few years in the Library Journal construction statistics as projects are completed.

It is interesting to note that the total of $94 million is approaching the overall amount of state funds ($101 million) reported for the last nineteen years of data collection in Library Journal. Since the state-funded building projects, as well as the state grant programs, are on different timetables for development, it is difficult to say when these new appropriations will appear in the Library Journal statistics. It is safe to say that a two- to four-year period will probably cover most of the projects recently funded with state funds. This means that it is likely that the statistics from 1988 to 1991 will show state funds in the range of $20 million to $30 million annually.

Table 2 shows that the annual allotment of funds from state sources has averaged approximately $5 million over the last nineteen years. State funding levels in the $20 to $30 million range would reflect a four fold to six fold increase over past years! This kind of significant increase in state funding levels certainly classifies as a substantial trend and one which should be watched carefully in the years to come.

Over the years, state capital outlay programs have fulfilled an important role acting as "seed" money for local fund raising similar to
the way that federal funds have stimulated both state and local construction funds. While most of the library profession believes that the federal LSCA Title II program was the genesis of state and federal funding for public library construction, few realize that two states—Maryland and Kentucky—made matching grants prior to the beginning of LSCA Title II.

Many states have had regular annual appropriations for capital outlay over the years, but recently new state construction programs have begun, due in some part to the resurgence of interest in public library construction stimulated by the recent though limited appropriations of the LSCA Title II program. States which have recently had new first-time appropriations for construction purposes are: New York, Illinois, Nevada, and Alabama. Further, both California and Massachusetts have campaigns in process which may culminate in substantial new state construction programs in future years.

Getting state programs started is the biggest hurdle, because after they have been funded for a few years, keeping them going is relatively easy if the need is present. Over the years, significant improvements in the program are likely to occur, and chances are good that the program will become very popular.
The advantages of state construction programs are many. Being closer to home than a federal program, they are easier to influence and administer. Because of their proximity to "local" politics, a state program is less likely to end abruptly in midstream. Everyone wants "a piece of the pie," which helps to keep the program afloat from year to year. All areas of the state benefit, and state construction programs return public tax dollars to local communities in a highly visible manner.

Local Sources

Regardless of the development of state and federal funding sources in recent years, the major source of funding for public library construction has always been local public revenues. Over the past nineteen years of Library Journal statistics, two-thirds of all funds expended for public library construction have consistently come from local public revenues. This mainstay of revenue has always been the most stable funding source for public library capital outlay.

Table 1, for example, shows that local public funds have the closest correlation to overall expenditures for capital outlay—i.e., when local funds go up, overall funds go up and vice versa. This fact is not surprising when one considers the strong desire for local control over public works projects in a community. It is safe to say that the funding source which is closest to home usually provides the most local control over the expenditure of the project funds.

Since local public funds account for such a high percentage of funding for public library buildings, it is important to consider the various financing methods utilized at the local level. It is not within the scope of the current article to make an in-depth review of all of the sources of local funding for public library construction, but some discussion of the major sources is in order.

Direct Tax Appropriations

When projects require relatively small amounts of local funds because of matching funds or simply because of the size of the building, communities are frequently able to handle the capital improvement project from the regular annual collection of tax revenues. Many library buildings have been built with direct one-time appropriations from local municipal operating budgets.

Occasionally a form of cash accrual is used. "This method of financing is accomplished by an annual assignment of a tax rate to the
taxpayers...."\textsuperscript{11} This approach allows for a specific amount of cash to be set aside each year for many years toward the day when enough has been accumulated to purchase a site and build a building. While workable today, this approach was more popular in the 1930s and 1940s when it was known as the "pay-as-you-go" method.

**Local Bond Issue**

The greatest number of projects which have funds from only one source are projects funded by local public bond issues. These projects usually tend to be the larger projects or part of a large bond issue which funds numerous smaller library buildings. While it is difficult to determine the exact percentage of local funds raised by public bond issues compared to those raised from direct operating revenues, the local public bond issue is one of the most common methods of raising sizable amounts of capital for library improvements. The problem is that there has never been a serious attempt by the library profession to analyze the percentage of funding coming from bond issues compared to the other local sources.

This is true for the years that the *Library Journal* statistics have been collected as well as back to the turn of the century: "It appears, however, from an analysis of such data as are available that the majority of libraries, excluding those financed by gifts, have been constructed from the proceeds of bond issues. No statistics are available to show the exact amount of construction by one method or another, so that the data upon which this conclusion is based results from the patching together of scattered bits of information."\textsuperscript{12}

A comprehensive retrospective search of library literature regarding the local bond issue turns up numerous accounts of individual success (and failure) stories, but as Guy Garrison, former director of the Library Research Center of the University of Illinois, notes:

> When planning such campaigns, librarians frequently depend on local experience on similar projects, on the advice of other librarians who have gone through such elections, either successfully or not, and on the meager amount of reliable information that is available to them in published accounts of library elections.

> The written material that exists is not only scattered widely but is largely reportorial in nature. The conclusions drawn, if any, are based more on opinions than on facts. There are too many libraries and too many kinds of local political situations to allow safe generalizations about library elections from articles of this type.\textsuperscript{13}

William S. Berner provides a similar lament in his 1969 survey of the literature regarding the planning of a library referendum campaign:
Financing Public Library Buildings

"Unfortunately it is difficult to determine how representative the experiences described in recent articles on library referendums may be. They represent only a few instances, and no systematic comparison has been made between successful and unsuccessful library referendum campaigns."\(^{14}\)

A careful reading of publications on this subject soon reveals that the most serious articles comparing the success and failure of referendums have been written by Guy Garrison. His studies of library elections in Illinois from 1953 to 1963,\(^ {15}\) and again from 1963 to 1968\(^ {16}\) are classics and provide invaluable insight into the results of library bond issues held for the purpose of construction during that time period.

The major finding in these two reports is that in the state of Illinois, from the years 1953 to 1968, the chances of getting a library bond issue approved were better than two to one. This percentage is certainly a testimony to how important libraries are perceived to be by the Illinois voter.

Recently, Herbert Goldhor, director of the Library Research Center of the University of Illinois, reported that over two-thirds of the library bond issues held in the state of Illinois from 1980 to 1985 were successful. This encouraging high rate of voter approval for library bond issues is further supported by data from his unpublished national survey of Public Library Referenda in 1985. Again, approximately two-thirds of all local bond issues held were successful in the states participating in the survey.

Not all research into library bond issues has shown such positive results. As reported by Albert C. Lake\(^ {17}\) in a speech given at an ALA preconference on library buildings in the early 1970s, an unpublished research study by Howard M. Rowe entitled "A Study of Public Library Bond Issue Campaigns in the State of California during the Period 1945-1962" showed that two-thirds of all library bond issues held in California during that time period failed. It seems that the reason that library bond issues are so speculative in California is the requirement of a two-thirds majority in order to pass a bond referendum in that state.

The variation in these different research studies demonstrates how unfortunate it is that there is no single agency which has collected and published the results of public library bond referendums nationally over the years. Considering the fact that so much funding for public library construction comes from local sources and so much of that from the local bond issue, there certainly is a need for this information to be collected, analyzed, and reported annually. The best way for this to be accomplished would be to build on a data collection process which is already in place.
Possibly during the process of collecting construction statistics through the state library agencies for Library Journal, additional information concerning library bond referendums could be collected along with more in-depth information about local funding sources for buildings in general. Further, there is the need for the development of a comprehensive compendium providing a detailed overview of the literature as well as an analysis of the major issues facing the local library board which is embarking on a bond referendum. Again, it is not within the scope of this article to provide this kind of in-depth understanding of the various factors which determine the success or failure of a bond referendum. Once again, the authors who have written most extensively about this issue are Guy Garrison, William Berner, and Ruth G. Lindahl.

Miscellaneous Methods of Funding

There are numerous additional methods of financing public library facilities in this country, but their legality tends to vary greatly from state to state. Illinois has made use of the mortgage approach by borrowing funds against the future collection of funds which works when a library system has taxing authority.

Some buildings have been financed by the use of revenue bonds, although this process is not popular because, unlike general obligation bonds utilized with public referendums, revenue bonds are not guaranteed by the taxing authority of cities or counties. Revenue bonds are usually retired by the income generated from the operation of the project for which they were sold. Along with generating criticism over the bypassing of a public referendum, the cost of financing for revenue bonds is higher than general obligation bonds.

Another approach is the lease-rental bond: "With this method, an 'authority' or nonprofit corporation is set up to issue bonds. In several states a public building authority has been established to provide funds through special bonding powers for the construction of buildings for public agencies. The authority retires the bonds by charging the agency rental over a specified number of years—enough to retire the bonds. In states in which this method of funding is legal, it is a means of dealing with restrictive debt limit legislation." A similar option is the lease-purchase financing arrangement. In this case, the library system contracts with the private sector, usually a developer or group of developers, and a building is built by the private firm often upon a site that the library already owns. The library makes
Financing Public Library Buildings

return payments over the years, and the "loan" is guaranteed by either the value of the land or, when legal, by tax revenues.

The legality of the lease-purchase approach has been questioned in many cases: "The lease-to-own arrangement may be specifically illegal in your state. In many places it isn't legal nor is it specifically illegal, so both parties, the board and the developer, may be willing to take the chance. Many legal authorities look with disfavor on local public bodies doing anything not specifically allowed by statute." It is difficult to identify projects utilizing this method of financing, thereby making it difficult for library management to duplicate methods used in other successful projects. Further, the ability to use this approach varies tremendously from state to state so that care must be taken to avoid legal as well as public relations problems. While it seems that the lease-purchase has enjoyed some resurgence of interest in recent years, it is a method which has been around for quite a number of years. With this in mind, it is difficult to say whether or not the seemingly renewed interest in this approach is really a trend.

Private Sources

While funds to build a facility through a lease-purchase arrangement may initially come from the private sector, they are ultimately paid back by the public tax base and so should not really be counted as funds from private sources. However, there are various methods which ultimately utilize funds from the private sector to construct public library buildings. These "private sector deals" may encompass several methods, but one of the most common is the use of fees.

In the states of Florida and California, "special use development fees" may be assessed on development property requiring the developer to contribute to the cost of acquiring land and installing public facilities. This approach recognizes the fiscal restraints of a municipality or county which is experiencing rapid growth and spreads the costs of development of public services to the private sector. Interest in the development fee method of financing peaked as a result of the tax limitation imposed by the passage of Proposition 13 in California. When employed it has been successful in shifting part of the burden of public service development from the property taxpayer to the private sector developer. While the use of the development fee appears to be on the increase, it remains to be seen if this is a significant trend in the financing of public library facilities.
While this method is obviously not popular with many developers, it does have substantial support in both the private and public sectors in those states where it is legal. 'Some land developers consider inclusion of a library an enhancement to their total development, or may consider their tax situation in either donating the site or requiring a lower price than for commercial purposes.' Further, many big city library systems with valuable downtown sites have been able to obtain substantial amounts of funding from private developers for the use of air rights. Most notable in the use of this approach are the recent developments in Los Angeles, California, and Tucson, Arizona.

Another "private sector deal" method used some years ago which is regaining popularity is the approach of the library administration constructing with public funds a larger building than currently needed and then renting prime commercial parts of the building to private concerns. With this method, the funds for the building of the extra space do ultimately come from the private sector through the payment of rent over the years.

This approach was outlined many years ago by Angus Snead MacDonald in his pamphlet, Morrow's Library, and discussed again in a Library Journal article:

20,000 square feet was leased to an international commercial organization. The rental paid, after deducting operating expenses and taxes on the rented area, will amortize the cost of the entire building within twenty years. Then the library will have the whole building free and clear for its own expansion or to increase its operating income. Meanwhile the ground floor... accommodates a busy regional branch on a valuable site that would have been inadequately improved with a one-story building.24

While important to consider, "private sector deals" are not the main source of funds from the private sector. Private philanthropy of the kind sponsored by Andrew Carnegie has always been the backbone of private sector financing for public library buildings. Were it not for the momentum built up by the gifts of Andrew Carnegie, it might have been many years before the development of public libraries took hold in this country.

Figure 3 is a graph showing the number of public library buildings erected by the Carnegie Corporation as well as the amount expended for public library buildings from 1897 to 1923.25 For a full listing of all communities receiving Carnegie Grants for public library buildings and the amounts of the grant see appendix B of Bobinski's Carnegie Libraries.26 During this time period, because of Andrew Carnegie, the
Financing Public Library Buildings

private sector provided its highest percentage of funding for public library buildings.

Figure 3. Library Appropriations Made by Andrew Carnegie 1897-1923

This dominance soon began to slip when the effects of Carnegie's private sector stimulation of public funding for public libraries began to take effect. In his 1930 article regarding the use of local bond issues for
financing library construction, Simeon E. Leland provided a listing of over 150 local bond issues for public library buildings from 1899 to 1927. Never again would the private sector regain its preeminence in public library construction, but it has had a long and welcome impact on the history of public library facility development in this country.

Calculating the percentage of private funds as part of the total funds available for public library construction in table 1 demonstrates this decline since the end of World War II. In 1945, private funds accounted for 16.7 percent of the total and then dropped for each year reported until 1965:

<table>
<thead>
<tr>
<th>Year</th>
<th>Private Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946</td>
<td>11.1%</td>
</tr>
<tr>
<td>1950</td>
<td>6.8%</td>
</tr>
<tr>
<td>1956</td>
<td>4.9%</td>
</tr>
<tr>
<td>1962</td>
<td>3.3%</td>
</tr>
<tr>
<td>1964</td>
<td>2.0%</td>
</tr>
<tr>
<td>1965</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

In recent years, there has been some recovery from the all-time low reported in 1965. In the last nineteen years since Library Journal began collecting statistics, funds from the private sector have averaged 9 percent. While this percentage has varied from a low of 3.5 percent in 1984 to a high of 14.5 percent in 1982, it does not any longer appear to be on the decline. Even though recent years' percentages are high (14 percent in 1985 and 13.5 percent in 1986 respectively), private sources do not appear to be significantly on the increase as can be seen by comparing the percentages for private funds from 1968 to 1976 to the time period from 1977 to 1986 in table 3.

While there have been many notable one-benefactor gifts for public library sites and buildings, overall there have not been a large number of well organized private fund-raising campaigns. This is not to say that this type of financing has not occurred, but it has not been at the forefront in recent years. A review of the statistics shows that a well-planned private funding-raising drive generated $11 million for the Dallas Central Library (close to half of all funds raised from the private sector as reported in 1982).

Further, as reported in 1978, the community of Allentown, Pennsylvania, raised $2.7 million for a public library building in a private fund-raising campaign that was termed an “amateur effort.” This campaign is well documented in the proceedings of the 1980 ALA conference program entitled “Financing and Promotion of Public Library Facilities.” Kathryn Stephanoff covers the major steps in a broad based campaign, but acknowledges that most successful private fund-raising campaigns secure 75 percent of the total from three or four major gifts.
Financing Public Library Buildings

There have been other major private fund-raising efforts which have raised substantial amounts of funds for public library construction: Gowrie, Iowa in 1985 ($2.5 million); Alsip, Illinois in 1982 ($2.2 million); Duluth, Minnesota in 1981 ($1 million); Canton, Ohio in 1980 ($1.5 million); Chappaqua, New York in 1979 ($2.2 million); Jai, New Mexico in 1979 ($1.2 million); and Dearborn, Michigan in 1970 ($4.2 million).

In many of these projects, as well as others which have received gift funds, it can easily be seen that these private sector funds have stimulated local public funds. The reverse has been true in many cases just as state and federal grants have frequently stimulated private giving toward public library capital projects. It is clear though that private funds for public library buildings have never been able to totally meet the need.

Private benefactorship is a cherished part of the development of public library buildings in this country, but not since the days of the Carnegie philanthropy has the private sector been the primary source of funding for public library construction. Further, it does not appear that this leadership role in the early 1900s will be regained in the foreseeable future. Because of the recent passage of the Tax Reform Act of 1986 (P.L. 99-514), with its negative effect on donations to nonprofit organizations, it appears that this source may, in fact, be somewhat diminished.

This change in the tax law is of concern to those anticipating not only private funds for the building project, but also gifts of land which in the past have been used as tax write-offs. Private funding is not a candidate to take the place of declining federal funding as some have asserted. Relatively few libraries in the past have been capable of mounting private fund-raising drives necessary to raise the substantial amount of funds needed to meet the continued growth in public library facility development.

EXPENDITURES BY CATEGORY

Construction, Equipment, Site, and Other

Along with where the funds have come from, the data also provide interesting information regarding expenditures of the funds. The average expenditures for all nineteen years of Library Journal construction statistics by category for new buildings are as follows: construction 76 percent, equipment 9.4 percent, site 6.4 percent, and other 8.4 percent. The range for construction was from 72 percent to 82 percent, while the
range for equipment was from 8 percent to 11 percent. The range for other costs was from 7 percent to 11.5 percent.

The average expenditures for each category have remained fairly stable over the years with one notable exception. The range for site costs was from 2 percent to 12 percent. Site costs were the single most volatile category. Further, there does seem to be a trend toward a lower percentage of the total project going into site costs. In the first nine years site costs averaged 8.4 percent of the total project, while during the last ten years the average has dropped to 4.3 percent. This may reflect the increased use of sites already owned by communities and/or a general decline in the quality of library sites.

There does seem to be somewhat of a trend away from centrally located prime commercial property for use by public libraries. This may be accounted for by rapidly rising real estate costs in the last decade, competition with commercial firms for good sites, and the difficulty in convincing local officials of the importance of a prime location for the public library. This trend is certainly not a good one for quality library service nationally and may have severe repercussions on the delivery of service to a community for future generations.

New Construction v. Additions/Renovations

In comparing the ratio of new construction projects v. addition/renovation projects, there are three factors to be considered: (1) the number of projects, (2) the amount of square footage, and (3) the amount of funds expended. In the early years of collecting the statistics (late 1960s through the early 1970s), new buildings were the clear leader with percentages in the 70 to 80 percent range for all three factors. This overwhelming dominance has gradually decreased until, for the first time since the statistics have been kept, the percentage for two of the three factors was greater for additions/renovations than for new buildings in 1985 and 1986. This trend is most noticeable when looking at the number of projects in each category.

This reversal has shown up for three years in a row in this factor, and if it continues, it may demonstrate a significant shift in emphasis for upcoming projects. Further, it may actually signal a maturing of the program for building public libraries in this country or it may simply be demonstrating that the increasingly high cost of construction tends to push communities into enlarging existing structures rather than building completely new facilities.
Financing Public Library Buildings

While new library buildings continue to be designed and constructed, financial realities appear to be forcing a larger number of libraries to defer or abandon the quest for an entirely new facility. Instead, many are adding to their existing structures and, among public libraries, a growing number are considering or actively involved in the conversion to library use of a variety of structures originally designed and used for other purposes.  

This direction in the data, which started in the mid-1980s, will have to continue for several more years before it can be considered to be a definite trend.

The Number of Projects Built Each Year

It appears that on the whole, the number of projects being built each year (including new and addition/renovation projects) is on the decline. By looking at table 5, one can see that there is a high variation in the number of projects built each year, ranging from a low of just under 100 projects in 1983 to a high of almost 300 projects in 1969. The average for all nineteen years of statistics falls at the mid-point of approximately 200 buildings per year. The average number of projects in the first nine years was 229 buildings each year, but for the last ten years the average is only 182 buildings each year.

The Amount of Square Footage Added

Table 5 also shows that the average number of square feet added each year is 2.5 million. This category also appears to be showing some decline. For the first nine years of data collection, the average number of square feet built was 2.8 million while the last ten years has only averaged 2.2 million square feet. Further, there was an alarming decline in 1983 and 1984 to a level of 1.2 and 1.3 million square feet per year respectively. It is interesting to note that this steep decline in the square footage built coincided with the two lowest years of federal funding.

Average Cost & Average Square Footage Per Building

As expected, the average cost of a building project has been on the increase since the data were first collected. In the late 1960s the average cost per project was approximately $350,000. In the early 1980s this figure increased to approximately $830,000.
TABLE 5
MISCELLANEOUS STATISTICAL INFORMATION*

<table>
<thead>
<tr>
<th>FY</th>
<th>No. Built</th>
<th>Total Funds</th>
<th>Ave. Funds/ Bldg.</th>
<th>Ave. Funds/ SF*</th>
<th>Ave. SF/ Bldg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>259</td>
<td>91 M</td>
<td>$351,000</td>
<td>3.4 M</td>
<td>N/A</td>
</tr>
<tr>
<td>1969</td>
<td>298</td>
<td>107 M</td>
<td>$359,000</td>
<td>4.0 M</td>
<td>$29.77</td>
</tr>
<tr>
<td>1970</td>
<td>276</td>
<td>98 M</td>
<td>$355,000</td>
<td>3.2 M</td>
<td>$31.78</td>
</tr>
<tr>
<td>1971</td>
<td>208</td>
<td>76 M</td>
<td>$365,000</td>
<td>2.5 M</td>
<td>$32.08</td>
</tr>
<tr>
<td>1972</td>
<td>191</td>
<td>95 M</td>
<td>$497,000</td>
<td>2.7 M</td>
<td>$38.27</td>
</tr>
<tr>
<td>1973</td>
<td>143</td>
<td>101 M</td>
<td>$706,000</td>
<td>2.6 M</td>
<td>$37.36</td>
</tr>
<tr>
<td>1974</td>
<td>195</td>
<td>83 M</td>
<td>$426,000</td>
<td>2.2 M</td>
<td>$41.74</td>
</tr>
<tr>
<td>1975</td>
<td>212</td>
<td>81 M</td>
<td>$382,000</td>
<td>2.1 M</td>
<td>$43.14</td>
</tr>
<tr>
<td>1976</td>
<td>277</td>
<td>125 M</td>
<td>$451,000</td>
<td>2.8 M</td>
<td>$48.27</td>
</tr>
<tr>
<td>1977</td>
<td>211</td>
<td>132 M</td>
<td>$625,000</td>
<td>2.7 M</td>
<td>$54.55</td>
</tr>
<tr>
<td>1978</td>
<td>218</td>
<td>91 M</td>
<td>$417,000</td>
<td>2.0 M</td>
<td>$54.73</td>
</tr>
<tr>
<td>1979</td>
<td>280</td>
<td>194 M</td>
<td>$692,000</td>
<td>3.8 M</td>
<td>$41.78***</td>
</tr>
<tr>
<td>1980</td>
<td>166</td>
<td>120 M</td>
<td>$723,000</td>
<td>2.2 M</td>
<td>$61.67</td>
</tr>
<tr>
<td>1981</td>
<td>158</td>
<td>140 M</td>
<td>$886,000</td>
<td>2.1 M</td>
<td>$75.81</td>
</tr>
<tr>
<td>1982</td>
<td>168</td>
<td>157 M</td>
<td>$934,000</td>
<td>2.5 M</td>
<td>$68.93</td>
</tr>
<tr>
<td>1983</td>
<td>96</td>
<td>82 M</td>
<td>$854,000</td>
<td>1.2 M</td>
<td>$76.57</td>
</tr>
<tr>
<td>1984</td>
<td>111</td>
<td>110 M</td>
<td>$991,000</td>
<td>1.3 M</td>
<td>$98.52****</td>
</tr>
<tr>
<td>1985</td>
<td>224</td>
<td>140 M</td>
<td>$625,000</td>
<td>2.1 M</td>
<td>$82.76</td>
</tr>
<tr>
<td>1986</td>
<td>187</td>
<td>150 M</td>
<td>$802,000</td>
<td>2.2 M</td>
<td>$86.48</td>
</tr>
<tr>
<td>Total:</td>
<td>3878</td>
<td>2173 M</td>
<td>---</td>
<td>47.6 M</td>
<td>---</td>
</tr>
<tr>
<td>Average:</td>
<td>204</td>
<td>114 M</td>
<td>$550,000</td>
<td>2.5 M</td>
<td>---</td>
</tr>
</tbody>
</table>

*Compiled and calculated from the architectural issues of Library Journal.
**Calculated on data for new buildings only.
***This figure may be in error because of a change in the method of data collection.
****This figure is the result of one very large facility costing $129/ SF.

It is tempting to conclude that, due to the decline in the number of projects, the trend is toward building fewer but larger buildings. However, the last column of table 5 shows that the average size of a project (12,963 square feet) has not been on the increase over the last nineteen years. This means that the increase in the average cost per building is due primarily to the increase in the cost of construction over the last two decades.

The Average Cost Per Square Foot

The average cost per square foot of new public library buildings has been on a steady increase since the late 1960s. The available figures start out at just under $30 per square foot in 1969 and rise continually, with only a few exceptions, through the 1986 figure of $86.48 per square

LIBRARY TRENDS
Financing Public Library Buildings

This increase reflects a strongly inflationary period, with the average annual increase due to inflation being approximately 6.5 percent per year. This trend obviously diminishes the buying power of each dollar expended for public library buildings.

Figure 4 shows in graphic form the total amount of funds reported for public library construction from 1969 through 1986 compared to those amounts adjusted for inflation. It is clear that funds available for public library construction have varied tremendously from year to year but have generally been on the increase since 1968. Unfortunately, when these figures are adjusted for inflation using the changes in the average cost per square foot for public library construction, the actual buying power of the dollars available has significantly decreased over time. It is interesting to note that there is a very high degree of correlation between these adjusted public library construction cost figures and figures adjusted for inflation using the Consumer Price Index (CPI).

For public library buildings, the effective buying power of $150 million in 1986 is only $50 million in 1969 dollars. This is certainly a sobering trend in public library construction funding that must be recognized if there is to be a turnaround. If this trend is not reversed, the effective buying power of funds available for public library capital development will eventually dwindle to a negligible amount. While the inflation rate of the last few years appears to be slowing, there must be a significant increase in funds available for public library construction if there is to be a recovery to previous funding levels. It is difficult to see where this increase will come from, but it may of necessity come from increased stimulation from either state or federal sources.

From the 1979 data, it is obvious what a major influx of federal funds can do for expenditures. Unfortunately, this kind of increase in federal funding does not appear likely in the near term unless there are major changes in scheduled federal appropriations of capital outlays of funds for public libraries. The development of funding programs at the state level may be even more crucial than first thought if the continued decline is to be stopped.

This trend of decreased effective buying power for public library construction is even more alarming in light of the latest comprehensive attempt at determining the national need for new public library space. Table 6 shows the results of a 1980 survey of public libraries distributed to state library agencies. It shows that there was a need for over 2900 public library building projects costing in excess of $2.3 billion over the five-year period from 1981 to 1985.
This survey was performed in an attempt to determine the extent of need for Title III of the proposed National Library and Information Services Act sponsored by Senator Jacob Javits. This bill would have established appropriations of $150 million per year for public library construction. This bill did not become law, but as previously reported library construction funding was reestablished through the LSCA Title II program in 1983 with the advent of the “Jobs Bill” and subsequent appropriations for Title II itself in 1985 and 1986.
## Financing Public Library Buildings

### TABLE 6
**Public Library Construction Needs, 1981-85**

<table>
<thead>
<tr>
<th>State</th>
<th>Number of projects</th>
<th>Five-year Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>50</td>
<td>$38,203,243</td>
</tr>
<tr>
<td>Alaska</td>
<td>58</td>
<td>43,783,240</td>
</tr>
<tr>
<td>Arizona</td>
<td>54</td>
<td>54,084,803</td>
</tr>
<tr>
<td>Arkansas</td>
<td>72</td>
<td>21,037,880</td>
</tr>
<tr>
<td>California</td>
<td>231</td>
<td>324,511,319</td>
</tr>
<tr>
<td>Colorado</td>
<td>83</td>
<td>67,255,965</td>
</tr>
<tr>
<td>Connecticut</td>
<td>41</td>
<td>46,675,362</td>
</tr>
<tr>
<td>Delaware</td>
<td>17</td>
<td>7,178,190</td>
</tr>
<tr>
<td>D.C.</td>
<td>5</td>
<td>875,000</td>
</tr>
<tr>
<td>Florida</td>
<td>74</td>
<td>105,504,459</td>
</tr>
<tr>
<td>Georgia</td>
<td>120</td>
<td>93,739,918</td>
</tr>
<tr>
<td>Hawaii</td>
<td>5</td>
<td>22,800,000</td>
</tr>
<tr>
<td>Idaho</td>
<td>28</td>
<td>11,417,619</td>
</tr>
<tr>
<td>Illinois</td>
<td>220</td>
<td>169,240,584</td>
</tr>
<tr>
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FALL 1987 449
It is quite clear that capital development funds have never kept up with the space needs for public libraries regardless of the use of multiple sources. With the decline in federal funds, the decrease in incentives for private gifts, and the continuing increases in the cost of construction, it is inevitable that the burden of public library capital development funding will fall more heavily on the shoulders of state and local governments.

SUMMARY

Trends, Interrelationships, and Conclusions

There is little comprehensive public library building data for the period from the 1800s through the mid-1900s. The Office of Education's studies in the mid-sixties which were done to support the proposed LSCA legislation provide some useful information for the early years. The main source of information from the late 1960s, after the advent of federal funding, is the architectural issues of Library Journal which has chronicled the trends in public library construction to the present time.

The most important federal funding for public library construction began with the advent of the LSCA Title II program in the late sixties. Not only did this act contribute a significant amount of federal funding over the years, it has also been responsible for stimulating large amounts of both state and local funds for public library capital outlay purposes. On the average, federal funds have contributed 17.6 percent of all funds expended for public library construction, but in recent years
Financing Public Library Buildings

Federal funding has hit an all time low (4 percent in 1983). This decline, along with the demise of other federal capital outlay programs such as the General Revenue Sharing program and the negative effect of the Gramm-Rudman-Hollings bill, means that the future of federal funding is risky at best. It may possibly be that the real legacy of federal funding for public library construction is to have established strong ongoing state programs.

While state capital outlay for public library construction has historically been the lowest average percentage (4.6 percent) of the four sources, it appears to be on the increase. If this trend continues, it is possible that state funding may, at least in some part, pick up the slack created by the decline in federal funding. Because of recent state appropriations for public library capital outlay, there should be significant new levels of state funds reported in the near term. Like federal funds, state funding has stimulated local funds for increased construction dollars.

Over the last nineteen years, local funding has been the most stable mainstay of all funds for public library construction. Local funds on the average have accounted for 68.9 percent of all funds. While much of this funding comes from local operating budgets provided by direct tax appropriations, the most common source of large amounts of funds is from the bond referendum. Considering the significance of this particular funding source, it is unfortunate that the profession has not developed a more systematic method of collecting and analyzing data from local library bond issues.

Funding from the private sector has never regained the preeminence it experienced during the Carnegie years. In the last nineteen years, funds from the private sector have remained fairly stable, averaging 9 percent, but with the enactment of the Tax Reform Act of 1986 it is possible that this source may start to taper off. It does not appear to be the answer to possible future reductions in federal expenditures as some may have theorized. While the impact of the new tax reform act is an unknown, concern is high that the effect will be negative for donations of either dollars or land to public library capital improvement campaigns. Lease-back and other types of private sector deals appear to be on the increase, but it remains to be seen if this is a significant trend in library financing. The private sector does appear to stimulate local public funds as often as the reverse is true.

The average expenditures by category have remained stable over the last nineteen years with the notable exception of site costs which are on the decline. This drop reflects greater use of already owned sites and/or
signals the utilization of lower quality sites in recent years which will have a negative effect on the delivery of library service nationally. Further, there seems to be a trend toward renovating and expanding existing structures over constructing entirely new public library buildings. The number of projects built each year is on the decline as is the amount of square footage built each year. The average cost of a building is up considerably, but the average size of a building has remained fairly stable at approximately 13,000 square feet. The average cost per square foot has increased dramatically due to a 10 percent per year inflation rate for public library construction. Because of this increase in costs, the actual buying power of the dollars available has significantly decreased over the last nineteen years. It will take increased stimulation from either state or federal sources to turn this trend around. If needed new public library space is to be built, it is likely that the burden will fall most heavily on state and local governments.

References

Financing Public Library Buildings

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The Library Building Tomorrow

RICHARD L. WATERS

The World We Will (May?) Live In

The typical American family will be gone by the year 2000. The traditional family—married couple with children—will constitute but 25 percent of the family types by that time. The average household will be 2.5 persons then, down from 2.7 people today. The fastest-growing household type is expected to be nonfamilies, defined as a person living alone or persons living together without being married.¹

Forty-five million jobs will be impacted by home and office automation by the year 2000. There will be but one worker for every two retirees. Machines will shove aside bank tellers, assembly-line workers, lumberjacks.²

Knowledge information processing systems (KIPS) which rely on the merger of new software and hardware will duplicate expert thought processes that lead to correct answers by weighing all the alternatives to a problem. This form of artificial intelligence is a national priority of the Japanese, with a goal of developing and marketing on a major scale these systems by the late 1990s.³

There will be thousands, perhaps millions, of persons without work, or at least without work in the industries that they have known for generations. Automation and foreign competition may have permanently displaced this country’s steelworkers, lumberjacks, farmers, and


FALL 1987 455
automakers. The trauma that we will face as a society will be significant as we strive to work creatively and in a human manner with these persons, persons who by-and-large only want the opportunity to work and produce for themselves and their families (if they are among that 25 percent).

There will be a host of technological changes. Ken Dowlin, writing about the future in Public Library Quarterly, ventures eight educated guesses. 4

1. General purpose, interactive visual communications systems will be in place in most homes in this country by the year 2020 and will be a major competitor to the postal service.
2. The terminal will replace the telephone book.
3. Entertainment technology will continue to set the pace or level of the technology in the home.
4. Reference books will fade from the scene.
5. Most bookstores will stock only the bestsellers.
6. Homes will have computer printers that will allow you to retrieve information in print form without leaving home.
7. A form of electronic book will be commonplace. It will be portable, inexpensive, reloadable, and store large amounts of data. Libraries may transfer content to these electronic books over telecommunications lines instead of checking out books.
8. Libraries that do not use information technology to meet the needs of their user population will be relegated to the backwaters of their community.

The Role of Government

Government at all levels—federal, state, local—is struggling to come to terms with a difficult condition: the demand for an ever greater level of services in a time of declining revenues and resources available to the public sector for providing those services. Public officials who regard this condition as temporary are unaware of how strong is the public constituency for lower taxes. This irresistible force meeting this immovable object will have the eventual effect of redefining the very role of government. More today, and increasingly in the future, government will come to see its charge as not the provision of services, but as seeing that services are provided. It must be pointed out, however, that there are a good number of taxpayers who recognize the importance of libraries and are willing to pay for their continuation. As this article is being written, voters in the Atlanta suburban counties of DeKalb and
Cobb overwhelmingly approved bond issues for more library facilities. Central Arkansas voters (in and around Little Rock) passed a millage issue for that library system as did voters in the Eastern Oklahoma Library District and in all of the major tax district libraries in Colorado. On a nonlibrary issue, the voters in California firmly voted down Proposition 61, an idea which would have put a cap on the salaries of publicly funded officials—both elected and appointed—throughout the state.

This redefinition will likely take many forms: privatization, user fees, the selling or granting of public assets and franchises (often to the public employees now doing the work), closer cooperation with the private sector, and reduced regulation. A smaller government sector means a smaller government, fewer public employees, and lower taxes. It will also mean that those remaining government services will have to be managed more like private-sector, profit-making businesses.

A difficulty with publicly provided services is that they are free, their cost in taxes too indirect to influence behavior. When a resource is given away, it is overused and abused. The free market mechanism called price, is the more efficient allocator and distributor of resources. This includes even the basic economic and social resources needed to enhance the general welfare—water, power, transport, waste disposal, police, etc. In truth, when “everyone” owns a resource through public agencies, no one owns it, and it becomes either neglected or abused. Without a profit motive, the public sector can become inefficient, uncompetitive, open to favoritism, and inviting politicization.

Our highly complex, rapidly changing, technologized society must be tempered by “human” concerns that require fewer and simpler laws and regulations, not more, for the response to change should be adaptation, not denial. This will require more flexibility of us all. A new relationship between the public and private sectors is emerging. It will be a compromise between the complete separation of the nineteenth century and the pronounced intervention of the twentieth. Again, the role of the government will shift from one of providing services to one of seeing that needed and desired services are being provided.

Privatization, or the provision of services by private industry usually provided by government, is the most promising and fastest growing method of this redefinition of government. Many city and county governments find it is often cheaper and more efficient to contract out their responsibilities. And it is always more rational—it certainly makes more sense, for example, for a public court system to encourage litigants
to settle their disputes through alternative means (mediation, arbitration, rent-a-judge) than to overwhelm its own capacity. This development also promotes business and private sector employment.

It is at the local level that privatization has made the most progress in this country. There is not a single city service that is not being contracted out to a private firm somewhere, from traffic and crime control to landscaping, dogcatching, and firefighting, from the management of public works, cemeteries, parks, museums, tennis courts, swimming pools, and cultural centers, to even the actual administration of cities themselves.

The function of government in the future will be built around the belief that less is more. The current challenge for government is how to get from here to there. A major reeducation and reorientation in thinking is required on both the part of the public sector and on that of the private sector.

Will There be a Future for the Library?

Any look into the future of the library—academic, public, school, special—should first look backward a few years to see if the library is still in place. There has been much written the past several years about the demise of the library, especially the public library. The prophets of demise have already relegated the library as we have and do know it to the architectural scrap heap of society. At best the library will be a repository for seldom needed books and other “artifacts” of the last 200 or so years. Computers, databases, electronic publishing, etc. will singlehandedly or in concert serve to displace the library as a meaningful element of our society. Perhaps—but I doubt it.

Last fall F. Wilfrid Lancaster, the “paperless society” prophet, revised his prophecy. Ten years previous he forecast the replacement of print on paper by electronic publication. Since that forecast has not materialized (goodness, there is more paper now than ever and more print publishing than ever before), the prophet took stock of changes of the past ten years. Lancaster believes that his original forecast is on target, although he qualifies it now by stating that: “The replacement of print on paper is not inevitable.” Society could, he writes, “choose to reject the transition.” That means you and I and millions of other human beings could determine its own destiny.

Another gloomy library forecast, especially for the public library, was penned by Carlton Rochell. He suggests that the office-in-the-home theory will be commonplace by 2001—working, shopping, reading the
mail (electronic of course), viewing a movie—in short, almost any need met without ever setting foot outside the house. This development, certainly possible today from a technological point of view, will result in Lancaster's paperless society since print publishing will experience ever rising prices, resulting in fewer and fewer print produced journals, to be replaced by databases full of journals, with those remaining journals priced strictly according to the marketplace. Since there will be no need to house journals, then there may be no need for libraries—or at least library buildings. Rochell thinks that academic libraries may gain something from this development, but the poor public library will likely fade from the picture. Why? Because the principal office-in-the-home "owner" will be middle-class and a staple of the public library. Without a need to go to the library for information, this class of society will perceive no need to support the library, and without middle-class support, the public library may cease to exist—at least that is the conclusion one can draw from this peek into the future.

Allen Veaner speaks of "disturbing changes" that are developing much faster than anyone would have predicted. The online public catalog, electronic publishing, distributed processing, and the aggressive energy of the private sector into service areas heretofore the domain of the library, are the principal changes that Veaner believes will change the role of librarians if not libraries. Certainly the librarian's role is different than it was five or ten years ago—it will no doubt be much different in another five to ten years. A need for less library building space is envisioned by Irene Hoadley, director of libraries at Texas A&M University. Hoadley believes that the increased transfer of information into nonprint formats, especially commercial databases, will result in use becoming more distributed and decentralized, and therefore "there will be less need for users to come to a physical facility." Librarians are people—real, live, human beings. So are the patrons (or, if you prefer, customers/clients/users/etc.). It is the human factor—the people who make up our society—that libraries are about. The human factor is the real future of libraries, librarians, librarianship.

People Serving People

While the future of libraries will be characterized by the continuing infusion of technology into all aspects of librarianship, there is a paradox: librarianship is made more important by technology and not less so. After all, the purpose of technology is to reduce or eliminate
unwanted, unnecessary human contact for the very purpose of increasing the efficacy of the wanted and necessary human contact.

Since libraries are, in essence, people serving people, not just institutions serving people or other institutions, libraries and librarians should be in close touch with what is happening among the people they employ and the people they serve in society. And what is happening is change in demographics, in life-styles, in work styles, in values and attitudes, in motivations, and incentives.

We have become postindustrial societies and economies—working in information, communication, or “knowledge” industries in services, or working in the professional, technical, or managerial fields. What most characterizes a postindustrial society are diversity and choice. And people are availing themselves of those diverse choices in the way they work, live, play, and shop.

Demographics

In postindustrial societies, employment opportunities for women are much greater, and values, attitudes, and life-style preferences more oriented to the individual. As a result, there is more cohabitation, later marriages, fewer children, and smaller families.

Among the consequences of falling fertility are rising average and median ages and, therefore, an aging population and work force. We are becoming middle-aged societies and will remain so—75 percent of consumers and workers in the year 2000 are already in the marketplace and the work place. A middle-aged society is politically, socially, economically, and culturally dominated by a middle-aged population; but we are redefining what middle age means. Increasingly, because of two-income households, working women, higher disposable income, and the “youth” of the 1960s and the 1970s becoming the “mainstream” of adult society in the 1980s and the 1990s, our perception of middle age will move away from “settled, comfortable, and conformist” to “adventurous and diverse.”

Life-Style/Work Style

The patterns of modern life are changing. Traditional distinctions are blurring between:

—what we define as work, leisure, or learning activities;
—what we consider the proper male or female role;
The Library Building Tomorrow

—what we view as buying, maintenance, or investment expenditures; and
—what we regard as legitimate management or staff responsibilities.

Project, for example, an image for the year 2000 that is common today but will be more so in the future—someone sitting in front of a computer or video screen. Where are they? They may be at home but working on their firm’s latest project. Or they may be at work but playing the latest video game. They may be at the library, a school, a factory, in a bedroom, at an office, in a hotel room.

What age or sex are they? The person may be a young boy taking a tutorial (again, in a classroom, at a library, or home), an older woman checking the status of her financial portfolio, a middle-age man in some store checking a price list, or a repair woman consulting an expert system before starting a job.

Technology does not cause such distinctions to blur but does accelerate the process. As can be seen, however imbedded technology becomes in our lives, it is still just a tool meant to enhance the capabilities and possibilities of humans.

Libraries’ response to these changes will determine their level of success as providers of information and services and as employers. There is great opportunity in these changes. With good planning, sharp marketing, accurate costing (and pricing too in some instances), and the correct mix of people and technology, libraries will become indispensable as informational intermediaries—both needed and wanted—to fit the various life-styles and work styles of the future.

Values and Attitudes

How best to characterize postindustrial values and attitudes? They are inner-directed—that is, not so influenced by society’s traditional standards but by one’s own inner standards (or ideally, some combination of both); and post-materialistic, not that material things are any less desirable, but that they are not enough by themselves without, for example, work that is meaningful and fulfilling, or committed human relationships.
The Future Information Marketplace

What does this mean for libraries in the future? It means that the marketplace for information and related services will be characterized by:

1. market segmentation along nontraditional division; households, life-styles, ethnicity, per capita income, technological competency, values, and attitudes;
2. well-informed citizens who want, presented with their options and choices, to make their own decisions. Not loyal to any one institution. Willing to be educated (as to the benefit of new services, for example) but not willing to be tolerated or dictated to. A demand for quality, convenience, direct and honest services;
3. diversity; more women, more ethnics, more seniors, and more affluents.

Successful library service in the past was based, to a degree, on convenience. Successful library service in the future will also be based on convenience—to a much larger degree. However, the definition of convenience has changed. Geographic location and wide distribution are no longer sufficient. Convenience is now also measured in speed, accessibility, acceptability (as in life-style compatibility), and high quality, flexible service.

Survivors and Thrivers

Which types of informational institutions will survive and which will thrive in this environment? Many, for there are many market niches to be filled—large, small, regionally based, nationally based, product based, and locally based.

The key will not be the size or even the location but the innovation in providing particular services geared to specific markets. These will be offered via a broad range of delivery systems with many available twenty-four hours a day.

Effect on Staff and Management

What does this mean for the employer-employee relationship? Just as citizens are fragmenting into new and ever finer segments, so too are staff. Therefore, the personnel practices, policies, and relations of libraries must become as individualized as the services.
The role of management is changing from that of authorization to one of collaboration. Workers are coming to be viewed as human capital and as vital a resource as any technology and perhaps as the single most important component in any "business" strategy.

Managers must finally move their long-neglected people to center stage. Generous investment in basic training and constant skill upgrading are becoming "musts," not options. The old organization was deeply hierarchical. The new organization is much flatter and composed of smaller units dominated by line operations. People with diverse skills, not specialists, are needed.

As for the new work force itself, it is true that security is not the motivator it was in the past, nor is money the incentive it was in the past, nor is fear of dismissal the threat it was in the past. But the work ethic is not dead—people will give great effort to an organization they believe in, or in which they "belong" (share a common bond with coworkers). The workplace of the future, therefore, is likely to be characterized by flexible schedules, decentralization of authority, cafeteria-style benefits, "corporate culture," recognition of merit, and a spirit of equality.

The Importance of Education and Training

In the future, libraries will have to take greater care to ensure the hiring and development of the type of personnel that will succeed in the new environment. For too many years in the past, library service was a wait and serve operation. But the personality traits of individuals successful in a wait and serve environment are significantly different from the traits required in a more aggressive and competitive environment.

Informational services are of the "third wave," knowledge-intensive, human-resource based, dependent upon information, communication, and technology. An upgrading of employee skill is essential.

Knowledge is the new strategic resource. Libraries will need to commit to the constant education, training, retraining, and learning of their work force. The future requires a staff more highly skilled, motivated, flexible, technologically competent, and with greater depth of knowledge of the services offered by the institution. To attract and keep such staff requires incentives, suitable reward, and an invigorating work environment.
The Challenge

Today, the challenge to librarians and libraries is one of change, complexity, and choice. That change is now constant and fundamental—markets, workers, technologies, vendors, and citizens are all subject to upheaval. The interaction of these various economic, social, and political forces ensures that complexity is now a permanent condition as well.

But the future will not just happen to librarians and libraries. Through choices of what one does, where one wants to go, what one wants to become, and what markets one wants to serve, librarians and libraries can help to shape and create their own futures.

Librarians and libraries must be aware of how external environments are changing around them and develop the ability to perceive the opportunities in change (as well as the threats). Besides the willingness to change, they also need the insight to strengthen what deserves to be retained. No one can predict precisely what will happen in the future; but librarians and libraries can endeavor to become responsive to change, not merely reactive.

What About the Public Library?

Don Sager, now at Milwaukee Public Library, prepared a research report for OCLC a few years back. He concluded his report as follows:

The facts still indicate that the institution continues to grow and effectively serve the needs of its community. While it is difficult to easily measure the real cost and total impact of the public library upon American society, there can be little doubt that any institution that experiences over 8.5 million user visits a week, loans nearly a billion items each year, and has a total aggregate income of more than $1.6 billion has achieved some stature and utility.

As impressive as those numbers are, and Sager’s optimism notwithstanding, it is important to think about the future of the public library. In preparing this article, three viewpoints attracted me. Lowell Martin, in delivering the 1982 Bowker Memorial Lecture, envisions two possible roles for the public library. One role is the new concept of information center, the second role of the older, more traditional concept of cultural-educational-recreational resource center. Martin doubts that the public library will be “the” information center. Rather, libraries and “librarians must shift from the prevailing stance of acquire, open the door, and wait, and move to a policy of dissemination.”
Another view was put forward by the late J. Roby Kidd, University of Toronto. Kidd's crystal ball produced three options for libraries over the next several years. The first, and most familiar, results in the library being primarily a collection, housing all of the materials for learning—books, software and other media, including electronic media. The library would become an "emporium for the software of learning, and as such should be an exceedingly valuable resource for the community." Kidd's second option produces a public library that not only collects and maintains resources, but an institution that provides learning processes for many kinds of learning—self-directed and distance principally (see pages 535-37 of his article for definitions). Additional resources (read money) will be needed if this option is to be exercised. The final option involves choice and partial services. This option takes the position that a library will not have the resources to do everything and that it might have to specialize in the clientele to be served or the character of service that it would offer. Geography, or a "family" of knowledge and skills could all be examples of choice that the library will make.12

The third point of view regarding the future of the public library comes from Marilyn Gel1 Mason. She makes nine forecasts, stating that they "are not exhaustive in scope but are limited to the kinds of change we can expect if technological trends, economic constraints, and political conditions continue as some variation of the present without a major break or cataclysmic change." Here are four of Mason's forecasts which I believe have relevance to the library building of the future: (1) within ten years over half of the service provided to library users will be to individuals who never come into the library; (2) public libraries will develop an information infrastructure to provide access to a growing and changing flow of information; (3) this infrastructure will include more, smaller library branches; and (4) book circulation will continue to be an important part of library services.13

The views of Martin, Kidd, and Mason reflect, in my judgment, a positive future for the library, especially the public library. Contrary to Rochell and others who predict the end of public libraries, I will take bets that if any library type ceases to exist it will be the academic library, which will have been preceded in extinction by the school library. The major problems that this country faces in relation to the taxpayer wanting a better return on investment is with education and their libraries—not the public library.
Technology

Technology has, is, and will continue to affect how libraries and librarians go about their business. Technology will therefore, of course, affect our future library buildings. They must be designed for change, for the accommodation of all sorts of electronic gear, and for the human ease of using the technology. Let me repeat that—the human ease of using the technology. The library of the future will continue to be used by real people, people who will come to the library because it is there that they will find other people, information, excitement, things familiar, and things new. A futurist I am not—a believer in the library I am. There will be libraries in our future—thousands of them—scattered across the landscape as we have known them for the past seventy-five years or so. They will not look a great deal different than the more “modern” buildings of today, at least not from the outside. Within, the changes will not be very dramatic because they will evolve slowly as we adapt to the changes around us.

Technology, especially the hardware that makes much of it available for use, must be maintained at considerable annual expense—and then replaced every few years so that it, the hardware, will not be cast aside by the manufacturer and therefore unable to be repaired as well. System upgrading costs must also be met. These real problems make the challenge of building for tomorrow more taxing (no pun intended)—and more exciting.

Defining the Mission

It will become increasingly important for librarians to define and articulate their role and that of their institution. Samuels and Watts’s research indicates that while there are three perceived roles of the public library (educational, information dissemination, book provision) as expressed in the literature, the writing on the subject is scarce. We need to do a better job of informing our public who we are and what we are about. If we don’t, then Dubberly’s conclusion, when talking about libraries and their mission statements, may be on the mark: “You could be constructing...the wrong building and not even know it.”

Planning for the Library Building

The public library has a rich history as one of the most diverse and economically effective institutions organized and designed to provide citizens of all ages and educational levels with access to knowledge and
information. Today the public library is experiencing dramatic change produced by an avalanche of books, microforms, microdots, computers, and new communications technology ranging from lasers to satellite relays in what has been coined "telematics." The changes have called into question the role and organization of libraries and their materials including how they should be planned and housed.

As libraries prepare to assume a new and expanded role in the information age, their building forms and the internal packaging of their services and resources must be flexible and responsive to change. The marriage of the computer (with home computers becoming as common as television sets) and communications technology (two-way cable, video text, databases, robotics) will impact on the mission and operation of libraries.

More of the clerical, technical, and labor-intensive library functions such as circulation control, acquiring/cataloging/processing library materials, and bibliographic and literature searches are now wholly or partially automated in libraries of all sizes through computer systems that store and access the library's records. While some planners acknowledge that the library's traditional service role is caught in the maelstrom of change generated by advances in computer technology, the full effects will not be felt for some time.

Integrated Services Digital Network (ISDN) will be ubiquitous by the mid-1990s. Not only will it allow voice and data to be sent faster, cheaper, and more clearly than ever before, it will also connect virtually all communications devices—telephones, personal computers, and facsimile and video equipment—through one public network. Essentially, this blending of networks means that users will need only one access line or one network from their home or business, instead of separate ones for voice, data, and full-motion video. It also means they can use more than one device at the same time—for instance, allowing people to share computer data while discussing it by telephone. The biggest change—the one that makes ISDN possible—is that for the first time the public network will be digital from end to end, from telephone to telephone. With digital connections, the wider bandwidths will allow more data to be sent faster, and the elimination of analog should reduce traffic jams created when voice signals are converted for digital transmission. Although a complete digital system is at least ten years away, when it does come online the possibilities will be limitless. A fully developed network will not only allow high-speed data and video services (including the long-discussed but still unperfected picture-phone) but also totally new services as yet unknown.
Printed sources of information—books, periodicals, newspapers—will continue to remain basic to libraries and library service. However, the new technologies are adding expanded service dimensions for the public library of today. Libraries—large and small—are experiencing:

1. The advent of the microcomputer with online services for circulation and information management systems.
2. The emergence of a growing array of cooperative and specialized databases in economics, accounting, law, political science, education, chemistry, etc.
3. The conversion of more library materials and information to microform, videodisks, etc., as networking links libraries with schools, offices, homes, and other information databases.
4. Increased use of telefacsimile transmission and electronic mail to transmit information.
5. The important role for public libraries to continue to serve the "information rich" through the provision of the new technology and through the conventional formats such as books and audiovisual resources while continuing to serve the "information poor."
6. The need for more specialized librarians and information specialists to acquaint users with the new bibliographic search tools and document delivery systems.
7. The return of adults to the college and vocational classrooms, and subsequently to their public libraries, for related information.

These technological and related societal changes are impacting the design and planning for the library buildings of tomorrow. These changes include:

1. Increased emphasis on modular planning to ensure maximum flexibility for the library interior.
2. The need for more floor grids, raceways, and conduits for a variety of lines including electrical, coaxial cables, and other transmission lines.
3. A related need for more electrical outlets and flexible electrical service needs such as "flat wiring power" for selected areas of the building.
4. Greater attention to ergonomics (the relationship of users and staff to furnishings), including seating, terminal stations, and electronic media equipment to achieve the most effective work environment for maximum efficiency and productivity.
5. More effective temperature and humidity controls, sensing devices and filters to preserve the diversity of library formats—books, audiovisual materials, computer tapes, and related electronic equipment.
6. In-library television production and programming.
7. The inclusion of more furnishings such as individual carrels and enclosures—including electronically equipped units—to accommodate the increasing numbers of adults reentering and/or continuing their education.
8. Increased utilization of compact shelving, with near twice the capacity of conventional library shelving, to house lesser-used materials in order to free floor space for new future functions in the library.
9. Added dimensions for multipurpose meeting rooms that can also be used, for example, as mini-television production studios as needed for library programming, education and information transmission service needs.
10. Heightened attention to energy conservation and "life-cycle costing" in the design and construction of the facility and for cost-effective maintenance.
11. Planned incorporation of more sophisticated fire, smoke, heat, and intrusion systems and electronic library materials theft prevention systems.

Today's library planners, architects, and interior designers are given two important charges: design a library building that is responsive to the changing role of libraries produced by these technological and societal influences; and, at the same time, design a facility to accommodate the ongoing traditional service functions. The latter includes a commitment to provide access to a broad range of educational and recreational information and materials for users from preschool children to students through the community college, technical school and graduate school levels, and continue to serve the needs of the elderly, the handicapped, the non-English speaking, and others.

The library in the eighties is a broad based, learning, educational service institution which incorporates many alternatives for delivering and interpreting information services to all age levels. Libraries have long assumed the role of conserving and preserving our cultural heritage. Today, that role is dramatically expanded as libraries are expected to bridge the gap between our print-oriented educational system and our emerging electronic society. Librarians can respond affirmatively to this key question, provided that the new library buildings are carefully planned to easily accommodate and support future changes in services.
A Facility for the Contemporary Public Library

The contemporary public library is the most diverse and economically effective institution in the community to provide citizens of all ages and educational levels with ready access to knowledge and information. The public library also serves to document our social and cultural past, promote our technological progress, and to provide broad, unstructured intellectual stimulation that anticipates the future.

The public library plays a special role in introducing preschool children to the joys of reading and broadening their intellectual horizons through special programming, educational toys, games, and electronic media to cultivate learning and intellectual development.

The public library's services and materials complement all of the other necessary educational institutions in the community from preschools, community colleges, technical schools, to higher education. And the public library is the only educational resource that freely serves all citizens. Students of all ages who have a portion of their information needs met by their respective school or institutional libraries depend on the public library for expanded collections, extensive magazine, pamphlet, and audiovisual holdings.

In addition to supporting and sustaining formal education, the library provides support directly and through cooperative programs with other community agencies for continuing self-education, life-long learning, and adaptation to career changes triggered by changes in the work and marketplace. The public library is also the one place in the community where all types of information and programming, representing all points of view—popular and unpopular, orthodox and unorthodox—are organized and available for public use.

Accordingly, the public library facility must be designed to house, service, and support all of these ongoing, albeit traditional, services for its citizens. Too, the library facility must provide the necessary flexibility to respond to new and emerging library and information services.

Our rapidly changing technology environment and the transition to a knowledge-based society is providing many new interfaces with telecommunications and computerization that impact on the library. These changes are providing increased availability and access to information far beyond the printed page for library users. The provision of this new technological information is also stimulating increased use of traditional library materials, including books. Books will continue to serve an important function in libraries, but contemporary libraries are
also in the information business, the education business, the recreation business, and the entertainment business.

The design and physical arrangement for the library must accommodate a diverse range of services as suggested by the following uses:

—a solitary reader in a comfortable reading nook;
—an alcove with children absorbed with education minicomputers;
—adult reading and discussion group in a meeting room;
—a group of preschool children enjoying a puppet show in the adjoining meeting room;
—scores of high school students using indexes for back issues of periodicals;
—a business person in an enclosed study carrel working on a project while communicating with his office by a "loaner" phone;
—members of the historical society researching local history files;
—readers browsing the new books section and the new videocassette section;
—adults arriving at the library for an extension course in investment banking;
—library patrons picking up books on interlibrary loan;
—patrons at service desks needing to locate manufacturers of hot air balloons and seeking assistance from the reference librarian on subjects via a bibliographic database; and
—library staff arranging the multipurpose room for a lecture series scheduled in the evening.

The public library of tomorrow will be an important cultural and educational institution in the community, and its design should reflect the dignity associated with these functions.

There you have it. One person's view of the future of the library and building that will go with it. It is important to bear in mind that the building design and arrangement must reflect the service program of the institution. As "form follows function" in good architecture, so must library building design follow program of service.

But wait, something is missing. What will this library of tomorrow look like? Will it be all bells and whistles? Will there be people there? What about the staff? Will we know it to be a library building? Linda Crismond, director of the ninety-one branch Los Angeles County Public Library System—with assistance from this writer—drew a picture of the year 2000 library.17
A Future Community Library

The first thing that you notice as you enter is the number of people present—people all over the place—adults and children gaining knowledge, improving their skills, and enjoying the pleasure and thrill of learning. Looking beyond the people, you are struck by the layout of the furniture and equipment. You may think you are in a bookstore, for the graphics are clear and the terms used are not those of the librarian but of the customer: information, new books, check-out.

You next note that there are computer terminals all about. Some are at counters, others at desks. Some have printers, others only screens. Some are in private areas, where searching can be done quietly and without scrutiny of others; most are out in the open. All are silent, with no clattering or beeping. They are used for private individual projects, to access the library's collection, to communicate with research databases, and to link with other library collections across the country.

The staff, you note with interest, are dressed smartly. If you were not in a library, you might think you had stumbled into a corporate boardroom. The image they project leaves us with a good feeling, a feeling of confidence, a strong sense of professionalism.

Those are the tangibles you are aware of, those and the presence of a lot of small (two-, three-, and four-person) spaces for study and conferencing. There is open seating of all types, and there are many more small group spaces than we have been accustomed to. But what of the intangibles? What kind of service is being provided?

The customers are, in many instances, self-reliant. Having grown up with the computer, most do not need staff assistance to help them use the terminal or locate materials. The check-out process is, for many, self charging. Yes, there are clerks at the charge desk, but they are not needed for every transaction.

What are the librarians doing? They are assisting the customers with books, tapes, and films as always. Even though the age of the computer has produced many more self-reliant persons, there are still a great number of users seeking and needing assistance.

If you continue your stay, you will notice that several of the small study spaces created from modular office equipment are being used. If you eavesdrop you will overhear one group discussing their investments. The Thursday Afternoon Investment Club is meeting and using library materials to help them reach their buy-sell decisions. Another group is practicing their French. It seems that a trip to Paris is upcoming in two or three weeks (the company that employs the group now
The Library Building Tomorrow

provides three months of vacation every year, half with pay, half without pay.

A third group is reading a play, an obvious first reading, preparing to stage a production in the library’s 150-seat meeting room. The play will be a fund-raiser for the Friends of the Library. The last space is full of computers and related equipment, and computer-literacy class is underway. It seems that not everybody gets through school with all of the computer knowledge they need or want to have.

This 15,000 square foot library has a collection, you are informed, of about 50,000 books, subscriptions to 300 journals (with a fifteen-year backrun on optical disc), and “subscription” to most of the online databases. There is, of course, a wide array of video and audiocassettes and discs, listening and viewing stations aplenty, a host of duplicating machines (all coin-operated or with debit cards), and a large, electronic community bulletin board which has message space for library, community, and commercial events. The community bulletin board is supported by a fee—$5 per line, five-line minimum, one-week maximum run. The space, you discover, is always sold out and has a two-month waiting period. Good “merchants” know that the real movers and shakers in the community are frequent library users.

As you turn to leave, you become aware that you have just been in a true learning environment, a true community center. You are aware that here, in this one small building, you could access the whole of man’s knowledge, and that no one would question you as to why or what you were doing or wanted, and it is such a good feeling.

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WALTER C. ALLEN

The literature on library architecture and building is vast, scattered, and repetitive. The following items represent only a selection of the more recent and more useful general books and articles. Pieces on individual libraries have generally been omitted, with the exception of a few notable critiques; others can be found through Library Literature, Art Index, etc. The December 1 issue of Library Journal each year has many articles on new buildings and statistical information on recent buildings. Examination of the bibliographies listed below and citations in articles and books will uncover further sources for reports and readings on special topics. Categories included in this bibliography are:

- Bibliography
- History and Background
- General
- The Planning Team
- The Building Program
- Alternatives to a New Building
- Academic Libraries
- Public Libraries
- School Libraries
- Special Libraries
- Site Selection
- Interior Planning, Furniture, and Equipment
- Maintenance
- Security
- Moving

Walter C. Allen is an Emeritus Faculty Member, Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign.
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**General**


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The Planning Team: Librarian, Consultant, Architect


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The Building Program


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Selected References


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Public Libraries


Selected References


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### Partial List of Library Trends Issues in Print

<table>
<thead>
<tr>
<th>Volume</th>
<th>Number</th>
<th>Title</th>
<th>Editor</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.</td>
<td>14</td>
<td>Metropolitan Public Library Problems Around the World</td>
<td>H.C. Campbell</td>
<td>July 1965</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Library Service to Industry</td>
<td>Katharine G. Harris</td>
<td>Jan. 1966</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Current Trends in Branch Libraries</td>
<td>Eugene B. Jackson</td>
<td>April 1966</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Government Publications</td>
<td>Thomas S. Shaw</td>
<td>July 1966</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Collection Development in University Libraries</td>
<td>Jerrold Orne</td>
<td>Oct. 1966</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Bibliography: Current State and Future Trends, Part II</td>
<td>Frances B. Jenkins</td>
<td>April 1967</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Cooperative and Centralized Cataloging</td>
<td>Esther J. Percy</td>
<td>July 1967</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Library Use of the New Media of Communication</td>
<td>C. Walter Stone</td>
<td>Oct. 1967</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Abstracting Services</td>
<td>Foster E. Mohrhardt</td>
<td>Jan. 1968</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>School Library Services and Administration at the School District Level</td>
<td>Sara K. Srygley</td>
<td>April 1968</td>
</tr>
<tr>
<td>V.</td>
<td>16</td>
<td>Group Services in Public Libraries</td>
<td>Grace T. Stevenson</td>
<td>July 1968</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Young Adult Service in the Public Library</td>
<td>Audrey Biel</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Development in National Documentation and Information Services</td>
<td>H.C. Campbell</td>
<td>Jan. 1969</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>The Changing Nature of the School Library</td>
<td>Mar Graham</td>
<td>April 1969</td>
</tr>
<tr>
<td>V.</td>
<td>17</td>
<td>Trends in College Librarianship</td>
<td>H. Vail Drake</td>
<td>July 1969</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>University Library Buildings</td>
<td>David C. Weber</td>
<td>Oct. 1969</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Issues and Problems in Designing a National Program of Library Automation</td>
<td>Henry J. Dubester</td>
<td>April 1970</td>
</tr>
<tr>
<td>V.</td>
<td>18</td>
<td>Intellectual Freedom</td>
<td>Everett T. Moore</td>
<td>July 1970</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Book Storage</td>
<td>Mary B. Cassata</td>
<td>Jan. 1971</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>New Dimensions in Educational Technology for Multi-Media Centers</td>
<td>Philip Lewis</td>
<td>April 1971</td>
</tr>
<tr>
<td>V.</td>
<td>19</td>
<td>Personnel Development and Continuing Education in Libraries</td>
<td>Elizabeth W. Stone</td>
<td>July 1971</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Library Programs and Services to the Disadvantaged</td>
<td>Helen H. Lyman</td>
<td>Oct. 1971</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Current Trends in Urban Main Libraries</td>
<td>Larry Earl Bone</td>
<td>April 1972</td>
</tr>
<tr>
<td>V.</td>
<td>20</td>
<td>Trends in Archival and Reference Collections of Recorded Sound</td>
<td>Gordon R. Steen</td>
<td>July 1972</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Library Services to the Aging</td>
<td>Eleanor Phinney</td>
<td>Jan. 1973</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Systems Design and Analysis for Libraries</td>
<td>F. Willard Lancaster</td>
<td>April 1973</td>
</tr>
<tr>
<td>V.</td>
<td>21</td>
<td>Analyses of Bibliographies</td>
<td>H.R. Simoni</td>
<td>July 1973</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Research in the Fields of Reading and Communication</td>
<td>Alice Lohr</td>
<td>Oct. 1973</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Evaluation of Library Services</td>
<td>Sarah Reed</td>
<td>Jan. 1974</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Science Materials for Children and Young People</td>
<td>George S. Bonn</td>
<td>April 1974</td>
</tr>
<tr>
<td>V.</td>
<td>22</td>
<td>Health Sciences Libraries</td>
<td>Joan Tilley Adams</td>
<td>July 1974</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Library Services in Metropolitan Areas</td>
<td>William S. Badington</td>
<td>Oct. 1974</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Federal Aid to Libraries</td>
<td>H. William Auckland</td>
<td>April 1975</td>
</tr>
<tr>
<td>V.</td>
<td>23</td>
<td>American Library History, 1876-1976</td>
<td>Genevieve M. Casey</td>
<td>July 1975</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Commercial Library Supply Houses</td>
<td>Harold Roth</td>
<td>April 1976</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Changes in the Scholarly Use of Library Resources</td>
<td>Mary Ellen Soper</td>
<td>Jan. 1977</td>
</tr>
<tr>
<td>V.</td>
<td>25</td>
<td>Trends in the Scholarly Use of Library Resources</td>
<td>Benjamin F. Page</td>
<td>April 1977</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Co-Op Operations in the Northeastal Region</td>
<td>D.W. Krummel</td>
<td>April 1977</td>
</tr>
</tbody>
</table>
# Partial List of Library Trends Issues in Print

<table>
<thead>
<tr>
<th>Title</th>
<th>Editor</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>V 26 N 1 Library Services in Correctional Facilities</td>
<td>Jane Pool</td>
<td>Sum 1977</td>
</tr>
<tr>
<td>26 2 Trends in the Governance of Libraries</td>
<td>F. William Summers</td>
<td>Fall 1977</td>
</tr>
<tr>
<td>26 3 Institution Libraries</td>
<td>Harris C. McCluskey</td>
<td>Win 1978</td>
</tr>
<tr>
<td>26 4 Publishing in the Third World</td>
<td>Philip G. Atbach</td>
<td>Sprg 1978</td>
</tr>
<tr>
<td>V 27 N 1 Films in Public Libraries</td>
<td>John A. McCrossan</td>
<td>Sum 1978</td>
</tr>
<tr>
<td>27 2 State Library Development Agencies</td>
<td>Philip Dassen</td>
<td>Fall 1978</td>
</tr>
<tr>
<td>27 3 Libraries and Society</td>
<td>Margaret F. Sturg</td>
<td>Win 1979</td>
</tr>
<tr>
<td>27 4 Study and Collecting of Historical Children's Books</td>
<td>Selma K. Richardson</td>
<td>Sprg 1979</td>
</tr>
<tr>
<td>V 28 N 1 Economics of Academic Libraries</td>
<td>Allen Kari</td>
<td>Jacob Cohn</td>
</tr>
<tr>
<td>28 2 Emerging Patterns of Community Service</td>
<td>Margaret Monroe</td>
<td>Kathleen M. Henn</td>
</tr>
<tr>
<td>28 3 Libraries Consultants</td>
<td>Alice E. Mason</td>
<td>John M. Houlahan</td>
</tr>
<tr>
<td>28 4 Current Trends in Rural Public Library Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V 29 N 1 Current Library Use Instruction</td>
<td>A.P. Marshall</td>
<td>Sum 1980</td>
</tr>
<tr>
<td>29 2 Library Services to Ethnical Minorities</td>
<td>Leonard Wertheimer</td>
<td>Fall 1980</td>
</tr>
<tr>
<td>29 3 Map Librarianship and Map Collections</td>
<td>Mary Lynette Larsgaard</td>
<td>Win 1981</td>
</tr>
<tr>
<td>29 4 Public Lending Right</td>
<td>Perry D. Morrison</td>
<td>Sprg 1981</td>
</tr>
<tr>
<td>V 30 N 1 Bibliometrics</td>
<td>William Gray Potter</td>
<td>Sum 1981</td>
</tr>
<tr>
<td>30 2 Conservation of Library Materials</td>
<td>Gerald Landeen</td>
<td>Fall 1981</td>
</tr>
<tr>
<td>30 3 Data Libraries for the Social Sciences</td>
<td>Kathleen M. Henn</td>
<td>Win 1982</td>
</tr>
<tr>
<td>30 4 Mental Health Information Libraries and Services to the Patient</td>
<td>Phyllis Richelson</td>
<td>Sprg 1982</td>
</tr>
<tr>
<td>V 31 N 1 Standards for Libraries and Information Services</td>
<td>Terry L. Wrench</td>
<td>Sum 1982</td>
</tr>
<tr>
<td>31 2 Technical Standards for Libraries and Information Science</td>
<td>James E. Rust</td>
<td>Fall 1982</td>
</tr>
<tr>
<td>31 3 Current Trends in Library Services</td>
<td>Bernard Yasvi</td>
<td>Win 1983</td>
</tr>
<tr>
<td>31 4 Adult Learners, Learning and Public Libraries</td>
<td>Elizabeth J. Burge</td>
<td>Sprg 1983</td>
</tr>
<tr>
<td>V 32 N 1 Genealogy and Libraries</td>
<td>Diane Foshall Carothers</td>
<td>Sum 1983</td>
</tr>
<tr>
<td>32 2 Current Problems in Copyright</td>
<td>Walter Allen</td>
<td>Fall 1983</td>
</tr>
<tr>
<td>32 3 Archival Care and Instruction Services in Library and Information Science</td>
<td>Jerome K. Miller</td>
<td>Win 1984</td>
</tr>
<tr>
<td>32 4 Research in Librarianship</td>
<td>Lawrence V. Auld</td>
<td>Sprg 1984</td>
</tr>
<tr>
<td>V 33 N 1 Protecting the Library</td>
<td>Alan Jay Lincoln</td>
<td>Sum 1984</td>
</tr>
<tr>
<td>33 2 The Quality of Trade Book Publishing in the 1980s</td>
<td>Walter C. Allen</td>
<td>Fall 1984</td>
</tr>
<tr>
<td>33 3 Collection Evaluation</td>
<td>Freeman Blum</td>
<td>Win 1985</td>
</tr>
<tr>
<td>33 4 Community Junior College Libraries</td>
<td>Ann Heshkawad Eastman</td>
<td>Sprg 1985</td>
</tr>
<tr>
<td>V 34 N 1 Media Collections and Services in Academic Libraries</td>
<td>Phyllis G. Absher</td>
<td>Sum 1985</td>
</tr>
<tr>
<td>34 2 Women and Leadership in the Library Profession</td>
<td>Paul Graham</td>
<td>Fall 1985</td>
</tr>
<tr>
<td>34 3 History Libraries and Information Science Education</td>
<td>Donald G. Davis, Jr</td>
<td>Win 1986</td>
</tr>
<tr>
<td>34 4 Current and Future Trends in Libraries and Information Science Education</td>
<td>Phyllis Dain</td>
<td>Sprg 1986</td>
</tr>
<tr>
<td>V 35 N 1 Privacy, Secrecy and National Information Policy</td>
<td>Robert Burger</td>
<td>Sum 1986</td>
</tr>
<tr>
<td>35 2 Adult Education, Library, and Libraries</td>
<td>Darlene E. Wengand</td>
<td>Fall 1986</td>
</tr>
<tr>
<td>35 3 Current Trends in Public Library Services for Children</td>
<td>Ann Carlson Weeks</td>
<td>Win 1987</td>
</tr>
<tr>
<td>35 4 Public Access Online Catalogs</td>
<td>Karen Mathey</td>
<td>Sprg 1987</td>
</tr>
<tr>
<td>V 36 N 1 Recent Trends in Rare Book Librarianship</td>
<td>Michele Cloonan</td>
<td>Sum 1987</td>
</tr>
<tr>
<td>36 N 2 Library Buildings</td>
<td>Anders C. Dahlberg</td>
<td>Fall 1987</td>
</tr>
</tbody>
</table>

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Procedures for Proposing & Guest Editing an Issue of *Library Trends*

Scope

*Library Trends* focuses on library and information science topics of interest primarily to practicing librarians and information scientists and secondarily to educators and students. The style and tone of this quarterly are formal rather than journalistic or popular. *Library Trends* issues review the literature, summarize current practice and thinking, and evaluate the directions practice is taking. Papers must represent original work, published for the first time in *Library Trends*. Extensive updates of previously published studies are acceptable, but revisions or adaptations of published work are not sought.

Processes of Proposing and Publishing

An issue editor proposes the theme and scope of a new issue, draws up a list of prospective authors and articles, and provides short annotations of the articles' scope or else gives a statement of the philosophy guiding the issue's development. The issue prospectus is examined by the Graduate School of Library and Information Science (GSLIS) Publications Committee and requests for clarification or modification may be made before the prospectus is approved.

Once the prospectus is approved by the GSLIS Publications Committee, the issue will be scheduled for publication and the issue editor begins by inviting authors to write for the issue. The Publications Office will alert the authors to issue deadlines and will send them “Instructions for *Library Trends* Authors.” The issue editor also will be sent a copy of the instructions along with “Suggestions for *Library Trends* Issue Editors.” The suggestions are culled from our experience in editing and dealing with questions raised by issue editors and authors. Included are the typical stages an issue passes through; responsibilities of the issue editor; the responsibilities of the Publications Office editorial staff; and the typical timing of the writing, editing and production stages. Generally, it takes 1-2 years from proposal to publication.

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Fall 1988, Linking Art Objects. Editor: Deirdre Stam, Assistant Professor, School of Information Studies, Syracuse University, Syracuse, New York.