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Organizational Patterns of Academic Science Libraries

New theories about how to organize academic collections have been developed in recent years, and many practitioners of these theories have distinguished themselves by advancing their ideas. While discussing the pros and cons of various organizational possibilities, however, such as centralization and decentralization, authors seem occasionally to have tended to focus primarily on their effects on the library as a whole rather than on the user. Also, while there appears to be agreement about the peculiarity and the cruciality of science and technology collections, papers devoted exclusively to examining their inherent problems are scarce. This paper therefore considers the following question: "Which forms of library organization can best serve the needs of the academic scientific community while remaining within the administrative and financial limitations of institutions of various sizes?" The information and viewpoints contained in the literature are used as a guide for formulating alternative answers.

SINCE THE 1940's there have been many changes in the pattern of scientific research. A major factor has been the availability of federal funds for investigations to be conducted on campuses. Consequently there are more people (teaching staff, students, and others) doing research and publishing their results who need information on what has been and is being done in their field. The boundaries of previously clearly delineated subject areas are disappearing, and while specialization is growing, specialized information needs cut across borders.

Practitioners of experimental sciences (such as chemistry, physics, and biology) often have "peculiar" working and reading habits and consequently have

claimed special library requirements. While conducting an experiment they claim, regardless of hours of day or night, to need immediate access to reference works and current periodicals as closely located to their laboratories as possible.

Studies of users' habits have also shown "that scientists and engineers spend a significant amount of their reading time reading in comparatively few journals, spend comparatively little time reading in the central libraries, and engage in undirective browsing to a considerable extent, but again in comparatively few documents."¹

HISTORICAL DEVELOPMENT OF ORGANIZATIONAL PATTERNS

Before surveying briefly the general development of academic library organization it is important to note that the term "organization" has two distinct

¹ H. Marron, "Science Libraries—Consolidated/Departmental?" *Physics Today*, XVI (July 1963), 34-39.

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meanings. The first meaning is the division of work, or the unit of operation, often called a department. The second meaning is the system by which these units are coordinated and controlled. This terminology is borrowed from the management field. Although these meanings are not synonymous, the word "organization" is applied freely to both.²

According to a definition by E. A. Wight³, the following six characteristics form the basis of division of work in the library profession today: (1) function (*e.g.*, acquisition, circulation); (2) activity (*e.g.*, order, repair); (3) clientele; (4) geography; (5) subjects; and (6) form of materials (*e.g.*, maps, documents). The historical progression toward increased specialization in the organization of collections is by "function," followed by "form of material," and most recently by "subject." These three organizational patterns can be characterized as follows.

Functional organizations divide their labor among acquisition, cataloging, circulation, and reference departments. Organization by form of material is useful when there is a large increase in the types of materials to be maintained, such as documents, serials, or maps.

Subject departmentalization originated in the so-called "seminar collections." Faculty members of single (usually science) departments placed their private collections in a convenient location in their building in order to assure close proximity of needed materials at all times. The size of these collections increased with time and the administrative problems became obvious to all concerned. It must be noted that the development of subject departmental libraries on the campus followed the path set by the public libraries. "Since 1924, with the notable exception of Philadel-

phia, virtually every major public library in this country has been very largely or entirely a subject departmentalized library."⁴ It must also be noted that although these three patterns are distinguishable, they did not develop in a vacuum independently of each other. They were created out of necessity and often existed together within the same organization.

Organization by subject was an early attempt to provide better services to the reader. The basic assumption was that the closest proximity of materials to those who most needed them would increase the frequency of use of materials. The rapid proliferation of subject departmental libraries, however, creates serious administrative problems. Coordination, cooperation, and communication among the branches and with the main library become increasingly difficult. There is, therefore, a basic conflict between the desires of the users and practical administrative and financial considerations.

A possible answer to the problems created by completely decentralized reader services is a form of centralization where a larger unit, sometimes called a division, is formed. This can be based on one common characteristic, such as subject, clientele, or geography.

The remainder of this paper will examine, compare, and assess the pros and cons of the subject departmental and subject divisional patterns of organization with particular reference to the fields of science and technology.

DECENTRALIZED SUBJECT DEPARTMENTAL ORGANIZATION

Decentralized subject departmental organization is only feasible for large institutions, since only they can afford to have library units serving one or two individual specialized departments such as chemistry or physics. Typically the

² A. M. McAnally, "Departments in University Libraries," *Library Trends*, VII (January 1959), 448-64.

³ E. A. Wight, "Research in Organization and Administration," *Library Trends*, VI (October 1957), 141-46.

⁴ R. E. Maizell, "The Subject Departmentalized Public Library," *CRL XII* (July 1951), 255-60.

branches are supported by the central library, which is usually functional in its organization. Cataloging and the business aspects of acquisition are handled centrally. A notable exception is, of course, Harvard, where decentralization is so complete that "in 1955 at least 40 different cataloging centers with widely varying rules [were in existence]."⁵ "This system of organization provides very satisfactory and probably effective service to upperclassmen, graduate students, and faculty. . . . The needs of the undergraduate [however], tend to be overlooked."⁶

The characteristics, advantages and disadvantages, of this system can be summarized as follows—

Advantages: (1) close proximity of materials to greatest number of potential users; (2) possibility of twenty-four-hour-a-day access to facilities without serious threat to security; (3) possibility for providing individualized services by introducing certain special library techniques common in industry; and (4) better over-all departmental participation and increased interest in library affairs.

Disadvantages: (1) duplication of materials; (2) duplication of records; (3) duplication of personnel; (4) over-all cost increase as a result of numbers 1, 2, and 3 above; (5) lack of effective administrative control—problems in coordination, cooperation, and communication.

These advantages and disadvantages are well recognized by the two parties involved: the faculty on the one hand, and library administrators on the other. Strong feelings, both pro and con, have been registered during two recent surveys in which opinions from members of both parties were solicited by the fac-

ulties of the University of Cincinnati and Florida State University, independently of each other. D. A. Wells, chairman of the physics department at the University of Cincinnati, conducted a survey by sending out 126 questionnaires to other physics department chairmen. It was his purpose to determine the sentiment of his peers about decentralization and consolidation of science collections. His action was prompted by plans to unify all science libraries at the University of Cincinnati and opposition to the move as registered by the faculty.

Findings of the survey have been publicly summarized.⁷ The majority, eighty-four, of the respondents favored the branch system; seventeen had no strong commitments; and three argued for consolidation. One of the most interesting opinions was expressed by Vincent E. Parker, chairman of the physics department at Louisiana State University. Most of the science materials at LSU had been recently moved to a new building and organized along the centralized subject divisional plan, and Mr. Parker stated his and his colleagues' unequivocal opposition to the arrangement. The science division at LSU, as discussed by its head, M. M. Hanchey,⁸ contains all science and technology materials except government documents, which are part of the general documents department. There also remained a separate chemistry library located in the chemistry building. Her description of the division leaves one with the definite impression that Dr. Parker's contention to the contrary notwithstanding, the reorganization had been consented to and approved by the entire faculty.

N. O. Rush, director of libraries at Florida State University, in a recent article summarized the dilemma at his in-

⁵ R. J. Hyman, "Harvard University Libraries System Development: an Inductive Study" (unpublished paper).

⁶ A. M. McAnally, "Organization of College and University Libraries," *Library Trends*, I (July 1952), 20-36.

⁷ D. A. Wells, "Individual Department Libraries vs. Consolidated Science Library," *Physics Today*, XIV (May 1961), 40-41.

⁸ M. M. Hanchey, "Science Division, Louisiana State University Library," *Louisiana Library Association Bulletin*, XXV (Fall 1962), 107, 117.

stitution, their methods of attacking it, and the solutions chosen.⁹ In order to determine whether the establishment of a geographically separate physics library was feasible, a separate committee of the faculty library committee was appointed and charged with studying the problem and "making long range policy recommendations concerning divisional and departmental libraries." As part of the study,

a survey was conducted in which letters and detailed mail questionnaires and data sheets were sent to 63 universities and colleges throughout the United States, selected either on the basis of their pre-eminence in the educational or library fields or because their library problems might be comparable to those at FSU.

In addition to describing the content of the questionnaire, excerpts from respondents in the library field are given. Based on the preliminary studies, analysis of returns, and the local situation, the following recommendations were made: (1) A divisional natural science collection should be established in the FSU Science Center Complex. (2) All functions and technical processes should be centrally handled by the main library. (3) No further physical separation of the collections should occur.

If one accepts the assumption that the *raison d'être* of science and technology libraries is to serve scientists, it is apparent from the above that the departmental library system is the preferred choice of the patrons. Librarians, however, while appreciating the needs, desires, and habits of the scientific users, must work within a framework of financial and administrative limitations.

CENTRALIZED SUBJECT DIVISIONAL ORGANIZATION—THREE VARIATIONS

One observer has stated: "The idea of organizing centralized university library

service along divisional subject lines, proposed in the 1930's, has been the greatest advance in university library service in the last twenty years."¹⁰ Presently there are three clearly distinguishable variations on this theme: (1) administrative centralization; (2) complete geographic centralization; and (3) modified geographic centralization.

Administrative centralization has been recognized as an absolute necessity by large institutions organized along decentralized departmental lines. Often an assistant director for public services and/or a division head for such broad subject areas as science and technology has been installed to coordinate activities, enforce uniform policies, and decrease the span of command without necessitating physical changes in the location of various collections. Instead of reporting directly to the director, the department heads are supervised by the assistant director or division head, who then reports to the director. Further strengthening of organizational lines ideally would consist of the following hierarchy: department head, division head, assistant or associate director, and director.

Complete geographic centralization became the medium-sized university library's vehicle for achieving the results produced by the large university's dispersed subject departmental system. With the construction of many new library buildings following World War II, it became possible to provide subject orientation along broad lines (*e.g.*, science and technology) by classifying and clearly separating these divisions of human knowledge within the confines of one physical unit. Variation in the organization of functional units (acquisition, cataloging, and circulation) is wide among institutions. A brief summary of the known advantages and disadvantages of the system follows.

Advantages: (1) availability of

⁹ N. O. Rush, "Central vs. Departmental Libraries," *Mountain Plains Library Quarterly*, VII (Summer 1962), 3-9.

¹⁰ A. M. McAnally, "Coordinating the Departmental Library System," *Library Quarterly*, XXI (April 1951), 113-20.

pooled material resources, needed in view of the new specialized and overlapping subject areas; (2) reduction in user's time in locating materials of the above mentioned areas; (3) feasibility of automation resulting in centralized record keeping and provision of new types of services; (4) better utilization of professional staff due to reduction in clerical duties; (5) closer administrative control.

Disadvantages: (1) loss of proximity of materials and users; (2) probable loss of widespread faculty involvement and interest in library affairs.

It was the University of Colorado, under the direction of Ralph Ellsworth, that first executed nearly complete geographic centralization in 1940. Only materials pertaining to geology remained separate. The following quotation by the director appraises the situation:

As to the reaction to the centralization, my impression from discussion with various faculty members is that the advantages of centralization of materials, professional supervision and longer hours of opening for the divisional libraries are generally recognized as outweighing any disadvantages. . . . The only real disadvantage I can see is that occasionally it may be inconvenient for a [science or technology] faculty member to have to come to a central library. However, I feel that a sensible policy in regard to office or laboratory collections will provide materials which are frequently or constantly in use.¹¹

The University of Nebraska, under Frank Lundy's direction, centralized its operations and organization in 1945. In many respects that institution has developed subject divisional organization to its "ultimate." The science and technology division is one of five divisions under the direct supervision of an assistant director. The division comprises the following sections: divisional reading room in the main library; principal branches (medicine—located off campus—and

agriculture); branches (such as chemistry and geology); and laboratory libraries (such as physics and pharmacy). All are dispersed on campus. It becomes obvious from the above that although the basis of administration and service is subject matter, complete geographic centralization was not feasible. The central reading room and stack area can be considered a storehouse of materials in general science and in overlapping fields of interest to a variety of specialists. Also, they provide general reference and bibliographic services to the entire university community.

While discussing the organizational pattern at Nebraska one must mention the introduction of the dual assignment concept, although it is an extension rather than a component of organization.¹² In practice it means that the functions of selection, cataloging, classification, and servicing of materials are handled by the staffs of the several divisions, who are, ideally, subject specialists dividing their time among these operations. Mr. Lundy believed that the advantages provided by this system are manifold. They include familiarity with the collections, decrease in cataloging backlog, and consequently prompt availability of new materials resulting in goodwill and appreciation by the faculty. Recruitment of new librarians also becomes easier.

As has already been noted, the faculty's interest and involvement in library affairs is evident. Professor D. A. Wells's article¹³ summarizing the results of his survey on decentralization and consolidation of science collections was previously described. Dean Jesse H. Shera of the school of library service at Western Reserve University answered Dr. Wells publicly. Publishing in the scientific magazine in which Dr. Wells's article appeared, Dean Shera argued for

¹² F. A. Lundy, *et al.*, "The Dual Assignment: Cataloging and Reference; a Four Year Review of Cataloging in the Divisional Plan," *Library Resources and Technical Services*, III (Summer 1959), 167-88.

¹³ Wells, *op. cit.*

¹¹ E. H. Wilson, Letter to J. R. Blanchard of May 22, 1951, cited in footnote 1.

consolidation by relating his points to those discussed by proponents of decentralization in the survey. His counter-reasons are as follows: convenience for students, as opposed to considerations of faculty alone; importance of interdisciplinary relationships; economic advantages; improved services and collections; and the possibility of automation. It is his contention that the above are components of new concepts in library service that must be recognized and understood by the faculty.¹⁴

The importance of faculty recognizing the new concepts in modern library service is well summarized by N. N. Nicholson in the conclusion of her report on the "Centralization of Science Libraries at Johns Hopkins University."¹⁵

[Centralization] will be successful . . . only if complete agreement is reached by faculty, university and library administration that it is the best way in which the greatest number can be effectively served . . . under reasonable financial expenditures.

Modified geographic centralization is the third variation on the theme of subject divisional organization. Widely dispersed subject departmental and highly centralized subject divisional libraries are the two extremes of organizing by subject matter. Since there are no two identical situations and institutions, only comparable ones, it is inevitable that a compromise solution, absorbing the best of the two systems would emerge. It is always the local condition (such as history, geography, and size of enrollment) that necessitates these variations and modifications.

Starting in 1938, independently of but coinciding with the developments at the University of Colorado, Brown University consolidated its science departmental

libraries. The biology, botany, and psychology collections merged and formed the Biological Sciences division located in the Biological Laboratory. The astronomy, chemistry, engineering, general science, geology, mathematics, and physics collections became the Physical Sciences Library located in the Chemical Research Laboratory. Two small laboratory collections remained separate, administered and maintained by the division of which they were an integral part. The significance of Brown's decision lies in the fact that they consolidated departmental libraries into two divisions located outside the main library rather than moving all of them in the main library under one science and technology division. In other words, local conditions were right for partial but not complete centralization.

Cornell University, under the leadership of Stephen McCarthy, achieved almost complete reorganization of its administration and services during the last twenty years. September 1966 marked the moving of the last outstanding science collection, zoology, into new quarters in order "to place [it] in better relationship to [its] current use."¹⁶ With this relocation all science and technology materials are arranged in the following three large groups, each located in a different building: agriculture, including biological sciences; engineering; and physical sciences. Mathematics remains a departmental library, while collections in geology, geography, and history of science are housed in the graduate research library. This graduate research library, which opened in 1961, and the undergraduate library, which opened in 1962, form the center of all library activities. The movement toward consolidation is all the more significant because it means integrating a state university's collection with that of a private

¹⁴ J. H. Spera, "How Much Is the Physicist's Inertia Worth?" *Physics Today*, XIV (August 1961), 42-43.

¹⁵ N. N. Nicholson, "Centralization of Science Libraries at Johns Hopkins University," in Rutgers University graduate school of library service, *Studies in Library Administrative Problems* (New Brunswick, N.J.: Rutgers University Press, 1960), p. 133-56.

¹⁶ S. A. McCarthy, "Centralization and Decentralization at Cornell," in M. F. Tauber, ed., "Centralization and Decentralization in Academic Libraries: a Symposium," *CRL*, XXII (September 1961), 334-38.

institution. It is evident from the above that divisional organization at Cornell focuses on the reader by having both subject matter and clientele as the basis of service and administration.

Cornell's great achievements are readily apparent if one studies the "Report of a Survey of the Libraries of Cornell University" prepared by L. R. Wilson, R. B. Downs, and M. F. Tauber for the period of October 1947 to February 1948. According to the report there were thirty-seven separate units, including the university library and various departmental and laboratory collections, on the Ithaca campus on June 30, 1947. Coordination, cooperation, and communication among them were nonexistent, as were central administrative control and planning. The surveyors recognized

that some degree of decentralization is necessary and desirable to facilitate instruction and research and 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 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.¹⁷

New buildings, indeed, were erected. All of the major physical units discussed above have either been newly constructed or completely remodeled since 1950.

The significance of Cornell's progress and accomplishments lies in the fact that by combining two organizational patterns (*i.e.*, division based on subject and on clientele), it synthesized the kind of

administrative organization that would assure the best service and the most conducive environment for its clientele.

Centralized subject divisional organizations, then, appear to offer possibilities of satisfying the needs, desires, and habits of scientific users while simultaneously remaining administratively and economically viable. This might be true for institutions of various sizes.

CONCLUSION

The organizational patterns of science and technology libraries result from compromises between the needs of users, as they see them, and the practical requirements of budgets and administrative control, as seen by the librarians.

Users such as those quoted above appear to have strong preferences for some form of departmental libraries. An expensive but effective compromise is administrative subject divisional centralization. This pattern offers users the various advantages of having "their own" library and offers the librarian, usually, the benefits of centralized acquisitions and cataloging and uniform policies. Duplicated records, personnel, and materials are the major contributors to the high expense of maintaining the many libraries in this type of organization.

Expenses and administrative problems can be significantly reduced with little decrease in convenience to the users by adopting the modified geographic-subject-divisional pattern of organization. Several subjects that are closely related are served at one location that is physically close to the departments involved. Examples could be an engineering, a physical sciences, and a biological sciences library.

In special situations where all science buildings are near one another one might consider complete centralization of materials and services. If acceptable to the users, it could result in an extremely economical operation. ■■

¹⁷ L. R. Wilson, R. B. Downs, and M. F. Tauber, *Report of a Survey of the Libraries of Cornell University for the Library Board of Cornell University* (Ithaca, N.Y.: Cornell University, 1948), 202p.