Compact Book Storage: Solutions Using Conventional Methods

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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 The library clientele's negative reaction to material withdrawn from the collection is apt to be inappropriate to the use and/or value of the item, thus this technique has had little appeal for most librarians.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 app-
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The approach. 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.14 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."15 Chronological order, combined with sizing, is standard procedure in Europe,16 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,17 and those conducted by Fussler and Simon18 and that by Lister19 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.20

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 Hoesen21 provided concrete data; however, they failed to indicate the procedures and costs involved in sizing. The more recent study of sizing done by Cox22 at Auburn and those conducted at Yale28 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). 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.

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. 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.

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
heights, 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.”28 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.”29

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.”30 He arrived at his cu-
book by calculating the volume ratios of octavos (85 percent), quartos
(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.31

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,"38 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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17. Simon, op. cit.; Cox, op. cit.; and Ash, op. cit.


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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


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