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Book Storage

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Library Trends, a quarterly journal of librarianship, provides a medium for evaluative recapitulation of current thought and practice, searching for those ideas and procedures which hold the greatest potentialities for the future.

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Introduction

MARY B. CASSATA

Irrespective of their size, most libraries today face or will face sometime in their future the problem of what to do about the lack of space. In the now world of libraries, there are a number of inescapable givens: 1) the publication of information has grown astronomically, 2) the explosion of information shows no sign of abatement, 3) the compulsion (which affluency nurtures) to acquire all material in all languages and all media has become a library hang-up, 4) the cure for kicking this habit, to collect exhaustively, is more expensive and difficult to effect than was its acquisition, and finally, 5) the realization that the problem has reached crisis proportions.

As a consequence of this desperate situation libraries are intently seeking the right solution to their book storage problems, only to find there are no simple answers and no instant or right solutions. No two libraries are alike in the conditions they face; hence each must study and examine the avenues for solving its book storage problems according to its needs, its plight, and its resources.

The literature on the subject of book storage has been given widely scattered treatment; this issue of Library Trends attempts to synthesize the many viewpoints held on the subject and to deal with the alternatives for solving the problem.

An automatic response to overflowing bookstacks is to seek relief via “in-house” practices. Roscoe Rouse, while extolling the praises of the librarian who can “make space out of nothing,” nevertheless cautions that the procedures he uses must be considered as stop-gap measures, which in the end may be more expensive than facing the problem squarely. The opening chapter touches on many of the more commonly used practices, e.g., weeding of collections, restricted acquisitions policies, shelving of books by size, shelving on the fore-edge,

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allowing minimal shelf space for expansion, and shelving two and
three deep. To give his chapter an empirical base, Rouse constructed
a questionnaire, which he sent to 200 libraries, on book space needs
and specific solutions attempted. His article reports his findings.

According to Herman Totten, to store or not to store is the basic
question. Totten reviews the important considerations for determining
what materials are to be stored—that is, the materials that are the
least used. He also raises the more pertinent question of how to de-
determine the future use of these materials.

Compact storage without resorting to added equipment is explored
in the article by Manuel Lopez. Lopez brings into sharp focus many
of the very same "home remedy" solutions introduced in the Roscoe
Rouse article, but he concentrates on the important aspects (although
they are too often the disregarded and intangible aspects) of utilizing
conventional compactions.

There has been a great deal written on the subject of compact book
storage equipment, and a Library Trends article of not too many years
ago covered the subject thoroughly. The chapter by Kent Schriefer
and Iva Mostecky in this issue of Library Trends poses this question:
What can compact shelving do for the library? In answering this
question, the authors choose to omit the discussion of the more con-
ventional types of equipment. They provide instead an exciting look
into the more unconventional systems that are available today.

Among the several options available outside the library for solving
book storage problems is relocation or decentralization. J. Michael
Bruno divides the various forms of decentralization into "two species,"
viz., the "operations-oriented" and the "user- and subject-oriented"
types. For the first category, the decision to decentralize is based on
the kinds of forms and materials, as exemplified by libraries for rare
books, map collections, documents, etc.; the second category subsumes
graduate and professional school libraries, laboratory collections, and
separate undergraduate collections. Bruno reviews and analyzes once
more the advantages and disadvantages of decentralization.

Another off-site alternative for finding more space for continually
expanding collections is cooperative storage. One can liken this mea-
sure, which is utilized by various libraries, to the phenomenon of com-
munal living utilized by various elements of our now generation. H.
Joanne Harrar, who has long been interested in this subject, postulates
that libraries resort to cooperative storage facilities because they hope
to effect economies and to achieve an extension of their resources. Her
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conclusion is that the principal value of the cooperative warehouse storage concept is not that any economies have been achieved but rather that libraries can cooperate. She exhorts the profession to explore other modes of cooperation.

One such alternative mode is communications networks: William Budington, however, views library networks not so much as vehicles to alleviate storage problems, but more as avenues to enhance accessibility to information resources. Nevertheless, he maintains, “One may consider their success as preventive therapy, making unnecessary the duplicative acquisition of such resources by the participants. . . . [and that implicitly there is the possibility] of removing some portion of a crowded collection, if the removed segment is already available in or becomes part of an accessible organized resource.”

Some librarians would view the tabula rasa approach as the most exciting solution to their spatial problems. Indeed, the prospect of erecting a new building—to design and plan an edifice to achieve the best for all of their concerns for staff, users, and materials—comes once in a lifetime. William Ernst reviews a variety of approaches ranging from climbing skyward to going underground. But, he hints that even this alternative becomes circular, i.e., “Plan as they may, libraries usually seem to be in the position of having completely filled such space [i.e., new building] much sooner than anticipated.”

In the final paper of this issue, Rolland Stevens hails the microform revolution as the alternative to pursue rather than resorting to: extending stack areas; decentralizing the collection; using compact shelving, with or without compactions; participating in cooperative storage agreements; or any other method, explicit or implied, which has already been covered in this issue. Stevens carefully develops the history of the use of microforms in libraries in terms of the space-saving factor.

What solution is the best? Indeed, that is difficult, if it is at all possible to ascertain. There are no panaceas, and even new buildings do not always provide the hoped-for solution. Suffice it to say that it is the sophistication of the librarian and his knowledge of the various alternatives from which he may choose which will determine the route or routes a particular library will take toward solving its space problems.
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WILLIAM B. ERNST, JR.

There exists in library folklore the tale of the eminent architect who, upon being upbraided by a compliment-bearing friend for his lack of enthusiasm over his recently completed library, replied, "Oh, the building is all right, but I don't know what to do with the books." Some fifty or more years later, I strongly suspect that most architects feel that they now know what to do with the books, but that librarians are still far from complacent about the matter. The inherent problems are many and the solutions are as varied as the local situations will permit.

The basic problem is really very simple, but it is one that has so far eluded any definitive answer. It is not a question of architecture alone; the mere provision of suitable space in which to house a collection of books is not sufficient. It is easy enough to program and design a relatively simple structure with masses of open space to be stacked solidly. The real difficulty lies in location for accessibility and organization for utility. Any attempt to reach an ideal solution is quickly frustrated by the familiar request to provide a central location, easily accessible from all points on campus, and in proximity to all library services that any given individual may want to use at any time of the day or night.

The fortunate man is he who can plan a building from the ground up—or down—without having to conform to the exigencies of an existing structure. He will still be faced with local tradition, the need to adapt in style and size to adjacent buildings, and the limitations imposed by the size and conformation of the available sites. If he is one of the chosen few who can start with an entirely new campus, he indeed will have more freedom to create, but the dictates of a unified plan will still impose constraints. An urban institution, or one with an almost fully built campus, is precluded from using many

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of the solutions available to the institution in a more rural and less crowded area. Construction costs, building codes, and similar items beyond the control of the planner will all conspire further to limit his freedom of choice.

Important as these considerations are, even more fundamental to the orderly process of planning is a careful consideration of the accessibility of collections. The educational and economic implications of various storage plans must be carefully thought through. Every planner is well aware that he cannot hope to satisfy everyone, no matter which of the many possible arrangements of books is chosen. Yet attempts to plan stack and storage areas must gain the maximum benefit for the largest number of users. William S. Dix, University Librarian at Princeton, has skillfully and succinctly stated the problem:

Assuming that the local situation, always the determining factor, permits us to establish a system of subject classification as the basic organizing principle of the library and that we are so fortunate as to be able to permit our books to be placed on open shelves for anyone to consult, another problem arises. Do we put all the books on the campus in one building, or do we lift out great chunks of books which cohere by subject and disperse these chunks around campus? After considerable reflection on the subject and a fair amount of abrasion, I for one have concluded that there is no one right system, no sacrosanct ideology applicable to all situations. So long as the collection is thought of as a single university library, existing for the greatest good of the greatest number of readers and administered with as much tolerant concern for the special interests of the individual as circumstances permit, a considerable variety of local geography can be tolerated by the academic community.1

When librarians opt for any considerable amount of local geography, they must be cautious in dispersion of collections in order not to vitiate the effectiveness of respectable collections by making arbitrary relocation decisions based on administrative rather than academic considerations. Too many instances can be cited where this kind of decision has led to cleavage of collections on an illogical and unjustifiable basis. Rather than solving problems, this has only created new ones and intensified existing ones.

Careful attention must be paid also to economic factors. If the decision is made to establish a storage facility for seldom-used ma-

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terials at a point some distance from the main library, then both academic and economic considerations are present. Ralph E. Ellsworth, in his recent study, makes some cogent points concerning the gains in space achieved and the lower costs of housing and shelving versus the costs of selecting materials to be moved, changing records, and retrieving items from such a storage unit. The intangible costs of user frustration at not finding the wanted title immediately, at losing the ability to browse, and at delays in retrieval cannot be ignored. And do libraries not run the risk of eventually finding that the aegis of the research library has passed from the central to the storage facility through the sheer amount of material in the latter?

Many different approaches, all within parameters dictated by local considerations, have been essayed in the last decade. Whether a new building or an addition to an existing building is being considered; whether it is to be modular, underground, or designed in traditional or new forms; the same concern is ever present—to attain the best and maximum possible use of space. The opportunity has been seized to experiment and to incorporate new methods and forms to reach this goal. Since the majority of these buildings are multi-purpose in nature, combining readers, services and storage all within one fabric, it is often difficult to separate these closely interwoven functions to arrive at a valid assessment of the purely storage potential. The shelving of current, heavily used items poses a set of problems quite distinct from those involved in a strictly storage facility. Most effort has been expended on solutions for more immediate needs by providing for centralization of dispersed services and collections, with great accessibility through well planned open stacks. As the necessity to reach more viable methods of storing large masses of material in a less expensive manner becomes more pressing, attention is being focused on what is no longer long-range planning, but is a much more immediate need. Increasingly ingenious ideas are being brought forward which will provide the basis for testing and discussion, resulting hopefully in solutions that can be generally adapted.

Two recent buildings show the influence that location and topography exert. In each case it was possible to consolidate and coordinate both services and collections previously, and of necessity, rather widely dispersed. Existing shelf capacity has been increased, but within the more traditional and accepted modes. Plan as they may, libraries usually seem to be in the position of having completely filled such space much sooner than anticipated. New York University in the
midst of New York City had no real choice but to go up some thirteen stories, hedged in as it is by city regulations, building codes and the anguished fears of neighbors. Johns Hopkins, building a new library adjacent to Homewood House, had to conform to that building's style and height. Using a naturally sloping site, it erected a building with one story above ground and five below ground, making possible the consolidation of the bulk of its collections under one roof and eliminating the separate maintenance of eleven departmental libraries.

Many newer library buildings have employed the modular type of design and construction. With sleek skins enclosing theoretically flexible and infinitely expandable space, they are varied only by the ingenuity of their architects, and, in their own way, are as traditional as their monumental precursors. Such a building indeed is more easily expanded, and the multitudinous problems that are met in attempting to add to, or wrap around, an older building are absent. Some of the imperfections, encountered only after the tribulations of a period of use, are bound to be perpetuated in later additions while attempting to assure that a harmonious continuity exists between the original and the additions. The library of the University of Illinois at Chicago Circle is such a building. Five years old, it already has an addition to the north and south, extending its length to 475 feet. When funds are available, it will be extended westward by seventy feet for its entire length. The cost of construction of the original module was found to be so high that the bay size will be decreased in the new additions. The established articulation of supports and service elements will be continued, and hence the vaunted flexibility is not so readily apparent as would be supposed. Yet there is enough flexibility to allow the remodeling of old areas and the design of new ones to meet the changes in academic goals and programs that have added graduate programs, both at the master’s and doctoral levels, to the original undergraduate programs that the library was built to serve. It will be possible to devote two-thirds of the new space to book storage.

In seeking new ways to increase storage capacity, more and more attention is being given to better utilization of underground areas. Basement space, usually given over to other purposes, is now being used as readily accessible space, which when equipped with compact or more closely spaced standard stacking, is highly desirable space for lesser-used materials. Northwestern University, in its new three-towered building, has provided a storage area with compact shelving.
below the basement level. Dalhousie University, Halifax, Nova Scotia, in the new Killam Memorial Library has storage space, in closed stacks in the basement, for 100,000 volumes. Designed as an open stack library with a capacity of 800,000 volumes, the plan has effectively recaptured space not normally used, in which an additional 200,000 volumes in dead storage can be shelved. This has been accomplished by extending a concrete rib from the floor slab above down over each stack range. The steel uprights can be fastened to this, thus allowing for two extra shelves in each section. Similar space is standing unused in many libraries, yet once a commitment has been made to the standard seven-shelf section, it becomes expensive in a large installation to change the supports to add an extra two shelves.

Other institutions have gone completely underground. Harvard University, faced with full stacks and no additional surface sites available, has chosen to excavate further the southeast corner of the Yard, temporarily doing away with greensward and part of the president's garden, to build four levels of underground stacks. Capable of holding over a million volumes, with study space for 100 faculty and graduate students, the new levels will be connected with the areas already under Lamont and Houghton Libraries. At a cost of five million dollars, and in conjunction with a program of decentralizing specialized collections to old established departmental libraries and a new science center, Harvard's space needs will be solved for another decade. Dictated almost wholly because there was no place else to go, the choice is certainly eminently practical and wiser than wholesale dispersion to a distant point.

The University of Illinois at Champaign-Urbana is more fortunate in that it still has available space on which to build additional stack wings onto the general library, thus preserving the entity of its central collections. Faced with the need for improved undergraduate facilities, Illinois also went underground with a new undergraduate library, connected by tunnel to the general library. Its two levels receive the benefit of a pleasant vista and natural light from a central landscaped court that doubles as a controlled reading area. By going underground, a central site easily accessible from heavily trafficked parts of the campus was obtained without destroying either the mall or the historic Morrow Plots which have provided agricultural research data continuously for over a century. Hendrix College, Conway, Arkansas, by going underground, reduced construction and maintenance costs
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and gained a landscaped plaza for other uses. True, these are not storage areas, but the idea is there and can be adapted.

The storage building for little-used materials, located at a distance from the central library on less expensive land has been a familiar part of the library scene for the last thirty years. Its use, while generally successful, has produced mixed blessings. Theoretically only seldom-used materials are transferred to storage, and they are easily retrieved upon relatively short notice. Buildings to house such collections can be cheaply and quickly constructed, since they are essentially warehouses with ranges installed as close together as is feasible, each shelf tightly packed with sized volumes in fixed locations. The difficulties come, not from the buildings themselves or the basic idea, but from its applications. The sometimes arbitrary selection methods, the management of records, the delays in retrieval, the lack of classification and the inability to browse all contribute to user frustration. These difficulties would seem to occur most frequently when large research collections are divided, and to become less problematical in smaller collections with storage facilities close at hand.

Princeton University has elected to alleviate its pressing space problems by planning a major underground addition to the Firestone Library, but more immediately by the construction of an auxiliary storage library on its Forrestal campus, about two miles away from the main campus. This building is capable of holding 500,000 volumes at a density of thirty-five volumes per square foot, compared to the conventional fifteen volumes per square foot. Its uniqueness is not the building itself, but rather in the methods of organization. Books are shelved by subject within six size categories, by height, on ranges eight and one-half feet high, spaced twenty-two inches apart. Through carefully coordinated selection of titles, by making the selection process easily reversible, and by preserving the browsing capability, Princeton hopes to overcome the problems encountered in other similar ventures, and to emerge with a very workable and acceptable solution.

A gleam of hope on the horizon is presented by the mechanical and electronic shelving and retrieval devices now becoming available. While still in the expensive toy category, such systems as Remington Rand's Randtriever have great possibilities. They will affect library architecture by making possible the use of less expensive construction
methods for stack areas in central library buildings. Installed in ranges 200 feet long and twenty shelves high with sixteen inches between ranges, such systems will do away with expensive walls, floors and stairways, while substituting for them equally expensive retrieval and control mechanisms and conveyors. In addition, books randomly shelved and tightly packed will not permit browsing, nor will they be visible. The pioneering installations will be at Ohio State University and at Rotterdam in the Netherlands.

For the past six or seven years, the State University of New York at Buffalo has been anticipating and planning an entirely new campus of 1,200 acres. Located six miles from the present campus, the now open fields present an exciting prospect for new departures in campus planning. In conjunction with a reorganization of the university on the basis of seven faculties, the library has been given a rare opportunity not only to plan new buildings but to reorganize its services and functions to meet the changing pattern of the university itself.

As ideas were developed, one concept was to provide: 1) five faculty libraries organized on a divisional basis to serve the needs of the seven faculties, 2) a general library to house the undergraduate library, special collections and administration, 3) a storage facility, and 4) a technical services building. The faculty libraries and the general library would be in prime space in close proximity to the faculties and community they served, housing current collections of heavily used materials and reader and appropriate library services. The capability of shifting large blocks of material to and from the storage library as the needs and interests of the faculties change and shift would also be present. The storage library would occupy less desired, inexpensive land on the edge of the campus. The technical services could be in the same building, or in a service building to facilitate deliveries, since vehicular traffic is to be limited in the more densely built-up central campus. The effectiveness of such an arrangement is greatly dependent on maximum use of electronic and mechanical means of communication, transmission of documents, and materials handling.

As the campus master plan evolved, certain clusterings became apparent—science, engineering and health sciences in a grouping; social sciences, education and law in another; and the humanities in a third, with the general library positioned between the social sciences and the humanities areas, around a central plaza. Simultaneously grumblings were heard from concerned faculty in inter-disciplinary pro-
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grams and overlapping disciplines about unnecessary or arbitrary collection dispersion. Some further pondering of master plans produced the idea to go underground in the central campus area with the general stacks and storage stacks. Since the area would have to be excavated, why not go whole hog and dig out enough space to house the whole collection (then given an upper growth limit of three and one-half million volumes)? Beneath the central plaza could be open stacking for the humanities, social sciences and special collections; some of whose faculty members threatened revolt if any cleavage were made between them. Beneath the sciences, engineering and health science could be the open stacks for these disciplines, and connecting the two underground stack areas could be a compactly shelved closed stack storage area. With the faculty libraries rising above ground, access to the underground stack areas could be provided from each such library. The collections would be in close proximity to their prime users, they would remain intact as a university library, and they would be easily and quickly accessible.

To dream in such a fashion comes only once in a lifetime, and usually less than that. Dreams and reality are quite different entities, yet without such musings no progress is made. Even if Buffalo builds something far different, or nothing at all, the germs of ideas are there, practical or not, to be developed and refined, or discarded, as the search for solutions is continued.

Architecture and buildings alone are not going to bring us the answers we seek to the problems of the most efficient and effective ways to handle the storage of large masses of little-used books. Nor will the most efficient selection methods, the most highly refined retrieval techniques, nor the most sophisticated organization of materials alone give us the solutions we need. It is only the imaginative combination of space utilization and collection organization that will help reach the desired goal. The employment of every skill possible in planning suitable buildings, in effective space utilization, in organizing collections for usability and accessibility is demanded. That these skills are available has been amply demonstrated.

References


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Within-Library Solutions to Book Space Problems

ROSCOE ROUSE

Librarians are known for filling bookstacks faster than the building planners had expected. We never seem to learn from past experience that our collections are indeed doubling in size faster than we would expect.

Before additional space can be made available, librarians have had to make do and many have become quite adept at making book space out of nothing. Whether one looks within or without the library building for solutions to space problems, usually higher cost and greater inconvenience will be encountered unless additional space is provided as a part of the existing structure. Internal solutions can at best be considered only temporary and the over-all long-range cost will probably be greater by postponing construction. The principal advantages gained by increasing book capacity within the existing building are the relative speed and ease with which it can be accomplished and the proximity of the materials. Some avenues of relief via in-house practices will be set forth in this paper, all of which have been attempted in some library at some time, but they should be considered only stop-gap measures. The only permanent solution to the book space problem as long as libraries are buildings where books are housed and as long as book collections continue to grow, is construction of additional space.

To develop a base from which to begin research, the writer distributed a questionnaire to 200 libraries requesting information about current book space needs and specific solutions attempted. The cooperation of the librarians queried was most satisfying—84 percent completed and returned the forms. The over-all response seemed to indicate that the matter is a serious one for many libraries and solutions are being sought.

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A prevailing pattern seems to exist for college and university libraries; when a building has been occupied for about ten years, the librarian will then declare a state of emergency and begin to store, weed, or practice some kind of space economy. Another fact unearthed by the survey is the paradox that some libraries, public libraries in particular, occupy a one-year-old building but already have a storage facility.

Both library literature and the survey indicate that there are some common methods—and a few uncommon ones—practiced by libraries to accommodate larger numbers of books within the building. A list of the most widely used practices would include the weeding of collections or a book retirement program, a restricted acquisitions policy, shelving of books by size, shelving on the fore-edge, leaving less space for growth, shelving two or three deep, using higher shelves, decreasing the depth of shelves, reducing aisle widths, using longer ranges and therefore having fewer cross aisles, and reducing the width of cross aisles. Other within-library means of accommodating more volumes in a given space are microreproduction and storage, but these will not be discussed here except peripherally as they are treated by other writers in this issue.

Early in a librarian's consideration of his book space problem he will give thought to weeding the collection if this is not already an ongoing process in his library, and to heavier weeding if it is. The approach to the philosophy of weeding varies among different kinds of libraries. The average public library can without a qualm get rid of many authors past their heyday and shelves can be unloaded of books on subjects long out of the current public interest. Most college and university librarians feel some obligation to retain nearly everything purchased, even out-of-date material, in the interest of academic research, but one must be careful not to generalize on the matter as exceptions show up with annoying regularity.

More than a few librarians have expressed themselves on the subject of book selection in reverse, noting that weeding books is more difficult than adding them. One author commented that almost anyone can make the decision to add a book to the library but considerable thought and consultation are necessary to remove one. There is indeed much to be said for keeping a collection current and substantial, especially when the library must operate on a small budget and cannot aspire to comprehensiveness through size. It has been said that the quality of a collection can be weakened as surely by an overabundance
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of dead weight on its shelves as it can by insufficient current acquisitions. Verner W. Clapp wrote of "the impracticality of comprehensiveness"; Keyes D. Metcalf said the discarding of books is one method of reducing growth, "because not all books that are added to a collection remain useful indefinitely"; and Ralph E. Ellsworth wrote of prophets who "proclaim that unless some kind of bibliothecal birth control is developed, blockbuster library buildings with cancerous tendencies will eventually fill up the open spaces in the middle of our campuses."

The survey questionnaire that was sent to public libraries for this study asked if they practiced weeding and for what purpose, how many weeded books were sent to storage and how many were discarded. Every public library returning the questionnaire responded that it did weed its collection and over one third indicated that they weed for the sole purpose of making additional space for new acquisitions. Only 9 percent of the volumes weeded by these libraries last year went to storage and 87 percent were discarded.

Of the academic libraries queried, 60 percent weed their collections. Small college libraries, especially, are weeders. The results of the questionnaire indicate that the 116 academic libraries responding had last year retired from their collections over 800,000 volumes, most of which were placed in storage, while 122,958 volumes were discarded. Large university libraries weed their collections and discard books on a much smaller scale than do small academic libraries and public libraries, and in every instance they reported the stated reason for doing so was based on space needs, never quality control.

Perhaps the best known book retirement project undertaken by a major library in this country is that at Yale. A full account of the project, funded by the Council on Library Resources, Inc., was published by Lee M. Ash, project director, in 1963. He described the program as a systematic weeding of the stacks, class by class, for the purpose of storing, transferring, filming, or discarding the material. The Yale project includes the assignment of certain new acquisitions to storage. A recent report from that library indicated that the project does not now operate on the same scale as previously, "chiefly because of faculty opposition." The operation has resulted in placing nearly a quarter of a million volumes in storage, transferring over 50,000 volumes to other campus libraries, and discarding 5,626 volumes. Ash was again chief discarer when the Harvard libraries of medicine, public health and dentistry were combined, along with the old Boston
Medical Library, to form the new Countway Medical Library. He banished "several tons" of books equal to 2,000 feet of shelf space, amounting to 70 percent of the collection.  

Special libraries in New Jersey entered into a periodical discard project in 1962 in which lists of materials which they were planning to discard were circulated so that other libraries might request them if they wanted them. Seven academic and public libraries in the state received the lists. The results apparently were disappointing as the project was abandoned after four or five years.  

One can conclude from the literature and the results of the questionnaire that, except for the use of separate storage areas, weeding is the most widely used in-house space-saver. For the public library, it is an accepted way of life, but economy of space alone cannot be named as the prime reason for its employment there.  

The fact has been asserted that the best time and place to weed a book collection is in the selection process. Most libraries impose a set of standards or qualifications which must be applied to every book purchased but all-books-current plans have proliferated and there is now much less actual selection on the part of librarians than formerly. Alexander Laing in his treatise, "The Virtuous Stack-Weeder's Manual," said, "Every library, however large, must exercise some sort of selection at its gate." He pointed out the relative ease with which a library can acquire any book (through photocopy if no other way) and the arduous task of removing one.  

The librarian of Yale University wrote in his annual report for 1952-53 of the futility of continuing the principle that had been adopted and followed by the library over a period of time—to be a library of record and "to collect as much of the printed and manuscript output of the world as was needed..." Absolute comprehensiveness was finally viewed as impractical, unnecessary and impossible. Overwhelming space problems brought the matter to the fore with an immediate solution sought and the Yale "selective acquisitions program" was born. The fact had been realized that the growth of the collections could not continue at the rate they were experiencing and a plan (never fully realized) was established for weeding the collection before the books were purchased.  

The libraries queried in the writer's survey were asked questions regarding their interest in highly selective book purchasing for reasons of space economy. When asked if they practice reduced and discriminate purchasing of library materials specifically because of the
shortage of shelf space, a surprisingly large number of public libraries answered "yes"—21 percent of those answering the questionnaire. Asked if a shortage or consideration of shelf space entered into the decision to buy or not buy duplicate copies, 37 percent answered "yes" again. The same percentage also gives extra consideration to the purchase of long periodical runs or large sets for the same reason.

Only two academic libraries, less than 2 percent of the college and university libraries responding, replied that they limit their purchasing program because of book space needs in the building. Only 13 percent to 14 percent give special attention to decisions to buy long runs of periodicals or large sets because of space considerations.

It has been suggested that a cooperative acquisitions agreement may be considered one means of conserving shelf space in the library. This may or may not be the case, depending particularly upon the kind of agreement envisioned. If it is the purpose of the pact to economize on funds and space, not necessarily the further development of specified fields which would involve accelerated expenditures in those fields, one might expect some help with shelf space from the agreement. If the plan calls for heavier spending by each library in one or more areas, there may be no space economy resulting, but indeed a need for more shelf space, especially if no more than two libraries participate.

If more than two libraries take part in the agreement, there is a chance that space may be saved but this will depend upon several factors, including the degree and depth of the collection development program that is planned. For example, if a given library is assigned an area which requires large bulk purchases, it may find that more space is required than if it had continued to purchase moderately in all fields designated in the plan. Another contingency is whether or not the participating libraries will exchange volumes among themselves to form core collections upon which to build. If a cooperative acquisitions agreement is under consideration with an eye toward relief for crowded book shelves, a bit of circumspection is advised.

Our large depository libraries have served a most admirable purpose in housing and servicing vast collections of research materials. They act as a library’s library and very definitely will provide a library with thousands of feet of additional bookshelf space. The Center for Research Libraries in Chicago and the Hampshire Interlibrary Center in Amherst, Massachusetts, are two such resource centers. The writer cannot, however, refer to the use of these centers as in-house
solutions to book space problems for the purposes of this paper; buying a subscription to their services is certainly more than buying storage space, but it is *that* also. The materials are located outside the library's walls and must be considered stored in another place.

Major acquisitions programs and projects exist which can be utilized by libraries to make esoteric and foreign materials available to patrons without housing them on the premises. Again we must go abroad to locate them but only for the cost of an interlibrary loan from another library in the country. The Farmington Plan, whose purpose is to acquire for housing in an American library one copy of the important works from all countries, was inaugurated during World War II and is active today.

The National Foreign Newspaper Microfilm Program of the Association of Research Libraries aspires to involve most large United States libraries in microfilming newspapers from abroad so they will be available on film in this country. The plan is not fully activated, but, in the meantime, we can call upon the Library of Congress for approximately 800 filmed newspapers from other lands, and the Center for Research Libraries has filmed an additional 200 foreign newspapers.11

The Latin American Cooperative Acquisitions Project (LACAP) has operated through Stechert-Hafner, Inc., since 1959, starting with a traveling agent to search out important library materials in all Latin American countries. New publications are acquired and sold to libraries, many of whom acquire all materials from certain countries.

Finally, two programs of the federal government offer succor in acquiring and locating foreign publications in United States libraries: the PL 480 program and Title II-C of the Higher Education Act of 1965.12

Physical arrangements of books which permit more volumes per square foot are often employed when space crises arise. Most of these are emergency measures and would not be recommended for planning the placement of books and bookstacks under normal circumstances. Although they will bring a measure of relief to a crowded situation, they will also bring inconveniences.

An old, old remedy for book space ills, the chronological arrangement or fixed location of books, was first used by libraries in Europe and is still used by many today. No classification scheme is necessary. Books are added to the shelves chronologically as they are acquired;
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the call number is a location indicator rather than a subject symbol. Browsing is obviated by the employment of such a plan. In this arrangement it is never necessary to shift books as the shelves are filled consecutively, and filled to capacity. It has been estimated that a standard section of shelves three feet in length will accommodate 168 volumes by this method, about forty books more than would be shelved with one-fourth space allowed for expansion. The fixed location plan will therefore allow for the shelving of 32 percent more books over the standard arrangement which allows expansion space.

Librarians were not asked in the questionnaire whether they did or did not employ fixed shelving, but they were asked if they used minimal expansion space (less than 20 percent on the shelf). A surprisingly large number responded that they do: 60 percent of the public libraries and 50 percent of the academic libraries.

Shelving books by size is one means of increasing stack capacity which is utilized in many libraries, but most often in large research libraries, and then most frequently in their storage quarters. It is possible, according to Keyes D. Metcalf, to gain as much as 20 percent in space if five sized sections are used, the classified arrangement of the books is maintained, and adequate space for expansion on each shelf is allowed.13

This technique is employed to some degree by the New York Public Library Reference Department; the Bay City, Michigan, Public Library; the University of Michigan Library; the California Lutheran College Library; and others, both large and small, including the cooperative deposit library centers. Responses made to the questionnaire indicate that 32 percent of all libraries answering the question shelve books by size, at least to some extent. The Center for Research Libraries combines the chronological and the size method in portions of their building and considerable space is gained over conventional shelving arrangements.

A library can simply choose to leave less space for growth or expansion and thus add more books to each shelf. Most library building consultants would advise keeping the shelves at no more than 75 percent of capacity in the interest of convenience, time and actual economy. When the books are beginning to crowd one another on the shelf, there is greater wear on the covers and spines, and the time consumed in procuring or replacing one becomes a factor to consider. This space saver is another example of the false economy in gaining
space through makeshift designs. As previously noted, more than half the libraries queried fill their shelves to more than 80 percent capacity.

Most librarians know that aisles between ranges in an open access library should be at least 36 inches in width. Under adverse conditions when the need to create additional book space is imperative, one can narrow this aisle to 30 inches and gain over 10 percent in space for shelving books. It would be possible, but not advisable, unless the bookstacks were closed, to narrow the aisle still further and make a greater gain. At least one library added as much as 60 percent space by narrowing the aisles to 20 inches. Twenty percent of the college and university libraries answering the question in the writer's survey have narrowed aisles to less than 30 inches in order to acquire more space; 22 percent of the public libraries have done so.

Metcalf points out the opportunity we have to conserve bookstack space by installing shallower shelves. He notes that Fremont Rider told us that 94 percent of all books in college and research libraries measure 9 inches or less from spine to fore-edge. Most libraries are equipped with ranges that measure 20 inches in depth while we actually require only 16 inches in most cases. Two 7 inch shelves back to back have 2 inches between them, thus making it possible for a book 9 inches in depth and a book 7 inches in depth to be shelved opposite one another on the same range. Since most of our books are no more than 9 inches in depth, says Metcalf, the 7 inch shelf should meet our needs, for the most part. The amount of space that can be saved in this manner would come to about 8 percent. Eighty percent of the librarians answering the survey questionnaire stated that they use shelves larger than 7 inches in depth in their buildings.

Virtually all books are taller than they are wide and this height is a factor to be considered in the search for shelving space. Often times a harried librarian will resort to placing books on the shelves on the fore-edge in order to reduce the height needed to shelve them and thereby creating space for another shelf. Of the librarians responding to the question, 20 percent shelve some books on the fore-edge in order to gain additional space.

A combination of shelving books on the fore-edge and shelving by size can result in very great economy of bookstack space. Metcalf refers to this technique as saving as much as 100 percent over the subject arrangement plan. He also points out the danger this method has
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for the life of the book; it is detrimental to the spine for a book to rest in this position.

Higher bookstacks and longer ranges with fewer cross aisles will, of course, accommodate more books. Long ranges are not necessarily undesirable but high shelves bring several problems. Despite this fact we often willingly add one more shelf to a range already too tall for a small girl to reach, but it is with some reluctance that we extend ranges to eight or ten sections. It is even possible to improve traffic patterns in the stacks and create greater ease of use with long stacks which have fewer interruptions from cross aisles. A high shelf can be resorted to when circumstances demand it, but it is one of the least desirable means of finding additional space for books. It is less objectionable, of course, if the bookstacks are closed to the public.

Cross aisles are normally expected to be over 4 feet in width and anything less should not be considered for an open stack library. If the aisle is as wide as 5 or 6 feet, consideration can be given to gaining more bookstack space by making it narrower if there be such a need. Metcalf says that 2.5 percent in space can be gained by reducing the cross aisle from 6 feet to 4.5 feet, provided the ranges are 30 feet long. Another 2.5 percent can be gained if the aisle is reduced to 3 feet.¹⁵

Thirty-seven percent of the librarians answering the questionnaire stated that they have some shelves high enough to require a step stool. Twelve percent said their libraries are equipped with ranges longer than ten sections.

Placing books two or three deep on a shelf is a desperate measure and perhaps the court of last resort in the librarian's search for book room. The great inconvenience provoked by such an arrangement is equivalent to that of storing the books in boxes, or perhaps outside the building. This is not to say that it is not utilized and it will indeed give books a home until better quarters can be found. Wide shelves are necessary and a closed stack situation is highly recommended.

Five public libraries out of fifty-five responding to the question in the survey regarding storage areas gave an affirmative answer to the question, "Do you shelve books two or three deep on shelves?" Four academic libraries out of 116 responding gave an affirmative reply.

Libraries included in the survey are of various sizes although they are mostly large libraries. It was thought that their space problems
are more acute than those of smaller libraries and the suggested solutions can be applied generally. In concluding this paper it seems apropos to set down some additional interesting facts gleaned from the survey questionnaire distributed and analyzed by the writer. For the purposes of simplification they are enumerated below.

**Academic Libraries**

1) Eighty-eight percent have bookstacks open to all students and faculty. Less than 3 percent indicate that their bookstacks are closed to everyone. The remaining percentage obviously has a limited open stack arrangement.

2) Nearly half have storage space within their library buildings. Many also have an “annex” in another location. Shelving in storage is as follows, in order of frequency named: standard shelves, store in boxes, commercial storage shelves, shelved by size, and two or three deep on shelves.

3) Two academic libraries out of 116 responding have branch or departmental libraries solely because of space limitations in the main building. Twenty-five state that they exist *partially* for that reason. Sixty-one report that space in the central library has nothing to do with the existence of departmental or branch libraries.

4) Nearly one-half purchase microform materials, even when hard copy is available, in order to conserve shelf space, the cost or frequency of use notwithstanding.

5) Less than one-tenth admitted that they participate in an acquisitions program with other libraries for the single purpose of saving bookstack space. Twenty percent stated that their purpose in joining such a venture was in the interest of book budget economy.

6) Fifteen academic libraries resort to storing books in boxes.

7) Means employed within the library to gain additional book space, listed in order of frequency reported by academic libraries:

   a) Weeding or retirement to storage
   b) Minimal shelf expansion space
   c) Purchase of microforms
   d) Extra high shelves
   e) Shelve by size
   f) Excessively long ranges
   g) Narrow aisles
   h) Shelve on fore-edge
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i) Shallow shelves
j) Discriminate purchasing

Public Libraries

1) Twelve percent have an annex used for storage purposes.
2) Twenty-seven percent purchase microform materials, even when hard copy is available, in order to conserve shelf space, the cost or frequency of use notwithstanding.
3) About one-half of one percent of the public libraries responding entered into a cooperative acquisitions program for reasons of space economy alone.
4) Two-thirds have a storage facility within the central library, either a separate floor, wing, room, or area. Shelving there is as follows, in order of frequency: standard shelves, commercial storage shelves, two or three deep on shelves, stored in boxes, and shelved by size.
5) Means employed within the library to gain additional book space, listed in order of frequency reported by public libraries:
   a) Storage in building
   b) Minimal shelf expansion space
   c) Equally: (i) Weeding
      (ii) Extra high shelves
   d) Shelve by size
   e) Equally: (i) Discriminate purchasing
      (ii) Shelve on fore-edge
   f) Equally: (i) Narrow aisles
      (ii) Shallow shelves
   g) Excessively long ranges

Fremont Rider, who pronounced many succinct precepts for library administration over twenty years ago, made an issue of the fact that storage and weeding are not solutions to book space problems; he calls them “confessions of avoidance.” Rider, of course, was enamored with the future of the micro-card. But even the revolution in microfacsimile materials offers little help for immediate needs, writes Robert H. Muller: “Yet the concensus seems to be that, for the next decade at least, no great help can be expected as far as space is concerned, from microreduction, computer applications, cooperative networks, and facsimile transmission.”

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Any within-library solution to book space problems will of necessity be a short-termed one. Construction of one kind or another is inevitable in the long run but librarians must expect the plea for needed space, in the future, to fall on less concerned ears than before, as our boards and our regents expect the millennium very soon and assume that the library will be wired for every new, non-book, space-saving device invented. The general conception of the computerized, miniaturized library is growing and it does harm to our efforts to resolve the now library space problem.

References

Decentralization in Academic Libraries

J. Michael Bruno

The change taking place in all areas of human knowledge is increasing at a tremendous rate and is exponential in character, i.e., where change occurs new information is generated, which in turn creates change, ad infinitum. This growth of information by compound rather than simple progression is reflected in the upward spiral of publication and an accelerated growth of library collections. The end result is an ongoing spatial problem which has become critical.

The prime question is, of course, what alternatives are available (other than new construction) when a library's collections approach the limits of its stack capacity. Keyes D. Metcalf suggests three major possibilities: transfer of material from an overcrowded unit of the library to another unit; storage; and rejection of material—weeding for gift, exchange, sale, or outright discard.¹

This paper will consider the various approaches to relocation or decentralization as possible solutions to the spatial problem. There is and has been considerable discussion in the literature of librarianship on the topic of decentralization. All of the traditional arguments on both sides have been presented in a very capable manner; however, the problem of decentralization is interesting and becomes more complex with the growth of what has come to be called the multi-university. Perhaps the only excuse for yet another examination of the topic was ably stated by Metcalf: "As long as there are universities with large libraries, the question of centralization or decentralization will be a live topic for discussion; and, if I am not mistaken, the question will never be settled permanently one way or the other."²

Robert R. Walsh divides the forms of decentralization into "two species." In the first he includes that type of division based on kinds

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of forms and materials, i.e., separate libraries for rare books, map collections, documents, and so on. He identifies this pattern as "operations-oriented." The second or "user- and subject-oriented pattern" includes graduate and professional school libraries, laboratory collections, and separate undergraduate libraries. It is proper at this time to note other terms linked to decentralization that have appeared in the literature. The University of North Carolina has engaged in "planned decentralization" in contrast to "expedient decentralization." The result is the creation of large multi-disciplinary libraries, or "cluster libraries." Douglas Bryant of Harvard used the term "coordinated decentralization" to describe the administrative integration of ninety units of the university library system.

A detailed historical background of the topic can be found in Lawrence S. Thompson's evaluation of the trends in the development of departmental and collegiate libraries. An earlier document was issued by the University of Chicago in 1924. Most of the traditional arguments for and against centralization are developed here, and, as Wilson and Tauber point out, it was a unique study in that "it was the product of a faculty committee which approached it from the points of view of building requirements and subject interrelations." Many other singularly outstanding discussions have been presented, among them Miller, McAnally (particularly the administrative aspects), and Rush. Within the last fifteen years at least two symposia relating to the topic took place. The first concerned itself with divisional library needs for undergraduates, and the second took up the problems of centralization and decentralization in academic libraries. Despite these periodic examinations the questions of whether or not to decentralize, and to what extent, remain unanswered.

Decentralization by form of material, i.e., rare books, manuscripts, government documents, map collections, etc., has been practiced for many years. Whether these materials are housed, as is usual, in separate quarters in the central library, or in separate buildings which contain rare materials such as Harvard's Houghton Library, Yale's Beinecke Library, and the Lilly Library at Indiana, is not pertinent to this paper. The above is merely illustrative of the early tendency to decentralize library holdings by form of material. The prime advantage of housing such materials in separate quarters lies in the specialized service afforded scholars who use these collections. Service is more personalized and tailored to individual need.
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Another advantage is that collections consisting of rare books and manuscript material that are housed separately will attract more donors. There are three obvious disadvantages: 1) operational problems, 2) a necessary duplication of some reference and a large amount of bibliographical material, and 3) possible user frustration over access to the collection. However, due to the very nature of these materials, libraries will continue to create special areas for their preservation and service.

Before turning our attention to the user- and subject-oriented pattern of decentralization, specifically the widely dispersed subject departmental library and the more centralized subject divisional approach, we will assume that graduate and professional school libraries, such as law and medicine, will continue to be separated from the main library and enjoy variations of administrative autonomy depending on the local situation. The trend appears to be in the direction of establishing libraries in more of the professional schools such as engineering, education, etc.

The concept of subject departmentalization which supposedly originated in the seminar collections established by members of the faculty was not exclusively a product of the academic world, for by the first quarter of the twentieth century most major public libraries were organized on this pattern. As universities grew and more departments were added, the proliferation of departmental libraries went on. The main disadvantages with this type of organization are in the administrative area:

1) Administrative control (coordination, cooperation, and communication) is difficult to achieve.

2) The cost of administering such branches is indicated in the following statement by Wagman: "Fully 30% of the personnel budget of my library system is spent in staffing the many branches in less than adequate fashion. In addition, a very high cost is incurred by the catalogue department. . . ." Added to these is the expense of duplicating materials.

3) The problems of access and security increase. Other disadvantages such as the parochial attitudes developed by faculty members and graduate students, and the usually inadequate space and facilities, are of a lesser nature than the administrative problems outlined above.

Naturally there were certain advantages to which proponents of
this type of division could point. We cannot argue that they provided a greater convenience for those who find them geographically accessible, nor could we depreciate the possibility of a more personalized and individual service on the part of the library personnel assigned to a departmental branch. Perhaps we could even agree that there would be better faculty participation in the affairs of their own library. However, the disadvantages of having such small units as departmental libraries far outweigh any of these advantages. Departmental libraries may fill a need but they are far too costly. The fight to save these decentralized subject libraries serving one or two individual departments still goes on, but with the concept of the unity of knowledge, especially in the sciences, departmental libraries are giving way to a larger subject division approach.

A broader, more centralized subject divisional organization became possible with the accelerated construction of library buildings during the last twenty-five years. Before 1940 there were few examples of broad subject organization in academic libraries. During the late 1930s the University of Colorado began experimenting with such an approach, and Brown University consolidated its science departmental libraries into two large divisions, a biological science library and a physical science library. By 1945, Nebraska had developed a subject divisional organization which was created in an unusual manner due to the fact that geographic centralization was not feasible. A science and technology division was created with a number of sections; the divisional reading room was located in the main library, and various branch libraries remained both on and off campus. Cornell's reorganization was completed in the 1960s with a relocation of all science and technological material into three large divisions with separate facilities: agriculture (inclusive of the biological sciences), engineering, and the physical sciences. Preceding this move, a new graduate research library opened in 1961, and the renovated main library for undergraduate services became operational in 1962.

Briefly stated, the advantages of a more centralized subject divisional approach are: 1) closer administrative control, 2) expansion of available resources by a pooling of the material of overlapping subject fields, and 3) better utilization of the professional staff.

A possibly serious disadvantage could be the loss of the type of faculty involvement that would take place in the departmental library. Loss of the proximity of the materials might disturb some faculty but the recent trend to provide adequate library areas in the
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large inter-disciplinary building complexes should alleviate this complaint.

Another divisional library approach would be the establishment of separate undergraduate library facilities. This concept has found wide acceptance, for in the last decade at least a dozen such libraries have opened. In 1949 the Lamont Library at Harvard set the trend for separate quarters. Other major universities followed: Michigan, Texas, North Carolina, South Carolina, Stanford, and so on. At other universities such as UCLA and Cornell the original main library buildings have been renovated for undergraduate use. At this moment more are under construction, and many, like Oklahoma, are far advanced in their planning for such a facility.

An interesting set of papers was presented in 1955 on the topic of the undergraduate library. Lundy and Wagman argue that the undergraduate is deserving of a particular facility geared to his needs. Wagman feels that the undergraduate is frequently overlooked in the research and publication interests of the university. Dix does not feel that separate facilities are needed, for the stimulus generated by using a general instead of a selected collection would be lost. There is no doubt that separate undergraduate libraries help solve the spatial problems occurring in main libraries, but their educational efficacy is still open to question. It appears that the trend toward construction of separate undergraduate facilities will continue on major university campuses.

After reviewing the literature to date I find that there are perhaps only two principle disadvantages concerning decentralization. The first is the cost that occurs in the duplication of services and materials. If we assume that service of equal quality must be rendered in branch libraries, then there will be an extra economic burden dependent on the size of the branch unit. For example, with the decentralized facilities at Rutgers nearly 35 percent of the total book fund is used to purchase duplicate materials for its various libraries. It was pointed out that this duplication is unavoidable due to the geography of the campus and the attached satellite locations. Increased salaries for librarians, the constantly rising cost of materials, and the financial pinch which occurs in times of little money merely accentuate the problem. The second is that administrative control of libraries, whether it is due to their number (as in the case of departmental) or geographic distances, becomes difficult. The older the departmental library, the more difficult it is to wrest administrative control away
from the particular department. The addition of satellite campuses with their attendant libraries contributes to problems of coordination. In such a situation the delegation of authority and the extent of such authority must be clearly defined. Administrative control over all units on campus is much easier to achieve than the extension of such control over libraries which may be located ten or twenty miles away.

Of the many advantages of decentralization noted in the literature, the following are most often mentioned. First, it affords the patron the opportunity for readier access to needed materials, and second, it creates the desire in a faculty member to take more of an interest in library activities. The latter is probably more true in the case of departmental situations, but with the increasing interdependence among subject fields the same desire to participate in book selections, etc., will be transferred to the larger subject divisional unit.

We may conclude that:

1) Consolidation of small units into larger and larger divisions will continue to take place. This constitutes partial decentralization or partial centralization, depending on one's point of view.

2) There are no easy answers to the questions of how much and what kind of decentralization should take place. There are many factors which must be considered: governmental structure of the university, financial ability, size of the library, number of professional personnel, etc.

3) The type of library service planned for the future will have some bearing on decisions to centralize or decentralize, as will the library's proposed use of technological advances.

Some twenty-three years ago the results of a survey conducted for the Cornell libraries were made public and I believe one observation not only has merit but has enjoyed general implementation:

Some degree of decentralization is necessary and desirable to facilitate instruction and research in order to provide the most useful library service. On the other hand, the multiplication of departmental collections too small to be staffed or serviced economically or which will require an extensive duplication of books is unnecessary and undesirable. As new building plans mature around the campus, it should be quite feasible to merge departmental libraries in closely related fields into larger units, perhaps along broad divisional lines, such as biological sciences or physical sciences, especially if the teaching departments they serve are contiguous.20
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References


2. Ibid., p. 133.


Cooperative Storage

H. JOANNE HARRAR

In the effort to contain and to service their continually expanding collections without incurring substantial additional costs, many libraries have resorted—permanently or temporarily, on- or off-site—to some form of storage for their little-used materials. From the individually maintained storage facility to the storage unit jointly owned and operated by several libraries would seem, superficially at least, a logical, economical and widely adopted transition. Yet cooperative storage, although the subject of a lengthy history and a voluminous literature, has been limited in realization.

The history of cooperative storage in the United States parallels that of cooperation in general; the latter has been so fully explored in print as to have become a cliché. Too, it seems to have become a virtue in and for itself, rather than simply a means of solving certain bibliographic difficulties. Library literature abounds with exhortations to librarians to work together; with lists of benefits, tangible and intangible, to be derived from these activities; with descriptions of efforts undertaken; and with evaluations, generally based on subjective judgments rather than upon carefully gathered facts.

It should be noted that any one cooperative practice has traditionally been bound to others. In the case of cooperative storage, mutually acceptable criteria for selection and deposit of little-used material, cooperative acquisitions, even cooperative specialization in collecting have been considered by storage proponents, thus broadening—and complicating—the scope of activity.

A scanning of the writing on cooperative storage (which obviously must include a considerable portion of that on cooperation as such) soon yields several conclusions: since its conception in the last century, virtually the same reasons for employing this technique have been advanced over the years. Arguments pro and con have remained constant, and examples of cooperative storage enterprises undertaken on any appreciable scale have totaled only three in number.

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To be sure, cooperative storage facilities have become the tools only of large academic and research libraries obligated to collect in ever greater depth and breadth, and to retain against future need those holdings which are no longer heavily used or which have not yet realized their usefulness. In his review of storage warehouses of all types, Jerrold Orne pointed out that small public libraries must emphasize currency in their collections. Due to limited budgets and heavy use, books no longer in heavy demand are usually either outdated or in poor physical condition, ready to be discarded rather than sent to storage. Much the same applies to small college libraries whose holdings constitute working, rather than research, collections. Small special libraries whose holdings are limited in scope likewise need not concern themselves with storage.

While medium-sized public, academic and special libraries may begin to warrant storage facilities, "the storage library idea has attained its fullest development in the areas of the major public, academic and special libraries." Thus it can be seen that storage indeed is a function of collection size.

Among those large libraries for whom cooperative storage might appear to offer solutions to their housing and organizing problems, a variety of factors have inhibited action. For example, planning for the Midwest Inter-Library Center (MILC) bogged down for several years due in part to "the constitutional inability of librarians to agree on anything, the inherent weakness of the storage library idea by itself, plus the basic philosophies of the librarians concerned." Institutional pride, coupled with the desire to be able to provide locally and immediately whatever a faculty member or student needs, have been impediments. So has the reluctance to give up physical accessibility, thereby prohibiting browsing and the possible products of serendipity. Legal difficulties in the transfer of state-owned property have arisen. Concern has been voiced that supporting cooperative activities might prove detrimental to the local development of those libraries cooperating. Robert B. Downs, in discussing the Midwest Inter-Library Center said, "There is a fear, perhaps unjustified, that university administrators may use MILC as an excuse not to provide adequate support for their own libraries. Particularly in the case of buildings or building additions, the argument is used that nothing new is needed because any overflow can be transferred to MILC. Book funds might be affected. If such an attitude should develop, it could have disastrous consequences."
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In view of such deterrents, it may well be surprising that as many as, rather than so few as, three cooperative storage facilities ever achieved concrete development. On the other hand, the case for cooperative storage has been equally strong.

While the first printed mention of storage as a means of solving the problems caused by growing collections was made about 1893 by C. F. Adams, librarian of the Public Library, Quincy, Massachusetts, the first suggested application to academic libraries came at the turn of the century when W. C. Lane, librarian of Harvard University, raised the possibility of a storage warehouse for Harvard. Lane proposed a separate building in which little-used books might be housed, thereby freeing the library shelves of “dead wood.” In his 1902 report to Harvard President Charles W. Eliot, Lane extended his proposal to include the Massachusetts State Library and the Boston Public Library.⁶

During that same year, President Eliot, in an address to the American Library Association on the problems of the Harvard Libraries, advanced Lane’s proposal, adding that disused books should be housed in inexpensive buildings on cheap land, duplicate copies should be eliminated as far as possible, compact storage with fixed location by size should be employed, stacks should be closed, and records of books moved to storage should be removed from the public catalogs of the original owner libraries. While browsing would be eliminated, Eliot believed that the monetary savings would more than offset the disadvantages. As he envisioned it, expensive pieces of land around existing buildings would no longer be kept in reserve for future additions; indeed, the additions themselves would not be needed, since by retiring unused materials to storage the existing structures could continue to accommodate the living collection. Maintenance costs of a storage facility would be lower than that of the active library in terms of heat, light, number of attendants and cleaning; catalog handling and book delivery would be rendered quicker and easier and hence cheaper.⁶

Eliot’s speech elicited great interest, much of it directed, however, to the use of the unfortunate term “dead books.” A new main library was erected shortly thereafter, relieving the need for additional space, and the storage concept lay dormant until the late 1930s, at which time the need for additional space had become a major problem. Keyes D. Metcalf, then librarian, again suggested that little-used books be moved off campus to a low-cost, low-upkeep facility where
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they might be housed compactly. In order to ease the cost to Harvard of the initial investment, Metcalf conceived of a cooperatively owned and managed warehouse, in which several libraries could deposit materials, thereby spreading the cost among a number of institutions. Eight Boston-area libraries incorporated to form the New England Deposit Library in 1941.

Under the terms of the original agreement each member rented space in the building, selected, shipped, and shelved its own materials for deposit. Each member was to file cards for its holdings into the deposit library's union catalog.

Three types of storage were to be employed: permanent storage of little-used books available for use by anyone, temporary storage of books which would eventually return to the depositing library, and dead storage of books not available for general use.

Shortly after the opening of the library in 1942, Metcalf wrote, "It is hoped that cooperation between the libraries connected with the new institution will (1) do away with a good deal of unnecessary duplication that has already taken place, (2) prevent additional unnecessary duplication in the future, (3) provide for the advantageous disposal of the unnecessary duplicates, (4) help to bring about a suitable division of fields between the co-operating libraries as far as research material is concerned, and (5) make readily available to all the libraries the little-used books of any one of them."

Consideration of a cooperative storage facility in the Middle West came about in the early 1930s when a group of college and university presidents within the region discussed the possibilities. Due to the Depression and the resulting lack of funds, the idea was temporarily dismissed. In the late 1930s it was revived, and John Fall was engaged to explore the potential for a cooperative storage and distribution center in that section of the country.

The report of his survey recommended a deposit library "on the basis of the economies and useful services such a cooperative warehouse [would] provide [member institutions]." The need for new libraries would be "reduced and delayed," permitting the accumulation of "cash reserves and credits which [could] be directed toward other needs, such as increasing the book collections, bettering services to readers, and improving library personnel." As with the New England Deposit Library, such a facility would, it was predicted, speed service, permit elimination of unnecessary duplication, and allow use by all members of the titles deposited by any member library.
For the first time, the ideas of cooperative cataloging and of cooperative acquisitions were introduced.

The Fall report served as a basis of discussion during the next several years. In 1948, another survey was made, this time by E. W. McDiarmid, who called for a long-term program of library development to "make better provision for the total research need of the area and second, provide for economical and efficient utilization of existing and future resources to avoid duplication and needless expense." To achieve these ends, McDiarmid called for an inter-library corporation, which would make it possible for every member institution to consider more intelligently the kinds of research programs it would offer, to make more effective use of its faculty through access to materials in all fields and not just those in the local library, and to select areas for specialization in research. Each member institution could elect for itself areas of specialization, and all members would be encouraged to eliminate wasteful competition, with the net result of expanding and diversifying graduate work within the region as a whole.

In 1949 ten research libraries incorporated as the Midwest Inter-Library Center, with the declared purposes being to establish a facility "for the cooperative custody, organization, housing, servicing (and for some materials, ownership), of little-used research materials"; to encourage and even implement "coordination of collecting policies for specialized fields, among the cooperating libraries"; and to permit exploration of possibilities for cooperative bibliographical services among the membership.

In its buying programs, the center would purchase material only if it were not in or easily available to a member library, if it had research value within the region, and if it were little used. As for the deposit program, it was planned that insofar as possible, material would be merged into a single collection, the ownership of which would be given over to the center by the original owners. This collection would be arranged compactly by size. Legal problems in transfer of state-owned property required that four categories of deposit be established. Items in the first were gifts to the center; those in the second would continue to be the property of the depositing library, but would remain on permanent deposit in the center so long as it should last, with return to the owning institution only upon the dissolution of the corporation. Items in the third category, still the property of the depositing library, would remain on indefinite deposit.
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Those items in the fourth category were to be housed in rental storage, for recall by the owning library whenever it wished.

The center was to pay storage costs for deposits in the first three categories, as well as their transportation, cataloging, organizing and shelving. The depositing libraries were to cover all costs for items in the fourth category, as well as packing and shipping their own materials in the other three categories.

The center reserved the right to reject offered material if it failed to meet the three conditions for deposit previously outlined. Too, when an offered deposit seemed more appropriate within another member library, the center might suggest this solution to the offering library.

While the Midwest Inter-Library Center struggled through its early stages, three New England colleges in close geographical proximity discussed a similar undertaking. In 1951 Amherst, Mount Holyoke and Smith organized the Hampshire Inter-Library Center "to accomplish for colleges serving undergraduate students, faculty members and a few graduates what the Midwest Inter-Library Center . . . accomplishes for a dozen large universities . . . with their elaborate graduate and research programs." The purpose of the center was twofold: to release space for more heavily used materials, and to release funds to be used in extending coverage of lesser-used research materials by pooling backfiles and current subscriptions to specialized journals not in heavy demand.

Unlike the Midwest Inter-Library Center, which was housed in a specially constructed facility, the Hampshire Inter-Library Center was located first in the Mount Holyoke College Library, then later in the library of the University of Massachusetts, which became a member in 1954. In both cases, overhead costs were supported by the host institution.

It can be seen that all three warehouses derive from the same basic proposals, although in their development the cooperative storage concept evolved from that of a warehouse designed primarily to store little-used materials to that of joint acquisition for the purpose of extending regional resources.

In her dissertation, which considered the proposed and actual benefits contributed by each of the three facilities, this writer discovered that few of the stated gains had in fact been realized.

By 1960, members of all three cooperative storage facilities had either added to their main library buildings, constructed departmental units or contemplated so doing, thereby indicating that cooperative
storage might defer, but could not eliminate library additions. Processing costs might have been reduced, as indeed they were for a time by Harvard, which sent 20 to 25 percent of its acquisitions directly into storage; but under normal deposit conditions in all three centers, processing costs had increased instead, due to the added steps required to weed and deprocess books from the main collections and then reprocess them for storage.

While increased storage capacity could be gained through use of compact storage, only Harvard, of the New England Deposit Library members, employed size classes to any appreciable degree. Maximum capacity was not achieved at the Midwest Inter-Library Center, where by 1960 only one-tenth of the collection was stored by size. The New England Deposit Library had not eliminated unnecessary duplication, nor had it brought about division of responsibility for collecting research materials. While the Hampshire Inter-Library Center had eliminated duplication of little-used serial holdings, it had not apparently increased savings elsewhere. True, regional resources had been strengthened, but it is quite probable that the center merely formalized the working agreements that had taken place among the member librarians long prior to the center's development.

Many benefits suggested by Fall and by McDiarmid had not been achieved through the Midwest Inter-Library Center. Cash reserves had not accrued, partly because non-profit educational institutions do not build up reserves, and partly because the expenses of tax-supported institutions are met as necessary by the supporting bodies. Other unrealized aims were those of development and utilization of faculty skills; specialization in acquisitions and in graduate work; and consideration of types of research programs, either by individual members or by the membership as a whole.

The lack of sufficient data on individual library operations makes it impossible to compare costs of operations and services between participating libraries and the cooperative storage facilities of which they are members. Yet throughout the history of cooperative storage, certain factors have apparently been overlooked. For example, it should be feasible locally to produce conditions of reduced heat, light and staffing similar to those used in the cooperative facility, thereby permitting economies in maintenance to be effected as well on-site as in a joint facility. Another error lay in the idea that catalogs and catalog handling could be reduced through elimination of cards representing the titles shifted to storage. Indeed, decreased physical acces-
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sibility demands an increase in bibliographical control over stored items, via the card catalog or an equivalent, in order to make such material accessible to all members. Obviously, increased bibliographical control would result in increased costs. Another benefit—increased accessibility to all members’ deposits—has never been realized at the New England Deposit Library for the simple reason that bibliographical control in the form of a union catalog has never been developed. Finally, the argument that construction on inexpensive land is more economical than on expensive land overlooks the fact that land does not depreciate, that it is indeed merely a conversion of capital from one form to another.

In the decade since the aforementioned analysis, the three facilities have continued to operate with varying degrees of change. The New England Deposit Library now has ten members, of whom seven were charter members; other libraries have come and gone, using space only temporarily. For Harvard, even with some ten library units now in planning, construction or recent completion, the deposit library remains an important local storage facility. For other members, almost all of whom have added to their own library space, the deposit library either serves a needed storage function presently, or as a reserve against future demands. Refuting Eliot and bowing to the view that the serendipity of browsing is valuable after all, Harvard in recent years has abandoned its earlier practice of shelving by accession number within size class, in favor of shelving by subject classification within size class. Where previously the stacks were closed, users are now allowed direct access to the collections. In other major respects, policies and operations of the deposit library remain the same, indicating that it is still simply a warehouse owned and operated by several members, each of whom rents space and handles its own collections as it sees fit.

The Hampshire Inter-Library Center, too, retains substantially the same purpose and operation as it did a decade ago, although the Forbes Library in Northampton has become a full dues-paying member, and Hampshire College entered as a contributing member in 1970. Emphasis remains on developing the serial resources available to center members through sales of pooled duplicates and through funds contributed by members for that purpose.

The greatest change among the three has been in the Midwest Inter-Library Center, which in 1961 recognized a shift in geographical orientation and in direction by eliminating geographical restric-
tions on membership and opening full participation to any research library. While the deposit program continues, although on a reduced scale, heavy emphasis has been given to the cooperative acquisitions program. The transition in emphasis was furthered by the results of a center-authorized survey by Raynard Swank and Stephen McCarthy "to ask if the Center's activities were truly worth their cost to the members, to ask how well they were accomplishing their intended purpose, and to ask what it might do to become of still greater service to all of the nation's research libraries." Their major recommendation called for the center to cease being a regional agency and to become a national institution.

Too, they placed stress on the cooperative acquisition program because "cooperative, central acquisition before and in lieu of local acquisition offers the opportunity of substantial savings. The initial costs of purchasing, acquisition, cataloguing, and processing, are incurred once for the group of cooperating libraries, not several times, and the material is cooperatively housed and serviced from the outset. The further expense of discarding duplicates is eliminated." This statement thus recognized that the originally stated economies of cooperative storage had not proved out in operation, while simultaneously endowing the center with a somewhat different, albeit not new, focus.

The expanded scope of center activities and collecting has been recognized through legislation introduced with the support of the Library of Congress to amend Title II-C of the Higher Education Act of 1965 so that second copies of important and current foreign publications might be purchased and deposited in the center as national loan copies. The Committee on Research Libraries of the American Council of Learned Societies, in its recommendations to the National Advisory Commission on Libraries, urged that the center be given federal support in order to build on the center's "already substantial collections" and "thereby enabled to provide ready access to materials that could not otherwise, or only at unnecessarily greater national expense, be made readily available to all research workers." Accordingly, the center would effectively become a national library for the dissemination of research materials.

While relatively little attention has been given to the center in print in recent years, the scope of collecting and of services, together with the expansion of membership, may be appreciated by scanning the
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center's Handbook. Indeed, the center is well on its way to becoming, if it has not already become, a national resource.

Taken in sum, cooperative storage warehouses have been advocated largely on two bases: the economies to be realized, and the extension of resources to be achieved. History shows that the economies have not been made, but on the other hand, the extension of resources, in one instance, certainly has. However, the question should be asked whether improvement of resources through cooperative acquisition must take place as an integral part of a tangible facility, or whether cooperative acquisition, even cooperative specialization in subject collecting, could not be effectively pursued independently of an external physical entity. Perhaps the prime value of the three warehouses is their continuing testimonial to the fact that cooperation among libraries can indeed be achieved. If viewed as experiments, they can be shown to have made important contributions to the knowledge of possible means of resolving the storage problem. They should not, however, be looked upon as successful models upon which future storage facilities should be patterned. Instead, libraries attempting to find the same solutions sought by the advocates of cooperative storage would do well to investigate such other cooperative measures as those which are presently advocated or included as part of the storage facilities' extra-storage activities. Other possible alternatives, including such recent developments as communications networks of all kinds, should also be fully explored.

References

2. Ibid., p. 9.

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20. Ibid., p. 3.
21. Ibid., p. 10.
Network Alternatives and Solutions for Storage

WILLIAM S. BUDINGTON

The rationale for relating library network developments to library storage problems warrants at least a few introductory remarks. Sections of other contributions touch on certain significant and related matters: the conclusion of agreements for planned acquisitions programs and specialized, sharable resources; the decentralization of institutional holdings with arrangements for access; and the establishment of centralized storage facilities, cooperative and otherwise, with access and/or transport of informational materials. Such activities obviously have network characteristics about them.

By and large, library networks are not established to alleviate storage problems but to enhance accessibility to information resources. One may consider their success as preventive therapy, making unnecessary the duplicative acquisition of such resources by the participants. The possibility is presented, also, of removing some portion of a crowded collection, if the removed segment is already available in or becomes part of an accessible organized resource. It should be recognized that such networks may or may not have relevance to planned acquisitions programs, for either the central storage resource or the participants' own collections. Then, too, networks may relate to communication of bibliographic information only; the hypothetic remote accessing of a MARC data bank would qualify as some kind of network activity, but unless copy location is provided there likely will be no easing of storage problems. The various prototype or operating networks thus may deal with bibliographic access or physical access to information, or to both requirements, and one needs to bear the distinction in mind when considering their present relevance.

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for networks *per se* are not necessarily alternatives or solutions to overflowing bookstacks.

Cooperative undertakings among librarians are (we say) nothing new at all. Interlibrary loan activity has always functioned in network fashion amongst librarians, with extension of local self-sufficiency to include other collections, and the extension of sharing as a concept of access.¹ The metamorphosis from cooperation to networks seems to rest upon 1) formalization and planning and, 2) the inferred application of new mechanics and techniques, rather than increased amounts of old procedures and traffic. With respect to formalization, the objectives of a network must be selected and identified specifically and carefully, and based upon acknowledged and solvable needs. To be considered are: subject areas, physical format and content; restrictions such as language, existing resource inventories, supplemental resources required, and channels of communication; assignment of responsibilities; standardization and compatibility of records and procedures; cost determination and allocation; and many other organizational factors. With respect to new techniques, the influence of systems analysis techniques and particularly the availability and future potential of computerization and communication developments should be noted.

The forces working toward formalized cooperation have been many and powerful.² The impact of the so-called explosion in knowledge and resultant publications has made clear the impossibility of local self-sufficiency in meeting demands for information. Such demands have also been intensified by the expansion of educational programs and facilities, the growing consciousness that information is indeed a necessary base to progress and understanding in all fields of human activity, and the thrust toward intellectual freedom and the inherent right of each individual to the full development of his capacities.³ Recognition of these various factors has been achieved in varying degrees at various local and national levels; provision of public funds has encouraged and enabled the planning and implementation of many library and information-related programs. Through them, it is hoped, access to information records will be assured and the economic burden shared through assessments and the tax base.

Of pitfalls there are many, and an illustrative few may bear mentioning. Provisions of the Higher Education Act, Title II-A, give preference to libraries engaged in cooperative undertakings. As might be expected, eagerness for funds has generated at least a few poorly
considered consortia and other hasty arrangements. Then, too, cooperation does not preserve the existing components but changes them, more or less irreversibly. As one or more participants discontinue collecting in certain subject areas, the resource collections are built up, receive more use, and access may even be diminished.

The emergence of structures for coordinated action has been examined in a number of conferences. Initially, action has occurred within groups of similar libraries—small colleges, large universities and small public libraries. As planning proceeds, the barriers between types of libraries are hopefully surmounted, with a regional cohesiveness that recognizes the universality of human interest and inquiry and of the basic information record. Numerous examples of each level of enterprise may be enumerated. Among academic libraries the achievements include union catalogs and lists of serials, non-duplicating acquisitions agreements, open-door mutual privileges for faculties and students, common research centers, and centralized processing. Typical groups include the Associated Colleges of the Midwest, Associated Mid-Florida Colleges, the Tri-State College Cooperative and the Claremont Colleges. In New Jersey, ten state colleges and universities formed a Council of New Jersey State College and University Librarians to cooperate in the planning and acquisition of grant money, and the sharing of resources. The Ohio College Library Center will coordinate the library resources of fifty-one potential college members, public and private, based on a computerized processing center, shared cataloging and resource materials, with faculties given access to all member libraries. Within bounds of a single discipline, ten small Pennsylvania college libraries have each accepted responsibility for acquisitions in a different area of biology. At the university level, the five New England state university libraries are building their NELINET on a central computerized processing center, and New York has its Five Associated University Libraries (FAUL: Cornell, Syracuse, Rochester, SUNY/Buffalo, SUNY/Binghamton).

In the realm of public libraries, recognition has been given to the fact that small groups of individuals have the same potential interest range as large groups, and that each person should have full and convenient access to a total information panoply through the “seamless web of library service.” A vast amount of planning has occurred, much of it through support of the Library Services and Construction Act, Title III, and centered on coordination and funding of systems of libraries within the states. A bibliographic survey, 1956-1967, disco
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closed 132 published surveys, excluding those formulated as annual reports to the Office of Education. Querying 159 systems identified in the American Library Directory, 24th ed., 1964, Nelson Associates received 491 replies on which to base its study of effectiveness. From this mass of data on many cooperative activities was deduced a need for further information on such specifics as unit costs, audiences served, and the real value to the ultimate users. One estimate suggests that more books have become available in many small libraries, that there has been some increase in interlibrary loans, and that improved staff work has occurred in a few libraries.

Where funds have been made available, systems planning and formation have thrived, with varying degrees of success and much gained in experience. While many states can point to functioning combinations of arrangements, the most extensive infusion has probably occurred in New York State. Following passage of enabling legislation in 1958, twenty-two public library systems eventually came into being (including 700 of 725 public libraries in the state). The next step came about in 1966, when a governor's conference on libraries brought about the budgeting of $700,000 to provide for reference and research library resource systems (3R's). Nine such systems, representing, governed by, and drawing upon the research resources libraries of the respective regions have been set up, with services and cooperative programs of varying types ranging from centralized reference and referral operations to delivery of library materials. Two network activities were evolved for the state as a whole. The NYSILL (New York State interlibrary loans) program, tied together by TWX, included public, academic and special research libraries, using the state library as a focus and referral center. Three geographic referral centers received requests unfilled by the state library, channeling as appropriate to nine specialized subject referral libraries. Over 40,000 requests were handled in an eight-month monitoring period, and 87,000 in a subsequent operating period. Critical findings of two evaluative surveys dealt with relatively high costs (reduced from $15.80 to $10.82 per transaction) and slow delivery (nineteen days overall).

The second network trial under the 3R's program was FACTS (Facsimile Transmission System). Fourteen major libraries were linked for transfer of needed documents, six having both receiving and transmitting equipment and the remaining eight receiving sets only. Cost, quality of transmission, and imperfect utilization of such
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a system brought this trial to a close, as has occurred in similar experiments elsewhere.¹⁹

Of the nine reference and research library agencies chartered under the New York 3R's legislation, the largest and most publicized has been METRO—the New York Metropolitan Reference and Research Library Agency, centered at the New York Public Library. With a number of proposals in its future, those relating specifically to shared resources include cooperative acquisition of little-used research materials, cooperative storage, referral to other appropriate information and document sources, and a delivery system. Some fifty members with 400 library outlets constitute the METRO organization.²⁰ One thorough-going study in the area of science technology has been sponsored, with resulting recommendations for resource sharing and strengthening by various means.²¹

Moving now to networks formed on other bases, it is to be noted that subject disciplines (rather than geographic groupings) have also served as the common parameter. Again, New York State provides an outstanding example—the SUNY Biomedical Communication Network. Fifteen libraries participate, including various medical center and SUNY libraries, as well as the Countway Library of Harvard Medical School and the National Library of Medicine (NLM) in Bethesda, Maryland. A computerized data base includes book catalog records for three of the SUNY medical libraries starting with 1962, NLM book catalog records starting with 1966, article indexing records of the NLM's MEDLARS file, and holdings records for the journals indexed by Index Medicus from the New York State Union List of Serials file for network members. From remote terminals the user can identify the existence of literature satisfying his need and locate copies of specific documents. This impressive facility entailed development costs exceeding one million dollars (borne primarily by New York State), and has an annual operating cost of approximately $600,000.²²

On the national scene, the National Library of Medicine has produced a biomedical communications network featuring a number of elements funded by the Medical Library Assistance Act of 1965 (extended, 1969). Bearing directly on the provision of needed publications not locally available is the network of eleven regional medical libraries. Serving specific geographic regions, these libraries act as backup resources to local facilities and as referral centers to other regions and to NLM. Books are loaned and photocopies of articles are
delivered (at no cost to the user) when not found in local resources.23 The eleven-member ARLO (Art Research Libraries of Ohio) envisioned a program of planned acquisitions, work on a union list, and collections freely shared with each other.24 Following an original proposal in 1967,25 an agricultural information network was still being called for in 1970, with revamped plans drawn by EDUCOM.26

In one sense, EDUCOM (Interuniversity Communications Council) might be termed discipline-based, if pedagogy is admissible. Principally motivated toward a system of interconnected and powerful computer centers, EDUCOM hoped to provide its member universities throughout the United States with access to data banks and computing facilities. Its project EDUNET was to be an information network of advanced design, some part of which would provide textual access (at first digital, later by image) to the decentralized resources of the information record.27

The eventual place and necessity of nationally conceived networks of libraries is recognized, though progress in such thinking has been gradual and no “master plan” has yet been approached (let alone agreed upon). During the 1950s and early 1960s, the communication of information was the concern of several presidential panels, though their horizon was limited largely to government agencies and their focus was on science and technology. The “information problem” came to be seen as a complex of information processing and of document dissemination. Since the second factor is more amenable to systems design, modeling, and administration (and certainly to conceptual grasp), the COSATI report of 1965 was issued for study and reaction.28 In essence, dissemination of information and documents was to center on designated agencies appropriate to various scientific disciplines—including some libraries. The reaction of the library community was, at most, lukewarm; limitation to scientific output and lack of recognition of any large-dimension solution were felt to be serious shortcomings.

But the profession brought forth no detailed blueprint of its own. Rather, its appointive committee tried to highlight a few particulars: the total problem was national, not federal; an essential provision was intellectual access—the determination that needed information exists, in some location; a second essential provision was physical access—delivery of the record to the user by an unspecified mechanism built on established and shared resources; and, since specification of details lay beyond presently existing capabilities, the establishment of a national
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commission or body with authority, funding and expertise to attack the problem with necessary vigor and on a comprehensive front.29 Meanwhile, the National Advisory Commission on Libraries (NACL), having duly listened to many proponents and exponents, formulated its report to the president. It, too, emphasized the urgency of physical access. Recognizing the known interchange of materials and the reliance on resource collections, it noted the high cost to lending libraries and the slowness of transfer. “It is apparent that national, regional and state planning is needed to facilitate physical access to publications generally, utilizing any technological aids that it is feasible to employ.”30 In its recommendations to the NACL, the American Council of Learned Societies called for “the creation of a coherent national system of research libraries, minimizing unnecessary duplication, fostering cooperative efforts, and ensuring the freest possible access, consistent with local needs, to the resources of all libraries and archives embraced by the system.”31 Finally, the Committee on Scientific and Technical Communication (SATCOM) included a recommendation in its 1969 report (buried deep amidst more far-ranging thinking) for support of “research-library services, with emphasis on start-up costs for innovative services,” noting that “such services may and usually should cut across institutional lines and involve the concept of networks and the cooperative use of library resources.”32

In the 1968 amendment to the Higher Education Act, a new Title VIII offered much promise toward “Networks for Knowledge.” Funding was authorized for programs of acquisition designed for sharing and joint use, for giving access through interinstitutional catalogs and through efficient and effective systems for transmission. In such respects, it goes beyond the interlibrary cooperation enabled under LSCA Title III.33 But, by mid-1970 funds had yet to be appropriated under the HEA title.

There has thus been much expression of urgent need and deep belief in the high councils of the land. Were national networks to evolve, what form would they take? In the present context, how can needed documents be shared, transported from repository to user (transporting user to repository having some limitations)? Our present channels of interlibrary loan are progressing, from book post to United Parcel Service to library systems trucks to commuter airline routes. Use of photocopies in lieu of loan has been customary for economically short documents or sections. Through special funding or mutual agree-
ments, copying is often provided at no user charge. The Medusa-head of copyright difficulties lifts at each mention of this device of resource sharing, but doubtless some equitable balances will be achieved. The facilities which we hope we see approaching employ electronic communication and the application of computer power and automaton servanthood.

Presently, teletype (TWX, Telex) links hundreds (possibly thousands) of libraries, using both commercial and leased lines. While its messages are almost wholly inquiry and acknowledgment, some textual transmission occurs in most installations when transmission time is minimized. Its mechanical nature of operation does not and probably will not serve, even with high speed tape operation, as a principal medium for document transmission. The promise of facsimile transmission of entire pages has been held up to us, and numerous trials made over long and short distances. Depending upon the sophistication of equipment and character of cable or telephone line used, the print quality varies from illegible to excellent. The costs, in nearly all cases, are such as to cool the ambition and temper the demand for immediate service. Nonetheless, the prospect is still there, with coming development of flat-bed scanners, improved telephone lines, microwave transmission, cathode-ray tube projection, satellite relays—indeed a limitless array of "someday" apparatus to speed the needed resource in one collection to a distant user.

Teaming up computers with electronic transmission brings us to the limits of our present vision and sends us beyond to fantasies. The role of computers in aiding access to information now centers on the bibliographic, not the physical or document-transfer phase. Data bases are substantially limited to bibliographic citations, together with necessary surrogates (codes, indexing terms, locations, etc.) by which the existence and availability of an information record are determined. Most are batch-mode operations used for printouts and updates, but on-line facilities are becoming more numerous and even more are planned. The groundwork for any highly computerized network requires the most extensive analysis—exceeding by far the not inconsiderable study needed for a simple, formalized conventionally geared coalition. A number of interesting approaches have been made, utilizing techniques of systems analysis and mathematical modeling, ranging from the relatively basic to the esoteric.

Text input and storage for a computerized data base promise substantial obstacles. While the technology is readily available, the opti-
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mum selection, character of text (i.e., color, illustrations, etc.), user communities, and many other characteristics must be weighed. To aid in this preliminary task, EDUCOM has published a substantial compilation of data already available, as well as results of some new studies. However, the principal present barrier is cost. A recent estimate finds that the cost of keeping a book on the shelf is about 20¢ per year, or 2¢ per megabit for the average 10 million-bit book. Off-line storage in tape form increases the tab to $7.47 per megabit year—a multiplier of 373. Finally, on-line disc storage is $237 per megabit year, and our multiplier has reached 11,800, or, more fancifully, $1.18 \times 10^4$. For any immediate solution to our current book storage difficulties, one would seem well advised not to wait for help by this means. The technique being developed by Project Intrex at M.I.T. appears, in some respects, more promising. Text retrieval utilizes computer selection and manipulation of images stored in microfiche form, then transmission to remote stations and projection on a viewing screen.

The dimensions of the book storage problem, then, vary from rigid to flexible and from conventional to futuristically hazy. The yellow brick road of cooperation seems firm, familiar, and reasonably broad. As we establish the various branches and gradations, stretching to more distant regions, the earth moving and paving is ever more rigorous. Systems, by their very nature, can tend as much to cumbersome as to expedited operation. Resource planning and workable agreements are exceedingly difficult to negotiate and maintain, particularly at the levels of large research collections and in contexts where faculty, not librarians, may bend the final decisions. Cost analyses and reimbursement hold many pitfalls, and money may not solve all problems, despite our cultural training. The host of barriers is indeed all too well known. But the library network, conceived as a channel of access to information otherwise largely denied, has definite promise of assistance—but not total solution—for storage problems.

References


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The Selection of Library Materials for Storage: A State of the Art

HERMAN L. TOTTEN

Although the outstripping of library facilities by ever-increasing collections is not a new problem, it is becoming increasingly serious in many libraries. Weeding of the collection is one solution, but it is much easier to decide what to acquire for a collection than what to throw away or select for storage. In research libraries, particularly those with implicit or explicit national subject responsibilities, it is not really possible to anticipate the research needs of the future. In his article, "Crisis in Our University Libraries," Robert B. Downs states that the phenomenal growth of the book world is one of the many dilemmas facing university libraries.¹

Science and technology are among the most prolific areas of research. The cumulative nature and the exponential growth rate of science are well known. According to Price, science grows by a factor of ten every fifty years.² As the number of items published increases, so do prices. These increases in both volume and price inevitably have an impact on all library functions.

Academic libraries have traditionally considered their major function to be the collection and retention of materials with current or possible future value in support of the educational and research goals of their constituency. As a consequence of the explosive growth of print, there has been a corresponding mushrooming growth in the size of research library collections.

In dealing with the problem of growth, three types of solutions have emerged over the years: 1) development of on-campus facilities for storing materials beyond the scope of current interest (Iowa State University and the University of Michigan); 2) development of off-campus cooperative enterprises (Medical Library Center of New

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The selection of the type of storage facility is part of a larger problem that Cox calls the "total storage decision problems." In his view, there are two basic questions: 1) How will the books be selected for storage? and 2) How will they be stored? 8

The determination of material to be stored has received considerable attention over the years, but the amount of attention given to this problem in the past decade emphasizes its critical state. The common assumption of people working in the field is that it is the least-used materials that should be stored; therefore, a method of arranging the collection in descending order of probable future use is sought. The basic question arises as to what are the alternatives for predicting the future use of currently held materials. Can systematic methods that consider objective characteristics such as language, date of publication, and past circulation history be devised, or should the decision on storage be based on the sole judgment of subject experts?

Because of the nature of science and scientific publishing, considerable attention has been paid to studying what scientists read, what their reading habits are, how they get their information, and what the relation is between usage and age of journals. Studies have shown that it is possible to determine empirically for each subject field, the most frequently used serials and the ages of these titles. Results demonstrate that the use of scientific periodicals in a given subject field, as well as in general, is concentrated on a small percentage of the total number of journals in that field. 4

Burton and Kebler defined the time that is required for the obsolescence of one-half of the currently published literature as "half-life." 5 This is equivalent to the time during which one-half of the currently active literature was published. Strain 6 and Cole 7 determined that a relationship exists between usage and age. Cole developed mathematical formulas for predicting economic retention periods that assure effective utilization of stack space; Strain, faced with the problem of a serious space shortage, conducted research to develop possible remedies. The analysis of serial circulation records showed the percentage of the collection used for a given year, as well as the most frequently requested titles and their age distribution. Her findings supported Cole's: 80 percent of all requests were published within the last five years. The first six years (current and previous five) contributed to
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almost 84 percent of all requests. Based on these findings, a retirement policy was developed.

Both Fussler and Simon\(^8\) and Trueswell\(^9\) imply that more or less mechanical guidelines can be developed. Fussler and Simon made a frontal attack on the problem of the storage of little-used materials. The authors chose for a preliminary detailed survey of techniques, the collections of the University of Chicago Library in economics and Teutonic languages and literatures. They took a random sample from the shelflists of these collections, weighted it to avoid including too high a proportion of modern works, and examined the loan records of the titles chosen. They adopted the hypothesis that one in four titles had been selected for storage in 1953, used various formulas to decide which title would have been stored, and examined the success of each formula in turn by means of the records of actual issues in the following five years.

The simplest methods of selection depended on publication date, accession date, language of the text, as well as various combinations of these. None proved entirely satisfactory. When the library's records of past issues, over a period of five to twenty years, were combined with the previous data, the results improved considerably. A fair degree of correlation was found between the predictions for Chicago and those derived from Chicago data but applied to the collections of three other major universities in the United States. Rules similar to those for storing monographs were tested to see whether equally good predictions could be made about the future use of periodically published material. The most satisfactory rule was one which depended on the examination of each volume of a periodical title, starting from the earliest, until a specified amount of use appeared. It was pointed out, however, that such formulas were less useful than those for books.

Trueswell suggests a possible aid to the librarian for thinning a library's stacks based on the criterion of user needs.\(^9\) The method employs the last circulation date of the book as a parameter of user circulation requirements. By design, the resulting stack collection would serve over 99 percent of the user circulation requirements and yet be of a minimum size. Early research suggests that the number of volumes in a library collection may be reduced by 60 to 70 percent and yet fill well over 99 percent of the user needs. This method may also possibly determine which books should have multiple copies to minimize user disappointment.
The selective book retirement program at Yale developed from the need to consider the economic and administrative problems of the rapid growth of the libraries. For most of its existence, the Yale University Library had operated on the principle that it should acquire everything it could afford or that was offered as a gift or an exchange. In the 1950s, the library recognized that it could never provide space to house or shelve or for staff to process and service such a collection, and that it must become more selective in its acquisitions. The library proposed to the Council on Library Resources, Inc., a three-year concentrated program, sufficiently well-guided and controlled so as to make it possible to secure valid data, which would be useful to the university and to other libraries. It also hoped to obtain data for improving the criteria of selection for compact storage to be applied to various types of material, both old and current.

The three-year study resulted in the formation of a policy for determining types of materials which are placed in storage collections. The types of materials included the following: out-of-date scientific and technological material, out-of-date travel guides unless there was no other edition at Yale, transfers from the undergraduate browsing collection which had not circulated in three years, books on highly specialized topics which were covered or duplicated in more extensive studies, books in uncommon languages on very specific topics and on general topics which would not be of special interest to Yale, Farmington acquisitions in German and Swiss dialects, Farmington acquisitions of a technical nature (how-to-do-it books), inspirational literature, juveniles, noncontemporary minor authors, elementary and secondary school textbooks, crank literature, and biographies of obscure persons. The study provided another category of types of material which should be considered for storage: personal narratives of war experiences, transfers from departmental libraries, early imprints not wanted in special collections, and out-of-date books in any field.

Pamphlets were usually not considered for storage; however, any pamphlet considered for storage had to be one considered essential to the library’s permanent collection. Dissertations were assigned to storage with the following exceptions: a dissertation in a subject box which had a date due slip showing the volume to be frequently used would be retained in the stacks; a dissertation which seemed to be a major contribution to a subject field would be cataloged and classified as a monograph for the stacks; and a dissertation on an individual literary author would generally be classified with the author, particu-
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larly if it were an author which Yale collects. In general, second copies which were no longer needed were not assigned to storage. If there were two or more editions of a work and the later editions were revised and expanded, the latest edition was kept in the stacks and earlier editions were considered for storage. Original language editions and English translation, if there was one, were assigned to storage. Translations of works originally published in English were assigned to storage if Yale had the English original.

An analysis of loans by date of publication showed that there was a fairly regular decline in the use of older books among all classes of users. If a book had been charged out on an average of once or more a year for the past five years, it would be considered "heavily used" material and would not be transferred to storage.

Rules given for monographs that were applicable to serials could be followed. Rules devised especially for serials included complete sets of titles which ceased publication and early volumes of long current serial sets (usually not less than fifty to sixty volumes). It was determined that incomplete serials sets or incomplete early files of current sets could be transferred if 10 percent or less of the titles were missing.

Cooper relates the application of the criteria for weeding and storage at Columbia University's Chemistry Library. The Chemistry Library had been serving the departments of chemistry and chemical engineering for about fifty years; however, space problems and the erection of a new building complex for engineering disciplines dictated a transfer of part of the collection from the Chemistry Library. The move involved dividing the collection into two separate collections and physically moving numerous volumes. The Chemistry Library's entire collection was reviewed in order to determine which materials were of single and which were of joint departmental interest, as well as to determine the extent of overlap in those areas of joint concern. It was also decided that concurrently with the collection's assessment, a thorough weeding program would be started. The goal was to identify the extent of unused or little-used materials in the holdings, and then, based on the findings, to segregate the collection into levels of accessibility.

Different methods were used for serials and books in the weeding and separation programs. Books were reviewed according to subject fields as indicated by the Dewey class numbers, while serials were evaluated on a title-by-title basis. Lists of serials were drawn up and
circulated among faculty members seeking their suggestions as to the final disposition of the title. The following alternatives were suggested to the faculty: 1) title of no interest at all; 2) title of some interest, but not needed if available elsewhere in New York City; 3) title should probably be received, but not bound or stored (discard); 4) title not needed at Columbia if available anywhere in the United States on loan; and 5) title should be continued. The weeding policy adopted for books by all participating science and technology libraries was not to discard the following: 1) pre-1900 American imprints (unless a textbook) or pre-1820 European imprints; 2) books by Columbia University authors; 3) consecutive editions of more than three when the library has a copy of each; and 4) materials of intrinsic historical significance. The Trueswell technique was used to further weed the collections, and based on the findings it was decided to keep items in the active collection if they had been borrowed at least once during the previous five years. Other criteria, such as reference value, were also included in the final analysis so that circulation history was not the sole criterion.

Cornell University Library had over 22,000 (in 1961) infrequently used titles compactly shelved in storage areas where the only classification is by size. This arrangement results from one of a number of decisions made in the 1950s for the reorganization of libraries at Cornell. Badly overcrowded stacks dictated immediate transfer of some of the materials to other locations on campus. Back files of periodicals chosen first for relocation were those which could be moved without the need of changing catalog records or of changing many individual titles at the loan desk. Superseded editions and less-used monographs and pamphlets were next considered for storage. Some were discarded; others, though valuable enough to be retained, might only hamper the scholar consulting bookshelves in his discipline. It was decided to store these books in the most economical manner possible, while given direct approach through a minimum of cataloging apparatus.

The director for technical services, Felix Reichmann, devised a scheme called "area classification"—"area" referring to location in storage. In general, books are not chosen for compact storage if they require more than one subject approach, nor are titles worth retaining in duplicate sent to "area." Materials selected include the following: out-of-date textbooks; older editions of literary works in all languages if the library has modern and more legible editions available on the
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shelves; many scientific, legal, theological, and medical publications bearing imprints before 1920; a large number of foreign dissertations, particularly medical ones; publications in the humanities and the social sciences issued prior to 1850; obsolete books in all fields which have been superseded by newer editions and monographs; and many bound, boarded, or boxed pamphlet volumes. Current accessions have been included in "area" from the beginning.

The plan of establishing separate storage libraries for books that are seldom used was first proposed by Charles Eliot, President of Harvard. He devised the method as a means of relieving the congestion in the Harvard College Library bookstacks. He had been haunted by the spectre of keeping a roof over the library during the forty years of his administration. As early as 1871, in his second annual report, he called attention to the urgent need for an addition to Gore Hall. Many piecemeal remedies were offered to alleviate the crowding in the library over the years.

However, in his report for 1898/99, he stated in general terms his idea of ways in which the problem of book storage at Harvard and other large libraries might be solved:

One who watches the rapid accumulation of books in any large library must long for some means of dividing the books that are used from those that are not used, and for a more compact mode. . . . Although the iron stack was a great improvement on any former method of shelving books in a large library, it still wastes much room, and access to the books that are wanted is made slower and more difficult by the presence on the shelves of a great number of books that are never wanted.

Eliot's remarks drew fire from his librarian, although he had not proposed discarding unused books, and Lane (the Harvard librarian) was quick to warn against such a policy. Lane stated: "It remains true nevertheless that every old library contains an increasing amount of what might be called 'dead wood,' which impedes the progress of the student . . . and it may well be that in time such dead wood will have to be thinned out and stored away at one side, making a library 'wood pile' which can be looked over and drawn upon when necessary."

President Eliot had been arguing for the setting aside of just such a "wood pile" to help remedy the crisis in the stacks at Harvard. In 1901 he returned to the problem and developed his idea in some detail. He inferred that there must be "a large mass of unused, or
very little used books in the Gore Hall collection of 367,000 volumes” if only 63,673 books had been borrowed from the library during the current year. He further suggested that the economy and safety of modern methods of communication made it unnecessary for libraries to undertake storing books “by the million.” He also proposed that the Harvard stacks be examined every five or ten years, and those which had not been loaned be stored in a more compact manner somewhere else.

Eliot later had an opportunity to address two groups of librarians in order to answer the criticisms of his proposals. He addressed the Massachusetts Library Club in the spring of 1902, and the speech is chiefly remarkable for containing Eliot’s first concrete proposal for achieving the more economical means of the storage for little-used books—the erection of a separate storage building in which “all the books should be sorted by sizes, serially numbered, and arranged in double rows, if need be.” He gave fuller treatment to his ideas about “dead” books in his address before the American Library Association in June of 1901. The problem of the storing of “dead” books as a means of solving space problems came to an end with the building of Widener Library in 1915—but the problem was merely postponed for a generation. Eliot’s dream of a storage library came to fruition in the New England Deposit Library.

In the 1940s, Harvard again was faced with a crisis in space, and the ghost of Eliot’s recommendations of 1901 haunted Harvard’s libraries. The 1901 suggestions, though seriously considered, died a natural death with the construction of larger facilities at Harvard. The need for space in the Boston area led to the organization in 1941 of the New England Deposit Library Corporation, and in 1942 a storage warehouse for books was opened. The material stored or in the storage classification has been drawn from certain classes, transferred in toto to storage from materials weeded from other classes, and from current acquisitions of the library. The policy of decentralization of collection is an accepted one at Harvard, and the question of any individual unit outgrowing its available space is in a sense an individual problem.

An appreciable proportion of current acquisitions is sent directly to storage as is material selected by the catalog department and the department of resources and acquisitions. Early efforts at weeding collections have shown that removal of duplicate copies and multiple editions will release a great deal of space. Because of the different
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characteristics inherent in the various disciplines, there can be no basic and all-encompassing rules for selection. One general rule has been to move out large sets of volumes—items which would clear the most stack space for the least recataloging cost.

Velva J. Osborn, a former staff member of the Midwest Interlibrary Center (MILC) (now the Center for Research Libraries), at the behest of the Board of Cataloging Policy and Research of ALA’s Division of Cataloging and Classification, described the early development of the center. The study was a firsthand account of the beginnings of the center, and the author was afforded the opportunity of observing the truckloads of books, periodicals and newspapers as they arrived at the center’s loading dock and were placed upon the shelves. She was intimately associated at the receiving end with the mechanics of deposit transfers.

At its inception, MILC proposed a two-point program of cooperation for its library participants: 1) cooperative housing of little-used material, and 2) coordination of collection policies. The actual mechanics of selection of materials to be stored varied widely from member to member, but in essence all plans, no matter how detailed or impromptu, were motivated largely by two factors: 1) the kinds of materials which center librarians had generally regarded as appropriate, and 2) those materials which for one reason or another (lack of space, time, or ability to continue as an organized resource) the member library felt strong compulsion to turn over to MILC in hope of gaining better service. Materials selected for storage included both processed and unprocessed materials. The state of processing did not seem to have much influence on the types of materials selected. Members sent state documents, “collections,” books, textbooks, periodicals, college materials (catalogs, administrative bulletins, alumni and fraternity publications), foreign dissertations, foreign language or other special newspapers, manufacturers’ catalogs, war crime documents, trade union papers, miscellaneous books and periodicals, and serial publications. Some of the member libraries stated that references to circulation records, or to the experience of the circulation staff determined whether materials could be withdrawn from the library for deposit at MILC; others indicated that they made no use of studies.

Lister discovered that criteria for weeding should be based on the current (or immediate past) rate of usage. This was found to be superior to the age criterion or to other subjective rules. Intellectual
weeding policies which require judgment and are based upon somewhat intangible variables usually turn out to be time-consuming and expensive.

It continues to be true that many books in a large research library are seldom used, that being the nature of the "beast." It is now possible to use sophisticated methods for selecting little-used materials from a large library stack and storing them elsewhere without disrupting a statistically significant percentage of library users—in some fields of knowledge.

References

15. Ibid., p. 301.
16. Ibid., p. 305.
17. Harrer, Gustav A. "Relocation, Storage and Rejection of Materials in the
Selection of Library Materials


ADDITIONAL REFERENCES


JANUARY, 1971
Compact Book Storage: Solutions Utilizing Conventional Methods

MANUEL D. LOPEZ

The space problems of large collections as well as those of libraries that have almost reached their capacity are obvious. What has been belatedly recognized are the significant secondary problems and costs that are involved. Collections containing a significant number of necessary but little-used books are an impediment to the patrons' accessibility to titles. Such collections increase the costs of public service and maintenance, necessitate extensive shifting with subsequent damage to the books, and in general diminish the quality and quantity of patron satisfaction.

Consequently, space as a commodity in the library has been subjected to increasingly refined analysis. Of all areas of the library, the bookstacks have undergone perhaps the most careful scrutiny, resulting in various solutions or combination of solutions which include weeding and discarding, decentralization, the transfer of part of the collection, storage and the compact shelving of the collection.

Weeding is difficult and expensive. The library clientele's negative reaction to material withdrawn from the collection is apt to be inappropriate to the use and/or value of the item, thus this technique has had little appeal for most librarians. While little-used but valuable books must not be discarded in a cavalier manner, neither should timidity allow material of no value to be retained. Discarding at the same, or approximately the same, rate as material is acquired is another solution, but few situations exist which permit this alternative to be practiced. Like weeding, discarding is expensive, particularly in terms of staff time, i.e., in selecting and in changing bibliographic records.

The decentralization of the collection is a more acceptable ap-

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The transfer of part of the collection to branch or departmental libraries has proved effective in diminishing shelving costs while maintaining collection accessibility for the patron. The transfer of that part of the collection to be incorporated in another (outside) library system, having that (subject) as its special subject responsibility is another possibility; however, such a decision requires approval from the administration of the supporting or parent institution. Also, the participation in a cooperative acquisition program involves administrative sanction; and while the situation may initially be relieved, eventually collecting in depth may result in the same spatial problems.

The concept of storage has been utilized in a combination of ways. Regional or cooperative book storage warehouses are one approach; another is for the library to acquire (build or lease) storage space in the vicinity. Book storage warehousing is widespread, as indicated by Plumb. It not only provides savings in construction (low cost structures on cheap land) but also results in the reduction of expenses for lighting, heat, ventilation installations, floor coverings, decoration, maintenance, janitorial services, and shelving. Almost all of these economies are possible since access is severely limited or denied to the library patron. Compact book shelving techniques need not be confined to the storage warehouse situation. Indeed, just as it is done in Europe, a compact book storage area may be created within the library itself.

To be counted among the disadvantages of storage warehousing are the elimination of browsing as well as a calculated loss of book use. Equally true is the fact that the patron must be inconvenienced while the item is being retrieved. However, this vital issue is succinctly delineated by both Simon and Metcalf who remind us that space demands require decisions either to keep all books at the first level of accessibility, committing larger portions of our budgets to new construction and upkeep, or to control and contain those demands allowing for the reassignment of funds to cover other library functions. The possible solutions to that problem will be reviewed later in this paper when the economies and costs of compact book shelving are considered.

It should be noted that spatial problems are not limited to large research libraries. All too often the construction of a new building begins only when the current one has reached or exceeded its capacity, thereby creating, at least temporarily and in part, the transfer,
storage, and retrieval problems of the large research library. Conversely it may be decided that a new building cannot be built and the lack of funds or land precludes expansion, thereby requiring the maximum use of existing space. It should be noted that even the library administrator with a building having a growth potential of many years, could by the judicious use of the techniques and solutions employed by his more pressed colleagues, increase the quality of public service, optimize expenditures for overhead, maintenance, shifting, and cataloging, and in other ways increase the effectiveness of his operation.

Sizing—the segregation and shelving of books by their height—is one such technique. The material to be sized is usually divided into six to eight classes or groups according to height. Cox's study of two and three-dimensional unconstrained compact storage models resulted in the recommendation that only three to five shelf heights are necessary for optimal benefits. In practice, Yale and Cornell used six classes; the New England Depository Library preferred seven; and the New York Public Library decided to use eight categories. Using the standard formula of 125 volumes per standard section (7½ feet high, 3 feet wide, and seven shelves with expansion capacity for additional growth), Metcalf, postulating the use of six or more groups, states, "It should be possible to place eight or nine shelves per section, in a stack of the standard 7'6" height in the clear." Using eight-and-one-half shelves as an average, he computes an increase of 20 percent over conventional classified shelving. Rider estimated a 25 percent increase; and, seeking more space, he examined the relative merits of "fixed" location (chronological) versus the "relative" or subject arrangement of the sized books.

The latter scheme, according to the number of size categories used, would result in that number of separate classified orders. One criticism of this arrangement is that it requires expansion space—usually between one-quarter to one-third of the available linear footage—to be dispersed throughout the bookstack. It also contributes to misshelving and necessitates expensive shifting with its concomitant damage to book bindings. In contrast, the chronological sequence fills each shelf to capacity and according to informed sources, use in combination with sizing would result in an increased capacity of 60 percent (200 volumes per standard section). Advocates of the chronological method argue that the complex relationship of a subject makes it impossible to shelve all related material in the same location; the magni-
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tude of a collection prevents it from being viewed as a whole; and closed stacks, standard for storage areas, require the patron to use the card catalog or other bibliographic records for entry to the material. That position is buttressed by the observation that sizing eliminates the value of shelf access; Hill suggests that access to bookstacks with two or more sequences should be avoided, because they are confusing to the patron. Opponents of the chronological sequence criticize it on the basis that copies or editions of the same title will be placed in different locations according to their sequence of accession. Weber states the argument against the randomly stored collection and comments, "The Harvard Library is presently giving serious consideration to full classification for its storage volumes—after twenty years of using a simple size-and-accession number arrangement." Chronological order, combined with sizing, is standard procedure in Europe, the United Kingdom, and in many of the warehouse storage situations in this country.

The compromise "ribbon" arrangement of materials includes the sizing of books (in one classified order), but the height of the shelves remains constant throughout the bookstack area. For example, the top two shelves in a stack would be reserved for books of the minimal height category; the third lower shelf for the next larger size, and so forth. This "ribbon" arrangement, with some shelf adjustment, could keep all the materials of subject or class together; however, some estimates concerning the number of books that will be placed in storage are necessary in order to provide the necessary expansion space within each class. Fortunately, a number of studies and those conducted by Fussler and Simon and that by Lister provide guidelines and techniques for making those estimates. While Rider only considered the ribbon technique, the Manchester City Library, when renovating its services and bookstacks, employed it in combination with the determination of those classes of books in current demand.

The heights of books are an integral factor of sizing. The ratio of book heights (octavos, quartos and folios) was theoretical until the studies of Kilpatrick and Van Hoesen provided concrete data; however, they failed to indicate the procedures and costs involved in sizing. The more recent study of sizing done by Cox at Auburn and those conducted at Yale have corrected the situation and it is now possible to compare the procedures and devices so far developed.

Another variation of sizing (though one not in general use) is that
of fore-edge shelving. The width of the book becomes its height and it is shelved on its long edge. Rider estimated a theoretical 60 percent capacity increase and in combination with a chronological arrangement the increase would be 100 percent (250 volumes in contrast to the standard 125 volumes).\textsuperscript{24} As Metcalf points out, when using as a guide construction costs of $20 per square foot, $650,000 may be saved in the construction of a one million volume bookstack if books are shelved by size, in chronological order, and on fore-edge.\textsuperscript{25}

Fore-edge shelving involves several problems. Critics of the procedure point out that bindings break away from the spines of books and cite as a problem the lack of a surface for location symbols or class numbers. Rider solved the problem by “cropping” the book to provide a suitable surface. Although this solution is generally unacceptable to most librarians, the Yale selective book retirement program proposed an acceptable alternative: books shelved on their fore-edge (first four sizes) had the call number written on their inside cover, with every tenth volume placed in a box labeled and marked with the call number on it.\textsuperscript{26} With sizing, chronological order, and fore-edge shelving, Yale was able to store four and one-half as many volumes as would have been possible with conventional shelving techniques.

Boxing was another compact storage technique used by Rider. To inexpensive pasteboard boxes, the short end presented to the aisle, he relegated: continuations that appear in a variety of forms and sizes; books—rare, old and/or in need of rebinding; thin books likely to become lost on shelves; miscellaneous materials such as maps, clippings, and prints; and books lacking the surfaces for location symbols. While extensive boxing has never been a significant compact storage device, it is used in a limited manner in both active and storage collections. Jordan’s advocacy of the plastic book box is unique in that he advocates its general use not only for compact storage items but throughout the library.\textsuperscript{27}

Increasing standard stack capacity from 125 volumes to 400 volumes is possible by resorting to sizing, putting books in chronological order, and shelving them two deep (one behind the other) on 12-inch shelves. The inconveniences are obvious, but this technique, which is generally resorted to only in temporary circumstances, may provide savings that are not readily apparent. The possibility of shelving fifty volumes per square foot (the standard is fifteen) should not be casually discarded because it conflicts with our psychological set.
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toward open stacks and classified arrangements. While the above
techniques have been concerned with maximizing shelf capacity, there
are other aspects of compact book storage to be considered—stack
eights, shelf dimensions, aisles, and range length.

Focusing upon the relationship of the heights of books to stack
heights, the studies of Kilpatrick and Van Hoesen indicated that the
standard stack height was wasteful, i.e., "neither the 7½- nor the 8-foot
stack is the correct height for shelving 26 cm. books with the best
economy of space." Their analysis of the heights of 100,000 and
350,000 volumes indicated that 80 percent of them were less than
25 cm. or 9¾ inches high and 26 cm. was the optimum segregating
point for distinguishing between ordinary sized and oversized books.
They recommended stack heights of 80 inches to 88 inches high, for
seven shelves, or 97 inches to 100 inches for a stack of eight shelves.
More than twenty-five years later Cox's study on optimum storage
recommended stack heights of 86 inches to 89 inches and echoed the
now almost historic plea that "the 'optimal' design of stack units
should be studied for the benefit of librarians and manufacturers."

Cognizant of the studies on bookstack heights, Henderson warned
against estimating stack capacity without taking into consideration all
three dimensions of the book. He offered the concept of the "cubook"
which he defined as "the volume of space required to shelve the
average book in a typical library." He figured that "a standard 3-foot
section 7½ feet high, contains 100 cubooks." He arrived at his cu-
book by calculating the volume ratios of octavos (85 percent), quar-
tos (13 percent), and folios (2 percent). Even though Henderson's
cubook did not become a standard unit for estimating capacity, it
presumably was instrumental in focusing attention on maximizing
the cubic volume of space in the bookstack area.

Storage capacity can also be increased by the use of shallower
shelves, thereby reducing the width of the stack. Many stacks have
wasteful widths of 20 inches or more. Metcalf asserts that a large
percentage of books in research and college libraries measure less
than 7 inches wide, which could allow for a reduction of stack width
from 20 to 16 inches. This modification would result in a capacity
increase of 8 percent per square foot.

Since more space is devoted to aisles than stacks, the number and
the width of aisles have been a prime subject for analysis. Conven-
tional practice has aisles ranging in width from 36 inches (heavily
used stacks) to 26 inches and 22 inches (closed storage areas). Ca-
pacity increases due to reduction of aisle width have been determined by Muller who also raises the question of appropriate aisle widths for specific situations. Estimates of a 35 percent shelving increase have been made by Metcalf simply by using shallower shelves in ranges having 40-inch centers instead of 54-inch centers.

The reduction of the number of cross aisles and the extension of range lengths may also contribute substantially to maximizing space. A 40-foot range replacing a 4-foot cross aisle and two 20-foot ranges provides 10 percent more shelving. Additional gains can be made by using only one cross aisle and none at the walls.

Historically, the techniques of compact book storage have dominated the literature; however, it has been only within the last two decades that any appreciable effort and interest have been directed toward determining the costs of investments necessary to achieve the long-term economies envisioned. Initially, cost considerations were limited to the storage area factors, alternatives to additional buildings, and comparisons of equipment. As indicated by Hopp, questions of basic policy emerged. Research began to focus upon the more discrete aspects of compact storage, such as the expenditures incurred in the removal of materials to compact storage. These included the selection of materials, the correcting or creating of records, the physical transfer of materials and their retrieval, all of which, when placed in their proper perspective, were recognized as integral and significant aspects of the investment. A number of studies focused upon storage criteria, optimum lot size for transfer, the variables determining the efficiency of storage stack capacity, location, and indexes of the quality of library service vis-à-vis book accessibility. The directors of the Yale book retirement project, by assigning all its functions to a special staff, were able to maintain accurate cost statistics for the remarking, selection, physical transfer, and recordkeeping of the items involved. The report of this project also contains detailed explanations of procedures, routines, and statements of policies. Mattison's unique analysis of shelving costs not only evaluated the merits of different types of compact shelving, but carried the procedure a step further by presenting data on cost per volume shelved as well as on different lighting systems to be utilized with the various types of storage shelving. Unfortunately, research has made little attempt at focusing attention on the interrelationships of the different facets of compact storage.

While determining costs for the physical aspects of compact storage
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is difficult, it is not impossible, and the final decision involves a number of intangible factors. For example, will compact storage reduce the effectiveness of the collection? Do the advantages of compact storage outweigh the inconvenience to the patron? When should compact storage be initiated and to what extent? What are the long-range consequences of compact storage? What combination of methods is best? While the growing body of literature dealing with these data and the methodology of compact storage do provide partial answers, Simon, cautioning that "use is a satisfactory indication of value," presents several techniques for determining (in terms of satisfaction) the value of book use. Through his method it is possible to calculate revenue to the library by assigning a dollar equivalent to that value. In the same way, loss of revenue can be calculated for the materials placed in storage. With this approach all factors are assigned a fiscal denominator which presumably allows the librarian to be more precise in evaluating all of the elements involved in compact storage decisions.

The increased recognition given to the discrete as well as intangible aspects of compact storage has resulted in the development of numerous, diverse, and sophisticated techniques for the resolution of the problems involved. Unfortunately, the individual circumstances of each library, its unique clientele and their requirements, the variables of population shifts, future bibliographic demands, and unpredictable costs make long-range planning hazardous. Consequently, ventures into compact book storage utilizing conventional equipment require the utmost care in the identification (and detailed cost analysis) of all the elements that will effect present and future decisions for compact bookshelving.

References


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35. Simon, op. cit.; Cox, op. cit.; Fussler and Simon, op. cit.; and Lister, op. cit.
38. Simon, op. cit., p. 3.

ADDITIONAL REFERENCES


JANUARY, 1971
Compact Book Storage: Mechanized Systems

KENT SCHRIEFER AND IVA MOSTECKY

“A Fatal Injury in a Compact Stack Installation”¹

A fatal accident which occurred in a compact stack installation was reported in the October 1968 issue of the Information Bulletin of the Verwaltungsberufgenossenschaft. The installation in question consists of thirty-five stack ranges which can be closed against one another. For considerations of safety, the installation is accessible from only one side. On this side there are a number of structural columns about 30 feet apart. The stacks are opened and closed by operation of a key. The accident is reported to have happened as reported below.

The victim had opened the aisle for the twelfth range; thus twenty-three ranges had been moved. The entry to this aisle was narrow because of the structural column at the twelfth range. After using the material in the stacks, the person activated the mechanism by means of the key at the twelfth range. After the stacks had begun to move, she remembered that she had forgotten something and again went into the aisle without turning off the mechanism. She apparently believed that she would have time to leave the aisle before the stacks had closed completely. She had not noticed that the aisle was blocked by the column soon after the stacks had begun to move. The moving ranges pressed her against the column so that she was severely injured and died as a result of the accident. Obviously, she must have panicked on realizing her dangerous position and did not attempt to deactivate the mechanism.

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Compact Book Storage: Mechanized Systems

If a sense of false security is to be avoided, it is necessary that adequate free space be allowed around such movable stack installations. Libraries and bookstores with movable compact stacks should determine whether architectural features (columns, pedestals, protruding walls, etc.) are sources of hazards. A working report is available free from the Verwaltungsberufgenossenschaft. Its title is “Machine Driven Stacks or Cabinets.”

How and by whom a library is used may well dictate the methods the librarian must use to solve his space problem; it is assumed that every library is either presently faced with a space problem or will be in the future. It is ultimately the library patron’s tolerance for inconvenience that determines with what efficiency the available space is used. Obviously, one can fill a room with books from floor to ceiling, creating a solid cube of books, and gain 100 percent use of the storage facility—and, by so doing, reduce the accessibility to those books by 100 percent. What is desirable, therefore is optimal efficiency in space utilization. Compact shelving, in one form or another, is one approach to the realization of this goal.

What can compact shelving do for a library? Obviously compact shelving allows for a greater book storage potential; more books per cubic foot in the stack area could either insure enough room for growth of the collection or it could free stack space needed for other library functions. It may mean that a scattered collection (perhaps located in remote storage facilities) could be unified and serviced from under one convenient roof. If what can be gained by the use of compact shelving is reasonable and desirable, why then has there been so little acceptance of it, other than for the treatment of quasi-dormant or dead collections? Ellsworth has quite capably shown that conventional shelving is appreciably more expensive to install as well as maintain. Each institution must weigh the gains and losses that any form of compact storage would impose.

In this paper, the authors wish to omit any discussion of the most obvious (and most familiar) kinds of compact book storage—conventional shelving compressed into less space by reducing aisle width and using taller sections and manually operated movable shelving. Both varieties of compact storage have been in use for years (movable shelving alone has been in evidence for almost a century) and have been thoroughly discussed in the literature.
What the machine and the computer have done to help solve the problem will be studied and evaluated. In discussing the various systems and their operation, it should be understood that in the application of each one, the individual library administration must make decisions which will either increase or reduce the efficiency of the system. Arranging books by size makes for better space utilization, but it either 1) destroys a classification system that must be replaced by a whole new numbering system that indicates location, or 2) creates any number of parallel locations to be checked by process of elimination, unless the entries in the public catalog have been marked to give specific directions. In both cases, massive and costly record changing is inevitable.

Perhaps the most critical option that is open (Randtriever and Bibliophone excepted) is closed versus open stacks. Better performance and control would be realized if the stacks were not accessible to the users; each library’s clientele will probably react differently.

The various systems fall into two categories: (1) mechanized with power assist and (2) mechanized and/or computerized.

MECHANIZED SYSTEMS WITH POWER ASSIST

Three very similar systems are included in this group of compact storage devices: Compactus, Estey-Elecompack, and Space Saver Electric Mobile Storage. Each system provides for a series of two-face stack ranges that are mounted on tracks or rails perpendicular to their length; each range has from four to six sections. The ranges are so mounted that one aisle serves all of the ranges in that particular group; usually ten to twelve ranges are the maximum number of ranges in one group. An electric motor provides the necessary power to move the ranges back and forth on the rails. When signaled, the motor moves the ranges, creating the desired access aisle.

While all three systems share the same basic concept, there are some individual differences to be noted.

Power

1. Compactus uses but one motor for each group of ranges; the motor moves a cable which is mounted beneath the ranges. Each range is equipped with a clutch device that grasps the cable when it is signaled to do so, thus pulling the range to its position.

2. Estey-Elecompack substitutes a movable metal strip, also mounted under the floor, for compactus’s cables. The hook-and-eye
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principal is that of Estey; the metal strips have hook-like devices which make contact with the appropriate range when the signal is given.

3. **Space Saver** equips each range with a separate motor. Each range has its own 110 volt, 5 amp. gear motor that produces a torque of 400 inch-pounds. The motor is connected by a roller chain to a drive wheel that rides the rail the range is mounted on.

**Control**

1. **Compactus** ranges are individually activated by means of levers mounted on the end panels of the ranges. When the lever is moved, the cable makes contact with the range.

2. **Estey-Elecompack** has the most versatile and useful control system. The ranges can either be activated individually by pressing the buttons mounted on their end panels or from a master control panel which controls the movement of all the ranges in the group.

3. **Space Saver** ranges are individually controlled by electric push buttons mounted on their end panels.

While each manufacturer has given attention to built-in safety features, the Estey-Elecompack approach is worth mentioning separately. If an aisle is in use—and only then—is it lighted. A light goes on automatically when the aisle is formed; when finished with the aisle, the user is instructed to push a turn-off button that extinguishes the light. Even if another button is pressed when one aisle is lighted, the system will not operate. In the event an object or a person is left in an unlighted aisle, and someone else pushes the operation button, safety bars at hip height and toe level trigger the unit back to its former position. The safety bars are continuous strips running the length of each range.

To summarize, it would be difficult to rank these three systems; they all are basically the same system emerging from a common concept. The few differences in hardware, power application, and control are not appreciable to allow establishing one’s preeminence over another.

**MECHANIZED AND/OR COMPUTERIZED SYSTEMS**

The Randtriever is the only system that qualifies in this area. While the Bibliofone which is now operational at the Delft Technological Institute is intriguing and innovative, it is purely a computerized

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circulation system and not a compact storage system. To explain the system very briefly, the patron dials the number assigned to the book he wants; by so dialing, the number is automatically fed into a computer containing the library's circulation records. If a number match occurs, the transaction is ended and the patron is so advised. When there is no match, a bell alerts the book number to a library page on the appropriate stack level, who fetches the book and places it on a spiral chute; gravity takes over and the book slides down the chute to the charge-out desk. All retrieving and shelving activities are performed manually by library personnel.

The Library Bureau (division of Sperry Rand) ABC-801 system is basically only a variation in the implementation of a Randtriever, the difference being that the ABC-801 will function in standard bookstacks 7½ feet high. It will not be discussed as a separate system in this paper.

The Randtriever—How It Works

The Randtriever, as the name implies, is basically a compact book storage unit that has a built-in book retriever. Each book in the collection is assigned a fixed, address number and placed in a correspondingly numbered container. The methods of assigning numbers may vary from library to library. For example, one approach is to assign a seven-digit, unique address number to each book in the system, with the last three digits designating the container in which the book is stored. This number then could be used for the circulation record as well as the address number for the book. Any number of possibilities exist from which to choose. The book containers are a uniform 10 inches high, 7½ inches wide, and 15 inches deep (see Figure 1). The manufacturer's research has shown that, on the average, each container will accommodate twelve and one-half books. If a book is more than 10 inches tall, it can be laid flat and still fit into the container. Any book with a single dimension greater than 15 inches (atlas, folio, etc.) is not allowable in the system and must be cared for in the conventional manner. For further refinement, the books can be arranged either by call number or address number within the container. The authors see absolutely no virtue in retaining a classified collection in a Randtriever installation. Assigning address numbers—not dissimilar from accessioning—is far cheaper and easier than for a cataloger to agonize over finding the perfect call number for each book.

In any event, the address number is the only input the system
recognizes as legal; classification serves no purpose and is probably a
hindrance. This becomes more apparent when one realizes that titles
in series and journal volumes are not acquired all at one time, and
therefore will not rest in the same book container with their com-
panion volumes. The same holds true of course, for each new edition
the library acquires of a title already in the collection. In order to
realize the maximum storage density within each book container, the
books could be batched by size and then assigned their address
numbers—an additional argument for a non-classified library. The
collection still must be cataloged however; author, title, and subject
approaches must be made available to the patron who now must do
his browsing in the catalog, not in the stacks.

The book containers are numerically arranged on shelves in 20-foot
high ranges; a master column (the retrieving device) is located in
each aisle and retrieves the book containers facing into the aisle from
both ranges (see Figure 2). When an address number is input elec-
tronically (via a ten-key console), the appropriate master column is
signaled to retrieve the book container in which the book is housed
(see Figure 3). The master column searches horizontally and ver-
tically at the same time, thus greatly reducing the turnaround time
from request input to book in hand. This can range from ninety sec-
onds to two minutes depending on how loaded with requests the
system is. If, for example, six patrons requested books whose address
numbers all happened to be assigned to the same master column,
the completed transaction for the sixth patron would require far
more search time than that for the first or third. The master column,
after locating the proper book container, attaches itself to it mag-
netically, and places the container onto a conveyer whose terminus
is a charge-out desk (see Figure 4). A display device alerts either
the patron or the desk attendant which book container has been re-
trieved. The requested title is then manually selected from among
the others in the container.

The assumption is that each book request must be mediated by
library personnel, and perhaps that is as it should be in some installa-
tions, e.g., small to medium-sized public libraries. However, in a
library whose primary user population is composed of graduate stu-
dents and faculty members, it would seem unnecessary to filter each
request through a staff member.

At this writing, none of the four Randtrievers contracted for (New
Health Sciences Library, Ohio State University, Columbus, Ohio;
Figure 1. Book Containers

Figure 2. Master Column
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Figure 3. Console

Figure 4. Conveyor
Logansport-Cass County Public Library, Logansport, Indiana; Des Moines Area Community College, Des Moines, Iowa; and Monroe County Public Library, Bloomington, Indiana) has the capability of refusing to search for titles already charged out—other than, of course, having someone manually check against a charge-out record—and not permitting the search in the first place. An automatic inventory control check would greatly improve the efficiency of the operation, to say nothing of the borrower frustration that would be significantly reduced.

The prototype Randttrieve which Ellsworth describes was equipped with an automatic inventory control check; all book requests, prior to their being submitted for search, were first fed into a computerized circulation record. If a requested title were charged out, the computer record would so indicate and the transaction would go no farther. Unfortunately, engineering difficulties have as yet not been sufficiently overcome to place the computerized model on the market. It is hoped that, whatever the problems are, they soon will be resolved. The necessary technology certainly exists and should be applied.

Restoring a book to the stacks is a variation of the same procedure. A punched card (Hollerith) is either pocketed or hinged onto the inside back cover of each volume in the system. The card is coded with the book’s address number. By inserting it into a card reader, the system is signaled to retrieve the book container provided for that particular book. When the container arrives at the control station, the punched card is reread to insure that the numbers match; if there is a disparity between the two numbers, the book container is reshelved and the process is repeated until a match occurs and the book is restored to its proper address.

Each master column can accommodate two commands per mission; it can for example, refile a book container in the same trip it is making to retrieve a book container. A buffer system permits the storage of commands; no requests, consequently, are dumped. The memory of the buffer system can be enlarged if it has been shown that the traffic is too great; a single request memory per master column is standard.

The basic system as described above can—and doubtlessly should—be tailored to meet each library’s needs but yet not sacrifice the overall efficiency of the installation. One of the first considerations to make, it would seem, is what types of materials can best be stored and retrieved without a major alteration of the installation’s fundamental configuration. Most libraries acquire materials in two formats: book
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and non-book. Within each category are some general problems that merit discussion. It should be kept in mind that the Randtriever is not all things to all of the pieces in a library's collection. The comments which follow apply, in most instances, to the other previously mentioned systems as well.

Book Format

Most monographs can easily fit into the system unless there are special restrictions placed on their use. In this category are books that are considered: 1) rare (for any number of criteria that vary widely from library to library); 2) to be a smaller, discrete collection in the library, e.g., ready reference and reserve materials, a special subject collection, an intact legacy that must be maintained as such, etc.; and 3) too frequently lost, stolen, or mutilated, e.g., books describing sexual behavior, art or travel books with handsome plates, and so forth.

Bound and unbound journal volumes present another problem if the library's policy is not to circulate them. What with quick and relatively inexpensive photocopy being substituted for requested journal articles, many libraries no longer permit journals to leave their premises. If this is the case, it would seem folly to include journals in a Randtriever system. A journal collection that does not circulate, whether arranged alphabetically or by classification number, would appear to be far more accessible to patrons as well as the library staff if maintained on conventional shelves. In medical and science libraries where current journals (both bound and unbound) are in constant demand, the librarian who interfered with their immediate accessibility would be committing suicide. It may be decided, however, that older, less-used journals can be incorporated into the system satisfactorily. If journals are allowed to circulate, one could consider them no different from monographs and therefore treat them as such.

Non-Book

Non-book materials in a collection are a mixed bag of troubles ranging from all the various types of microforms to maps, letters, broadsides, manuscripts, phonodiscs, audio-visual materials, paintings and prints, sheet music, and an endless variety of objets d'art and artifacts. Without begging the question, a Randtriever offers little potential for such holdings—nor should it be expected to. For a host of obvious reasons, a librarian is usually necessary to mediate requests for these
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materials, explain or set up special equipment, and supervise their use, etc.

The obvious conclusion to make is that the Randtriever is only a partial solution to a library's storage problem, albeit a very effective one. There will always be parallel storage and retrieval systems co-existing in libraries, whether they be manual, mechanical, or computerized. It seems inconceivable that any one method or device can be designed which is flexible enough to accommodate all the sizes, shapes, and use restrictions inherent in any collection.

The Randtriever can, however, compactly organize and control a large portion of a library's collection, even if its use is restricted to the "unspecial" monographs. This in itself is a monumental achievement; it concentrates more volumes in less space and frees library personnel from some of the less captivating chores of stack maintenance—shelving and reshelving, shelf reading, inventory taking, and shifting. Because of the built-in checks and double-checks, both in retrieving and refiling books, coupled with the virtual impossibility of theft, one becomes somewhat more credulous when consulting a circulation record. The patron who has always reaped the harvest of library inefficiency, human error, theft, and confusion, doubtlessly will welcome not hearing, "I'm sorry, the book is not on the shelf nor has it been charged out."

To help evaluate the Randtriever system, particularly with an eye toward determining what type of library is most suitable for such an installation, an outline of pros and cons follows.

**Pros**

1. Allows efficient use of space; uses one-third the cubic space required for conventional stacks
2. Overhead and maintenance costs reduced, i.e., lighting, heating, cooling, etc.
3. Personnel costs reduced:
   a. two people can monitor the system
   b. processing costs reduced—no longer necessary to classify or Cutter titles; this may not be a total saving, for it is conceivable that more time may have to be used to describe the collection more fully, a necessity in a closed stack situation
4. Reduces, if not eliminates, book theft
5. Organizes and controls a large segment of the collection
6. Reduces human error factors in shelving, etc.
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7. Prompt retrieval
8. Expandable
9. Can be modified to meet local needs
10. Compatible with electronic data processing equipment

Cons
1. Does not as yet automatically check circulation records before retrieving; can result in squandered time and patron frustration
2. Does not retrieve only the title specifically requested but all titles sharing the same container
3. Does not lend itself to many types of library materials
4. More expensive than conventional shelving and other types of compact storage. Because there are no firm figures available, this is conjecture. It may well be when costs are amortized and all factors considered, i.e., personnel savings, maintenance and overhead, theft reduction, etc., the Randtriever could end up most economical
5. Requires special and somewhat atypical space allocation. This of course, would not be a problem if a new structure were being built to house the installation. A major remodeling job with many structural changes would be required in an existing building to realize 24-foot ceilings and adequate load-bearing floors. The Randtriever can be supplied in shorter heights with resulting loss of space per square foot of floor
6. Closed stacks; patron cannot browse

What kind of library that presumably is sensitive to its patrons' needs, can live with both these positive and negative features? The last mentioned, closed stacks, may well be the most pivotal characteristic of all. This is true more in the United States than in Europe where libraries have rarely encouraged free access to the bookstacks. In the United States, however, what with the public library movement and the democratization of higher education, the public library card (if not free, at least modestly priced) or a bursar's receipt has quite literally, become carte blanche to millions of library users. To be sure, there are patrons who will be eager to negotiate their browsing power for greater efficiency, speed, and reduced frustration. There are others who regard free access as a birthright, if not an inalienable or constitutional right, and will not surrender this privilege.

The problem it seems then, is to determine what a patron will tolerate in his own library setting, and what types of libraries or parts of libraries can provide better service to their users with a Randtriever.
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Recommended for

Some libraries or sections of libraries are better suited to use a Randtriever system than others. In libraries where finding the particular book that contains the specific piece of information desired is often the customary action, the patron usually knows what book he wants and does not regret not getting it himself. Included in this group are either autonomous libraries or identifiable collections within a larger, parent institution; a minimum volume count of 100,000 would be necessary to make the system feasible. Most large monograph collections not specifically assembled for recreational reading, browsing, etc., could benefit by the system. These would include: 1) science and technology libraries, 2) special and industrial libraries, 3) medical and paramedical libraries, 4) large reference-research collections usually found in big public and university libraries, or reference libraries per se, and 5) commerce, business administration, economics, etc., libraries.

Not Recommended for

The system would not recommend itself to 1) small to medium-sized public libraries, 2) libraries whose holdings are principally those in a non-book format, or 3) any type library qualifying as “Recommended for,” but with holdings below the 100,000 to 150,000 volume level. (For a more specific and technical look at the Randtriever, a portion of the specifications submitted by the Sperry Rand Corporation to be followed for the installation in Ohio State’s New Health Sciences Library is given in the Appendix.)

References

5. Information supplied by Jack Pearson, Manager for Manufacturing-Engineering, Randtriever.

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ADDITIONAL REFERENCES


APPENDIX

TECHNICAL NOTES

(A portion of the specifications submitted by the Sperry Rand Corporation to be followed for the installation of a Randtriever in Ohio State’s New Health Sciences Library)

This installation, using 8.33 books per container as an average, will compactly store and retrieve 139,594 volumes. If this collection were an average library collection, each container could hold 12.5 books and the installation would be capable of housing 209,475 volumes.

Description of Equipment to be Furnished to Owner

General Description—Randtriever equipment provides a means of mechanically storing and retrieving containers without human participation, except for making requests by keyboard or encoded card and removal or replacement of stored media from the container at the operator console (desk). The equipment includes four operator consoles from which requests for containers are made and to which containers are delivered from the container storage area. The container storage area consists of an array of lateral shelving, arranged in fourteen rows forming thirteen aisles. Four of the rows will be only five containers deep.

A total of 16,758 containers with outside measurements of 8 inches wide by 10½ inches high and 15 inches long are stacked on both sides of the aisles along each of which one of the eight motorized columns traverses. (The five aisles formed by the short length rows will not be equipped with motorized columns.) A platform with an extraction mechanism rides each motorized column, positioning on the container cubicle, extracting the container and delivering it to any one of four
predetermined conveyer positions at the head of the aisle depending upon from which console the container was requested. The container will then be delivered by conveyer to the console through which the request was initiated.

The shelving housing the containers must be designed to occupy a space no greater than 23 feet 10 inches high, 65 feet 10 inches wide, and 51 feet 1 inch long. The Randtriever equipment shall be designed on the basis of handling a container load of up to thirty-five pounds per container (excluding the weight of the container itself).

Conveyers—Conveyers will be of sufficient length to accommodate expansion of the system to thirteen aisles and will require only additional connecting equipment if the system is later expanded by the owner to add all or some of the five aisles formed by the short rows.

Consoles—Each console will be equipped with the following subsystems:

a) one ten-key keyboard for manual entry of requests,
b) one card reader for entry of requests by use of a pre-coded card,
c) one seven-digit display controlled by the keyboard for check of requests entered,
d) one electro-optical container reader for automatic identification of the container retrieved from the shelves,
e) one seven digit display controlled by the container reader showing the number being read by the console electro-optical head,
f) one electronic buffer in each console to permit storage of a maximum of twenty-six requests distributed on a basis of two requests per column (i.e., the buffer will permit storage of two requests for each of the eight columns to be furnished and will also contain excess capacity to permit storage of two requests for each of five columns if such columns should be added in the future by the owner).
g) one verification interlock that allows a container to be returned to storage if the output of the card reader corresponds with the output of the container reader. (The card reader is transferred from request operation to verification operation by a manually operated switch.)
h) one set of transfer indicator lights, indicating when a requested container has been transferred from the column platform to the conveyer system.

Retrieval Cycle—A request for a container (thus a book) is made at any of the four consoles through either keyboard or card reader. The
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number entered is displayed on the seven-digit display. After having checked this display for accuracy, the operator depresses the “retrieve” button which causes the displayed information to be transferred to the electronic buffer. The buffer is divided into thirteen segments (i.e., one segment for each of the eight columns to be furnished plus excess capacity segments for the addition of five columns if said columns should be ordered in the future by the owner), each feeding electronic information to the columns. The command stored in the buffer will initiate the appropriate electronic information storage module for the appropriate column immediately if that module is not then in use. If the module is in use, and there is unused capacity (for that column) in the electronic buffer in the console from which the unsatisfied request was made, the command will “queue up.” During this queue up, commands for containers covered by other modules may be entered and they will be processed as described above. When a container is presented to the predetermined position, it is deposited onto the conveyer run and is transported to the requesting console. If necessary, it will queue up with other containers coming into the console. As each container arrives in the console, its coding is sensed by the electro-optical container reader. This sensed information is displayed on a digital display allowing the operator to match the request with the container at the console. After the book has been removed, a foot switch will release the container on the return run of the conveyer. The returning container is automatically “read” at each predetermined position. When the container arrives at its home information storage module, a diverter is activated and the container held in a file position from which the column will restore it to its assigned cubicle within the shelving.

Return Cycle—The return of books to the system is generally the same as that for retrieval, with the exception that the verification interlock subsystem is used as an additional check.

Floor Load—The floor in the container storage area is to be designed and installed by the owner to carry a uniformly distributed load of 536 pounds per square foot, and a punching load of 3,283 pounds on a bearing surface of 4 inches by 2½ inches. (Owner recognizes that these load bearings and punching values assume a maximum load per container of thirty-five pounds.)

Temperature and Humidity—The temperature range in the container

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storage area is to be from a minimum of 40°F to a maximum of 112°F. The maximum humidity is to be no greater than 90 percent.

**Power Distribution and Loading**—The following number and type of alternating current electrical power lines are to be furnished by the owner at a distribution panel in the storage area.

- 13—2 KVA, 117 volt, 60 Hz circuits (master columns)
- 10—1.5 KVA, 117 volt, 60 Hz circuits (controls, consoles, conveyers, utilities and spares)

The distribution panel will be equipped by the owner with a magnetic type breaker for each electrical line. The line running from the main power source in the building to the distribution panel in the storage area is to be installed by the owner and is to be without other attachments thereto.

All lines shall be from a three-phase, four-wire system, consisting of three phase lines and a neutral. Line regulations will have a maximum tolerance of 208 VAC to 250 VAC and 105 VAC to 130 VAC.

**Quality Assurance**

**On-Site Testing**—After installation of the Randtriever equipment has been completed, a test shall be performed as described below. A test run will consist of directing all the motorized columns from all consoles using both the keyboard and the card reader. The ranges of shelves shall have test containers installed in a configuration that will, when the containers are replaced or retrieved, test the capability of the equipment to operate to all the vertical cubicles and to operate to the various horizontal positions on both the left and right sides of the aisle.
The Microform Revolution

ROLLAND E. STEVENS

Library have tried replacing some of their books and journal files with microfilm copies or other microforms in order to save valuable space in the bookstacks, instead of or in addition to extension of the stack area, decentralization, compact shelving, separate storage warehouse, or any of the other solutions to the storage problem discussed in earlier chapters. As a final paper, this solution for the storage of library materials will be discussed. Although the distinct forms will not often be designated, “microform” is used here to mean the four forms most common in the United States: 35 mm. roll microfilm, microfiche (now standardized in the United States and Great Britain at 4 by 6 inches) and the two micro-opaque forms—3 by 5 inch Microcard, and 6 by 9 inch Microprint.

Library materials in microform are acquired for a variety of reasons: 1) to obtain rare books, journals, manuscripts, archives, and other needed information sources that are either unobtainable or prohibitively expensive in their original form; 2) to replace items that are printed or written on badly deteriorating paper; 3) to furnish a working copy of rare and fragile books; 4) to replace large, bulky volumes such as newspaper volumes with a compact form that is easier to handle and to use; or 5) to replace printed sources with copies in microform in order to save stack space. Each of these is a separate and distinct purpose, yet the librarian is seldom motivated by one of them alone. Usually the acquiring of microform materials is intended to answer several of these purposes, even in the case of a single title. Microfilm copies of newspapers already owned by the library are usually substituted for ease of use, for saving of shelf space, and to replace originals on deteriorating paper. Working copies of fragile books are acquired both to prolong the life of the original work as long as possible, and as a safeguard against the day of its final

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crumbling. British sessional papers may be purchased in microform both because of their relative scarcity and, therefore, the expense of getting a complete file in its original form, and in order to save shelf space. Insofar as possible, this paper will concern itself only with the space-saving aspect of acquiring materials in microform. While it is recognized that motives other than this are usually present, no examples will be used in which the motive of space saving is not the primary reason for microform acquisition.

Saving of shelving space has not always been one of the motives for reducing books to microform. Microphotography was invented by J. B. Dancer in England in 1839, when he produced the first microphotographs at a reduction of 160:1.\(^1\) The invention suffered the fate of most new ideas for which a social need is not yet well developed, however, in not being taken up either by librarians or individual collectors for many years. Interestingly, microfilmed dispatches were flown into news-hungry Paris by carrier pigeon during the war of 1870.\(^2\) Other than this, or probably including this use, microfilming was regarded more as a stunt or a curiosity than as a method for promoting scholarly or other serious activities. Not until the 1920s was microfilm taken up for serious purposes. By this time a pressing need, essential for the development of an invention, was arising, and cameras and other equipment adapted to microfilming had been produced. The Leica camera, marketed in 1924, is mentioned as especially valuable for this purpose.\(^3\) The great impetus for the development of microfilming at this time and especially in the 1930s was from the scholar, who now found that he could microfilm manuscripts, archives, and other needed records in much less time, with less effort, and, most important, with greater accuracy than by his previous method of copying extracts by hand. This was especially important to him because the libraries in which these documents were kept frequently permitted only severely limited hours of use. When in the same decade the largest research libraries began to purchase microfilms and to produce their own, they used the method for acquiring information sources that could not be purchased in original form or for preparing microfilm copies for other libraries from this kind of research material held in their own stock.\(^4\)

Not until the following decade was there a concern for microforms of library materials as a means of reducing the storage space needed. In 1944, Fremont Rider published *The Scholar and the Future of the Research Library, a Problem and Its Solution.*\(^5\) In it he called atten-
tion, in his characteristically dramatic style, to the exponential rate of growth of the nation’s research libraries and extrapolated from statistics of growth over the past century to indicate the probable size of the largest ones by the end of another century. Yale, for example, in the year 2040 would have about 200 million volumes occupying more than six thousand miles of shelves; its catalog would cover eight acres of floor space, and cataloging of the twelve million volumes acquired annually would require a cataloging staff of more than six thousand persons. Rider then went on to propose the following solution to this problem of growth: the entire book collection of the research library would be microfilmed and photographically printed on micro-cards.* These were 3 by 5 inch opaque cards of which the front was a standard catalog card plus an abstract of the work; the reverse side contained the complete text of the book at a reduction of about 20x to a maximum of 250 pages. No bookstack would be needed in this library of the future since the entire contents of the collection, excepting perhaps a few of the more frequently used reference books, would be on the back of the micro-cards, filed in the card catalog in the usual dictionary arrangement. When a reader wished to use a book, he would remove the micro-card from the catalog, leaving in its place a call slip, and charge out the micro-card for home use. Or he could make his own copy of the micro-card in a coin-operated camera.† The saving in space, as Rider pointed out, would be 100 percent, since the bookstack would be completely eliminated.8

Rider’s book had little practical effect on libraries. No library converted any significant part of its collection to micro-cards. Microcards, containing the text of rare, out-of-print, and little-used research materials, such as accounts of early travel in the United States, theses, and other unpublished papers began to be produced commercially. Such research materials had been issued on a subscription basis in the form of microfilm since at least 1937, when University Microfilms began to distribute its Short Title Catalogue series, and since 1950 on Microprint when the Readex Microprint Corporation began pub-

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* Rider was the first to use this term, hyphenated and uncapitalized, as used here. The currently used Microcard is a trade name.

† The caption under the frontispiece illustration of a micro-card reads in part, “This photogravure reproduction of the original micro-text is merely an attempt to show the general appearance of the card; for, being a reproduction of a reproduction, it is not readable.” He does not explain, however, why the reproduction of a micro-card made in a coin-operated camera would be more readable.
lishing its famous series of scarce research sources. But purchases of these series by libraries have been for the purpose of adding otherwise unobtainable titles to the collection, not for saving space. Again in 1951, Rider urged librarians to consider the great saving in space, and therefore in cost, of substituting micro-cards for books in their original form. In this article he no longer considers the earlier idea of converting the entire book collection to micro-card form and filing these in the card catalog. Only the infrequently used books will be converted. Presumably these micro-cards would be housed in cabinets in or near the conventional bookstacks, would be represented by conventional catalog cards in the catalog, and would be charged out for home use in the same manner as regular books, rather than being duplicated by camera. As far as using this method primarily for space saving, librarians paid no more attention to Rider's reminder than they did to his initial proposal seven years earlier.

In the same issue of *American Documentation* as the article just referred to, there appeared an article by Eugene Power, president of University Microfilms, pointing out the economy of substituting microfilm copies of older files of periodicals for bound volumes. He sought to demonstrate mathematically that the cumulated difference in annual storage cost between bound volumes and microfilm copies in several years would be about equal to the difference in cost of binding and microfilming and that thereafter the saving in storage cost for the microfilm copy would be actual saving to the library. The details of these mathematics need not occupy us here, since they are taken up at more length below. The point is that this, together with Rider's publication of the micro-card idea, is the earliest consideration of microforms purely from the viewpoint of saving storage cost. Since that time there have been several other papers on the subject, but this aspect of microform acquisitions has never ranked foremost with the average librarian, certainly not with those in large public and research libraries.

The purchase of microforms for the main purpose of conserving storage space has been favored more by librarians in the largest and best high school libraries and in small junior college and college libraries than by those in public, university, or research libraries. Even among the former group, the practice is by no means universal or even common. The writer is informed by University Microfilms that the largest proportion of its current periodicals service is to college libraries, followed by university libraries, with high school libraries...
and public libraries using the service less.¹¹ A recent trend is observed in technical libraries, where bound volumes of journals are being replaced, in order to conserve space, with 16 mm. film in cartridges for use in motor-driven reader-printers. Users find the ease of loading cartridges, the speed of searching the film, and the convenience of getting an immediate, take-home copy of any desired page preferable to using the original bound journal.¹²

The kind of microform material that is most often used for conserving shelving space is back files of periodicals and newspapers on microfilm. Libraries which do not retain back files of periodicals and newspapers, such as the average school library or small public library, would, of course, have no need for such files on microfilm. On the other hand, libraries in which back files are not only kept but also frequently used do not want the inconvenience of microfilm copies, even though they may need to conserve shelving space. The latter group would include large public and college libraries and all university and research libraries.

In order to partially solve the storage problem by substituting microform copies for the original form of infrequently used materials, the librarian has several alternative methods. He may make his own microforms of materials in his own collection. He may send his volumes or papers to a commercial firm to have microforms made. He may share the cost with a certain number of other librarians, each of whom will then receive a microform copy. Or he may purchase microform copies of certain journals, theses, or other works, which are offered for sale by a commercial producer on a mass basis. In general, the larger the number of microform copies made of the same material, the lower the cost of each copy, since the most expensive part of the process is making the initial microform. For microfilm the initial negative costs at least five times as much as each copy made from that negative. If one hundred microfilm copies were made of a book, each would cost only a little more than one-fifth the cost of a single copy. The best buy in microfilm or some other microform, then, is a title that many other libraries will also be interested in acquiring in that form. Thus, the kind of library material for which microform is most often acquired in place of the original, which the library either has already or could easily get is the general journal or newspaper, such as Atlantic Monthly, Christian Century, Current History, Harper's, Life, or the New York Times. These and similar titles, both back runs and recent volumes, are not infrequently purchased in microfilm.
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copies by strong high school libraries and some junior college and college libraries for three reasons: 1) a substantial saving in storage space can be realized by the substitution for the original volumes, 2) microfilm of these runs is relatively inexpensive, and 3) in these libraries, back files of such journals are needed but are not used with great frequency. With respect to the second reason, a check of several general periodical titles shows that the cost of microfilm is about the same as the cost of binding for current volumes and even lower than binding costs for earlier volumes. In elaboration of the third reason, practices vary among libraries as to the length of back run to be acquired, if any. High school libraries may not have a need for purchasing any back runs, although they would keep the microfilms they acquired on standing order; college libraries usually need good files of most journals.

Whether or not the library purchases back files of these commonly held journals on microfilm, it may want to subscribe to a microfilm of the current year, to be sent soon after the volume is complete. The library retains the unbound issues as long as they are heavily used and discards them when use has decreased sufficiently. The cost of the microfilm is usually no greater than binding the volume would be. The publishers of such general journals expect libraries to subscribe to the journal and not to get the microfilm copy in place of the journal itself; the microfilming firm, therefore, requires evidence that the library does subscribe to the journal.18

When a librarian determines to save storage space by substituting microforms for the original bound volumes, the kind of library materials which are considered first are these standard, general periodicals and newspapers. The writer is not aware of any other category of library materials which is widely converted to microform primarily to save storage space. The purchase of microfilm or microfiche technical reports and scientific or technical journals in place of original format is sometimes done in the special library in order to save space.14 A detailed examination of several studies of the cost of microfilming printed matter, outlined below, will make clear why the general periodical or newspaper is the favored material for this purpose. Up to the present time, furthermore, the substitution of microform is the least used method of solving the storage problem. What factors must the librarian consider in reaching a decision about microfilming or going to one of the other microforms for this purpose? David Peele listed the following factors to be considered in deciding whether to
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bind and keep periodicals in their original form or to substitute microfilm copies: 1) The likelihood of theft or mutilation of the material if left in its original form. 2) The nature of the material. Is it an abstract index or other reference work which would be unsatisfactory on microfilm? Does it have many color illustrations which would make black and white microfilm unsatisfactory? Does it have ads and text on the same page, which would make binding expensive, since ads cannot be removed? 3) The user. Is he a high school student to whom microfilm may be an adventure, or is he a college professor, to whom it is a pain in the neck? 4) Cost.15

Admittedly, the decision to bind or microfilm is not quite the same as the one we are considering in this paper; the likelihood of theft and mutilation does not enter into the latter decision as it does in the former. But the other three factors can be examined further here. The cost factor is the one most often considered by librarians in the past. Rider's and Power’s articles on this aspect have already been mentioned. Rider's exaggerated claim for the economy of substituting micro-cards for the original volumes was pure gobbledygook. He maintained that the library would realize a substantial saving of money by discarding bound volumes of little-used sets and purchasing micro-cards in their place. In order to prove his case he contrasts the cost of micro-carding with the capital investment needed, from which the annual interest would pay the storage cost of the bound volumes. This seems fair enough. But what he neglects to draw attention to, although he does not actually hide the detail, is that his estimates of the cost of preparing micro-cards are based on the agreement of about one hundred libraries to purchase micro-cards of the same titles and to share the cost. Nowhere in his estimates does Rider include the cost of cabinets for storing the micro-cards, of machines for reading the micro-cards, of maintaining and replacing these reading machines, or of the additional space required for the reading machines.

The analysis by Power is much more realistic than that by Rider. It shows that the cost of microfilming an average city newspaper is less than half the cost of binding and shelving the bound volumes for fifty years. If two libraries share the cost of microfilming, each receiving a print, the cost to each library would be about the same as binding and shelving the bound volumes for ten years. Beyond ten years, the cost of storing the bound volumes would be substantially higher than storing the microfilm copy. Power’s formula does not include the costs of reading machines. But he acknowledges that these costs

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should be included in the librarian's estimates and even suggests the number of machines required and the probable replacement costs, although his prediction that reading machines will have a useful life of twenty years now seems optimistic.

Several thorough studies of the economy of microfilming in place of conventional storage have been made since the one by Power. Alan B. Pritsker and J. William Sadler reported a study they had made in the Columbia University School of Engineering storage library. They stated that many undesirable economies would have to be made in order to bring the cost of microfilming down to a comparable level with that of storing the original books. These economies included cutting the bindings off the books to be filmed, thus removing the possibility of reducing the cost by selling the volumes after they were filmed; the use of the faster rotary camera, although it results in poorer quality filming than that possible with a planetary camera; elimination of final editing of the film for pages missing or mutilated in the original or illegible in the film; and, worst, the use of the master negative as the working copy. "If a positive copy of the film is required," they report, "the cost of microfilm storage is prohibitive." But by making these economies, they were able to get a microfilming cost of the order of one-tenth and even one-twentieth the amount charged by commercial firms. Pritsker and Sadler, however, considered only the case where a single library bears the cost of microfilming. Six years earlier, Dallas Irvine had reported that a study made by the U.S. National Archives showed "that micro-reproduction is not a generally applicable means of reducing the costs of storing records. For records that are not to be preserved beyond thirty years and for records that cannot be microfilmed at a very low cost, it is simply cheaper to provide suitable warehousing."

More recently, Verner W. Clapp and Robert T. Jordan sought to re-examine the comparative cost question, by considering the sharing of the cost of microfilming among several libraries. They were able to reach somewhat more favorable conclusions than Pritsker and Sadler. By assuming twenty libraries to share the cost, each of whom would receive a positive print of the film, they could match the cost of conventional shelving without making any of the sacrifices required in the earlier study except that of shearing the backs off the volumes before filming. With fewer than twenty libraries, the cost of microfilming in their plan would be higher than the cost of storing the bound volumes; with more than twenty libraries participating, it
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would be cheaper to microfilm and discard the original volumes. Their proposal would allow both pre-inspection of the books and post-inspection of the film, use of the higher quality planetary camera, color filming where required, and retention of the negative as a master copy, from which further positives could be made on demand. If the participating libraries would be satisfied with the product of the faster rotary camera and/or with all black and white film, further economies could be realized. This study was limited to storage and microfilming costs; it did not consider binding costs, on one hand, nor reading-machine costs, on the other. Nor did it take into account building maintenance, servicing, or altering catalog records, each of which would be different for the two methods of storage.

It now becomes clear, since the cost of microfilming can be comparable to the cost of conventional storage only when a number of libraries share in the cost of filming, why librarians wishing to save space acquire microfilm of general periodicals and newspapers rather than of infrequently used monographs, archives, manuscripts, local reports, and other research materials that are not commonly held. The latter represent the type of library material which Rider supposed would be appropriate for micro-carding. But the former are the serials that are widely needed; therefore, the kind of material for which there would be more demand. Only microfilm has been considered in these studies of cost, except by Rider. The reason for this seeming neglect of the other microforms is that the micro-opaque forms, of which Microcards and Microprint are considered in this paper, cannot be produced economically in small editions. From the cost standpoint, Microcards should be made in editions of no less than twenty-five, although in large editions they can become cheaper than microfilm. Microprint requires a still larger edition and is even cheaper in large editions than Microcard. Even in these larger (and cheaper) editions, however, there are deterrents to the use of micro-opaques. The chief problems are the number of pages of original text that will fit on a single card and the optical problems of the opaque card. A double-sided Microcard or a single-sided Microprint card will hold about 100 to 120 pages of the original text; a 100-foot microfilm roll will hold about 1,200 to 1,500 pages. The Microcard has the advantage for pamphlets and small booklets, but to reproduce a typical 400-page volume of a periodical on four separate cards has some drawback. More serious are the optical problems of the micro-opaques, for which reading machines have never been as satisfactory as those developed...
for transparencies and for which no feasible reader-printer has ever been developed. The fourth form mentioned at the beginning of this paper, microfiche, also suffers from the first disadvantage, but not from the second. Furthermore, it has so many advantages, mainly its ease of handling, that it is soon likely to supplant the microfilm roll as the most widely used microform in this country. That it has not done so already is most likely the result of our brief experience with it and the caution with which we cling to old and familiar habits. It is no credit to librarians or the microform industry that we were so slow in the United States in adopting this form, which Europe has long used successfully, and which has long been acknowledged to be superior to roll film.21

In addition to these considerations of cost, however, are the far more important, and too often neglected factors of the material involved and of the user's convenience. Reference books are rarely, and never should, be issued in microform. Even the reference features of non-reference books, such as the index, are more and more frequently issued in original size, when the text is reduced to microform. The *New York Times* on microfilm with its *Index* in bound form is a familiar example of this. A more recent example is the "dual media" proposal by the United States Historical Documents, Inc., to issue the various series of the proceedings of the U.S. Congress on microfilm with index volumes in bound form.22 Other kinds of library material which are least suitable in microform, if original form is available, are texts which must be compared with other similar texts for the purpose of collating or editing, early printed books which are to be studied in their original state for the placement of watermark or the positioning of separate pages, books of art reproductions or other books in which the quality of illustrations are important, reserve books, and other books which are used frequently. Often these books are not available in original format and must be acquired in microform or not at all. Such use of microform, however, is not the subject of this paper.

Even more important than the nature and probable use of the material is the convenience of the user. The reluctance of most readers to use microfilm or other microform is too well known to argue.23 Those who seldom need to use it waste time learning how to use the reading machine; those who must frequently use it complain about eyestrain. Criticisms from both groups of users are mostly well founded. Physical discomfort of using microfilm for long hours comes
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not only from eyestrain but also from sitting and holding the head in the same position for an extended period in order to get the best possible view of the projected image. Both sources of difficulty in the use of microfilm can be corrected on the basis of our present knowledge. The difficulty of inserting the roll microfilm in the reading machine is overcome by the use of cartridge film and microfiche. The difficulty of readily finding the desired frame can be solved by coding the frames and using an automatic reader, such as Eastman's Lodestar. Eight years ago, L. E. Walkup and his colleagues at Battelle Memorial Institute experimented with different levels of magnification, definition, page brightness, ambient light, and other factors that affect reading ease. They were able to identify the features that should be incorporated into a microfilm reader in order to promote optimum ease of use, and they constructed a breadboard model of this ideal reader. The model was made to simulate ordinary reading of a book by projecting the image onto a gray opaque reading surface held in the lap; the projector was light and small enough to enable the user to change his position and even to move about the room while reading. Testing of the model showed that a user could read microfilm for long periods of time with no more discomfort than he would experience in reading a book. It is interesting to note that the investigators worked only with transparencies because of "the projection difficulties encountered with opaque microimages." Unfortunately, the study, which was implemented by a grant of the Council on Library Resources, Inc., was never followed up and the indicated microfilm reader was never commercially developed.

It was noted above that if storage space is conserved by substituting microfilm copies for the original volumes, they are usually general periodicals and newspapers rather than little-used monographs or other kinds of library material, even though these would seem to be good candidates for microfilming. It was further noted that this general practice results from the duplication of these periodicals and newspapers in most libraries and, therefore, from the potential market for microfilm copies of them. But we know that there is also high duplication of monographs among libraries of the same type: high school, public, college, and university libraries. A study of duplication among collections of members of the Association of Research Libraries made in 1942 by the late LeRoy C. Merritt showed a duplication among these libraries averaging between 15 percent and 25 percent. This study included monographs and serials alike and indicated
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a core of titles held commonly by most of the libraries. A more recent study of a highly homogeneous group of smaller university libraries showed an average duplication of monographs of 40 percent to 45 percent. There seems to be no reason, then, why agreement might not be reached among a hundred or more libraries of like type on the infrequently used monographs they would buy on microfilm or microfiche to replace the original bound volumes. In the light of past experience, however, the move will come probably not from librarians but from microform publishers, who will offer a compact package library on film or fiche.

At this time no counterpart of the current periodicals system has been offered for monographs; that is, one in which microform copies are purchased by the library to replace the bound volumes, which can then be discarded in order to save space. A number of “package libraries” have been offered on microform, since University Microfilms began to distribute the Short Title Catalogue microfilm in 1937, as mentioned earlier. Typical projects have been “Russian Historical Sources,” “Three Centuries of English and American Plays,” and “British Sessional Papers” on Microprint, titles from Clark’s Travels in the Old South, on Microcard, and “American Periodical Series,” on microfilm. When a library subscribed to these, it was almost always to acquire texts of sources not generally available in original form; saving space by discarding bound volumes and substituting microform copies was not a motive in this acquisition. The market for these source collections was usually the research library. In the present year, several package libraries on microform are being offered to a different market—the new junior college library or college library which must quickly build a collection to support undergraduate study. What is needed in these libraries is a collection of 50,000 to 100,000 or more volumes on various subjects in the sciences, social sciences, and humanities. Only a small part of these needed books will be in print and readily available. Current titles must be backed up with a large collection of books considered standard sources in various fields. Such collections, selected by subject specialists or from standard bibliographies, are now being offered in microform. The collections range from several hundred to several thousand volumes on a related subject field such as American civilization, British history, Black studies, Shakespeare, etc. Two such projects are now being offered in a new microform that has not yet been tested outside the industrial field. The original, patented name of this microform is PCMI, for photochromic micro-image, a process developed by the National Cash
Register Company (NCR) about 1960. Essentially, the technique is to microfilm a text at the conventional ratio of 15x to 20x, then to reduce it further onto a grain-free coating that allows high resolution at linear reductions of 200:1, or area reductions of 40,000:1. The photo-chromic coating has certain properties different from those of conventional microfilm, which are not important for this paper but which make feasible the storage of a 300-page book on a single square inch of film. The National Cash Register Company is producing a series of PCMI Library Collections, with initial delivery date announced for fall, 1970. Each collection will consist of one hundred 4 by 6 inch transparencies containing the text of seven to ten books on closely related subjects. The National Cash Register Company has already developed a reading machine for PCMI fiches made at 150:1 reduction. It is in use at many Ford Motor Company service departments for consulting the Ford parts catalogs, which have been issued on PCMI fiches. The image projected on this reader is sharp and clear, although refocusing is frequently necessitated in moving from page to page. Loading the fiche and moving to the desired frame are easy and fast. The vertical position of the screen may lead to discomfort in long hours of reading. This reader is also capable of producing hard copy, although the writer has not seen an example. Library Resources, Inc., a division of Encyclopaedia Britannica Company, has also announced a series of Microbook Libraries on a similar micro-format, which will be a 3 by 5 inch fiche containing a maximum 1,000 pages, but no more than a single title. These will be made at a variable reduction up to 90x, depending on the size of the original book. Library Resources does not yet have a reading machine in production, but promises a table reader and a smaller lap reader early in 1971, when the first shipments of Microbooks will be made to libraries. A reader-printer is promised later. The first Microbook will be the Library of American Civilization, consisting of over 12,000 fiches. It will contain the texts of books on politics and government, foreign affairs, military government, science and technology, and other aspects of American life. Later libraries offered by Library Resources will include the Library of European Civilization, the Library of English Literature, the Library of the History of Art, and the Library of the History of Philosophy. Most titles in the series of both firms will be out of print and very difficult to find in original form, although the National Cash Register Company says that about 10 percent of its PCMI titles are still under copyright.

New projects of this type are being announced more and more fre-
quently, some, like the Newberry project, being directed primarily at the large research library; others, like the two described above and NCR’s Books for College Libraries, appealing more to the new junior college or college library. While it cannot be claimed that any of these are acquired primarily in order to conserve space, they have been described because they approach the “all microform” library, which has for some years been a predicted form of the future library. Probably the ancestor of this idea was a classical paper by Vannevar Bush, in which he proposed the ideal scholar’s library, a “memex,” as he called it.  

This would be the size of a desk; in it would be reels of microfilm on which were reproduced all of the papers and books of even potential interest to the scholar. Each document would be coded for its subjects. The user would merely tap out subjects of his immediate interest on a keyboard on top of the desk; this would cause each pertinent document to be displayed on a screen, and hard copy could be produced of any document at will. Furthermore, memex could record an associative trail among the documents, as the scholar threaded his way from one subject to a related one, so that any of these search trails could be called up in the future. Ralph Shaw, then librarian of the United States Department of Agriculture, developed a working model based on this idea; he called it the Rapid Selector, although it seems never to have been produced commercially.

These, however, were specialized collections and led to a number of information retrieval systems, based on microfilm storage, in industry and in government. Of the all-microform library in a more general sense, Verner Clapp, then President of the Council on Library Resources, Inc., explored the possibilities and obstacles in his 1963 Windsor lecture at the University of Illinois. By all-microform library in this general sense should be understood one in which most of the collection has been miniaturized, but reference books and other materials that need to be used frequently and quickly would remain in easier to use form. Several years before that, L. B. Heilprin, then a senior staff member of the Council on Library Resources, Inc., had gone considerably more deeply into the concept of a D-library, that is, a duplicating-library. This kind of library never circulates its books but duplicates them on demand. The library copy of the book remains in the store, where it is immediately available for the next request. The stored master copy may be a microfilm negative or another form which can be duplicated quickly and cheaply. The duplicate copy may be kept by the user and need not be returned to the library. This
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caption has been a familiar one, of course, for about a decade in
construction firms, architectural firms, map services, and similar very
specialized uses, where the drawing, blueprint, or map is copied
for the user and refiled for other requests. In the D-library there is
no need for loan records, overdue notices, or fines. No books are mutil-
ated, lost, at the bindery, or charged out. Heilprin faced but did not solve, the problem of copyright. If microfilm negatives are used
as master copies, it is because they are easy to handle and make in-
expensive, high quality copies. It must be admitted again that this
proposed all-microform library is not strictly within the scope of this
paper, since saving space is not its principal purpose. Compactness,
however, is valued for reasons other than saving space. Most readers
would prefer to use a microfilm of a 1915 newspaper than the heavy,
dirty, crumbling bound volume. Also, in the all-microform library,
manipulating, retrieving, copying, replacing, and inventorying are
much easier with microfilm copies than with originals.

Do we have in Heilprin's D-library a model for the future library?
Peter Scott, in a flight of fancy but one based on present technical
capability, has given a vision of the information center in a university
library of the near future. It is Vannevar Bush's memex multiplied
many times to accommodate a number of users simultaneously. This
is a search room, where the reader can retrieve and display by com-
puter all documents pertinent to his needs, following associative trail
patterns worked out over the years by some of the best thinkers of
our time. In the adjacent reading room, to which the user had retired
with the titles of the documents he needed, were the newest and best
reading machines. These had screens adjustable for magnification,
background color, and orientation of position, all of which help to
eliminate reading fatigue. Loading of film in the machines was com-
pletely automatic. Even in this library, the user observes, about half
the collection was still in book form, but with a rapidly increasing
ratio of film to paper.

The kind of library envisioned by Scott is no more science fiction
than the atom bomb or moon travel was when the writer used to read
about such fantasies some forty years ago in Amazing Stories. We
can perform now all of the operations and make all of the equipment
required in Scott's dream library. There are, in fact, libraries making
use of coded microfilm on rolls or micro-chips in specialized informa-
tion retrieval systems. Further development both of coding systems
and of equipment to extend these techniques to the general library

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may require another twenty-five years, or about the length of time it
took to adopt microfiche in this country following its widespread, suc-
cessful use in Europe. But there is no real obstacle to this develop-
ment, and there are apparently many advantages that are either not
possible or very difficult with the book in its traditional form. Space
saving will not be the principal motive in conversion to an all-micro-
form library, but the value and uses of such a compact library will be
evident.41

References

1. Luther, Frederic. *Microfilm: A History 1839-1900*. Annapolis, Md., Na-
tional Microfilm Association, 1959, p. 16.
2. Ibid., pp. 70-82.
   Libraries*, 16:1, Jan.-Feb. 1962; and Hawkins, Reginald. *Production of Micro-
   School of Library Service, Rutgers, The State University, 1960, pp. 6-7.
4. Hawkins, op. cit., p. 8; and Johnson, Amandus. “Early Experiences in
   Md., 1959, pp. 70-75.
6. Ibid., p. 12.
7. Ibid., pp. 168-70.
8. Ibid., pp. 101-02.
10. Power, Eugene. “Microfilm as a Substitute for Binding,” *American Docu-
12. Starker, Lee N. “User Experiences with Primary Journals on 16-mm
14. Lyon, Cathryn C. “Some Current Uses of Microform for Scientific and
15. Peele, David. “Bind or Film: Factors in the Decision,” *Library Resources
   1957.
17. Ibid., p. 296.
   Documentation*, 2:86, Spring 1951.
Microform Revolution

24. Ibid., pp. 283-310.
25. Ibid., p. 299.
26. Ibid., p. 287.
40. Bagg and Stevens, op. cit.

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