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9

The Management of Libraries and Information Centers

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HIGHLIGHTS

There has been much activity in the study of the management of libraries and information centers. Two outstanding management events of 1973 were: 1) The series of detailed internal management studies conducted in U.S. research libraries using the "Management Review and Analysis Program" (Webster, 210, 212); 2) The reorganization in the U.K. of a number of disparate libraries to a functional grouping of national libraries known as the British Library (Great Britain, 79, 80).

The environment within which managers of libraries and information centers operate was illuminated by a study by Baumol & Marcus (15) of trends and costs in academic libraries. Several libraries developed written statements of mission and objectives. Orr's (142) writing of "library goodness" has developed significantly the theoretical framework for considering measures of library performance. Three major studies of library effectiveness using different measures of effectiveness have developed our view of the library as a system: Hamburg et al. (85, 86), who revive and refine the concept of document exposure; Newhouse (Newhouse & Alexander, 139), who uses a net economic benefit; and De Prospro et al. (55), who develop a battery of separate measures of various services. McClellan (122) finally published his account of the stock control system implemented at Tottenham, which continuously adapts the provision of stock in relation to a blend of measures of users' behavior and users' needs.

In a systematic review of individual management functions, the following can be regarded as highlights. Cornell University Libraries undertook an experiment in developing a long-range strategic plan (McGrath, 123). Budgeting remains preoccupied with PPBS (Programming, Planning, and

Budgeting System). The use of policies and management information continue to be neglected areas. Columbia University Libraries underwent a major change in organizational structure (Booz, Allen & Hamilton, 23, 24; Columbia University, 48) and emerged with a resources group, a services group, and a technical support group. Participative management and staff roles continue to attract attention. Education for the management of libraries and information centers is a problem area but is, at least, a lively one with basic disagreements amongst educators and the launching of the Lancaster Library Management Game (Brophy et al., 27). Cooperation between libraries is being treated more critically and more rigorously, but communication in libraries is still unduly neglected. The rise of in-house research and development units is noteworthy.

Nevertheless, the administration of research and the management of change, while not absent from the literature, do need more attention.

The literature specific to information centers appears to be relatively small, but highlights include a book by Weisman (214), which is useful on definitions, planning, and funding, and a discussion of funding by Schwuchow (173).

Interest in economic analysis and quantitative analysis as applied to libraries has reached a remarkably high level, at least in terms of theoretical treatments and publication. It seems likely that cybernetics and adaptive mechanisms will become important in both theory and practice, and that much more behavioral research will be done in connection with the management of libraries and information centers.

In brief, there are significant pockets of neglect and enormous scope for improved management. Nevertheless, ten years ago, when research in information science was largely preoccupied with the use of computers and the information needs of scientists, only optimists would have predicted the present quantity and range of work on the management of libraries and information centers.

COVERAGE AND TREATMENT

Coverage

The usual problems of preparing this chapter for the *Annual Review* have been compounded by the fact that no chapter appeared on this topic in last year's volume. Cooper (49) and Simmons (177) are to be commended for the broad view that they took in their chapters on the economics of information and library automation, respectively. Nevertheless, a gap remained, and so this chapter contains fairly frequent reference to the

literature published in 1972 in addition to the primary emphasis on 1973.

A similar lacuna is the consistent disregard that other reviewers of this topic have shown for literature in languages other than English. Criticizing that weakness has proved easier than correcting it, and, although there are a number of references to developments outside North America in 1973, the coverage is probably uneven.

The reviewer has interpreted the scope of the chapter rather strictly and has not attempted to review the literature on management generally, but only the literature specific to the management of libraries and information centers. Certain aspects of management that are marginal have been excluded: legal aspects of management, performance of indexing systems and mechanized information retrieval systems, planning and design of buildings, market analysis and user studies, and organization and management of computer files. In addition, manuals on library techniques have been deemed out of scope.

Treatment

In the previous chapter on this topic (Leimkuhler & Billingsley, 115), a technique-oriented approach was adopted: MIS (management information systems), PPBS, OR (operations research), cost-effectiveness. This reviewer has chosen to formulate the present chapter primarily on a functional or problem-oriented approach, closer to that of Wasserman & Daniel (208).

Following the "Highlights" and these notes on coverage and treatment, a third section will review three major events. The fourth section will review work on the environment of libraries and information centers and on their mission and effectiveness. The fifth, and largest, section will treat various specific management functions. The sixth section will discuss some methodological and theoretical aspects of the literature under review. Inevitably, this chapter reflects the personal perspective of the author.

MAJOR EVENTS

To judge by the activities and literature within the scope of this chapter, 1973 has to be the year of the large research library. Two events affecting large research libraries are sufficiently momentous to deserve special comment: the Management Review and Analysis Program launched by the Association of Research Libraries, and the combining of several disparate entities into the British Library.

Management Review and Analysis Program

The Office of University Library Management Studies of the Association of Research Libraries developed a manual (Webster, 210) for a systematic self-study of the management of large research libraries. This self-study is known as the "Management Review and Analysis Program." The judgment that more self-help was needed in U.S. academic librarianship is, in this reviewer's opinion, correct. In brief, what happens with this study is that the director of a library desiring to undertake such a study appoints a study team from his staff and, in effect, tells the team to review the way the library system is being run and then report its analysis and recommendations to the director. The thoroughness of the exercise is fostered by liaison with study teams at other libraries, an emphasis on staff involvement, and the rather comprehensive, structured, and problem-oriented nature of the manual. After a systematic review of the environment and role of the library system, the study team fragments into a series of task forces on specific management functions (planning, budgeting, management information, policies, organization, staff development, supervision and leadership, personnel, communication, etc.). Having been assigned a management function such as planning, the task force is expected to familiarize itself with the nature of the planning process, and identify characteristics of good planning (such as consistent, anticipatory decision-making) and symptoms of bad planning (or the lack of it). The task force is then required to appraise the local situation and make recommendations for improvement. Finally, the study team has to synthesize the material into a report for the director.

Management review by internal self-study is a significantly different approach from the use of outside consultants, or even an in-house directed study. Self-study reveals views which might be myopic because familiar details loom larger than the less familiar, but the very fact of a study in this mode has an impact on the organization, and the staff involvement is likely to build a significant commitment to the results. By the end of 1973, 14 research libraries had undertaken the program,¹ and three reports

¹ They are Iowa State University, Purdue University, University of Tennessee at Knoxville, Case Western Reserve University, University of Connecticut, Boston University, University of Washington, Smithsonian Institution, Rutgers State University, Washington State University, University of Missouri, University of Maryland, Library of Congress Division of the Blind and Physically Handicapped, University of Rochester.

have so far been made generally available,² (Purdue University, 153; Smithsonian Institution, 181; University of Tennessee, 187). Little has so far been published, but reference can be made to a brochure (Association of Research Libraries, 9), a symposium by the first participants (8, pp. 41-80), and a description by Webster, its designer (212). The cumulative effect on both libraries and librarians of this extensive investment of effort in improving management practices is likely to be considerable.

British Library

In 1969, the report of Britain's officially appointed National Libraries Committee, with Dr. F. S. Dainton as chairman (Great Britain, 79), recommended that the various disparate and administratively unconnected bodies that, between them, perform the services usually associated with a national library should be merged into one public corporation organized along functional lines. The Government issued a policy statement ('white paper') (Great Britain, 80) indicating general acceptance, appointed a Planning Office, and passed necessary legislation. Already by the end of 1973, the organizational changes and key appointments have been or are about to be made. The National Central Library and the National Lending Library for Science and Technology now constitute the British Library Lending Division. The Library Departments of the British Museum are now the British Library Reference Division. The British National Bibliography and the Office for Scientific and Technical Information are expected to join the British Library early in 1974.

The management problems facing the Director General of the British Library (Dr. H. T. Hookway) are enormous, but so are the opportunities for improvement. Documentation of these developments is, so far, extremely sparse. The so-called "Dainton report" (Great Britain, 79), upon which it is all based, is strongly recommended for both its proposals and its emphasis on measurement. Reference can also be made to an organization chart (185) and a paper by Richnell (161). Presumably, much more will be published in 1974.

EURIM

"EURIM"—the first European conference on research into the management of information services and libraries—was held in Paris in November

² Reports will, presumably, be completed at each library, but will not necessarily be made generally available.

1973 (65)³. This conference was organized by Aslib in conjunction with six other European organizations and can be regarded as symptomatic of a significant level of interest in Europe in the management of libraries and information centers.

ENVIRONMENT, MISSION, AND EFFECTIVENESS

Environment

In management, as in politics, the perception of the environment in its various aspects—political, economic, cultural, legal, technological, intellectual, and social—is important both for the practitioner and for those who study the subject. The practitioner needs to be aware in order to adapt his decision making accordingly, and the student needs to understand the constraints and opportunities in order to appreciate the skill and greatness (or otherwise) of manager(s) being studied.

Almost any information on the contemporary world could, of course, be regarded as more or less relevant. This review is confined to a few examples of writings that address rather directly the environment in which the managers of the libraries and information centers operate.

An examination by Bhattacharyya (16) of some characteristics of special libraries in science and technology in Britain relates variations in the size, staffing, and activities of the libraries to type of parent organization, the subject discipline, and the extent to which the research is pure or applied. For example, he finds that documentation activity, such as the compilation of abstracts and special lists, is far more common in special libraries serving applied research than it is in those serving pure research.

Academic librarians have a good deal of material on the changing scene. The eagerly awaited book *Economics of Academic Libraries* by Baumol & Marcus (15) vividly describes the alarming inflation in the cost of libraries, in terms reminiscent of Fremont Rider, who drew attention to the exponential growth of libraries in 1944 (162). For this reviewer, the excitement and challenge of the inflationary trend spelled out in this book became rather an anticlimax when, near the end, the authors pointed out that the same trends apply to education generally and health services. We are, it seems, in good company.

The environment of university libraries was also discussed by Bolton (19), who is Vice-President of the Educational and Institutional Division of Booz, Allen & Hamilton and was a member of the consulting team

³ The proceedings are to be published by Aslib in 1974.

performing the Columbia Study described below. His paper provides a convenient review of some of the factors affecting university library administration. He foresees financial distress and a fundamental challenge to keep in mind the basic mission of the university. He expects new modes of organization with more lateral interchange and more "relentless gradualism" rather than disruption. The future librarian, he argues, needs to be more flexible and will need to emphasize planning, fund raising, and innovation.

Similarly, Lyman (119) foresees more materials, more users, more services, more relationships, more use of advanced technology, and more need for managerial skills and diplomacy on the part of university library administrators. A major issue in the U.S. during 1973 was the paper by McAnally & Downs (121) on the increasingly difficult pressures on the Director of Libraries. (See the section entitled Personnel for a discussion of this paper).

There have been a substantial number of publications on media centers and the introduction of nonprint media into libraries. The papers sampled by this reviewer have tended to contain a high proportion of exhortation and "how-we-did-it." Perhaps this should be seen, in part, as reflecting an uneven response to an environmental change: new media are increasingly available but have not always been accepted and incorporated into libraries to the extent advocated by nonprint media specialists. Good examples of these publications are one by Atkins (11) and a special issue of *Drexel Library Quarterly* (Barber, 14).

The environment and the mission of the public library in the U.S. have received an extensive historical and bibliographical survey by Harris (90). The difficulties faced by librarians attempting to provide outreach services to a community with a different cultural environment are reviewed by Colson (47), who uses the High John project as an example.

The studies of the environment of library management merge into the broader area of comparative librarianship, which is outside the scope of this chapter. However, some examples that have been of interest to this reviewer for shedding light on the environment of library management are *The Libraries in Paris* by Newman (140), *Libraries in the Federal Republic of Germany* by Busse & Ernestus (36), and a study by Walker (204) of the response of the library profession in Czechoslovakia to the reforms of premier Dubcek. The impact of situational factors—cultural, economic, and social, as well as technological—on management style and performance seems, to this reviewer, to warrant more attention.

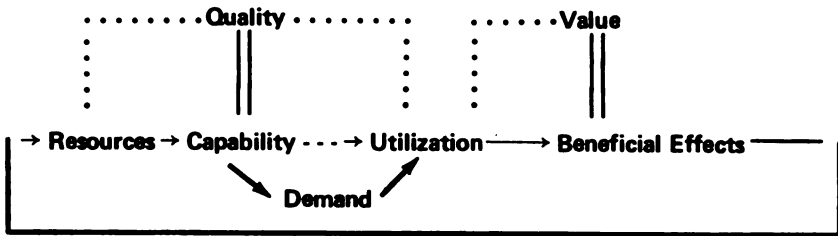
Mission, Goals, and Effectiveness

It was cold comfort to be told, in Ford's thorough review of research in user behavior in university libraries (70), that it has yet to be demonstrated that the use of libraries has any definite influence on anything else. Nevertheless, there was a great deal of work, some of it highly significant, in developing statements of mission and measures of effectiveness in the period reviewed. Roberts (164), in one of his periodic reviews of the British academic library scene, very plausibly attributes this interest in mission and effectiveness to greater cost-consciousness induced by inflation and tighter money.

One model statement of mission and objectives for a research library was that proposed for Columbia University Libraries by Booz, Allen & Hamilton (23) and subsequently adopted in a revised form (Columbia University, 48). Statements of mission and objectives were also drafted in each of the libraries undertaking the Management Review and Analysis Program in order to provide direction for the study. The usual format is a brief statement of mission, defining what kind of role the library has, followed by a series of "objectives," which are thrusts or activities needed to perform the role.

A "Statement of Public Library Aims and Objectives," prepared by the Public Library Research Group of the London and Home Countries Branch of the (British) Library Association, is reported and discussed by Gardner (74).

Library goodness. This reviewer's choice as the most important paper of the year is Orr's article entitled "Measuring the Goodness of Library Services: A General Framework for Considering Quantitative Measures" (142). Orr starts with the distinction between *quality* ("How good is the service?"—a measure of capability) and *value* ("How much good does it do?"—a measure of beneficial effects). Because of the difficulties of measuring quality or value directly, Orr argues, the tendency has been to fall back on two other, more easily measurable attributes: resources and utilization. The justification for reliance on using resources and utilization as surrogate measures for quality and value stems not only from convenience but also from the fact that all four are linked in a sequence of cause and effect. Other things being equal, the capability of a service will tend to increase as resources devoted to it increase, but not necessarily proportionately. Similarly, demand—and, therefore, utilization—will tend to increase as capability increases; beneficial effects will tend to increase as utilization increases; and resources will tend to increase as beneficial effects increase. Schematically, this chain can be represented:



Orr also observes that an optimist would favor the proposition that the closeness of coupling will tend to increase as management skills improve.

The importance of this paper is that it provides a conceptual framework within which the various proposed measures of library goodness can be considered and compared. Indeed, the paper could have been improved by relating to it some actual measures such as the Document Delivery Test developed by Orr et al. (143), which is a measure of capability. However, and this is a point not adequately brought out by Orr, capability can only be measured in terms of the ability to perform a specified task (such as meeting a demand), and measurement techniques proposed in the literature vary in extent to which the task used in the measurement coincides with the demand on the library. This variation can be illustrated by three measures of capability used in the literature surveyed. The demand for books is known to be highly skewed. Therefore, the ability of a library to provide a random sample of modern U.S. publications (as proposed by De Prospo et al., 55) will be a less close match of the library's capability of serving the demands of its clientele than if the sample used had been picked to reflect the users' supposed demands [as in the Document Delivery Test of Orr & Schless (144) and Penner (148)]. Here again, the reliability of the results would be further enhanced if the test used involved actual usage (e.g., Line, 117; Urquhart & Schofield, 193, 194; Buckland et al., 33) rather than a sample assumed to simulate demand. There is, therefore, for measures of capability, a dimension that represents the degree to which the task being used to test capability coincides with the task of satisfying demand.

The rest of Orr's paper (142) discusses the needs for measures of library goodness, the operational problems in measuring, and the desirable attributes of measures. Let us hope that this paper is widely read and Orr's framework used in future discussions of library effectiveness.

An earlier paper by Evans et al. (66), reviewing criteria used to measure library effectiveness, is already outdated both by Orr's framework and by

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other recent literature. It does, however, provide a checklist of criteria and points out that the preservation function of libraries has been consistently disregarded when library effectiveness has been discussed.

Overall evaluation. It is a tribute to the liveliness of the field that no fewer than three studies have been reported that attempted to provide a reasonably complete system for determining library effectiveness.

One very substantial study entitled "The Development of Statistical Information Systems for University and Large Public Libraries" was based on the Wharton School of Commerce and Finance, University of Pennsylvania, and is described in a paper (Hamburg et al., 86), a thesis (Bommer, 20), and, more fully, in a book (Hamburg et al., 85). This team, directed by Hamburg, resuscitated the "item-use-day" measure, proposed several years before in a paper by Meier (132), which has been frequently cited but otherwise ignored by librarians. The Hamburg team argued that, although measures such as "immediate availability" may have some usefulness to library management, any overall measure of library services ought to be as nearly concerned with beneficial effects as possible. The amount of actual document usage in hours is one degree more refined than raw circulation data, and so "document exposure" was used. The team used considerable energy and ingenuity to analyze the Free Library of Philadelphia in terms of dollar investment and document exposure. If it is further assumed that public authorities invest their resources with a rationality and eye for social benefit comparable with private investors, then one can impute a monetary value as well as a monetary cost for an hour of document exposure. Some of the assumptions needed to transmute all services into an output of document exposure weaken the credibility of the study. Nevertheless, the completeness of the study, the competence of the researchers, and the (usually) very lucid exposition make this a study that needs to be carefully read, digested, and then improved upon. Although practicing librarians may not be inclined to take document exposure very seriously, the fact that demand for library services is known to be elastic (in the economic sense) implies that utilization is a measure that is, at least, of co-equal importance with capability measures such as immediate availability.

A second rather complete study is that authored primarily by Newhouse (Newhouse & Alexander, 139) and entitled *An Economic Analysis of Public Library Services*. The decision areas considered include size of materials budget, allocation of book funds by subject, loan periods, fine policies, and management information. Newhouse's approach can be summarized as follows. By making books available on loan, the public

library saves expenditure by individuals who might otherwise have bought books instead of borrowing them. The aggregation of these savings, less the public library expenditure, represents a net saving to the community, quite apart from the economic externalities such as the benefits derived by those who read books that they would not have bought. To maximize this saving, the library needs to maximize document utilization, and increasing the probability that a user can find the document sought is rightly seen as being of primary importance. Newhouse's specific recommendations, which include a plea for user-oriented stock policies—including "variable" loan and fine policies whereby the length of the loan and the size of the fine depend on the popularity of the document in question—are remarkably consistent with, though apparently independent of, the work on library stock control at the University of Lancaster (Buckland, 30). The difference comes generally in the weighting by price to which Newhouse's economic benefit is presumably sensitive.

There is a report on the first three phases of the "Measurement of Effectiveness of Public Library Service Study" by De Prospro et al. (55), which is summarized by De Prospro & Altman (54). The study attempts to cover most if not all aspects of library service, but whereas both Hamburg et al. (86) and Newhouse (Newhouse & Alexander, 139) try to achieve a synthesis in terms of a single measure of performance, the work of De Prospro and colleagues (54,55) achieves completeness by deriving a battery of different measures relative to different services without attempting an overall synthesis. The report discusses with feeling the ambivalence of librarians towards measures of library effectiveness. The individual measures proposed are interesting and are clustered around three basic services: 1) making materials available to users, 2) providing facilities to users, and 3) making staff available to users. In this reviewer's opinion, much more experience is needed with the type of proximate measures advocated by De Prospro and colleagues. Therefore, it is to be hoped that the report will be widely read and that the managers of libraries and information centers will experiment with and improve on the measures. However, the measures proposed are vulnerable to constructive criticism in two regards. In the first place, the measures are, in general, less user-oriented than the authors suggest. For example, measuring the proportion of time that equipment is utilized is not the same as measuring how often users could or could not use the equipment. Similarly, as mentioned above, a random sample of U.S. books may not be an accurate simulation of the pattern of users' demands. In the second place—and this is not unrelated—more thought needs to be given to the management implications of the measures, especially when they are not fully user-oriented.

This can be illustrated by the example given of a library that owns 16% of a sample taken at random from the last three years of *Book Publishers' Record*, the lowest score for medium-sized libraries. What should the librarian do in this case? The obvious reaction is that he or she should buy more different titles. However, it is also known that only about half of these titles are available on the shelves. In all probability, if the budget cannot be increased, the librarian ought to acquire fewer different titles and divert resources into the purchase of duplicates and review the loan, overdue, and fine systems. This would probably improve the library's capability of meeting users' needs and, thereby, increase utilization. The moral is twofold: 1) several proximate measures may be more enlightening than one, and 2) careful thinking, which implies good theory and conceptualization, is needed concerning the implications.

Measures of document delivery. The literature surveyed is richer than ever before in studies of measures of effectiveness of document delivery. While there was little that was entirely new, several measures were analyzed and discussed more fully than before. These will be reviewed seriatim.

The use of a random sample of modern publications in the study of public libraries by De Prospro et al. (55) has already been discussed above. Goldhor (76) has described an inversion of the traditional technique of checking a standard list against the holdings of a library. He has experimented with checking the holdings against several lists and noting the degree of overlap. The use of a sample of references, carefully selected to simulate the demand of a given group of users, is described at length by Orr & Schless (144). The validity of the results depends on two primary assumptions: 1) that the sample does not differ significantly from actual usage in either range of titles or currency, and 2) that searching by professional librarians from another library approximates the search behavior of researchers who are not professional librarians. The paper by Orr & Schless reports on the use of the standardized Document Delivery Tests in the U.S. to assess the capability of 92 medical school libraries for meeting the documentary needs of biomedical researchers, and of 15 major resource libraries for filling interlibrary loan requests from biomedical libraries. In brief, a search is made at each library for a list of documents believed to be representative of the documents sought by the user-population served. The proportion of documents supplied and the delays involved in delivering them are measured. The paper is recommended not only for its description of the Document Delivery Test (which is really a battery of partial tests that can be combined in more than one way), but also because the candid reporting of the methodological problems encountered is unusually

interesting. A replication designed for the self-testing of library school libraries has been reported by Penner (148, 149).

Citations in theses have often been used in the past as a sample presumed to reflect user needs. Chambers & Healey (41) have reported an unusual inversion of the typical approach. They analyzed the citations in masters' theses in education and English at the University of Rhode Island and related the data to the journal collections held. They conclude that the intensity of usage was so low as to suggest that the collections might be unjustifiably large with respect to range of titles and length of retention. Here, again, great reliance is being placed on the assumption that the sample used does, in fact, reflect user behavior. A more traditional use of citations in theses is to count the proportion of the total references to titles held by the local library. This proportion is then deemed to be a direct measurement of the adequacy of the local collection. Since user behavior, and, therefore, citations, are likely to be more or less influenced by what is available locally, this methodology is fundamentally unsound. Fortunately, the reviewer did not find examples of the latter approach in recent literature.

The direct monitoring of users' own searches instead of a sample used to simulate users' behavior has been reported in several papers. The terminology in the reports varies. The terms used included "readers' failure," "stock failure," "immediate choice," "immediate availability," and "satisfaction level," but the measures used are substantially similar. Line (117) provided a convenient and candid report and discussion. Urquhart & Schofield (194) of the Cambridge Library Management Research Unit extend their earlier report (193) on how simple techniques, such as bent paper clips, can be used to determine which classes of reader cannot find which books how often, why not, and how failure to find affects book usage. Piternick (151) reports a survey of causes of failure to find journal issues. Buckland reported in a summary form (30) and in some detail (28) on work at the University of Lancaster Library, where a "variable" loan and duplication policy was introduced. The policy was based on a study of the effects that demand, loan policies, and duplication policies have on the chances that users will find the documents they seek.

A general difficulty with measures of document delivery is that they are conceived in terms of title-specific searching, and no account is taken of browsing. For practical purposes, browsing can be defined as searching that may be more or less purposive but that is not title-specific. The literature reviewed had little to offer on this aspect. A formal measure of the suitability of a collection for browsing—"collection bias"—was reported by Buckland (30) and Buckland et al. (33). It is a measure of the extent to

which the array of documents available is biased in favor of the titles that are less in demand. Discussions of browsing in terms of a mathematical clarification can be found in Morse (134) and, more generally, in Hyman (99).

The various measures described above are all interrelated, both in theory and practice, though the relationships between them and their interactions with demand and utilization are by no means straightforward. The Lancaster Library Management game (113), made available during 1973 and earlier reported by Brophy et al. (27), is concerned with these relationships. It provides for the reporting of utilization, document exposure, immediate availability, and collection bias, as well as costs.

In a category of its own is *The Reader, the Library and the Book* by McClellan (122). This collection of essays dating back to 1949 is relevant to this section of this chapter because it includes a brief description of the elaborate book management system developed over the years at Tottenham Public Libraries. McClellan's dictum is that the management of accessibility deserves as much attention as selection, classifying, or cataloging. He divided the library stock into a number of discrete subject categories and then developed an ingenious system of stock control designed to determine the optimal size and subject allocation of book funds with respect to a series of variables. These variables include, among others, physical deterioration, intellectual obsolescence, actual usage, and "reader exhaustion" (the number of volumes per reader required to ensure an adequate selection of reading for all levels). As an operational system that incorporates standards of service and is designed to respond to changes in user behavior, it deserves to become better known.

Specific services. So far, this review has been concerned with broad treatments of the library. Library provision, however, is composed of a variety of specific services and, just as one must manage the whole, so also must each specific service be managed. Space prevents the mentioning of more than a few passing references by way of illustration. Some examples are the evaluation of a campus delivery system by Dougherty (57) and the survey of a teletype network in Indiana by Tolliver (188) and Tolliver & Drake (189). In another of the series of diagnostic techniques being developed by the Cambridge Library Management Research Unit, Seymour & Schofield (176) describe a survey design for estimating the factors that impede effective catalog use.

Examples reported of the evaluation of special types of libraries include service to disadvantaged groups in 15 cities by Lipsman (118) and in Albuquerque, New Mexico, by Zink et al. (222), and an appraisal of Presidential libraries (191).

User values. Since libraries and information centers exist to provide service, the work described above is, quite properly, user-oriented in that the style of service is related more or less directly to user behavior. However, policy considerations, such as net economic benefit (Newhouse & Alexander, 139) may substantially modify the extent to which the services will be based in any direct sense on the *preferences* of the users. In contrast, four papers have discussed the direct use of users' value judgments in policy setting. These are by Miller (133) and Reisman et al. (156), whose work will be considered below under planning, and a pair of papers by W. Cooper (50, 51) on indexing. Although the performance of indexing systems is outside the scope of this chapter, the discussion by Cooper (50, 51) of the use of subjective evaluation can be mentioned because it is of wider potential applications. Briefly, Cooper argues that users' subjective evaluations ought to be a usable method of measuring system effectiveness. However, the difficulties of measuring the subjective evaluations or of surrogates for it lead to numerous problems.

Standards. The discussion and development of recommended normative levels of staffing and provision as guidelines for managers and funders continues, though the amount of activity does not seem high. Examples of discussion are an issue of *Library Trends* (Hirsch, 95) devoted to this topic and a paper by Vainstein (195). An example of development is the set of standards recommended for Canadian Community College Libraries by the Canadian Association of College and University Libraries (39).

REVIEW OF MANAGEMENT FUNCTIONS

Planning

The major study of library planning was Cornell University Library's work on developing a long-range strategic plan. Fortunately, arrangements were made for an experienced administrator from another library (W. E. McGrath) to act as an impartial observer and to chronicle and evaluate the effort (McGrath, 123). Cornell established a team of 11 professional (and, it seems, senior) librarians and undertook the American Management Association's Team Planning Process. The planning effort involved two five-day retreats and much grappling with fundamental issues concerning the mission and management of library systems. McGrath's account makes interesting reading, but it is probably too soon to evaluate the impact of the effort.

The Association of Research Libraries' Office of University Library Management Studies issued a review of planning activities in academic libraries (158), and there has been an increase in the number of libraries with planning offices responsible for the initiation or coordination of planning.

The formal use of subjective opinions in developing plans is reported by Miller (133), who is concerned with planning the range of services to be offered by a special library, and by Reisman et al. (156), who are concerned with planning interlibrary transportation systems. The latter is a clearly described example of the Delphi technique's being applied to library management.

Short descriptive accounts of the planning processes were published: in a special library context emphasizing program budgeting (Sellers, 174), in relation to school media programs (Liesener, 116; Kraft & Liesener, 110), in a British public library context (Great Britain, 78), and in a university library context in terms of management by objectives (Johnson, 100).

Although the topic is outside this reviewer's competence, the planning of library provision at all levels in the USSR would seem to be worthy of more attention outside the USSR. Serov (175) provides a brief overview of developments. In the U.S., for example, the increasing emphasis on state plans, national plans, and techniques such as formula budgeting appears to indicate a convergence with Soviet development, in which case greater familiarity with Soviet experience would seem prudent. Late in 1973, the U.S. National Commission on Libraries and Information Science issued a draft statement entitled "A New National Program of Library and Information Service" (136). Apart from stressing the need for a rational approach to the growth of libraries and information centers, the draft report was principally concerned with networks and federal funding.

Budgeting

Discussions of budgeting remain dominated by PPBS (Programming, Planning, and Budgeting System), which had been described, usually with enthusiasm, by several authors. Allen (2) reported on an extensive survey of budgeting techniques in U.S. academic libraries. His report is supplemented by a brief survey by the Association of Research Libraries (157).

Hannigan (87) relates program budgeting to the 1969 *Standards for School Media Programs* (3) and presents a set of program elements that might be used. Tudor (190) discusses the budgeting problems of special libraries. He provides an overview of PPBS in general terms, stressing the

advantages rather than the difficulties. He also presents a checklist of economies and numerous references.

In general, this reviewer believes that there has been an excessive number of articles on PPBS that have been enthusiastic, uncritical, vague, and, in practical terms, unhelpful. In contrast, the approach of Schofield (171) is to be recommended. Writing from significant experience, Schofield is critical but constructive. He advocates program budgeting as an approach but also outlines the technical deficiencies of PPBS. He points out that one of the main ingredients required to operate and justify the end product of PPBS is measures of input, output, and impact. Unless such measures are developed, which in some cases may not be possible for library services, PPBS is substantially incomplete. He, therefore, stresses the need for developing measures of effectiveness.

Use of Policies

Every library and information center has policies. As determinants of the daily activities of staff and users, these policies are both a management tool and a resource capable of guiding both staff and users towards the achievement of desired outcomes. The only treatment of policies and their use that this reviewer found was a 40-page booklet in the Occasional Papers series issued by the Office of University Library Management Studies of the Association of Research Libraries. Authored by Webster (211), it provides a readable and useful guide to the definition, analysis, formulation, and review of library policies.

Management Information, Costs, and Statistics

Management information. The more quantitative approaches described elsewhere in this chapter depend on data collection and so also, though less directly, do the planning processes reviewed. Insofar as these developments are actually adopted, management information is likely to be taken more seriously in the management of libraries and information centers.

McClellan's stock control system based on management information of various kinds has been mentioned above (122). Duchesne (60), in a brief but well-referenced paper, outlines a library management information system designed to provide budget, cost, and performance data for planning and control purposes in addition to conventional financial and statistical statements. The references provide a convenient introduction to the literature.

The generation of management information from automated circulation systems is a technique that is, to this reviewer, sadly neglected. Griaznov & Zolotareva (81), however, describe its use to optimize the number of duplicate copies acquired.

Cost analysis. The derivation of management information on costs has been treated by several authors. Westat Research (Association of Research Libraries, 10) provided a detailed analysis of the characteristics, costs, and magnitude of interlibrary loans in U.S. academic libraries. The report includes a good example of a cost model: in this case, for producing instant estimates of interlibrary loan unit costs in large academic libraries. Results based on a small academic library are reported by Cossar (52). Axford (13) and California State University and Colleges (37) describe the application of unit-cost studies to the technical services functions of academic libraries.

Zaaiman (218) and Schmid (170) have reported on the analysis of labor costs, and a detailed Library Labor Cost Accounting system has been reported by Du Bois (59). The costing of library automation is discussed in another chapter, but it is appropriate to mention here a guide to costing by Ford (69), which is intended for those considering automation. A critique of the document costs of the National Technical Information Service is presented by Richardson (160).

Cost reduction for special libraries and information centers was the theme of the 1972 Midyear Conference of the American Society for Information Science (4), which included a useful review of the literature, numerous practical papers, and a mini-tutorial on costs.

Other statistics. The use of sampling to reduce the sheer counting effort required for some traditional library statistics has been described by Pinzelik & Tolliver (150), who demonstrate that, where two traditional statistical series can be positively correlated, one can count one and infer the other provided that the relationship is known.

Organization

The Columbia Study. The most notable event of the year in the literature of library organization is the publication of Booz, Allen & Hamilton's *Organization and Staffing of the Libraries of Columbia University: A Case Study* (23), its summary, (24) and a progress report by Columbia University Libraries on its implementation: *The Administrative Organization of the Libraries of Columbia University: A Detailed*

Description (48). The Columbia study had been initiated in an attempt to probe in greater depth the conclusions of an earlier Booz, Allen & Hamilton report (25) commissioned by the Association of Research Libraries in collaboration with the American Council on Education and the Council on Library Resources. These conclusions had included the finding that the organizational arrangements of research libraries were, in general, too informal, poorly matched to current and emerging requirements, and designed without benefit of modern management approaches. They were also described as often being inadequate in staffing and in provision for staff development.

The Columbia study is historically significant both as the first in-depth study in the Association of Research Libraries' program of fostering more actively the improvement of library management skills, and also as a formative influence on the Management Review and Analysis Program.

At Columbia, Booz, Allen & Hamilton recommended, and the libraries have implemented, a tri-partite structure of

- a *Resources Group*, which includes collection development and the design and provision of bibliographical control;
- a *Library Services Group*, which comprises the front-line operation of library services and much of what is traditionally designated Readers' Services; and
- a *Library Technical Support Group*, which performs a variety of specialized clerical and technical functions, such as purchasing, preservation, card production, and data control.

In many ways, the same staff members are performing the same tasks in the same units, but they will report up through a different administrative structure. The progress report (Columbia University, 48) is composed mainly of (necessarily) very detailed definitions of the role, objectives, functions, key working relationships, reporting obligations, and performance and evaluative criteria for each unit.

The reorganization of major libraries in the U.K. to form the British Library has been described above. The developing patterns of organization in the main libraries of large U.S. public libraries are analyzed by Hennington (93).

Roles: Participative management and collegiality. A clash between Lynch (120) and Marchant (128) reveals some of the methodological and conceptual problems of researching behavior in organizations such as a library. Lynch challenged various methodological aspects of the work of Marchant (129, 130) who has been exploring the hypothesis that a participative style

of management affects library effectiveness.

A case for participative management in libraries is made by Henss (94), and an overview of staff participation in large university libraries is provided by Flener (68). Participation is related to faculty status by Holley (97) and Kaplan (102) because the organizational structure of the professional staff *qua* faculty is an obvious basis for the development of participative management. This reviewer regrets the looseness of terminology in this area. "Participative" is often used to include situations in which "consultative" would be more accurate but is also used to describe collegiality. Ironically, there is a tendency to exclude the majority of the workforce—the clerical and paraprofessional staff—from the participative activities. In this sense the building of participatory management on faculty status smacks more of professional elitism than of interest in participative management.

Other aspects of organization. The organizational strains, role conflicts, and career development problems resulting from librarians specializing in a single subject area in a large library are discussed by Guttman (82).

Yates (216) discusses the organizational locus of an information service within the parent organization in terms of status, lines of communication between information unit and other parts of the organization, and relationships with management. The same topic is also considered by White (215). The basic choice appears to be between reporting through research or through management.

The relationship (or lack of it) between the development of library resources in a university, the location of the resources, and the location of the researchers is discussed by Redmond et al. (155). The separateness of departmental (institute) libraries from the central library continues to be a topic of concern, especially in West Germany and Austria (e.g., Ascher, 7; Gamsjäger, 73; Haas, 83), where the decentralization and separateness is particularly marked. The consolidation of small libraries in cognate disciplines and the centralization of administrative control are advocated and would bring definite change in academic tradition.

The division of labor as a source of *inefficiency* in technical services has been examined in Berlin and in Vienna. The theory is that excessive division of labor results in an excessive number of backlogs and, probably, low job satisfaction. The use of individuals or teams who complete all the processing on a given range of titles is seen as a superior alternative (Droz, 58; Kissel, 104, pp. 90-99; Stummvoll & Mayerhöfer, 186, p. 199).

Personnel

Reviewing the literature on matters of library personnel management has proved an awkward problem. The topic, in this labor-intensive industry, is important, but the literature seems, to this reviewer, to be uneven, fragmented, fuzzy, and even argumentative. In this section, a few topics that seemed significant are identified, and brief pointers are made to other aspects.

Staff requirements. Mahrenholtz (127) published a staffing formula for academic libraries prepared for the Bibliothekskommission des Landes Niedersachsen (Library Board of Lower Saxony). It is an elaborate structure of formulae based on the presumed relationship between the following factors: the number of students, number of faculty, range of subjects in the collections, average prices, the mix of books and serials, mix of arts and sciences, number of reading rooms and special areas and, (a connoisseur's item), how complete the collection is in relation to the size eventually desired. Predictably, the "Mahrenholtz formula" has since been criticized in the *Zeitschrift für Bibliothekswesen und Bibliographie*.

A predictive model of the changing staff needs of U.S. academic libraries was reported by Clark (45). Meanwhile, Gaines (71) describes how large academic libraries are likely to place greater reliance on well-paid professionals, who are effective in coping with change, and are accustomed to a free-lance role, to the notion of accountability, and to the delegation of responsibility.

The staffing of school library media centers has received considerable attention. Tasks and competencies have been reviewed by Case & Lowrey (40). Staffing models have been considered by Aaron (1).

Staff development. Smith & Schofield (180) report a survey of senior and intermediate staff deployment in U.K. university libraries. This included not only the numbers, mobility, and qualifications of librarians, but also their job expectations, reasons for movement, and professional development. In the same issue of the *Journal of Librarianship*, Roberts (163) reports a survey of Sheffield Library School graduates who were also part of the population surveyed by Smith & Schofield. We learn that the overwhelming majority are satisfied with their work and working situations, but that the managerial competence of their superiors is seen as a major source of frustration.

A welcome impetus to the study of job satisfaction in libraries is provided by a series of short reports by Vaughn & Dunn (197, 198, 199, 200, 201, 202). They conducted a study in six libraries examining pay, people, promotion, supervision, and work as determinants of job satisfaction.

Appraisal practices for staff performance in 138 North American Academic libraries were surveyed by Johnson (101) and a comparison between British and U.S. practices is presented by Peele (145)—both rather inconclusively. Peer evaluation among librarians for promotion and merit raises at Bouillon Library, Central Washington State College is described by Yen-Ran Yeh (217).

The Director. A stir was caused by McAnally & Downs (121), who reported that the position of director of university libraries was becoming a short-term and largely untenable position because of the pressures on the incumbent. A special session on this topic at the New Orleans meeting of the Association of Research Libraries (8, pp. 95-111) proved less interesting than a highly informal discussion after the meeting by some of the "Young Turks" of U.S. academic librarianship (42). They were clearly conscious of the problems but were less worried by them than their elders. Warner (206) has criticized the implicit assumption of McAnally & Downs that a long-term, stable directorship is a good thing. Unquestionably, the procession of directors of large research libraries into the quieter waters of library schools has become rather noticeable. At the other end of the scale, the attributes of the chief administrators of special libraries are summarized by Wasserman & O'Connell (209).

Education for the management of libraries and information centers. Professional education appears to have been a more lively area than most of the aspects of personnel surveyed. Neill (137) provided a basic criticism of standard Northern American professional education, saying that "professional librarianship is policy-making, evaluating, planning, and improving, and non-professional library work is the application of the rules, tools, and procedures. . ." It follows from these definitions, according to Neill, that much of what is taught in library schools and most of the products given MLS degrees are not professional. This reviewer surmises that this may be more true in education for management than in other more bibliographical areas.

The Chicago Graduate Library School annual conference (University of Chicago, 44) for 1973 was focused on management education in general and included a number of very distinguished speakers. The most interesting aspect (for this reviewer) was the recognition that management in a service-oriented, not-for-profit situation is particularly difficult, mainly because of lack of consensus concerning objectives and, therefore, measures of performance, and that the management of change was made complex because behavioral as well as technological factors are involved.

Concern on the part of library researchers at the time-lag between current research and classroom instruction and difficulties in explaining the concept of a mathematical model to practicing librarians were the motivations behind the Library Management Game developed by the Library Research Unit at the University of Lancaster, England. In the first prototype, the problems of library stock control were used as a framework for teaching basic concepts of management information, mathematical modeling, and planning in terms of measures of performance. Participants are told that they have each been designated director of an imaginary library, are provided with factual data on their library, and are required to prepare a five-year plan and a budget projection. They must justify both plan and budget in terms of expected improvements of service that are expected to ensue from the combination of planning decisions that they have taken. Actually, the planning decisions that can be exercised are confined to the number of titles held, the number of duplicates purchased, and the choice of loan period(s).

A computer simulation is used to predict, for any given plan, the probable user response and a variety of performance outputs. These include circulation, costs, immediate availability, collection bias and document exposure. What use the participant chooses to make of these outputs to revise his plan and defend his budget is part of the challenge. The formal report describing the game (Brophy et al., 27) and a user's kit (University of Lancaster, 113) have been published and the programs are being made available. The rationale behind the game may be found in Buckland & Hindle (32) and Buckland (29, p. 133). Response to the game by the initial participants (experienced librarians, researchers, and teachers of library management) appears to have been generally favorable and the University of Lancaster Library Research Unit was awarded the (British) Library Association's Robinson Medal for inventiveness. Other games are being developed based on other decision areas such as indexing policies or technical processing. Zachert (219) and Zachert & Pantelidis (220) report the use of experiential games designed to instill understanding through role playing. In a variant form of simulation, Matarazzo (131) describes encouraging students to practice the method of design and detail of the establishment of a company library. Other teaching techniques reported during the year are case studies (Galvin, 72) and short-term institutes (Hannigan, 87).

Finally, this reviewer recommends that Rosenberg's excellent discussion of teaching information science to nonscientists (165) deserves rereading by anyone interested in teaching quantitative management techniques to nonscientists; the problem is similar, and the same sort of approach is to be recommended. Rosenberg points out that the use of a formal mathematical

approach is liable to confuse conceptual difficulty with communication difficulties. He also foresees the computer losing its mystical power as a surrogate human and a basic change toward the design of adaptive flexible systems.

Communication

A problem persistently revealed in libraries undertaking the Management Review and Analysis Program (described above) is inadequate communication, especially in the large library organizations that have, say, more than 150 staff. It is, of course, possible that perceived communication problems may be just that—or they may be symptomatic of other malaises such as poor morale, mistrust, or executive indecisiveness. As with policies, this appears to be neglected territory. However, Penland (146) is to be commended for contributing some introductory guidance to the problem.

Promotional activities. External communications in the form of public relations have been the subject of two books: *Public Relations for Libraries* edited by Angoff (5) and *Public Relations for Librarians* by Harrison (91). Both are primarily practical guides.

The marketing of the products of information centers is discussed by Kuehl (111), whose paper is largely an essay on modern marketing perspectives: marketing as a “persuasive societal process” and as “a discipline focused on building linkages between producers and consumers.” Despite the jargon, the author makes valid points about the importance of defining the product and clarifying the need for it. Because libraries and information centers provide services, and because they are so dependent on the behavioral response of their clientèle, there is no doubt that marketing as a discipline has more to offer than technically oriented managers might normally realize.

Research on alternative promotional strategies for a batch-operated SDI service provided by the Mechanized Information Service at Ohio State University is reported by Stern et al. (184). The promotional programs considered were opinion leadership (endeavoring to develop a favorable attitude on the part of influential individuals), “blitz” (intensive publicity by mail and by personal presentation), and the solicitation of business by telephone. Blitz and telephone solicitation appear to be the most efficient means of promoting information services to faculty in an academic environment. However, the authors stress the importance of face-to-face interaction of the information specialists with the prospective user. The lack of awareness which is possible is illustrated by Nelson (138), who found that,

in a survey of six colleges, the average faculty member was aware of barely half the services actually available.

Cooperation

It may be wishful thinking, perhaps, but there are some signs that a fresh look is being taken at cooperation as a means toward more cost-effective management.

Schützack (172) in a paper on management problems and costs in setting up a mechanized information system stressed the importance of international cooperation. This is not a vague ideal of togetherness but increasingly a practical problem based on the interchange of machine-readable data. There are problems, however, in achieving it, which are discussed by East (62).

A more rigorous approach to cooperation is reflected not only in Sinclair's analysis of the typology of cooperatives (178) but also in increasing concern that cooperative arrangements be cost-effective to all parties and not simple mechanisms to permit those with poor library services to take advantage of others who have invested in good library services. Dagnese (53), for example, presents the need for cooperative arrangements to be "soundly based," by which is meant an arrangement based on the measurement of costs and benefits and possibly involving a contract and payment. Certainly, the notion of charges for interlibrary loans has been discussed seriously among the largest libraries, who are heavily subsidizing the rest in that they lend far more than they borrow.

Gell (75) describes newer forms of cooperation in urban areas, and Rossmassler (166) portrays the National Standard Reference Data System of the National Bureau of Standards as an example of private and public cooperation. Reynolds (159) has reprinted several papers in a *Reader in Library Cooperation*.

Management of Change; Research and Development

The "management of change," by which this reviewer means the management aspects of implementing changes within organizations, continues to be a seriously neglected topic in the literature. Goals and improvements are talked and written about, and self-consciously reform-oriented activities are undertaken, notably the Management Review and Analysis Program. Nevertheless, in this reviewer's opinion, there is still far too little discussion of the processes of accepting, implementing, and adapting to change in the environment of libraries and information centers, though guidance can

sometimes be derived from literature that is not specific to libraries, such as Hage & Aiken (84) and Etzioni (64). A noteworthy exception is Wasserman's book, *The New Librarianship: A Challenge for Change* (207). Wasserman provides a detailed critique of the "dynamic conservatism" of the library profession and argues the case for a more active role. Even when one agrees on a certain direction of development, how does one set about getting there? Kaplan (102) touches on this problem in the context of faculty status and management by participation in academic libraries.

Guided self-study as a means of improving staff skills, fostering a climate of change, identifying problems, and developing solutions has been discussed above in the context of the Management Review and Analysis Program. A similar mixture of study team, task forces, and self-help in tackling the problems of research libraries in Austria has been described by Zessner-Spitzenberg (221).

Other, mainly minor, contributions have approached the problem of innovation from a variety of angles. The case for a team composed of practicing librarians, students, and teaching faculty has been advocated by Olson et al. (141) and by Rouse & Rouse (167), while the conditions needed for this teamwork to be effective have been listed by Buckland (30, p. 105).

The past few years have seen a noteworthy growth of a significantly different alternative to the librarian-student-faculty approach; this alternative takes the form of management research units based inside libraries or organizationally linked to them but not affiliated to schools of librarianship or management science. The motivation is different in being oriented more toward implemented results than academic achievement, and the accountability for producing results would seem to be higher. Some examples of this form are: Library Management Research Unit, Cambridge University, England (Plumb, 152; Cambridge, 38); Office of University Library Management Studies, Association of Research Libraries, Washington, D.C. (Webster, 213); Instructional Media Research Unit, Purdue University, Indiana (154); Arbeitsstelle für Bibliothekstechnik (Study Center for Library Technology), Berlin (182, 183); University of Lancaster Library Research Unit, England (Mackenzie, 124); Österreichisches Institut für Bibliotheksforschung, Dokumentations- und Informationswesen (Austrian Institute for Library Research, Documentation and Information Science), Vienna, Austria (Stummvoll & Mayerhöfer, 186); as well as the well-known research activities of Aslib in London.

The administration of research and development was substantially neglected in the literature surveyed. Apart from items cited above, the brief review by Bock et al. (18), which stressed the interdisciplinary and

institutional aspects, was a noteworthy but isolated example, though the issue of *Library Trends* (Lancaster, 112) devoted to systems design and analysis for libraries is also relevant.

INFORMATION CENTERS

The distinction between information centers and libraries—particularly special libraries—is a blurred one. Much of the literature reviewed in this chapter would appear to be generally applicable to both libraries and information centers. Nevertheless, at the far end of the spectrum there do appear to be distinctive management problems in terms of funding and marketing.

A noteworthy contribution is a book by Weisman, *Information Systems, Services, and Centers* (214). This lucid and readable text covers information analysis centers, information centers, and clearinghouses, as well as special libraries. Indeed, a strong feature is Weisman's careful definition of each of these categories. Particularly good are his discussions of planning and of funding.

Schwuchow (173) has attempted to clarify some aspects of the economic analysis of computer-based information centers. He argues that the nature and benefits of information systems are such that partial public financing of information services is needed to close gaps in the interests of compatibility and to meet development costs. He notes that private enterprise and realistic fees have the advantage of inducing competition and, therefore, flexibility to users' needs. Nevertheless, he draws on the concept of public goods to justify at least partial public support on the grounds that the dissemination of information is very important to the development of society. In a discussion of fees for use of information services, he advocates the direct subsidy of user groups rather than a scale of fees.

The management of information analysis centers was the topic of a forum (192) sponsored by the Panel on Information Analysis Centers of the Committee on Scientific and Technical Information (COSATI). The miscellany of papers presented provides a useful counterpoint to Weisman (214) for those unfamiliar with information analysis centers. For those already familiar with this area, the interest is likely to be in technical details of the systems described.

MANAGEMENT RESEARCH TECHNIQUES

As far as possible, the literature has been reviewed from a functional or problem-oriented perspective. Nevertheless, three aspects concerning man-

agement research techniques seem to warrant special comment: the surprisingly large amount of quantitative analysis; prospects for emphasis on adaptive mechanisms and cybernetics; and greater recognition of the complexities of the systems being studied.

Quantitative Analysis

Reviewing the literature of 1972 and 1973 made it clear to this writer that the interest in the application of operations research and economic analysis to the problems of libraries and information centers is both substantial and widespread.

The proceedings of two conferences, at Chicago (43) and Columbus, Ohio (Hoadley & Clark, 96), were published. Surveys of the literature were provided by Slamecka (179) and by Mackenzie & Buckland (126). An evaluation of the scope for operations research in the library and information field was issued by Elton & Vickery (63). In addition, there were a didactic institute (Axford, 12) and various popularization papers, e.g., by Leimkuhler (114), Mackenzie (125), and Buckland & Tolliver (34).

Specific applications. Major projects listed above, such as those of Hamburg et al. (85, 86) and Newhouse (Newhouse & Alexander, 139), were complemented by numerous smaller studies. An extensive list of topics is given here to alert readers to studies that might be of special interest and to illustrate the variety. Examples of studies of a more or less quantitative nature include those dealing with book losses (Huttner, 98), book security systems (Karlin et al., 103), comparison of circulation systems (Burgess, 35), facsimile as an alternative to lending (Van Toll, 196), journal selection (Kraft & Hill, 108, 109), prediction of demand on a data base (Ware, 205), reference work (Kochen, 105, 106), searches for missing books (Bly, 17), shelf-reading (Bookstein, 21; Bookstein & Swanson, 22), staff scheduling at desks (Nar, 135; Rouse & Rouse, 167, 168), union catalogs (Arms, 6), and utility of holdings of journals (Codi & Mroz, 46).

The quality of such papers is varied and, even when the mathematical aspects are good, the assumptions needed for formulation or implementation may not be. An example of this is a study of the allocation of book funds by Goyal (77), in which an important variable ("social value") is not quantifiable in any very acceptable way [see K. Harris (89) for a critique]. Another study (best left unidentified) depends on the ludicrous assumption that a library administrator could permit or refuse to permit photocopying on a day-to-day basis. Mackenzie (125) points out that the implementation of operations research studies is far less noticeable than the studies them-

selves. The inference is that the results are not being implemented. Nevertheless, the amount and variety of the studies would seem very healthy.

Economic analysis. *Economics of Academic Libraries* by Baumol & Marcus (15) used regression analyses to generate a wealth of information on the normative patterns of growth and expenditure of academic libraries, extending the analyses produced in *The Past and Likely Future of 58 Research Libraries* by Dunn et al. (61). Buckland (31), however, has suggested that it would be more fruitful to stress the economic analysis of libraries at a different, microeconomic level, treating libraries as purposive enterprises in much the same way as an economist treats the theory of the firm. The more comprehensive studies of library effectiveness such as those by Hamburg et al. (86), Newhouse (Newhouse & Alexander, 139) and the University of Lancaster (Mackenzie, 124) are, perhaps, best seen in this light.

The treatment of libraries as enterprises was the theme of a major conference in Mannheim, West Germany (203), and this view of libraries was discussed in detail by Kortzfleisch (107), who discusses libraries in terms of six aspects of enterprises: goals, market, process, cost-effectiveness, competition, and usefulness. He concludes that library management is similar to industrial management in some aspects and that the comparison deserves further analysis.

The attempt to formulate library management problems in a form that is realistic, reasonably complete, and also tractable in terms of management research is also found in the work of Kissel in his book *Betriebswirtschaftliche Probleme Wissenschaftlicher Bibliotheken* (Management Problems of Research Libraries) (104) and in a paper at the EURIM conference.⁴

Predictions

Cybernetics and adaptive systems. It is a dull review that has no predictions. One development foreseen in this reviewer's crystal ball is a strong trend toward adaptive control systems and cybernetics. The literature provides a little justification for this. Salton (169) has made "proposals for a dynamic library." This is an essay on problems of large libraries' ability to change. He has some perceptive comments on the limitations of automation as such. The most significant part of his report, however, is the argument that recent developments in indexing would allow libraries to become significantly more dynamic in their adapting to the changing needs

⁴Private communication. The proceedings of the EURIM conference are to be published by Aslib, London, in 1974.

of users. Heilprin (92) and Penland & Williams (147) have produced papers exploring cybernetics as a basic ingredient in the theory of information science. Given the number and the complexity of the interactions that can be found in the provision and use of information services, this may well be the proper starting point for theoretical analysis. However, this reviewer is inclined to start with a more pragmatic consideration and stress that adaptive systems are a logical development of the more quantitative management studies described above in the section on *Environment, Mission, and Effectiveness*. Once one has derived a measure of performance and figured out how various factors affect it, the only sensible course of action in a dynamic environment is to develop management information systems and control devices such that the service organization can achieve some combination of coping with the stresses laid on it and also maximizing standards of service.

Bibliometrics. Bibliometrics has been defined by Fairthorne (67, p. 319) as "quantitative treatment of the properties of recorded discourse and behaviour appertaining to it." It is an area that is likely to become more important, not less, for two reasons: 1) it is unavoidable if the new emphasis on measures of performance is here to stay; and 2) analyses of growth, epidemics, scattering, obsolescence, and the like take on a new significance when seen, as by Brookes (26), as the means of exploring the production, distribution, and utilization of intellectual products ("social epistemology," in Shera's phrase). Donohue (56) has provided a convenient introductory guide that stresses management implications.

Behavioral approaches to management problems. Work reported on organization, staff development, and communication all seems to indicate that a substantial effort in the application of behavioral research to libraries and information centers is needed, difficult, and likely to be attempted.

ENVOI

The literature of the management of libraries and information centers as viewed in early 1974 is uneven. There is great research interest in measuring library cost-effectiveness and developing proximate measures of performance. Quantitative studies abound. Attention tends to be concentrated on large research libraries, and evidence of implementation lags behind evidence of research creativity. Some areas are still relatively neglected: these include organization, personnel, management information, and the use of policies.

Nevertheless, ten years ago, when research in information science was largely preoccupied with the use of computers and the information needs of scientists, only optimists would have predicted the present quantity and range of work on the management of libraries and information centers.

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