Shelving and Office Furniture for Archives Buildings

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SELECTING EQUIPMENT is one of the most important steps in planning a new or refurbished archival building. When William Van Schreeven took up the subject in a National Archives bulletin almost thirty years ago, he could touch on a wide range of equipment needs that must be met by archivists moving to new quarters.[1] Today, the availability of many new products makes a comprehensive survey impossible. A paper on equipment selection must itself be selective. The decision to concentrate on shelving and office furniture was motivated by their close relationship to the planning and successful operation of an archival building.

Van Schreeven called the stack area the "core" of an archival building, a description still true today. Consequently, the importance of selecting appropriate shelving is obvious. Before examining available products, however, archivists must determine their equipment needs,[2] something best done after a careful review of holdings and program functions that gives special consideration to the types of materials stored, present volume of materials, anticipated growth, and access requirements.

A survey of holdings in terms of media types is essential to the determination of shelving requirements. Does the storage area house both paper and nonpaper records? What types of containers are used? How much space is devoted to punched cards, invoices, and other small documents? Do holdings include maps, blueprints, and similar oversize items? Does the storage area house microforms, photographs, and magnetic-tape media?

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[1] William J. Van Schreeven, "Equipment Needs to be Considered in Constructing Post-War Archival Depositories," in *Buildings and Equipment for Archives*, Bulletins of the National Archives, No. 6 (Washington, D.C., 1944), pp. 22–32.

[2] Cf. "Planning a Determining Factor in Effective Records Center," *Texas Libraries* 32 (1970): 185–87.

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The volume of present holdings must be determined and anticipated growth estimated. Special attention should be given to expansion within the various types of media. Advances in technology have resulted in the increased use of microforms and magnetic tapes. What percentage of future storage space will have to be allotted to these nonpaper records?[3]

Access requirements depend on agency function. Archives, records centers and manuscript libraries experience different types of reference requests. The frequency and nature of present and anticipated retrieval requirements must be analyzed. In providing reference service, will it be necessary to remove large groups of records, or will individual file folders be removed from storage containers? Is it possible to identify groups of records that will seldom, if ever, be referred to?

Ideally, the shelving selected should meet all of the particular requirements of individual archives, records centers, or manuscript libraries. In almost every case, however, the ideal will require modification in the light of certain constraints. The available shelving budget will have a significant, and possibly overriding, influence on the selection process. The nature and amount of available storage space, especially considering present holdings and anticipated growth, may rule out certain types of shelving while enhancing the attractiveness of others. Constraints imposed by the availability of space are usually more significant to archivists moving to refurbished quarters than to those planning a new building. Every archives, records center, and manuscript library has unique operating constraints that require careful consideration. If the building assumes unusual configurations, if all or part of the shelving must be aesthetically pleasing, if the storage area must accommodate staff work space or technical service facilities, then equipment selection may be affected. Selecting shelving is much like buying a car. Even before entering the showroom, the buyer identifies priorities and limitations. The desire for luxury, speed, and ease of handling may have to be modified because of the need for economy and versatility.

With these considerations in mind, to approach shelving by examining two alternative ways to store records may be useful. The first of these methods employs interlocking storage containers that eliminate the need for shelving.[4] Although the product lines offered by

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[3] William Rofes and Benjamin Cutcliffe, in "Planning the Record Centers of the Future: Industry and Government Viewpoints," *Records Management Quarterly* 5 (1971): 18–23, stress the importance of expansion of records within various media types.

[4] "Equipping the In-House Records Center," *Information and Records Management* 6 (January 1972): 12–16, contains illustrations and descriptions of various types of interlocking storage containers.

several manufacturers vary somewhat, these containers are basically transfer cases, or transfiles, made of corrugated cardboard or metal. They are usually removed from the office or agency where the records are packed and taken directly to the storage area where they are stacked on top of one another. Special clips and stacking rods combine with nuts and bolts to interlock the containers both vertically and horizontally. The containers themselves may be either the drawer-style or the cubic-foot variety. In the latter case, two separate containers are inserted into specially designed, interlocking trays.

An interlocking container storage system offers certain advantages. Corrugated or metal containers are initially less expensive than shelving, although the amortization of shelving reduces the price disparity considerably. The interlocking arrangement allows for maximum utilization of storage space. Unusual storage area configurations pose few problems. Records can be stored practically anywhere there is available floor space. The configuration and orientation of the containers can be changed at will.

On the other hand, certain drawbacks suggest that interlocking containers are best suited to supplemental storage. Access to records within the containers is limited. Drawer files can be reached easily enough to remove particular folders, but it is inconvenient, if not impossible, to remove the contents of an entire drawer for lengthy searches. The interlocking arrangement is impractical for archives and manuscript libraries that must bring an entire container of records to a patron. The removal of a container from the middle or bottom of an interlocking stack can pose obvious problems. While vertical storage density is increased, aisles must be widened to accommodate extended container drawers.

Interlocking containers represent potential savings in initial cash outlay. Automated record retrieval equipment requires a fairly high capital expenditure at first but offers prospects for significant savings in labor costs and significant reductions in retrieval time. Although several types of automated retrieval systems have been available for years, the Randtriever has attracted the most attention among archivists and librarians[5] and serves as a representative example of this very sophisticated alternative to shelving. The Randtriever removes

5 Randtriever is a product of the Library Bureau of Sperry-Remington. Discussions of the Randtriever, within the context of automated library retrieval systems, include Ralph E. Ellsworth, *The Economics of Book Storage in College and University Libraries* (Metuchen, N.J.: Scarecrow Press, 1969), pp. 50–57, and Kent Schriefer and Iva Mostecky, "Compact Book Storage: Mechanized Systems," *Library Trends* 60 (1969): 160–68. "Centralized Retrieval Boosts Field Productivity," *Modern Office Procedures* 18 (February 1973): 44–46, discusses an automated filing system using the Conserv-a-Triev electronic file marketed by Supreme Equipment.

and replaces records electronically.   Metal containers are aligned on racks facing an aisle where a column moves back and forth on tracks attached to floor and ceiling.   Each container is given an address. When documents must be retrieved, their container address is determined by referring to an outside index and entered manually into the keyboard on a computer console.   On instructions from the computer, the column searches for the correct container, removes it magnetically from the rack, and delivers it to the operator control station. Documents are reshelved by replacing them in the container and instructing the computer to return the container to the rack.

The Randtriever is an impressive, fast, and accurate retrieval device.   It can be constructed to a height of twenty feet.   Containers can hold a maximum of 150 pounds.   In addition to fast retrieval, the Randtriever offers unique storage system advantages.   Aisle widths can be greatly reduced because there is no need to accommodate human record searchers.   Lighting in the storage area can be virtually eliminated.   Valuable records are especially secure against theft and unwarranted access because documents cannot be retrieved without entering their container addresses into the console keyboard. Against these advantages, the archivist must weigh an extremely high purchase or lease price that will vary considerably from installation to installation, the continuing cost of an annual maintenance agreement, and the possibility of machine malfunction that may bring archival operations to a standstill.

Interlocking storage containers have certain advantages, and the Randtriever may be a forerunner of record storage systems to come, but most archivists moving in the near future to a new or refurbished building will continue to rely on a combination of free-standing shelving and separate storage containers.   This reliance does not necessarily limit or impair program operations, although there is one potential drawback associated with shelving installations: the failure to obtain maximum utilization of available storage space.   Archivists can counteract this drawback in three ways: 1) by eliminating wasted space on shelves, 2) by reducing the amount of storage area floor space consumed by aisles, and 3) by increasing the vertical capacity of shelving units.[6]

6 Much of the library literature on shelving selection and the maximization of available storage space is applicable to archives. Keyes D. Metcalf, "Compact Shelving," *College and Research Libraries* 23 (1962): 103–11 is a good introduction to the problem. On the evaluation of shelving and the preparation of shelving specifications, cf. Martin Van Buren, "What to Look for When Buying Shelving," *Library Journal* 90 (1965): 1614–17; and A. M. Squillante, "Specifications for Steel and Wood Stack Shelving," *Law Library Journal* 61 (1968): 115–19. *Library Technology Reports* (Chicago: Library Technology Program and the American Library Association, 1965–) provides detailed

An obvious way to increase storage density is to eliminate wasted shelf space by selecting a shelf size capable of accommodating the widest range of storage containers and loose documents.[7] Fortunately, many, if not most, of the records maintained in archives and record centers are well suited to one or both of two types of containers: the legal-size manuscript box or document case with exterior dimensions of $5 \times 10\frac{1}{4} \times 15\frac{1}{4}$ inches, and the $12 \times 10 \times 15$-inch records-center container with approximate exterior dimensions, including lid, of $13 \times 11 \times 16$ inches.   Both types are well suited to a forty-two-inch shelf, a standard size for most manufacturers. Allowing about one inch for the space where the shelf meets the uprights on either side, the remaining forty inches of shelf space will accommodate eight manuscript boxes or three records-center containers.   The forty-two-inch shelf is more than capable of bearing the weight of archival documents.

Special equipment allows for the most effective and economical storage of paper and nonpaper records both large and small.   Pigeon-hole-type shelves and flat cases are available for the storage of maps, charts, blueprints, and other large documents.   Several manufacturers offer special shelving for either hanging, upright, or flat storage of magnetic tapes.   At least one manufacturer offers modular drawers that are interchangeable with conventional shelving uprights for the storage of microforms, punched cards, and other small items.[8] The availability of special shelving for various types of paper and nonpaper records points up the importance of a careful assessment of the nature of present holdings and of anticipated growth within various records media.

The simplest way to reduce the amount of floor space consumed by aisles is to reduce aisle widths from the standard thirty-six inches to thirty-two, thirty, or even twenty-eight inches.   Using thirty-inch-deep shelving, raised to a height of seven feet in ranges forty-two feet long, with thirty-six inch aisles, twenty-five hundred record-center containers would require 1,029 square feet of space.   Retaining the same shelving configuration, but reducing the aisle widths to thirty

evaluations of the library shelving of several manufacturers. Ivor M. Graham, "A New Archives Building in Central Africa," *Journal of the Society of Archivists* 3 (1965): 25–29, stresses the importance of a high-density shelving arrangement.

7 William J. Van Schreeven, "Stack and Shelf Arrangement of the Archives Division, Virginia State Library," *American Archivist* 11 (1948): 45–46, discusses the importance of selecting a proper shelf size; cf. Manuel Lopez, "Compact Book Storage: Solutions Utilizing Conventional Methods," *Library Trends* 19 (1971): 352–61.

8 Cf. "Tape and Disk Pack Storage, Maintenance and Handling" and "Directory of Microfilm Housing Equipment," *Information and Records Management* 6 (May 1972): 14–16, 32–36.

inches, the twenty-five hundred containers can be stored in 945 square feet.   The significance of this difference of 84 square feet can be expressed in several ways.   The use of thirty-inch aisles allows the same volume of records to be stored in 8 percent less floor space.   As much as 50 percent of the storage area floor can be taken up by thirty-six-inch aisles.   Thirty-inch aisles reduce that figure to about 40 percent.   In the example given, thirty-six-inch aisles allow a storage-density ratio of 2.4 cubic feet of records to 1 square foot of floor space. With thirty-inch aisles, the ratio increases to 2.7 to 1.[9]

Any reduction in aisle widths, however, restricts access.   It may prove difficult to remove charts, maps, and other oversize records from shelves into narrow aisles.   Book carts, stools, and ladders may prove difficult to maneuver, and personnel movement may be impeded.   The archivist must balance these potential inconveniences against the advantages of increased storage density.[10]

Eliminating aisles through the use of multiple shelving units produces greater storage density.   In a single shelving unit arrangement, containers are stored back to back on a thirty-inch deep shelf with an aisle on each side.   With double shelving, two units are placed side by side, eliminating the aisle between them while storing containers two deep.   Using this two-deep arrangement, twenty-five hundred records center containers can be stored in an area of less than 780 square feet, using thirty-six-inch aisles, or 735 square feet with thirty-inch aisles.   This arrangement increases the storage-density ratio to 3.2 to 1 and 3.4 to 1, respectively.   Aisles will occupy only between 30 and 35 percent of the storage area.   The entire amount of floor space required to store a given volume of records is reduced approximately 25 percent over a single unit arrangement.[11]

The increased storage density, however, will be accompanied by inconvenience.   In a two-deep arrangement, the front container must be removed to retrieve the one behind it.   The increased handling of containers necessitates increased labor costs.   It can be especially difficult to retrieve containers from the uppermost shelves.   One way to combat this difficulty is to follow consistently the practice of plac-

[9] The storage area configurations described in this and the following examples were chosen for illustrative purposes. Because buildings vary in shape and size, they may not be suitable in every case.

[10] On access limitations due to reduced aisle widths, cf. F. J. Hill, "The Compact Storage of Books: A Study of Methods and Equipment," *Journal of Documentation* 11 (1955): 202–16; and Lucinda Conger, "The Annex Library of Princeton University: The Development of a Compact Storage Library," *College and Research Libraries* 31 (1970): 160–68.

[11] Multiple shelving units are illustrated in William Benedon, *Records Management* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1969), pp. 71–73.

ing the most inactive or seldom referenced containers on the uppermost shelves. When the archivist's initial survey indicates that access requirements are not uniformly stringent, two-deep shelving can be used to increase storage density, decrease the number of aisles, and reduce floor-space requirements. It is possible to increase storage density further by using a three-deep arrangement. With triple shelving units, twenty-five hundred containers can be stored in about 650 square feet, yielding a storage-density ratio of over 3.8 to 1 but virtually eliminating easy access to a large number of containers. Such limitations may prove only a minor inconvenience in record centers but are usually unacceptable in archives and manuscript libraries.[12]

For decades librarians and archivists have used several types of mobile shelving systems to eliminate aisles and increase storage density.[13] The perpendicular sliding storage-case type best meets the needs of modern archives and manuscript libraries. The sliding cases consist of single shelving units, thirty inches deep, resting on mobile bases. The bases are mounted on tracks or runners attached to the storage-area floor with a groutlike sealing compound. The cases are aligned in ranges perpendicular to a main aisle with banks of mobile cases being separated by stationary ones. Access aisles are created by moving cases from side to side. The purpose of the stationary case is to limit the number of mobile cases in a bank. The number varies between six and twelve, depending on the type of shelving chosen and the nature of the installation. Both manual and motorized systems are available.[14] The length of ranges varies between five and fifteen feet, depending again on the type of shelving chosen and the requirements for particular applications. Using forty-two-inch shelves, a 10½-foot range is ideal. In a bank of twenty mobile storage cases divided into three groups by three stationary cases and serviced by three mobile aisles, twenty-five hundred record center containers can be stored in 600 square feet. Aisles occupy

12 Cf. Morris Rieger, "Packing, Labelling and Shelving at the National Archives," *American Archivist* 25 (1962): 417–25.

13 Drahoslav Gawrecki, *Compact Library Shelving*, trans. Stanislav Rehak (Chicago: Library Technology Program and the American Library Association, 1960), describes compact shelving installations in the National Archives of the German Federal Republic, the La Rochelle City Archives, and the Archives of Rousselle Laboratories. Ake Kromnow, "Rarliga bokkyllor: nya forsok att losa ett gammalt problem," *Tidskrift for Dokumentation* 14 (1958): 17–19, describes a similar installation in the Swedish Government Archives where the conversion to mobile shelving resulted in a 50 percent increase in storage space.

14 Cf. "Bedeutende Neuntwicklung im Archivwesen," *Technik und Betreib* 21 (1969): 278, for a description of a mechanized mobile shelving installation at the West German Oil Society.

approximately 12 percent of the storage space.   The storage-density ratio is 4.2 to 1.

Of the ways to increase storage density discussed so far, only mobile shelving requires a substantial additional investment in special equipment.   Actual costs will vary from installation to installation, but, as a rule of thumb, mobile shelving can be expected to cost twice as much as stationary shelving.   Archivists planning a new building may find that mobile storage systems allow them to make substantial reductions in the amount of space required for the storage of records, resulting in significant construction-cost savings.   There is some disagreement in the literature about the extent to which mobile shelving systems limit access to records.   Manufacturers claim that access to records is improved rather than restricted.   Archivists and librarians have generally found the perpendicular sliding cases to be less restrictive than other types of mobile shelving, but it is still necessary to move cases in order to gain access to particular containers. The cases are usually not difficult to maneuver, but any archivist considering mobile shelving should insist on a demonstration so that no illusions remain about ease of operation.   Some concern has been expressed about personal safety in mobile shelving installations.[15] Most manufacturers claim that the velocity at which manual cases are moved is not sufficient to create any danger.   As an added precaution, a bar can be attached to the cases to lock them into position whenever an access aisle is in use.   Motorized systems, which have been the subject of the most concern, can be equipped with similar devices.   Some manufacturers will install mobile shelves on grade only, thereby eliminating their use in multiple-floor storage areas. While installations are not necessarily permanent, the movement, rearrangement, and/or removal of tracks will necessitate a major disruption of storage-area activities.

Mobile cases are usually limited to seven-foot heights.   Where mobile storage systems prove inapplicable but a comparable increase in storage density is desired or required, gains can be obtained by increasing the height of shelving sections.   For example, by raising shelving heights from seven to nine feet in forty-two-foot ranges of single shelving units with thirty-six-inch aisles, twenty-five hundred containers can be stored in 798 square feet.   Using the same arrangement with aisle widths reduced to thirty inches requires 735 square feet.   The storage-density ratio is increased to 3.3 to 1 or 3.4 to 1, respectively.   Two factors limit the extent to which shelving height

15 "A Fatal Injury in a Compact Stack Installation," *Special Libraries* 60 (1969): 671–72.

can be increased to improve storage density: the height of the storage-area ceiling and access requirements. As a rule, when a sprinkler system is to be installed in the storage area, the top of the highest container must be more than eighteen inches from the ceiling. The most dramatic use of high shelving has been in warehouses converted to records centers. In such buildings, the storage density ratio may be higher than 20 to 1.

The difficulties in obtaining access to records stored on uppermost shelves can be reduced in several ways. When shelves are less than twelve feet high, ladders suffice. To enable personnel to remove and reference containers without climbing back down to ground level, pulpit or shelf-style ladders can be used. Shelving raised to heights greater than twelve feet may employ mezzanines or catwalks. The mezzanine consists of a mesh or metal webbed floor supported entirely by the shelving itself. It replaces one or more concrete floors, thereby reducing construction costs and eliminating some wasted space resulting from floor thicknesses. In addition, the mesh mezzanine may reduce lighting and sprinkling requirements. Elevators or stairways allow passage from the ground floor to the mezzanine.

The most serious restriction imposed by a mezzanine-type arrangement may be a psychological one. Staff members may feel uneasy at the thought of walking on the mesh floor. This uneasiness usually passes when the solidity of the mezzanine flooring is experienced. Special ladders will be required to obtain maximum maneuverability on a webbed floor. In addition, the webbed surface may prove abrasive, and dust particles loosened from shoes may filter down into the storage area below.

There are significant similarities between the selection of shelving and the selection of furnishings for staff work areas. Like shelving, furnishings should be well suited to the archives' operations. They must meet present requirements and be able to accommodate future growth. They should be flexible, capable of modification in response to changing program demands. They may have to be economical, but, in any case, they should render the greatest value for money spent. A well-equipped work area is as vital to the successful operation of an archives building as a well-equipped stack area.

As in the case of shelving, the planning and selection of furnishings for staff work areas must begin with a careful review of requirements. The review should include an examination of the responsibilities of each staff member, the types of equipment required to carry out those responsibilities, and the relationship of staff members to the public and to one another. Once again, the peculiar requirements of individual archival programs may act as constraints. The available

furnishings budget obviously can prove restrictive. Unusual building configurations may either limit or enhance the assignment of work space. Some institutions have special regulations about maximum allotment of work space depending on employee classification. During the review of work-space requirements, it is important to remember that, unlike record-storage containers and manuscript boxes, people have decided preferences about the nature of the work space assigned to them. Intangible considerations may play as significant a role in furnishings selection and work-area planning as do concrete ones. In reviewing work-area configurations and furnishings, two familiar extremes come to mind: the enclosed office and the open workroom. Both have been used in archives and manuscript libraries, and both have advantages and drawbacks.

Many archives assign their staff members to enclosed offices, either individually or in groups of two or three. The construction of concrete walls between offices can lock an archival agency into an inflexible arrangement that hardly allows for staff expansion or reassignment of space as program needs change. This disadvantage can be overcome to a limited extent by substituting movable walls for concrete ones. Movable walls, which are really floor-to-ceiling partitions, are available from several manufacturers and are indistinguishable in function and price from permanent walls. The extent to which the problems of inflexibility can be overcome is limited, however, by the spacing of lights and air ducts; the mere substitution of movable walls for permanent ones does little to relieve other problems associated with enclosed offices. Wasted space remains, especially behind doors and in unusual angles formed by walls. Asymmetrical furnishing layouts that encourage efficiency and maximum utilization of available floor space are discouraged. Standard office furnishings—the familiar desk, chair, and credenza—may not be best suited to the requirements of archivists. Walls impair supervision on the one hand and discourage communication and cooperation between staff members on the other. Shared offices may lead to discord. Finally, the enclosed office perpetuates the image of the archivist as the occupant of a cubbyhole, withdrawn from the company of other people and reluctant to interact with the surrounding human environment.

At the other extreme, the open workroom with rows of long tables can lead to even greater problems. Complete flexibility is obtained at the expense of any significant division of work areas. Staff members are lumped together regardless of their responsibilities. Distractions are ever present. Morale may suffer as staff members feel that they have no work area to call their own.

These drawbacks should not be misinterpreted. There is a place in archival buildings for both enclosed offices and open workrooms. Staff members whose administrative responsibilities require them to meet with patrons and donors must have an enclosed area that will ensure privacy of conversation while not disturbing the work of others. The open workroom is especially well suited to groups of archivists cooperating in the appraisal and arrangement of large collections of records. In recent years, office planners and administrators have tried to strike a satisfactory middle ground between these two extremes. The middle ground goes by several names: the open-plan office, the open-scaped office, or the landscaped office. Whatever the name, the concept replaces the traditional enclosed office with a work-station tailored to the exact space and equipment requirements of the individual staff member. Floor-to-ceiling walls are replaced by moveable partitions, screens, and/or dividers of less than ceiling height that offer standing or seated, visual or audial, privacy without sacrificing flexibility.[16] Work-stations can be arranged in a variety of configurations. Repositioning of dividers does not interfere with flow of light and air. In terms of construction, open-plan offices are one of two basic types: those that use regular office furniture in combination with free-standing dividers, and those that utilize an integrated combination of furniture and dividers. The first type is the most common, the least expensive, and, in many ways, the most flexible. In its simplest form, walls are replaced by dividers of various heights and shapes. Desks, chairs, and tables are arranged behind them as they would be in enclosed offices. No special furnishings are required, and no capital expenditure for new furniture is necessary. In the second type, work surfaces, desks, file cabinets, and even clothes closets are attached to divider panels with clips or brackets similar to those used in attaching shelving to uprights. Equipment heights are completely adjustable. A desk or table can be either raised or lowered as needed. Dividers and supporting equipment are available in a variety of styles and colors, with optional carpeted and sound-absorbing panels designed to control noise levels.

The open plan assures flexibility without drastic sacrifices in staff morale. An archivist responsible for the arrangement of documents,

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[16] For descriptions and illustrations of open-plan offices, cf. Axel Boje, *Open-Plan Offices,* ed. B. H. Walley (London: Business Books Ltd., 1971); and the Business Equipment Manufacturers Association publication *New Concepts in Office Design* (Elmhurst, Illinois: Business Press, 1968). Cf. Charles Cumpston, "Partitions and Screens Gaining Overdue Acceptance as Prominent Fixtures in Modern Office Environment," *Administrative Management* 34 (January 1973): 30–34; James V. Jones, "Furniture for Library Offices and Staff Work Areas," *Library Trends* 13 (1965): 448–54.

for example, may require eighty square feet of work space, including a work table, a chair, and twenty linear feet of shelving.   Dividers can be arranged in the most effective fashion.   Should the archivist's responsibilities be increased to include supervisory or administrative duties, the floor space can be expanded by rearranging and adding dividers, desks, chairs, conference tables, and similar items.   With the assignment of larger groups of records, additional shelving can be assigned as well.

The effective use of available floor space is maximized by the elimination of corridors and corners.   Some construction costs will be saved by the substitution of dividers for walls.   Supervisory responsibility should be easier to exercise, and staff communications should be improved.   Archivists are assured of a work environment tailored to their individual needs.

As indicated at the beginning of this paper, the selection of shelving and office furniture is one of the most important steps in the planning of a new or refurbished archival building.   The key words are planning and selection.   Initially, the archivist must evaluate record holdings and work area requirements and ask: What do we have?   What will we have?   What would we like to have?   What are the options?   What are the constraints?   These questions must be carefully answered in order to produce an effective and efficient archives building.