



Form vs. Function: Architecture and the College Library

DONALD E. THOMPSON

IN A STUDY of academic library architecture it is difficult to separate building trends as they apply either to colleges or universities because the general building trends that have developed over a long period of time are usually applicable to both types of institutions. The greatest differences will be found in the size of the physical facilities and the type and complexity of some of the automated and mechanical equipment. Since this issue of *Library Trends* is concerned only with college libraries, current trends will be presented as they relate to college library buildings, but it will not always be possible to separate them from university library buildings. Although some of the trends cover a longer period, this article will be concerned largely with a short history of college library architecture, an indication of some trends of the past two decades, and a look at what might be expected in the future. Detailed information on the trends to the mid-1950's can be found in the literature (see Additional References).

The evolution of academic library architecture over several centuries shows significant changes. The earliest universities in Europe were essentially colleges in which library collections were housed either in the professors' homes or in a room at the university if it had any buildings. When the first colleges were established in America in the seventeenth century they were usually patterned after European universities in the matter of curriculum, style or method of teaching, and physical facilities. As a result, the American academic institution was essentially a college. Library collections and services were housed in one or more rooms in a building. As more space was needed it was not uncommon for the library to expand into adjacent rooms. This type of housing was the rule rather than the exception until the nineteenth century.

Donald E. Thompson is the Librarian, Wabash College, Crawfordsville, Indiana.

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In a study of the American college library to 1800, the following summary describes the typical library physical facilities of the seventeenth and eighteenth centuries:

From the preceding sample descriptions of the quarters provided for colonial college collections we see the characteristic library as a room in a wooden or brick structure, which room was most frequently located in relation to the chapel, that other department serving the whole student body at one time. Indeed, at Yale, when plans for the new *chapel* were drawn, provisions for the library were made. Equipment apparently was limited to non-adjustable wooden shelving and furniture if the reproductions of early libraries in the present Yale and Dartmouth buildings can be considered representative. Somewhat more elaborate provisions were made at Harvard where leather chairs and a rug were provided. Judged by our modern architectural efforts the colonial college library was probably far from inviting for reading and study, but it was certainly not less provided for than other college departments of that day.¹

In the nineteenth century many American colleges began to develop into universities. This was due to increased enrollements, the expansion of undergraduate curriculums, and the development of graduate and professional schools. Because of these changes and the greatly increased production of printed materials, universities were forced to enlarge the library's physical facilities. As a result, it became necessary to think in terms of separate library buildings. But many academic institutions remained colleges and the physical facilities were rooms in buildings for some time after universities erected separate library buildings.

Starting in the late nineteenth century, some colleges constructed separate library buildings and this trend continued to the time of World War I. College library physical facilities during this period were essentially no different from those of other types of libraries. The size of rooms and general arrangement were limited by interior bearing walls. This made it difficult to expand internally when a function or service became too large for its quarters. The interior was generally gloomy because walls were quite often painted in dark colors and because of the dependence on natural light and poor artificial lighting. Books were stored on sections of shelving that were permanently located, either in separate bookstacks or wall alcoves. Ceilings were high to allow a better flow of air. Furniture was sturdy but usually

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unattractive and uncomfortable. Non-assignable library space sometimes amounted to as much as thirty or more percent of the total space in the form of large halls and foyers, high ceilings, thick floors and walls, and imposing stairways. The exterior was usually Georgian, Gothic, Greek, or Romanesque, quite often with many steps to the front entrance. In general, the entire building was poorly arranged and the interior space was not flexible. The monumental tradition of this period is attributed to following the European pattern of library construction.

During the latter part of the nineteenth century many librarians attempted to point out these inadequacies but their complaints were like cries in the wilderness. Architects continued to design library buildings that might be monuments of beauty but were functionally limited. One librarian in 1888 became eloquent in his denunciations and wrote a poem about the difficulties of making architects listen to the needs of librarians. He discussed the things that had been done to make the library non-functional and concluded with these lines to the architect:

You have raised a costly structure fit to stand for many a year,
But you quite forgot the scholar who seeks for wisdom here;
Will he find it sooner, think you, without help of air or light?
Does it add much to his comfort that the books are out of sight?
When librarians are angels, which they are not all (as yet),
They may be shut off in corners without getting in a jet;
When mechanical assistants are electrically wise,
They may work in "stained-glass attitudes" without much use for eyes.
You have made it fair and lovely any one may see who looks,
But, the object of a library being principally *books*,
Unless you can make up your mind to take that for your goal,
'Twill be like a lovely body without one spark of soul.²

The trends of the nineteenth century continued into the twentieth century but between the two World Wars some changes were evident in the planning of college library buildings. Shelving practices evolved from wall shelves and alcoves to multi-tiered stacks and, in a few cases, free-standing stacks. The interiors were still not functional but some effort was being made to relate library materials, readers, and services. Walls were load-bearing which limited the flexibility of the interior. Many of the ideas now thought to be necessary in a library building were being developed. Some of these ideas were included in the written building program of the library building being planned

at Iowa State College in 1922: 1) seating for 15 percent of the future student enrollment with a higher percentage for liberal arts colleges; 2) special facilities such as carrels, research study rooms, and seminar rooms; 3) facilities for special groups of students; 4) adequate book storage for the present and future; 5) location of the circulation desk near the card catalog, main reading room, staff workrooms, and book-stacks; 6) sufficient corridor space for peak traffic loads; 7) large elevators; and 8) comfortable and well-arranged staff working quarters.³

In 1933 Angus Snead McDonald wrote an article in which he urged a new look at the whole concept of library planning.⁴ Many of the ideas he discussed had been considered by librarians and some were being used in varying degrees, but not to any great extent. The proposals he presented were to have a marked effect on the construction of all types of library physical facilities. He advocated the change from fixed-function to modular buildings. He also suggested many of the things which today make libraries inviting and convenient—such as adequate air treatment, comfortable furniture, better and more efficient lighting, functional and flexible interiors, subject arrangements of books, better relationship between books and readers, elimination of most interior bearing walls, open-shelf arrangement, and an attractive exterior with grade-level entrance. He indicated that library buildings must be planned not only for the scholar and student but also for the general public. In the late 1930's modifications and variations of his modular planning idea were used in several new library buildings.

Immediately after World War II there was a marked change in the architecture of college library buildings. The idea of modular planning was becoming recognized as an excellent way to provide both flexibility and beauty. There was a gradual shift away from fixed-function buildings with large amounts of space used for non-assignable features to buildings with flexibility for functions and more space assigned to library operations.

One of the most significant changes has been the closer working relationship between the architect and the owner. Librarians had tried in earlier times to make themselves heard but it was either a weak effort or the architect or others concerned did not listen. In any event, after World War II the use of the planning team and a coordinated planning process began to develop. The planning team had a larger voice in the whole planning process and spent more time learning

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and observing new developments and ideas. The written building program became a standard document. All of the component parts and needs of the library building were put on paper before construction began. The architect was then able to translate library functions and services into a workable interior while still having considerable freedom in the matter of design. Non-assignable space was reduced and functions and services were more closely coordinated. The whole planning process was further helped by the use of consultants who had become experts in library construction and were able to assist the planning team in producing a more functional building.

During the last few decades there have been some marked differences in exterior building design. Exteriors such as colonial, Georgian, and Gothic have been common but there have been many other types. There is general agreement that a rectangular building is less expensive to construct than a building with the same amount of interior space but which has irregular exterior walls. However, there has been an increasing tendency to discount cost to some extent in favor of unusual designs that are more appealing than the rectangular type of construction. The new designs have taken forms too numerous to describe but the aesthetic effects have tended to make the library building more attractive and inviting.

Up until about twenty years ago, fenestration on college library buildings consisted of regular windows quite often set high on the walls to permit the use of wall shelving below them and to allow a better circulation of air. During the 1950's and early 1960's many libraries were built which had glass walls on one or more sides. A number of problems soon developed. The direct rays of the sun caused glare and heating and cooling problems. It was necessary to control this with the use of draperies, special types of glass, and overhangs or similar structural details. It was often not possible to place seating near glass walls because of temperature and glare. Custodial costs were increased due to the expense of cleaning the glass. Glass walls are still used to some extent but the trend has been reversed in recent years. The solution has been to seek new ways to overcome some of the problems or to revert back to standard windows or variations, such as the long slit window or smaller versions of the glass wall. In some cases, entire walls are windowless.

Modular planning has made it possible to make interior structural changes. Room heights of eight to ten feet are now common because of better artificial lighting and the use of forced air. The thickness of

floors has been reduced and most interior bearing walls have been eliminated because of support by columns. Ducts have been enclosed in walls, ceilings, and columns, and light fixtures are flush with the ceiling or protrude only a few inches below the ceiling. Noise is controlled better with acoustical treatment and the strategic location of library functions and services.

Interiors have been changed further by flexibility and informality. It is now possible to move areas and functions with a minimum of effort. This makes it possible to group functions in such a way that better service can be offered and, at the same time, staff working conditions can be improved. Reading rooms with rows of study tables and chairs have been largely replaced by reading areas scattered throughout the library with individual carrels, study tables and casual lounge furniture.

Several changes can be seen in the use and need for special rooms. An auditorium was once thought to be necessary but more and more libraries are finding it to be a burden, particularly when it is included to serve other functions on the campus. Because of the increasing demand for longer library hours, some libraries have found it beneficial to have an after-hours study room that can be kept open on an almost continual basis. Seminar rooms have been thought necessary for several decades but their use has been declining in recent years. To some extent they have been replaced by small rooms in which students can hold informal meetings. It is only in the past twenty or thirty years that staff rooms have been included in most new buildings. There are variations in typing facilities from the typing carrel to the single and multiple-seat typing room.

Until the second or third decade of the present century books were shelved in many ways. Shelving was largely along walls or in alcoves. Variations of the multi-tiered bookstack were started in the nineteenth century with the standards being used as supports for the floor as well as for shelves. Some shelves were stationary on the standards while others were adjustable by notches or set screws. Some bookstack floors were made of translucent glass tile for better light transmission. Over a period of years the evolution was made to freestanding bookstacks that can be moved to any part of the building and permit aisle widths of any size. The storage idea which was implied in the multi-tiered bookstack is now found in many types of compact stacks, some of which are mechanized.

The changing concept of the college library as it relates to the

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educational program of the college has caused some rethinking with regard to the seating of patrons. As long as forty or fifty years ago it was not thought necessary to seat a large percentage of the patrons. Since that time there has been a gradual increase until it is now important to seat 40 or 50 percent of the student body. Some colleges with special educational programs use a higher percentage. The types of student seating have changed from predominantly tables for six or eight people to as much as 75 percent of the seating at individual study desks. Formal seating has given way to the inclusion of informal seating with lounge chairs and sofas. There has been an increase in the facilities provided for faculty research, such as private studies, carrels, and special reading areas or rooms.

Since World War II the use of audio-visual materials in college libraries has increased rapidly. This service started with collections of phonorecords which were used largely for leisure. The use was later extended to phonorecords for instructional purposes. Films, filmstrips, slides, tapes, and other non-book materials were gradually acquired. Libraries first began to use microfilm in the 1930's. In the 1940's micro-cards were proposed and developed. Further refinements have led to other types of microforms. Equipment such as projectors, tape recorders, record players, projection screens, and new types of furniture are needed to handle and service these materials. This has not drastically altered the physical requirements of college library buildings but some accommodation has been necessary.

Further changing concepts of education are forcing college librarians to take a serious look at the services they should offer. There is some indication that teaching machines may be used in the library of the future. Experiments are now in process, or are being considered, with electronic carrels which can be equipped with tape recorders, television screens, dial-access information facilities, loudspeakers, and similar items. The trend is toward programming for self-learning. Since these programs and the use of the equipment are still in the experimental stage it is difficult to know what their impact will be on library architecture. What *is* known is that adequate conduits and outlets must be provided and that the building must be flexible enough to accommodate the machines of the future. Provision must also be made to extend the services beyond the library to the classroom, dormitory, and other places on the campus.

The computer will undoubtedly be used increasingly by libraries in the future, particularly for processing the data needed for control

over, access to, and storage of information. This is more likely to affect large libraries than small libraries. However, many college libraries have, or are planning, connections with computer centers in their own institutions so that they will be ready for possible new developments. Those college libraries which do not have institutional computers will probably have to depend on cooperative arrangements, such as time-sharing with computer centers or the co-ownership of a computer with other libraries. The computer and other types of automation and mechanization are now being used for circulation control, acquisitions, serials work, book catalogs, and many other procedures and functions. These uses will not necessarily reduce the storage problems but they will require changes in interior physical arrangements for the housing and use of machinery and equipment, the installation of special air treatment equipment, and an increased number of conduits and electrical outlets.

There have been many changes in college library architecture in the past century or two. From the changes that have already occurred, those that are now in the process of being developed, and the predictions that are being made for the future, it seems probable that the innovations in the next few decades may be even greater because of automation, mechanization, and the information explosion. Some of these possibilities should be examined to indicate the impact they might have for college library buildings.

John Kemeny⁵ predicts that the university library will be obsolete by 2000 A.D. because of the tremendous cost of purchasing, storing, cataloging, and servicing the ever-increasing amount of printed materials. He suggests that a national research library be established to preserve a majority or all of the printed materials available and that university libraries house only much-used materials. The national research library would be fully automated to store and service printed materials which would be reduced to tapes. University libraries would be connected to the national research library by multichannel cables. The patron would sit at a console in the library or in some other place on the campus and, by the use of a code book of subject classification schemes, dial the national research library for the information needed. The patron's console would be equipped with a screen for projecting facsimilies of printed pages, subject headings, or bibliographic references from the collection of microimages stored in the national research library. The patron would be able to obtain complete or partial coverage of the literature on a subject or the exact pages needed.

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There is evidence that Kemeny's predictions may have some validity. It is possible, in the future, that copies of printed pages may be transferred between libraries by telefacsimile or transmission on a screen. Several experiments have been tried or are now in progress. The results leave something to be desired due to the high cost and quality of the copies, particularly in telefacsimile transmission. But if either or both of these methods are perfected, or if some other method of transmission is found, and if their use should greatly increase, the effect may be to alter the pattern and size of college library buildings. This would be especially true if it became possible for college libraries to restrict their purchase of printed materials to those items that are needed for current use and depend on larger libraries for research and little-used materials.

During the past few years have been many experiments with further microreduction. It is now possible to achieve a reduction ratio of several hundred to one. Experiments have achieved reduction ratios of one million to one. If this can be done with printed materials, it would be possible to place the information from one million volumes into the average-size book. There has even been speculation about recording information at the molecular level and achieving greater reduction ratios. If this can be carried over to printed materials, hundreds of books could be placed on the head of a pin or all of the recorded knowledge of the world could be placed on a few sheets of paper.

There is evidence that real progress is being made in microreproduction of printed materials. More than 3,200 pages have been placed on a 4" x 6" microfiche and the whole Bible has been reduced to a 2" x 2" microfiche. A proposal has recently been made to produce a million-volume library on ultramicroform. This collection would be divided into various broad subjects each of which might be about 20,000 volumes on approximately 2,000 ultramicrofiches. With the rapid increase in the publication of printed materials during the past few years and the probable further increase in the future, it would seem that the use of ultramicroform might grow. The ultimate handicaps will undoubtedly be the development of reading machines capable of handling the great reduction ratios, the cost of producing large quantities of ultramicroforms, and the human element which might rebel at the necessity of reading an increasing amount of printed materials in forms other than books.

If the use of microreproductions and computer-stored knowledge

should increase as rapidly as seems likely, it would theoretically be possible for most libraries to own much or all of the printed information in the world. In practice, this would not be feasible because of the cost. It could also mean that the major portion of a library building would be used for seating, reading machines, and transmission and other equipment, and that books, periodicals, newspapers, and other library materials in the form of microfiche, tapes, records, etc. would be stored on sections of shelves or in filing cabinets. This does not seem likely in the immediate future but it could happen within the next fifty or one hundred years. The probable answer is that, for some time to come, books will continue to be used for a large percentage of needs and microreproductions will be increasingly used for little-used sets of publications.

In 1967, under the sponsorship of the Educational Facilities Laboratories, a group of communications and information technologists, librarians, and architects met in New York City to discuss the changing forms of communication, automation, and mechanization and their possible impact on the future of library architecture. The consensus of the participants was that "for at least the next 20 years the book will remain an irreplaceable medium of information. The bulk of library negotiations will continue to be with books—although the science and technology sections will gradually shrink. Remote retrieval of full texts in large amounts over long distances will not be generally feasible, and continued use of a central library building will still be necessary."⁶ It is suggested that library buildings of the next two decades will not vary greatly from those being planned today. The differences will be exchanges of space and additional space with planning for expansion. The group warns, however, that changing technologies may bring changes in the physical facilities of libraries. The library patron is the one who will be affected by new innovations and changes in physical facilities and this must be kept in mind. "Now, more than ever, it is important to design library buildings so they will be inviting and comfortable for people to use. The library building itself will gradually change, but people, who use libraries, are a constant factor."⁷

College library architecture in the 1970's and 1980's will continue somewhat along the same lines that it does today with some variations. It is entirely possible, however, that as the turn of the century approaches, there may be gradual changes in college library buildings because of the tremendous increase in the production of printed

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materials, the growing space needed to store such materials, and the effects of automation and mechanization. The results of these changes may mean less dependence upon, and use of, books and an increase in the use of printed materials reduced to some other form. It is possible that the present era is the beginning of what will eventually result in fully automatic information retrieval. For the most part, this may lead to push-button libraries in the twenty-first century. If this should happen, it is even more necessary than ever that library buildings be planned with as much flexibility as possible to accommodate the future.

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