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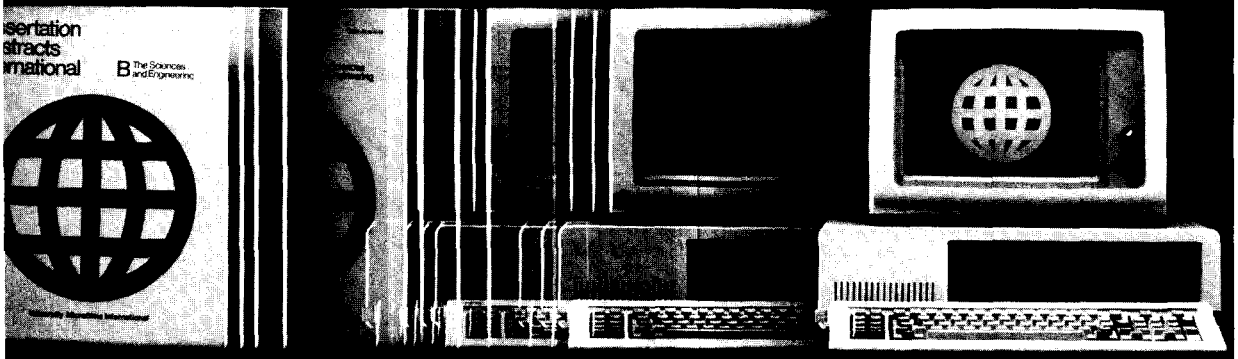

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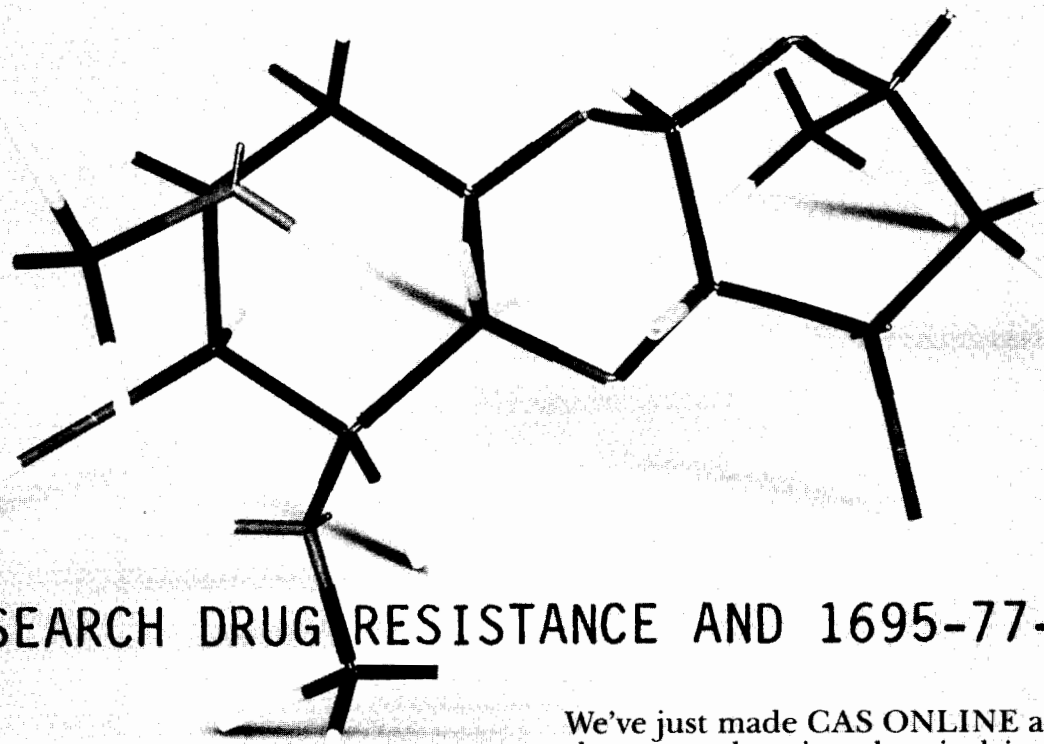

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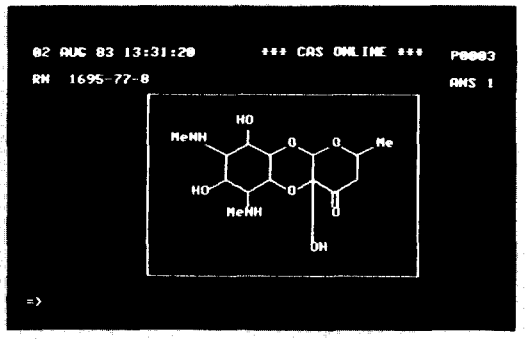

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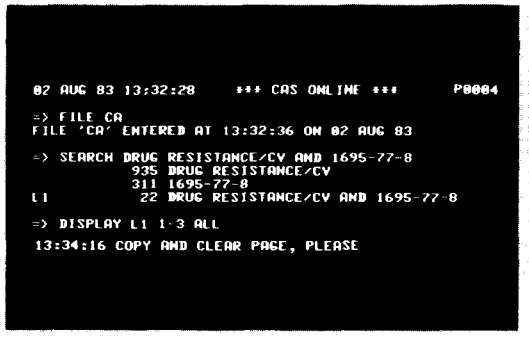

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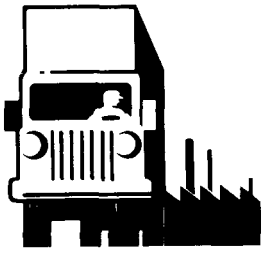

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LETTERS

Diskette Mania

"Microcomputers: An Interlibrary Loan Application" by Elizabeth A. Evans [*SL*75 (no. 1): 17–27 (Jan. 1984)] was read with great interest at MacNeal Hospital, because we have just completed a six-month programming project to computerize our library's ILL processing. We noted several aspects of Ms. Evans' program which are characteristic of systems produced in academic environs.

The article alludes to the "flexibility" of using a DBMS (such as dBASE II), gives source listings of dBASE II command files and cites a variety of dBASE II utility applications. This approach is impractical in small specialty libraries because ILL processing is often done by clerical employees; the logistics of learning and maintaining such a system would have been prohibitively difficult in comparison to the turnkey system we eventually wrote.

The system Ms. Evans describes is noticeably "loan" oriented with three separate files containing loans in varying stages of the ILL process. Although this approach affords the potential for limitless statistical analyses, it also results in the cumbersome accumulation of diskettes (for diskette users) and creates additional file maintenance chores. Recently, when we observed a librarian using a similar interlibrary loan package with a database management software package, we noticed that seven (7) disks were constantly being put in and taken out of the two disk drives. This appeared confusing and time consuming to two people involved in designing an interlibrary loan program; imagine a clerk learning to use this software with a database management package.

We opted for a system that is "library" and "periodical" oriented; after a loan is filled, library and loan files are updated to create summary statistics while disk space is reused. This approach was taken because (1) most inquiries regarding loan usage were library and periodical specific and (2) the result was a system which uses only two diskettes regardless of the number of loans processed.

In summary, librarians considering computer applications should keep in mind that greater flexibility means more time will be needed to learn and maintain the system and that systems which create additional maintenance chores should be avoided.

Jim Hees, Programmer Analyst
Systems Development

Rya Ben-Shir, Manager
Health Science Resource Center
MacNeal Memorial Hospital
Berwyn, IL 60402

The Author's Reply

Ms. Ben-Shir and Mr. Hees are right when they conclude that greater flexibility often requires a trade-off in time and effort, and I readily admit to a prejudice in that area. I believe that greater flexibility is *worth* the extra trade-off. However, as is always the case, individual libraries must decide for themselves the degree of flexibility or "user-friendliness" required for their situation.

I'd like to briefly address the specific points in Ms. Ben-Shir's and Mr. Hees' comments. First, the ILL system was originally developed in a small special library where ILL processing is handled by professional staff and library science student interns. The academic library (East Carolina University Health Sciences Library) where the system was subsequently implemented uses mostly clerical personnel in processing interlibrary loan requests. As far as I know, the non-professional staff has had no problems dealing with the system. Susan Speer, the Head of Circulation, programs modifications to the system as they are needed or desired.

The ILL system on dBase II does maintain separate databases for loans in varying stages of completeness. However, disks of completed loans are maintained purely for archival purposes and are not shuffled back and forth from disk drive

to disk drive. Depending on the storage capacity of the disk drives involved, and the volume of ILL requests, multiple disks may be required. Even under those circumstances multiple disks are only required once a month, and shuffling of disks is still limited to two or three. Under situations like that, I recommend a hard disk which would virtually eliminate disk swapping.

Finally, I fully agree that a library should consider the trade-offs involved in a flexible system. However, I feel that individual needs of libraries need to be met, and flexible systems are often appropriate choices to meet those needs.

Elizabeth A. Evans
University of North Carolina
Dept. of Psychiatry
Chapel Hill, NC

Information, Please

For a revision of my book *Library Automation Systems* (Marcel Dekker, 1975), I would appreciate receiving information on any existing library automation systems not described in the open literature. Readers of the first edition are also urged to send any corrections or suggestions for changes.

Stephen R. Salmon
President, Carlyle Systems, Inc.
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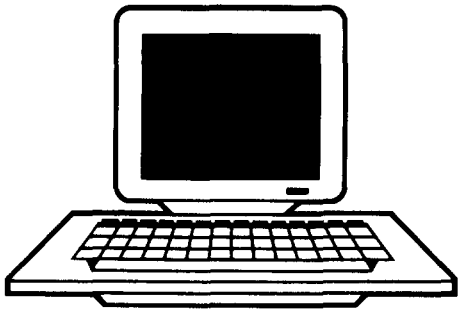

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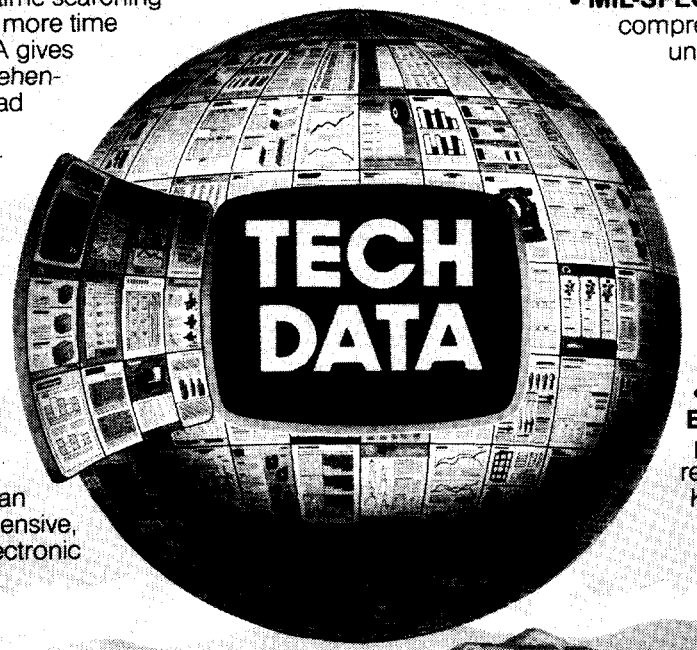

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Is It Possible to Educate Librarians as Managers?

Miriam H. Tees

McGill University, Graduate School of Library Science, Montreal

■ **The author discusses the importance of good management for libraries, and the need to train librarians as managers. She discusses some of the difficulties that librarians have faced in becoming managers. She examines the types of education now being offered to librarians both in library schools and in various continuing education programs, and emphasizes that librarians can and must be educated to be managers.**

Is it possible to educate librarians as managers?

Why not? Of course it is possible to educate librarians as managers. Perhaps not every librarian, but most. Some people are "born managers"; others need a great deal of help and practice to become good managers; still others never become managers at all, preferring to perform so-called professional tasks rather than administrative ones. But to assume that librarians as a group cannot be educated to be managers is ridiculous.

Having answered the question off the top of my head to begin with, let me go further into the topic and try to clarify why I have given this answer. It is curious that one should ask this question at all. Why is there any doubt that librarians can be educated as managers? Are librarians different from other people? Do librarians really need to be educated as managers? If so, how can they be taught?

These are the questions I shall address in this paper.

What does a manager need to know?

First, let us look briefly at what management is. There are many definitions of management, but there is general agreement that the tasks of a manager are planning, organizing, staffing, directing, and controlling.

The manager converts resources, hu-

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man, financial, material, technical knowledge and know-how, into outputs: goods, and services. We are all familiar with the definition of management. "Getting things done through other people."

"Are service institutions managed?

The service institutions themselves have become "management conscious." Service institutions increasingly turn to business to learn management. In all service institutions, manager development, management by objectives, and many other concepts and tools of business management are now common.

This is a healthy sign but it does not mean that the service institutions understand the problems of managing themselves. It only means that they begin to realize that at present they are not being managed . . .

But are they manageable?

We have no choice but to learn to manage the service institutions for performance.

And they can be managed for performance . . .

Managing the service institutions for performance will increasingly be seen as the central managerial challenge of a developed society, and as its greatest managerial need.

The service institution does not differ much from a business enterprise in any area other than its specific mission. It faces very similar—if not the same—challenges to make work productive and the workers achieving . . .

> "Nor does the service institution differ very much from business enterprise with respect to the manager's work and job, organization design and structure, or even the job and structure of top management. Internally the differences tend to be differences in terminology rather than in substance (*1*)."

Drucker is but one of those writing of the need for good management in service institutions. As financial resources dwindle, it becomes more imperative that all institutions become well managed if they are to survive. For this reason, those who are in charge of libraries are looking for people who can manage effectively at many levels of their organizations.

Must librarians be managers?

If libraries need to be well managed, librarians need to be good managers. Some doubt has been cast on the ability of librarians to manage well, especially since some major libraries have appointed non-librarians to direct them. In an interview in *Quill and Quire* (*2*), Norman Horrocks, Director of the School of Library Service at Dalhousie University in Halifax, was asked "Does the trend toward hiring business people, people who aren't librarians, for top library jobs worry you? "Yes", he replied, "If we try to recruit people and say, 'Come into this profession, but the top jobs are going to be closed off to you', that's obviously a problem."

These appointments probably reflect the fact that librarians have not always been trained as managers and the pool of competent librarians with managerial ability was probably not large enough in the days when libraries were expanding rapidly both in Canada and elsewhere. J.J. Leblanc writing of education of librarians in 1978 says:

> "Administration and management of libraries, as well as disciplines related to automation, have taken the lead among the new courses. It has been obvious for a long time that librarians are not born administrators and that the fact of possessing a master's degree does not automatically predestine them to assume management functions. The epoch of improvisation during which librarians were promoted to administrative positions solely on the basis of a long career in an institution, or because they excelled in some position (which they should never have left), is well and truly over. The schools should see that librarians leave them with a strong training in administration so that when they take positions in management they can consider themselves as much administrators as information specialists. In this way we will

avoid having the most prestigious positions in the profession given to non-librarians on the pretext that the former do not have the necessary administrative competence. The development of courses in administration should put an end to those situations in which promotion to administrative positions constitutes as much an honor as a responsibility and in which competent people are taken from the domain in which they excel and are catapulted into jobs where their good will is often not balanced by the disasters they cause. (*3*)."

A further doubt as to the ability of librarians to manage is underlined by some recent studies of librarians' personalities. Two such studies have appeared in *Argus* one by Marilyn McDermoth and one by Laurent-G. Denis and Florence Mackesy. McDermoth states, "It appears, therefore, that librarians conform partially to Adorno's hypothesized authoritarian or antidemocratic personality. As conventional, conservative, submissive, rigid individuals who respect authority, librarians exhibit some potential for antidemocratic behaviour. However, perhaps the most important characteristic—power and toughness—is completely absent. This would indicate for me, and would indeed support other findings, that the librarian is often quite content in a subordinate position in a hierarchical structure. It is unlikely that he/she will make a concerted effort to achieve a position of power, but, if awarded such a position, the librarian would probably exhibit those elements of authoritarianism which were previously respected (*4*).

Denis and Mackesy did a survey of eleven investigations of librarians as well as eighteen studies of physicians, lawyers, social workers, nurses, and teachers. Some of the findings about librarians were "submissive, not dominant in leadership qualities;" "weak overall in critical decision-making leadership qualities but F(emale) in lower ranks rated higher than M(ale);" "detached, indecisive and weak in leadership qualities (*5*)." To be fair, other findings showed such traits as independence, drive for achievement, outgoing, venturesome, imaginative. One can not put too much weight on these surveys since they deal with the collectivity and naturally do not describe all librarians, many of whom differ from the norm. However, there is some evidence here to back the notion that librarians do not have leadership qualities which are useful for managers.

It is true that management and leadership are not the same and do not require the same skills, or indeed personalities. Charles Davis, Dean of the Library School at the University of Illinois, discusses this (*6*), quoting Thomas E. Stanton in describing distinctions between leaders and managers. The following table summarizes Stanton's ideas.

Managers	*Leaders*
Results oriented	Goal oriented
Strive for order	Tolerate ambiguity
Try to correct failures	Turn failures into successes
Depend on systems	Inspire people
Attempt to adjust to change	Attempt to produce change (*7*)

Davis accepts the distinctions. He considers that leadership is also necessary for librarians, but it may be easier to train them in management techniques, than make leaders of people without inherent leadership qualities.

It has also been suggested that people entering the library profession rarely do so because they expect to follow a career in management. Rather they enter because of an interest in information, a love of books, or a desire to serve people, and they learn cataloguing, bibliography, information retrieval, indexing, and a number of special skills which they want to practise. Charles Davis points out that most library school students come from non-technical backgrounds and have difficulty learning the mathematically-based techniques now required for management (*8*). In talking to library school students, I have found that many of them are not at all interested in becoming managers. One stated that she would rather be left alone to do her work, and others agreed. But by no means all agreed; many

look forward to being managers. Still others are fearful because of inexperience.

The trouble with this is that libraries do have to be managed and, as Dr. Robert Hayes, Dean of the Graduate School of Library and Information Science at the University of California, Los Angeles, said at a McGill Management Seminar in 1981, most libraries are well managed and managed by librarians. Though very few library school graduates will head large research libraries, many will manage smaller libraries, departments, and almost all will at least supervise library technicians and clerks, often immediately upon graduation.

Must librarians be educated to be managers?

I have tried to show briefly that libraries do need to be managed and that librarians need to be managers. Must they be educated to be managers? Education for management is one of the fastest growing fields in North American colleges and universities, and has spread to Europe and the third world. Business has seen the value of management schools. In Canada, in 1979-80, some 37 000 students were enrolled full-time in management and administrative studies — 11,5% of all undergraduates — as compared to 11 747 in 1970-71 — 6% of all undergraduates (*9*). Clearly both management experts and management students believe that management can be taught and learned.

During the past several years there has been a cry for librarians graduating from schools with better management skills. Conant, author of a comprehensive report on the education of librarians in North America, questioned thirty-six alumni of library schools who had graduated three to five years previously.

> All but four of the alumni respondents had acquired administrative and supervisory responsibilities within a year or two out of graduate school. Some of them had taken first jobs that involved such responsibilities. These respondents said they wished they had had management and supervisory training during graduate school. The main concerns were how to manage a staff of people and how to construct a budget. Several who unexpectedly found themselves heads of small libraries wished in retrospect for training that would help them work with boards of trustees. Respondents observed that these opportunities often come with the first or second job, and even when they are on a small scale the problems can be as challenging to the young professional as the same problems on a larger scale are to the experienced professional. Half of the alumni respondents who had management responsibilities reported that they had become interested in supervisory positions after they had gotten into a position in which they were provided with staff assistance. At that point the problems of supervision and management became real and the gap in training evident (*10*).

In discussion with directors of thirteen special libraries he learned that they viewed that "failure to provide administrative skills, especially in the practical aspects of management, was felt to be a key weakness in the library education (*11*)."

In November 1979, John K. Mayeski and Marilyn J. Sharrow did a survey of recruitment of academic library managers in thirty major research libraries in the United States (*12*). To a question about the qualities lacking in recent applicants, "management ability/experience" received the top number of responses with 19; second "personnel" with 6. Qualities sought most in a middle/upper level manager were first "Administrative/ Management Skills/ Experience" with 24 responses; second "Interpersonal Skills 15; third "Communication Skills 9". In answer to "What should the Profession Do?" thirteen replied "Pressure Library Schools to Create Specific Programs for Research Libraries and Management of Libraries" and twelve said, "Provide More Management Training and Internal Staff Development Programs, Job Enrichment, etc." Their conclusion:

> It appears that the profession has been remiss over the years in training and educating potential library managers. Charles R. McClure observes that 'library man-

agers infrequently, if ever, receive training in traditional areas of management such as organization theory, personnel, budgeting, systems analysis, computer science, or planning and evaluation (*13*).' The survey shows that the librarians who are doing the hiring think that more management training, in library schools and in libraries, should be a top priority. It is also mentioned in the survey and McClure's article that librarians who aspire to management positions should begin to study management techniques early in their careers. It is up to the candidate, the library school, and the library administration to play a role in educating and training each library manager (*14*).

Paul Wasserman, in a foreword to John Rizzo's book *"Management for Librarians: Fundamentals and Issues"* says, "One theme that only recently has been recognized for its importance is library administration. The probabilities are that it will grow far more significant as a distinctive element of library occupation. Not very long ago the idea of applying managerial perspectives to libraries was perceived with thinly veiled disdain. It has taken growth in the size, scale, and complexity of the institution, coupled with the strains faced by such adapting organizations, and further complicated by economic, political, and technological stresses, to heighten awareness for the need for enhanced managerial sophistication. None of these factors is likely to prove any less central in the future. And so, like it or not, the stewardship of libraries requires a set of specialized abilities, insights, and organizational sensitivity well beyond those of librarianship itself."

"John Rizzo has served for more than a decade as director of a library management institute in which the central purpose is to refocus the self-perspective of its participants from one of librarian to that of a manager. This same theme undergirds the present work. The intrinsic idea implies that most of those in librarianship, as they move upward managerially, divest themselves of technical responsibility more and more until an almost total metamorphosis takes place, or perhaps should take place, transforming them from librarians originally to managers ultimately. This transition is as important for the embryo librarian to understand as it is for the middle and senior manager of libraries (*15*)."

Those responsible for educating librarians have also emphasized the need for librarians with management skills and have discussed the place of management education in the curricula of the schools.

The Association of American Library Schools in a paper prepared for White House Conferences discusses curriculum changes in schools (*16*). They note an increasing awareness of the need to apply current management skills to information services. In 1971 Andrew H. Horn wrote an article in *Special Libraries* outlining the new curriculum at the University of California, Los Angeles, where he was then Dean. Among seven areas of required competence which a degree in library and information should certify was "Government, organization, administration related to libraries and other information agencies; contemporary theory and practice in the use and development of human resources within organization(*17*)."

D.J. Foskett, well-known British educator, says, in talking of the needs of the student. "Since he intends to be a 'professional', it is likely that he will reach a post that will accord him a certain amount of managerial responsibility fairly soon after the completion of his initial training. He must therefore receive from his teachers a convincing account of what things are done in the name of professional activity, why they are done in a particular manner, and what principles of organization underlie their implementation (*18*)."

Librarians writing in countries beyond Europe and North America also emphasize the need for management education. A.C. Foskett (*19*), writing from Australia, lists "the principles of library management" amongst the five key areas to be taught. Oli Mohamed (*20*) discusses the situation in Malaysia, where a need to "cultivate managerial culture" is considered crucial.

Back in Canada, William Cameron of the University of Western Ontario's

School of Library and Information Science, writes:

> Present-day managers of library and information systems are expressing strong opinions that they were not prepared by their own educational programs to cope with the problems of top and middle management, and are strongly advising the schools (perhaps a little after the fact) that increased emphasis must be placed upon courses in administration, personnel management, labor relations, public relations, etc. . . Library schools in the United States have attempted to meet such demands for increased emphasis on managerial skills with joint MLS-MBA programs and the like, and McGill and other Canadian schools have experimented a little in this area. However, it seems to have been a more common response to increase the availability of management courses within the existing MLS program (*21*).

What are library schools doing?

Clearly there is a need for management education and a good deal is now being provided. Liz Bishoff, a public librarian from Illinois examined the curricula of 69 ALA accredited schools (*22*). From 59 responses using the 1980/81 calendars, she noted that for 31 schools there is a required course in management under a variety of titles, that there is an elective course in 33 schools. Forty have courses in type of library which included management, ten in personnel administration, three in fiscal administration, 29 in systems analysis, and many covered some other aspects of management in other courses. Six schools have no course in management but cover management topics in other courses.

In spite of all these courses, we are still hearing complaints that librarians are coming out of library school unable to manage. Why? Is it because librarians cannot be educated as managers? I do not think so, but I am not sure that one basic course in administration or management is sufficient to make managers out of any but the most favoured student — one who already has some experience in managing and who is a "born manager."

Norman Horrocks agrees. "You look at the trend in Canada towards bringing the managers, the MBA and the financial people, into senior librarian positions. The library schools are told that this is their problem, that they're not training people for these positions. However, I think that the first professional degree is not equal to that. I think that the first professional degree prepares you to practise in the profession, and if you want the more senior positions, then I think you've got to have some continuing education. If you want to be a curator of rare books or a specialist in a subject speciality, you get a subject speciality; if you want to be a manager, you get a master's in public administration or an MBA. I don't see any way of getting this in the first professional degree (*23*)."

Shera discusses the importance of teaching students how to understand the environment, of how to manage personnel and material, and how to ensure the smooth running of the library. But, he says "excessive preoccupation of the librarian with administrative and managerial problems has, in turn, led to neglect of the essentially bibliographic character of his profession. One must, therefore, bear in mind that administrative knowledge is *necessary* but not *central* to librarianship and its place in education for librarianship must reflect its ancillary character (*24*)."

Without a doubt, library schools need to provide some management training for every student because every student is likely to need to manage in the not too distant future. However, other opportunities will need to be provided beyond the basic course. Business management students spend three years in various courses leading to an MBA and learn many aspects of the subject. Library schools cannot hope to turn out qualified managers in 36 hours of classwork covering planning, organizing, budgeting, marketing, managing people, premises, and evaluating service.

What can library schools expect to teach and how?

First of all, students need to be familiar with the basic theory in the fundamental aspects of management.

Libraries have the same managerial requirements as other institutions, so students should learn the importance and need for good goals and objectives, should understand organizational structure and behaviour, should know how people behave in groups and have a knowledge of the development of theories of personnel management. The marketing approach which has changed so radically in later years needs to be understood, so that librarians can base their services on real needs and be able to identify users and their interests. Budgeting and control must be understood as well as means of evaluation as a basis for further planning.

The fastest but least effective means of introducing management theory is by lecturing and assigning readings. In this way, students will perhaps cover all the matrerial in the course in the time required, but theory will remain theory and it may be difficult for them to relate it to practice. With inadequate faculty and large classes, this may be the only way that learning can take place; in this case, it may be unsatisfactory in the extreme. Since students need to be involved in their learning, at least an opportunity should be given for discussion. Different library schools have different methods for teaching but most allow at least for a certain amount of discussion, and some use the seminar method.

A useful method for management study is the case method, so highly developed at Harvard and used widely in schools of management. This approach has also been taken in library schools. There are a number of collections of case studies available, and many instructors prepare their own. Unfortunately I have found most of the published cases to be unsatisfactory in some way or other. Frequently they are simply absurd or unrealistic. At other times they are not fully enough developed to permit students really to work them through. They are valuable if they are realistic, require background reading and application of theory, and provoke discussion in class, because they present problems for students to solve.

Simulation teaching has become popular in some schools. Martha Jane Zachert experimented with this method and wrote a very interesting book about it (*25*). She says, "Lecture/discussion, seminar, and case study are all contemplative modes, and the reality of administration is anything but-contemplative . . . Simulation is offered as an alternative. . . ." I have found simulation to work well with groups of not more than 24 students. Simulation teaching sets a scene into which students are plunged as role players. Using a model, learners interact with each other and the environment as if in real life, and thus deal with problems, make decisions, and act based on the decision. I have for some years used this approach in my course in special librarianship which deals, at least for half the course, with the particular problems of management of special libraries. Using a pharmaceutical library as a model the class moves through time to plan and set up the library over a five-six week period. Students examine the company and decide how a library can serve it, to whom the library should report, what staff it should have. They apply for the position of librarian, conduct a hiring interview, plan the space available, draw up a budget, cope with problems of budget cuts, performance interviews, etc. Following each simulation, debriefing is of the greatest importance. Though preparation for simulation is heavy, classes are lively and fun as well as work. The instructor must keep the ideas flowing and coach individuals and/or groups in preparation for each class. There must also be special exercises and surprises injected into the simulation just as there are in real life.

The great advantage of this type of learning is that students are involved in their learning experience. Class discussion is hot and heavy and many aspects of the problems encountered are studied. The instructor is able to steer the class toward theoretical knowledge through discussion and reading. The students gain practice and confidence through actual decision-making, action, discussion, though in a controlled atmosphere where mistakes are not catastrophic. They learn also to work together in groups, to speak

up in discussion, to run meetings, to handle interviews, all skills which are important for managers.

Allied to simulation as a method of teaching management, though less onerous and time-consuming, are such techniques as in-basket exercises and action mazes. An in-basket exercise consists of a group of messages: letters, memos or telephone calls, which librarians might find on returning to their desks after a conference. Students examine the messages, decide on priorities and on how they will handle each. Letters and memos are written, telephone messages and actions noted. These exercises permit the instructor to cover a wide range of problems leading to discussion and a grasp of the theory behind them. They may be done by individual students or by groups of students. In the latter case, students gain by hearing different points of view and are stimulated to think and make decisions.

Action mazes are stories arranged like programmed texts. The scene is set and as the story proceeds, the text stops and a number of alternative courses of action are suggested. Students decide which action to take and proceed to a designated page where the story is resumed, and the consequences of their decisions become clear. The story continues with further opportunities for decision-making till some resolution is reached.

These are some of the methods that are used in library schools to teach management to students. As we have seen most schools do attempt to educate students in management theory and skills in one or more courses devoted to managerial subjects. Other courses also help students to acquire skills useful to managers. Many require students to work together in groups, or to make presentations, and to hold their own in discussion. Student councils and associations sponsored by library schools also permit students an opportunity to chair meetings, arrange for speakers, take part in projects, and lead others. Students who have been active participants in such activities have learned something of the skills of management, and will later put them to good use. Most library schools also encourage students to take courses in other faculties in their universities. Where there is a faculty of management, students may supplement the courses in the library school with courses in management information services, organizational behavior, accounting, marketing, or personnel administration.

What seems to me important is that in library schools students are well grounded in the basic management theory and that they are themselves involved enough to really own the ideas presented and to be able to apply them in practice at a later date. They cannot emerge from library school fully trained as managers but they can know the fundamentals. Whether through lectures, readings, or discussion, case studies, simulation, external courses, or other activities, library schools can give students the grounding.

What of librarians already in the field?

Because of the perceived need of librarians for better management skills, many courses are offered today by associations, university continuing education departments, and libraries themselves. Here in Quebec we can choose from courses sponsored by the Corporation of Professional Librarians of Quebec, ASTED, Special Libraries Association, Eastern Canada Chapter/Section de l'Est du Canada, which are directly aimed at librarians. In addition many librarians who aspire to move into positions of management will enter programmes given by universities toward masters degrees in business administration.

Two Canadian schools, as well as a number of schools in the U.S., now have doctorate programs in which librarians can be trained further in management theory and research, and which are contributing to the improvement of management of libraries in many ways.

In addition to the in-depth approach

of the doctorate, certificates in management are becoming available for librarians both through Universities and through Associations. The Special Libraries Association is now offering a Middle Management Certificate: a 75 hour program given at five intervals over 24 months. It is designed for librarians with over five years' experience and covers management skills, analytical tools, human resources, marketing and public relations, and materials and machines (*26*).

Joan C. Durrance, Coordinator of Continuing Education at the University of Michigan's School of Library Science, describes two interesting programs (*27*). The first is the Career Development and Assessment Center at the University of Washington School of Librarianship. Librarians may participate in a one to two day assessment session during which they discover their own strengths and weaknesses and are encouraged to use these insights to further their own training and personal development. The second program is the Council on Library Resources CLR Internship Program, open to experienced librarians and proving a fast track to the top. It forces interns to focus on their own career goals and develop the knowledge and skills needed to achieve them.

Several library schools are now offering management diplomas through continuing education courses: series of advanced courses in various aspects of management which may usually be taken at night or on weekends and followed over a period of years.

There are, clearly, many opportunities for librarians with experience to take further training in management, and many have done so for years. The success of these programs in itself shows that librarians are finding that they are able to be educated as managers.

Whereas no one will deny that the value of experience and practice in managers, the old "seat-of-the pants type of manager" is rarer and rarer. More and more managers need the theory and practice provided by training. Dr. Robert Cooper of the Faculty of Management at McGill University spoke to a group of librarians at McGill in 1981 about the importance of acquiring the degree of Master of Business Administration. Someone asked him if his graduating students were ready to manage. "Not completely", he said, "but we can cut down the time it takes to learn on the job by several years." This is what we are attempting to do for librarians in educating them in management.

Conclusion

Let me return to the original question and answer. Is it possible to educate librarians as managers? Why not? Of course it is possible, and indeed it is necessary. Although some librarians will never become managers, most will begin to manage almost immediately upon graduation from library school. Libraries are no different from other institutions and need the most efficient administration possible, especially in days of budget cuts and financial restraint. Indeed library schools are increasing the management component of their curricula, using a variety of theories and techniques drawn from other disciplines. Continuing education courses are available to experienced librarians in a wide variety of subjects and formats.

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Marine Science Libraries

A State of the Art Report

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■ **Marine science libraries serve the informational needs of biological, chemical, geological and physical oceanographers, ocean engineers and public policy makers. A survey was made to determine the extent to which online databases are used for information and bibliographic control in these specialized collections. It was found that despite generally small staff and collection size, there is considerable involvement in OCLC and computerized reference service, as well as active planning for public catalogs, serials automation and integrated database management systems.**

SCIENTISTS and engineers in universities, federal and state governments and private-sector business and industry receive billions of dollars annually to support ocean-related research projects. Many issues in ocean resource management, such as outer continental shelf oil and gas drilling, deep-sea mining and marine pollution control confront the United States and other countries. Decisions on marine policy are based in great part on the results of scientific research and are made at national, state and local levels, as well as in the international arena. Researchers, technical support personnel and administrators need information on the biological, chemical, geological and physical sciences as applied to the ocean environment. Pertinent material in related subject areas, such as ocean engineering, fisheries technology, coastal zone management, environmental pollution, maritime history and international law is also required for informed decision-making.

Such specialized resources are collected by a diverse group of marine science libraries and information centers. Their users may be engaged in the study of coastal ecosystems or marine mammal migration; they may be involved in large-scale, multi-institutional programs such as the study of deep-sea ferromanganese nodules, or the changes in ocean circulation through geologic time; they may be developing sophisticated instruments for use aboard oceanographic vessels, investigating predator-prey relationships among species, or studying fishing vessel design to assist commercial fishing interests. Federal government officials may need data on ocean boundaries as an aid to forming policy positions for law of the sea negotiations, and state officials may require environmental studies on which to base coastal zone management plans.

Diverse types of marine science libraries provide essential informational resources to support this wide range of basic and applied oceanographic research. They comprise separate libraries serving university programs, as well as subject collections within university libraries. Marine science collections are also found in state and federal government agencies, consulting firms, research institutes and business and industry. Although they are an indispensable support to research efforts in oceanography and ocean engineering, no reports on marine science libraries have appeared in the extensive literature covering scientific and technical libraries. Rather, articles have been published on several individual collections, and on marine science resources in India *(1, 2, 3)*.

The present study was undertaken to describe the institutional setting, size, staffing and types of materials held in marine science libraries; to determine the extent of online database use for information retrieval and bibliographic control; and to gauge the extent of participation in electronic networks.

Methodology

Information was gathered by means of a survey questionnaire mailed in spring 1983 to 156 libraries listed in the 1981 *Directory of Marine Science Libraries and Information Centers (4)* and in subsequent issues of the *Newsletter (5)* of the International Association of Marine Science Libraries and Information Centers (IAMSLIC).* IAMSLIC is an independent association which has existed since 1975; however, it is not listed in any current directories of library and information science associations *(6, 7, 8)*.

Responses to the survey were received from 111 libraries located in the United States, Canada, United Kingdom and several other countries (a 71% return). The high response rate is perhaps indicative of strong interest in the questions posed and of a cooperative attitude among marine science librarians. Some respondents enclosed supplementary material and added informative comments to the questionnaire.

Respondents were assured that their libraries would not be identified by name. However, for the purpose of tabulating results and correlating survey responses with type of library, questionnaires were coded with numbers corresponding to the numbered entries in the IAMSLIC *Directory*. This made it possible to obtain information about specific libraries or types of libraries, such as those serving state or federal agencies. A copy of the questionnaire, with the numbers of responses indicated for most questions, appears in the Appendix.

Findings

The wide range of libraries represented in IAMSLIC presented some difficulties with the tabulation of responses to the questionnaire. Some of the larger university libraries reported statistics for their entire collection, since the marine science component could not be feasibly separated out. Some questions were not applicable to particular libraries: for example, questions on circulation systems do not apply to noncirculating collections. Responses were tallied directly from the completed forms with the awareness that such differences exist.

The information provided by the large percentage of respondents to the survey questionnaire forms the basis for the statistics reported below on type of library, user population, staffing, collections and automation capabilities. Because of the diversity of the population, some of the questions were not applicable to particular libraries and were left unanswered.

* Founded as the East Coast Marine Science Librarians, IAMSLIC provides a forum for professional exchange and cooperation among its members. Its *Newsletter* is published three times a year. Annual meetings are held on such themes as accessing marine science information, information handling in the marine sciences, and cooperation among marine information centers. Association members are currently preparing union lists of serials and of oceanographic atlases to be issued in microfiche.

Some respondents indicated that records were not kept, or that figures were not available to answer some of the questions. Some of the statistics had to be gathered by correlating the answers of individual libraries to several survey questions.

Eighteen percent of the respondents are special/academic libraries within university library systems. General university libraries with sizable subject collections in the marine sciences comprise 24% of the respondents; 11% of the libraries serve private sector business and industry; and 45% receive support from federal and state sources. Federal government libraries include those serving the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, the National Marine Fisheries Service, the Navy, and the Canadian Department of Fisheries and Oceans. These statistics were obtained by consulting the IAMSLIC *Directory* to identify the respondents to the several parts of Question 1. In some cases, individual respondents checked more than one applicable term.

The largest category of users of these marine science libraries is the scientific and technical staff of the respective institutions. Graduate students, faculty and undergraduates of academic institutions, and administrative and clerical staff follow in descending frequency of use. Other users include state and federal agency personnel who use the libraries of nearby academic institutions, as well as consulting firms, high school students and the general public.

According to the survey, 28.3% of the marine science libraries serve populations over 1,000; however, smaller user populations are more common. Cumulatively, 23.6% of the libraries serve under 100 users; 42.5% serve under 299 users; 58.5% serve under 499 users; and 71.7% serve populations under 999. The median population served is between 300 and 500.

Marine science libraries are run by relatively small staffs. Thirteen percent of the respondent libraries do not have a professional librarian, and 59% are staffed by one professional; 9% have two professionals, and 9% have three; 49% have one additional paraprofessional, and 18% have two. One clerical worker, in addition to the professional and paraprofessional staff, is employed by 34% of the libraries. Eleven percent of the libraries have two clericals, and 11% have three, in addition to professional and paraprofessional staff members.

These statistics were obtained by counting and tabulating the numbers of staff in each category of Question 4, as indicated by each respondent. The figures could not be listed on the summary questionnaire following the text; i.e., the library staffed solely by one professional would be lost in category 4a. Five percent of the libraries have a programmer, and 7.8% have a systems analyst on their staffs. Forty percent of the libraries are served by a systems analyst on the staff of their institution; 52% of the respondents indicated that one is not needed. Fifty-three percent are served by a programmer on the staff of their institution; 42% indicated that one is not needed.

Collections

In addition to books and journals, marine science collections may include maps and charts, reprints, technical reports, beach profile drawings, meteorological and hydrological data and specifications. Slides, aerial photos, transparencies, videocassettes, phonorecords and digital magnetic tapes are among the nonprint materials held by survey respondents. Journals and technical report holdings in microform and microfilms of seismograms were also listed. Marine realia and an herbarium collection of salt-water plants and algae are museum-type items held by two libraries. Survey Question 7 did not inquire about holdings of manuscripts and archives. One library indicated archival holdings in Part J; no library listed manuscript holdings.

Researchers in the marine science utilize the literature of biology, chemistry, geology and physics, mathematics and engineering, as well as that of their respective marine disciplines. Marine sci-

ence libraries must, therefore, maintain at least small core collections in the "hard" sciences. Additionally, marine-related aspects of other subject areas, such as law, history and medicine, may be included. Book and journal holdings reported by the respondents range from several hundred to over 200,000, with a median size of 10,000 volumes. Of the 103 libraries that responded to Questions 7a and 7b, 67 (65%) have book and journal collections of under 20,000 volumes. Eighty percent of the respondents hold fewer than 20,000 reprints, and 79% hold under 20,000 technical reports. Sixty-one of the 96 libraries (64%) responding to Question 7c receive fewer than 500 current periodicals. As might be surmised from the figures reported on staff number and collection size, budgets are relatively low. Total annual budgets of $150,000 and under are reported by 74% of the libraries.

Computerized Information Retrieval

Because access to the scientific literature in a wide range of subject areas is required by their users, marine science libraries use online bibliographic databases to a large extent. Survey Questions 9 and 12 distinguish between libraries with in-house terminals and those who refer their users to the main university library or to the university science library. Sixty-one percent of the respondents currently have in-house terminals for computerized information retrieval; 33% do not. Six percent of the respondents did not answer the question, and it is assumed that they do not offer online service.

Online service was first instituted in marine science libraries in 1972. Of the 62 libraries that indicated the year in which online service was initiated, 42 had made it available by the end of 1979. Eleven additional libraries indicated that they made arrangements to institute online searching by the end of 1983. Twenty-seven of the 37 respondents without an in-house terminal (73%) refer their users to the main university library, the university science library or a nearby academic library.

Online services are most heavily used by scientific and technical staff, followed by administrative staff, graduate students and faculty, with some overlap in definition between scientific staff and faculty. Marcy Murphy indicates in her study of online services *(9)* that those in the technical professional community are the heaviest users served by special libraries, followed by graduate students and faculty. Marine science library use of online services thus conforms to the pattern she describes.

Forty-one of the 68 libraries (60%) that have online reference service available, are staffed by one professional only. This indicates that online searching is not a luxury available only in large university libraries. Half of the libraries reported that they made 150 or fewer searches per year. The decision to provide this service may be based on a belief in its growing importance and on the expectation that its use will increase. The service is funded through a combination of library subsidy and user payment for each search. Twelve percent of the responding libraries levy an additional surcharge on outside users.

All of the marine science libraries with computerized information retrieval capabilities subscribe to DIALOG, and some use additional database vendors as well, depending on specific needs. Other vendors used are SDC, BRS and Institute for Scientific Information, in descending order. Canadian libraries listed CAN/OLE and QL Systems, Ltd. DROLS and DOE/RECON were listed by some U.S. federal government libraries. The most frequently accessed databases are Biosis, Aquatic Sciences and Fisheries Abstracts, and National Technical Information Service. They are followed by Oceanic Abstracts, GEOREF, CA Search (Chemical Abstracts) and Compendex.

As Susan Starr notes in a study of marine science databases *(10)*, Biosis includes the largest amount of material relevant to marine biology. Since that is the subject area most heavily represented

by the responding libraries, their frequent use of Biosis is in accordance with Starr's findings. Databases used less frequently are Aquaculture, Comprehensive Dissertation Index, Medline, ERIC and Science Citation Index. The National Sea Grant Depository database, accessible online only by NOAA libraries, would undoubtedly be among those frequently accessed if it were widely available. Canadian libraries use WAVES, the database of the Council of Fisheries and Oceans. Forty-two percent of the users of online service have access to nonbibliographic databases for chemical, physical or statistical data. Microcomputers with modems are used to access databases by 10% of the respondents.

Thirty-one libraries indicate that paper indexes and abstracts have been, or will be discontinued because of their access online. *Science Citation Index, Books in Print,* and *Monthly Catalog of U.S. Government Publications* were specifically mentioned in written-in comments. One respondent indicated that money would be diverted instead to primary journal subscriptions; another stated that the cost of the paper indexes and abstracts could not be justified because of infrequent use.

Selective Dissemination of Information (SDI) profiles have been made in 39 of the 111 responding libraries (35%). The current number is generally few, with a median of two searches.

Bibliographic Control

Only 88 libraries indicated the number of monographs added to the collection annually. Possibly, figures were not readily available to the other 23 survey respondents. Of the 88 libraries, 40 indicated that they add fewer than 250 monographs annually, and 23 libraries add between 250 and 500. The low number of monographs added annually reflects the rival claim of periodical subscriptions on the budget. It also indicates a lower monograph publishing output in marine science in relation to other scientific and technical fields. Additionally, some libraries may exclude from the monograph count government publications or technical reports of a monographic nature.

One would not expect that marine science libraries—so many of which add fewer than 500 volumes annually and have one-person staffs—would be heavily involved in computer-assisted methods of bibliographic control. However, several survey questions on the use of OCLC and on current activities and future plans for online catalogs, serials automation and integrated systems reveal considerable activity in these areas.

Brenda Corbin, in her article, "The Effective Use of OCLC in a One-Person Astronomy Library," describes the advantages of OCLC and concludes that "a one-person library has greater need for automation than does a library with a larger staff *(11).* The present survey confirms this. Forty of the responding marine science libraries (36%) participate in OCLC, either independently or via the main library of the institution. In addition, two libraries belong to RLIN, one to WLN, and five Canadian libraries belong to UTLAS, thus raising the percentage of libraries involved in shared cataloging to 43%.

Marine science libraries participating in OCLC report a median of 50% of their cataloging records found on the OCLC database. The decision to join OCLC may rest partly on the benefits outlined by Corbin (e.g., less clerical work, participation in interlibrary loan and retrospective conversion capabilities), and partly on future projections of increased growth of the OCLC database as more records are input by current marine science participants. Three additional libraries indicated their intention to join by December 1983.

Fifteen of the OCLC participants have replaced their card catalogs with computer output microfiche (COM) catalogs. Thirty-four currently use, or are planning to use, the OCLC interlibrary loan subsystem.

An increasing number of research libraries are implementing online public access catalogs. Collections can thus be made bibliographically accessible to users in both library and nonlibrary locations.

Online catalogs are currently in operation in 15 marine science libraries that are part of university or federal government networks. These libraries are affiliated with the Universities of California and Georgia, Massachusetts Institute of Technology, the National Atmospheric and Space Agency, the National Oceanic and Atmospheric Administration, and the Canadian Department of Fisheries and Oceans. Four additional libraries will have online catalogs operational in 1984 or 1985. One respondent noted that while the main library is completely automated, the marine science library's geographical location on an offshore island currently makes telecommunications connections impossible.

As the trend toward adoption of online catalogs by academic libraries grows, marine science libraries can be expected to participate to a greater extent. Survey respondents who have online capability and those planning to implement online cataloging indicated that retrospective conversion by a combination of in-house and main library staff has either been completed or is contemplated. Outside contractors have been used by a few of the U.S. federal government marine science libraries.

Responses to the questions on serials control indicate that check-in is largely a manual operation. As previously noted, 64% of the responding libraries receive fewer than 500 current titles; this small number hardly necessitates automation. Seven of the 100 respondents to Questions 33.b.1 use a commercial service for automated check-in; and three additional libraries are currently considering one of the services.

More than half of the respondents produce a computer-generated serials list, either as fiche or hard copy. Methods vary from use of microcomputer word processing program to use of the institution's mainframe. Several marine science libraries have their lists "dumped" from the university library serials list, a statewide union list of serials, or the federal network JOURNALINK.

Acquisitions, Circulation and Integrated Systems

The automation of acquisitions has been implemented by 11 of the survey respondents (10%). These include large university libraries with significant marine science collections which add between 1,000 and 5,000 monographs annually in all subject areas; marine science libraries within a university system; and two U.S. federal government libraries. One library uses a commercial service, and five use the OCLC acquisitions subsystem. RLIN and UTLAS acquisitions subsystems are each used by one library; two respondents use a locally developed system on the institution's mainframe, and one did not describe its system. The relatively small number of monographs acquired by marine science libraries does not generally warrant automation of the order and billing processes.

Similarly, the volume of circulation has not required automation in 83 of the 102 libraries responding to Question 38 (81%). Circulation is generally under 5,000 volumes annually, and several libraries do not keep any circulation statistics. Nineteen libraries (19% of the 102 respondents) report the use of automated circulation systems; except for two large university libraries, these are not the same libraries as the ones that have automated acquisitions systems. CLSI and GEAC automated circulation systems are used in five libraries. Five respondents use microcomputers, and two others will be doing so shortly. Software used for circulation control includes Wordstar Mailmerge and Bookworm I.

Integrated database management systems for bibliographic control, information retrieval, circulation and library management and finances are currently in place in six of the responding libraries and are being considered by 19 others (23% of the 111 respondents). Three of the six libraries use various commercial systems, and three have developed their own systems on their institution's mainframes. Two additional libraries are pre-

paring grant proposals for integrated systems, and one library plans to institute DOBIS, the system of the National Library of Canada.

Conclusion

One-person staffs are predominant in the marine science libraries surveyed. Collections are generally in the range of 10,000 books and journals. Seventy-four percent of the libraries have total annual budgets under $150,000. Many respondents noted funding problems as barriers to computerization of library functions. Although they may have access to their institutions' mainframe capabilities, their relatively small staff size does not permit the required investment of time to develop systems and input data.

The survey findings indicate that online information retrieval is being actively utilized to serve the informational needs of marine researchers, with 61% of the respondents reporting computerized reference service capability. Various databases, which cover a range of disciplines in science and technology, are accessed. Several comments, written in on the survey forms, reported that subscriptions to paper indexes are being cancelled when online databases become available.

Marine science libraries with small staffs report a considerable involvement in automated cataloging, with 43% participating in OCLC or other networks. A few have developed online catalogs. Computerized holdings lists of serials, technical reports and reprints are widely produced. There is less need for automation of serials check-in, circulation and acquisitions functions because of small collections and user populations. Relatively little use of microcomputers is reported.

There is no clear distinction in size and institutional setting between those marine science libraries that reported automation of reference and bibliographic control, and those without computerization. Levels of institutional funding and the interest and initiative of individual librarians may account for different degrees of utilization of computer technology. The survey indicates future plans for automation by many marine science libraries when funding levels increase. Marine science research is funded by such agencies as the National Science Foundation, the Department of Energy, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration and the Office of Naval Research. The survey might have included a question to determine whether any of the libraries receive funds from such grants for investigators in their institutions. Library funding could be written into grants to help defray the costs of computerizing library services.

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Appendix. Survey on Computer Applications in Marine Science Libraries

Please check appropriate items.

Background Information:

1. Which term(s) describe(s) your library?
a. Academic 44
b. Special 66
c. Publicly supported __ 1. State 27 Federal 41
d. Private sector 23

2. Which term(s) describe(s) your library's users?
a. Faculty 56
b. Students __ 1. Graduate 63 Undergraduate 51
c. Scientific and technical staff 90
d. Administrative and clerical staff 45
e. Other 25

3. Approximately how large a user population does your library serve?
a. Under 100 25
b. 100-299 20
c. 300-499 17
d. 500-999 14
e. Over 1000 30

4. Please indicate the size of the library staff (full-time equivalents):
a. Professional __
b. Para-professional __
c. Clerical __
d. Student assistants __

5. Is there a systems analyst on the library staff?
a. Yes 3
b. No, but we are served by one on the staff of the institution 41
c. No, not needed 53

6. Is there a programmer on the library staff?
a. Yes 5
b. No, but we are served by one on the staff of the institution 52
c. No, not needed 42

7. Please indicate the approximate number of items in your collection:
a. Books __
b. Bound journal volumes __
c. Number of periodicals currently received, either by subscription, gift or exchange __
d. Maps and charts __
e. Reprints __
f. Technical reports __
g. Government publications (if in a separate collection) __
h. Scientific data (please describe type) _____
i. Photographs and illustrations __
j. Other __

8. What is the approximate total annual budget of your library?
a. $50,000 or under 33
b. $51,000-150,000 36
c. $151,000-300,000 12
d. $301,000-750,000 5
e. $751,000-1,000,000 2
f. $1,000,001-2,000,000 3
g. Over $2,000,000 2

Information Retrieval:

9. Does your library offer online reference service:
a. Yes 58 b. No 37

10. If yes, in what year did it become available? __

11. If not currently available, will online searching be instituted by December 1983? A. Yes 9 b. No 19

12. If online searching is available elsewhere in your institution, but not in your library, please describe location. _____

13. If online searching is available, which vendors do you use?
a. DIALOG 69
b. SDC 25
c. BRS 24
d. Institute for Scientific Information 11
e. Other 7

14. Do you use a microcomputer to access databases?
a. Yes 11
b. No 70

15. Approximately how many searches have you done in the last reporting year? __

16. Which databases are accessed most frequently? Please rank from 1 to 5 (1–most frequent; 5–least frequent).
a. Aquatic Sciences & Fisheries __
b. BIOSIS __

c. Chemical Abstracts (CA Search) __
d. Compendex __
e. National Technical Info. Service __
f. Oceanic Abstracts __
g. GeoRef __
h. Other _____

17. Are any non-bibliographic databases available to your users?
a. No 37
b. Yes 29
1. Chemical or physical data 11
2. Numerical or statistical data 16
3. Full text 3
4. Other _____

18. Please rank each user category by frequency of searches, from 1 to 5 (1–most frequent; 5–least frequent)
a. Faculty __
b. Students __ 1. Graduate __ 2. Undergraduate __
c. Scientific and technical staff __
d. Administrative and clerical staff __
e. Other _____

19. How many librarians on the staff perform searches?
a. One reference librarian 44
b. All reference librarians 8
c. Some reference librarians 13
d. Other staff 15

20. How is the online search service funded? Please check where applicable.
a. New funds 5
b. Library subsidizes the service by reallocating funds 35
c. User is charged for the cost of each search 40
d. An additional surcharge is made to user above direct cost of each search 3
e. Outside users are charged more than the library's own constituents 11

21. Have subscriptions to any paper indexes or abstracts been discontinued because of their availability online?
a. No 37
b. Yes 31
1. Discontinued because of frequent online access 15
2. Discontinued because of infrequent online access 8
3. Discontinued to defray the cost of online searching 7
Comments:

22. Have any SDI (Selective Dissemination of Information) profiles been made for your users?
a. Yes 39
b. No 32
c. If yes, please indicate the number presently provided __

Cataloging:

23. How many monographs are added to the collection annually?
a. 250 or fewer 40
b. 251-500 23
c. 501-1000 18
d. 1001-5000 13
e. Over 5000 4

24. Is cataloging done in-house?
a. Yes 80
b. No 25
1. Done by central library of the institution 23
2. Other 2

25. Access to monographs is by (please check appropriate items)
a. Card Catalog 84
1. Cards are manually produced in-house 31
2. LC cards are currently used 10
3. Library is on OCLC and receives cards 40
4. Library is on RLIN and receives cards 2
5. Other 14
b. by COM catalog 15
c. Other 10

26. If your library is on OCLC or RLIN
a. In what year did your library join? __
b. Approximately what percent of the monographs being added to the collection are already present on the database? __

27. If you are not currently on OCLC or RLIN do you plan to join by December 1983?
a. Yes 3
b. No 36

28. If you are (or will be) on OCLC, do you use (plan to use) the subsystems for:
a. ILL 34
b. acquisitions 3
c. serials control 2

29. Does your library have an online catalog?
a. Yes 11
b. No 79
1. Not currently, but will be operational by December 1983? 8

30. If your library has, or will soon have an online catalog
a. It will list the library's holdings solely 7
b. It will be tied in with that of other libraries in the institution 16
c. It will be on institution's main frame 11
d. Other _____

31. Retrospective conversion was (will be) done
a. By in-house staff 23
b. By central library staff 10
c. By OCLC's service 3
d. Other 9

32. What system do you use for bibliographic control of reprints, technical reports, maps, photographs, scientific data? Please check where applicable:
a. Same system as used for monographs 46
b. Separate card catalogs for each type of material 34
c. Computer stored files 18
d. Not cataloged 27
e. Other _____

Serials:
33. Is serials control automated?
a. No 90
b. Yes 10
1. A commercial service (such as EBSCO or Faxon) is used 7
2. A microcomputer is used __

3. Other 3
4. The system is the same as that used by other libraries in the institution. a. Yes 5
b. No 1

34. Is a computer-produced serials list issued?
a. No 48
b. Yes 52
Please describe how it is generated _____

Acquisitions:

35. Is acquisitions automated?
a. No 88
b. Yes 11
1. A microcomputer is used 1
2. OCLC sub-system is used 5
3. Other 3

36. If you use a microcomputer for any acquisitions functions, please indicate the software used _____

Circulation:

37. What is your annual book circulation? __

38. Is circulation control automated?
a. No 83
b. Yes 19
1. A microcomputer is used 5
2. CLSI is used 4
3. The system is the same as that used by other libraries in the institution. a. Yes 3
b. No 2
4. Other 5

39. If you use a microcomputer for circulation control, please indicate the software used _____

Integrated Systems:

40. Do you use an integrated database management system that includes information retrieval, storage and retrieval of bibliographic records, circulation, and library management and finances?
a. No 89
b. Yes 6
1. It is a turnkey system (please indicate which one) 3
2. It was custom developed for this library 2
3. It was developed for all the libraries of the institution 1
c. We are considering various integrated database management systems now for adoption in the near future.
1. Yes 19
2. No 8

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Performance Measures for Corporate Information Centers

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■ **The current use of library performance measures is reviewed. Based on performance measures that have been developed for public libraries, the authors provide examples of measures that can be applied in a corporate information center. The importance of using performance measures as an ongoing evaluation technique, a method for justifying and improving the quality of corporate information services, and encouraging the development of an ongoing planning process is stressed.**

ALTHOUGH planning and evaluation of special libraries and information centers have received much attention, the use and application of performance measures in a special library context has yet to be adequately explored. Ironically, corporations that demand accountability from many organizational areas and activities have not recognized the importance of analyzing the performance (especially in terms of effectiveness) of their information centers. In addition, only recently have some special librarians recognized the need to clearly define and report the degree to which their activities contribute *directly* to organizational goals and profits.

Introduction

Evaluation of libraries can be conducted on the basis of a number of different approaches. In terms of systems thinking, libraries can measure input variables (such as library acquisitions) or output variables (such as the number of books circulated from a library's collections). Input measures are indicators of resources which make the provision of library services possible; output measures are indicators of the quantity, quality or character of the services resulting from library activities. (*1*). The term "performance measure" can be seen as a broad concept that includes both input

and output measures, stresses assessment of organizational effectiveness, and provides a basis for planning.

Performance measurement involves the establishment of library objectives based on user needs, the expression of these objectives in quantifiable units, the measurement of the units, and the assessment of library performance vis-a-vis its stated objectives (*2*). For purposes of this paper, the term "objective" is defined as a task designed to be accomplished within a designated period of time, in contrast to a "goal," which is a statement of long range, broad intent representing an area of library activity to be emphasized.

Only recently have some special librarians recognized the need to clearly define and report the degree to which their activities contribute directly to organizational goals and profits.

The importance of performance measures for corporate information centers was illustrated by James Matarazzo's 1981 study of corporate library closures (*3*). In each of five case studies, the lack of evaluation of library services was found to be a factor operative in the closure or reduction of the library. Matarazzo suggests that the lack of formal evaluation procedures robbed librarians of the data necessary for altering services as the information needs of each company changed over time. Performance measures, then, should be used in corporate information centers because they enable the center to determine the effectiveness of its current operations (how well information center objectives are being met); they provide the necessary data for modifying information center objectives in order to meet changing corporate information needs; and they provide information that can be used to justify and request resource allocations.

For purposes of this paper, the term "corporate information center" is used to designate the department or part of a corporation which provides library/information services to any part of, or to the entire organization. Library/information services encompass the acquisition, storage, organization, dissemination and management of information required by the corporation, and involve both traditional and nontraditional means for gathering information, including the use of print and nonprint materials, online searching and personal interviews.

Some writers have recommended that corporate information centers move toward information resources management (*4*), which could include "the administration of all corporate information, of all manual and automated data, and of all methods used for the communication, manipulation and presentation of information used in the course of doing business" (*5*). Thus, information resources management could also include such functions as library services, mail and telecommunications services, records management, and computer services. However, a 1979 survey covering library/information services in 200 U.S. companies indicated that only a small number were responsible for these more extended types of information services (*6*). Thus, this paper is limited to corporate information centers which provide library/information services but not broader IRM functions such as the administration of mail and computer services.

Use of performance measures is but one component of the larger planning process. It can serve an important role by providing "self-diagnostics" to assist the library to better assess how well it is providing services and meeting objectives. Such measures are intended to determine the degree to which objectives are accomplished. The evaluation component of planning is accomplished by using performance measures to provide an essential assessment of the question, "How well are we doing what we say we are doing?" However, planning is not the focus of this paper; other sources may be

referred to which provide general outlines and procedures for planning library and information services (*7*).

Because procedures for using performance measures in corporate information centers have not been proposed or tested, it is suggested here that some of the public library measures should be adapted for use in the corporate library environment. The measures selected for review were chosen as examples because they relate to important and commonly occurring activities in corporate information centers; however, many of the other public library performance measures could have been discussed as well.

Library Performance Measures

A recent review of the types of "performance measures" used in Illinois special libraries indicates that the information collected by corporate information centers is largely oriented toward input variables (*8*). Measures of output, however, should receive greater attention because these centers must justify their existence within the profit-making environment of the larger corporate body and concentrate greater assessment on the quality of information services and products delivered to their clientele. To record the number of acquisitions per year is not a measure of performance, but rather an expenditure to be justified. In order to justify both the purchase of information (in print or nonprint form) and the employment of information specialists, corporate information centers must measure what is accomplished with these information and human resources in terms of resolving corporate information needs and meeting objectives.

Three general types of literature on performance measurement in corporate information centers can be distinguished. Older works generally deal with the measurement of input variables. Examples can be seen in the list of objectives and standards for special libraries developed by Special Library Association in 1964 (*9*); Gordon Randall's review of the SLA publication (*10*) and his subsequent article on ratios for corporate library acquisitions, loans, expenditures and staff (*11*); and Eva Lou Fisher's checklist for the evaluation of company libraries (*12*).

The two other general types of literature concerned with performance measurement in corporate information centers either give an overview of some aspect of performance measurement as used in a particular information center, or advocate the measurement of output without suggesting procedures by which this may be accomplished. Articles by Jack Borbely at AT&T (*13*), Carolyn Warden of General Electric (*14*), Jacqueline R. Kates at Instrumentation Laboratories (*15*) and Paula M. Strain at MITRE Corporation (*16*) typify the first type of literature, while advocates of output measures include Paul Wasserman (*17*), Cecily J. Surace (*18*), and Miriam A. Drake (*19*). One problem with much of this literature is that the authors fail to outline specific procedures for collecting data related to corporate information center performance, or procedures for computing performance measures based on the data collected.

In contrast, there has been much concern with proceduralizing and testing output measures for public libraries. A manual of standardized procedures was published by the Public Library Association (PLA) of the American Library Association in 1982 (*20*). Schrader reports on the refinement of these procedures, based on their usage in a Canadian library system (*21*), and standards for Illinois public libraries partially based on the PLA output measures have been established (*22*). In addition, a manual for Oklahoma public library performance measures has been developed (*23*).

The Oklahoma and PLA manuals both contain menus of performance measures intended for public libraries. These measures can be divided into four areas, as is done in the Oklahoma manual. The areas encompass:

- *community penetration,* designed to measure the extent to which members of the community are aware of the library services available;

- *user services,* designed to measure how extensively the community uses the materials and services of the library and the effectiveness of library activities;
- *resource management,* designed to measure internal management decisions about how funds are allocated;
- *administration and finance,* designed to measure the decisions made by the library's governing jurisdiction, board, and director.

Table I is a composite listing of performance measures found in the PLA and the Oklahoma manuals. Definitions for each, descriptions of the data elements, and methods of computation are given. The list is organized in terms of the four areas for library performance measures outlined by the Oklahoma manual. Reference to this table can assist corporate libraries to identify, use, adapt, or modify appropriate measures for application in a corporate library environment. By becoming familiar, first, with these measures, corporate librarians will be better able to design unique measures appropriate for their specific situations.

Performance Measures for Corporate Information Centers

Although a number of possible performance measures can be developed for a corporate information center, the measures suggested for public libraries (see Table I) have great potential application and have been documented in detail. Community penetration measures, for example, are crucial because clientele must be aware of information services before they will be able to use them. Measuring the use and quality of information services is also important because, as Surace notes, "one thing most special libraries have in common is their emphasis on information and reference services" (*18,* p. 5).

Thus, a first performance measure is *corporate awareness of library resources and services.* In public libraries this community awareness measure is determined by means of a telephone survey. In order for this and later measures to be used in corporate information centers, the center must first determine its "jurisdictional population" and define the people it intends to serve. This process is an essential part of planning for the center and a statement defining clientele should be approved by upper management before the development of information center goals and objectives.

Data can be obtained from the personnel department for either the total number of persons employed by the corporation, or for the number of persons in certain departments or at certain levels. For example, an information center serving technical personnel may count as clientele only persons in relevant divisions, such as the research and development department. Alternatively, an information center intended for use by persons at a professional or managerial level would have to decide whether to include clerical personnel, when determining the figure for its jurisdictional population, even though secretaries use the center on behalf of their manager.

Once the size of the jurisdictional population has been determined, a random survey of clientele can be done to determine corporate awareness. The survey uses a list of the services and types of resources offered by the information center. Examples of survey instruments that obtain data to study these services in a public library context can be found in Palmour, et. al. (*24*) and the Oklahoma Study (*23*). The number of services or types of resources people report that they know about, divided by the total number of services or types of resources actually provided, comprises the awareness measure. As noted in Table I above, this measure relies on awareness units, with one awareness unit equal to one person being aware of one service or type of resource.

The awareness survey could also be used in the process of determining the information needs of corporate personnel by asking whether or not specific services or types of resources are needed. Thus, data can be obtained to make the following determinations:

Table 1. Summary of Performance Measures

Explanation: Part I is a listing of performance measures and the method for their computation as described in *Output Measures for Public Libraries: A Manual of Standardized Procedures* (Chicago: American Library Association, 1982) and *Performance Measures For Oklahoma Public Libraries* (Oklahoma City: Oklahoma Dept. of Libraries, 1982. [Dist. by Association of Specialized and Cooperative Library Agencies, ALA]). Part II is an explanation of the data elements (a-ax) as listed in the computation of the performance measures in Part I. For instance, in measure # 1, circulation per capita, the data element "jurisdiction population" is noted as "(b)". By referring to Part II, and looking under "b", definitional information about "jurisdictional population" is given.

Part I: List of Performance Measures

Community Penetration Performance Measures

1. CIRCULATION PER CAPITA (A,O)

$$\frac{\text{annual circulation (a)}}{\text{jurisdiction population (b)}} = \_\_\_\_ \text{ items per person checked out in one year}$$

2. IN-LIBRARY MATERIALS USE PER CAPITA (A)

$$\frac{\text{materials used in library (c)}}{\text{jurisdiction population (b)}} = \_\_\_\_ \text{ items per person used in library in one year}$$

3. LIBRARY VISITS PER CAPITA (A)

$$\frac{\text{library visits (d)}}{\text{jurisdiction population (b)}} = \_\_\_\_ \text{ visits per person in one year}$$

4. COMMUNITY AWARENESS OF LIBRARY SERVICES (O)

$$\frac{\text{actual awareness units (e)}}{\text{potential awareness units (f)}} \times 100 = \_\_\_\_\% \text{ awareness rate}$$

5. USERS AS A PERCENTAGE OF POPULATION (O)

$$\frac{\text{respondents who are library users (g)}}{\text{citizens survey respondents (h)}} \times 100 = \_\_\_\_\% \text{ of population are library users}$$

6. REGISTERED BORROWERS AS A PERCENTAGE OF POPULATION (A,O)

$$\frac{\text{library registration (i)}}{\text{jurisdiction individuals (b) or jurisdiction households (j)}} \times 100 = \_\_\_\_\% \text{ of the population are registered borrowers}$$

User Services Performance Measures

7. TITLE FILL RATE (A,O)

$$\frac{\text{titles found (l)}}{\text{titles sought (k)}} \times 100 = \_\_\_\_\% \text{ of titles desired were found}$$

8. SUBJECT FILL RATE (A,O)*

$$\frac{\text{subjects found (n)}}{\text{subjects sought (m)}} \times 100 = \_\_\_\_\% \text{ of subjects desired were found}$$

9. AUTHOR FILL RATE (A)*

$$\frac{\text{authors found (p)}}{\text{authors sought (o)}} \times 100 = \_\_\_\_\% \text{ of authors desired were found}$$

10. BROWSER'S FILL RATE (A)

$$\frac{\text{browsers finding something (r)}}{\text{browsers (q)}} \times 100 = \_\_\_\_\% \text{ of browsers who found something they wanted}$$

11. REFERENCE QUESTIONS PER CAPITA (A,O)

$$\frac{\text{reference questions asked (s)}}{\text{jurisdiction population (b)}} = \_\_\_\_ \text{ reference questions asked per person in one year}$$

12. REFERENCE FILL RATE (A)

$$\frac{\text{reference questions answered (u)}}{\text{reference questions asked (t)}} \times 100 = \_\_\_\_\% \text{ of reference questions asked that were answered}$$

13. PROGRAM ATTENDANCE PER CAPITA (A)

$$\frac{\text{program attendance (v)}}{\text{jurisdiction population (b)}} = \_\_\_\_ \text{ program attendances per person in one year}$$

14. ADULT PROGRAM ATTENDANCE PER ADULT CAPITA (O)

$$\frac{\text{adult program attendance (w)}}{\text{jurisdiction adult population (y)}} = \_\_\_\_ \text{ program attendances per adult in one year}$$

A = OUTPUT MEASURES FOR PUBLIC LIBRARIES (ALA)
O = PERFORMANCE MEASURES FOR OKLAHOMA PUBLIC LIBRARIES
* = ALA COMBINES THE AUTHOR AND SUBJECT FILL RATES

Table 1. (continued)

15. JUVENILE PROGRAM ATTENDANCE PER JUVENILE CAPITA (O)

$$\frac{\text{juvenile program attendance (x)}}{\text{jurisdiction juvenile population (z)}} = \_\_\_\_ \text{ program attendances per juvenile in one year}$$

16. JUVENILE PERCENTAGE OF CIRCULATION (ab): (ae) JUVENILE PERCENTAGE OF MATERIALS BUDGET (O)

$$\frac{\text{juvenile circulation (aa)}}{\text{annual circulation (a)}} \times 100 = \_\_\_\_\% \text{ of items circulated in one year were circulated to juveniles (juvenile \% of circ) (ab)}$$

$$\frac{\text{juvenile materials expenditures (ac)}}{\text{total materials expenditures (ad)}} \times 100 = \_\_\_\_\% \text{ of the materials budget was spent on juvenile materials (juvenile \% of materials budget) (ae)}$$

17. JUVENILE PERCENTAGE OF CIRCULATION (ab): (af) JUVENILE PERCENTAGE OF POPULATION (O)

juvenile percentage of circulation (as above) (ab)

$$\frac{\text{jurisdiction juvenile population (z)}}{\text{jurisdiction population (b)}} \times 100 = \_\_\_\_\% \text{ of the population served are juveniles (af)}$$

18. DOCUMENT DELIVERY RATE (A)

$$\frac{\text{material obtained within 7 days (ah) or 30 days (ai)}}{\text{requests for unavailable material (ag)}} \times 100 = \_\_\_\_\% \text{ unavailable material obtained within 7 or 30 days}$$

19. INTERLIBRARY LOAN FILL RATE (O)

$$\frac{\text{ILL requests filled (ak)}}{\text{ILL requests (aj)}} \times 100 = \_\_\_\_\% \text{ of ILL requests were filled}$$

Resource Management Performance Measures

20. COLLECTION TURNOVER RATE (A,O)

$$\frac{\text{annual circulation (a)}}{\text{holdings (al)}} = \_\_\_\_ \text{ circulations per item in one year}$$

21. RANGE OF HOURS OPEN (O)

$$\frac{\text{hours open within 8-5, M-F "box" (am)}}{\text{hours open (ao)}} \times 100 = \_\_\_\_\% \text{ of hours open were within the 8-5, M-F "box"}$$

$$\frac{\text{hours open outside 8-5, M-F "box" (an)}}{\text{hours open (ao)}} \times 100 = \_\_\_\_\% \text{ of hours open were outside the 8-5, M-F "box"}$$

22. RATIO OF STAFF TO POPULATION (O)

$$\frac{\text{jurisdiction population (b)}}{\text{FTE staff (ap)}} = \text{one staff member for every } \_\_\_\_ \text{ people served}$$

23. RATIO OF STAFF TO CIRCULATION (O)

$$\frac{\text{annual circulation (a)}}{\text{FTE staff (ap)}} = \_\_\_\_ \text{ circulated items per FTE staff member}$$

24. SQUARE FOOTAGE PER CAPITA (O)

$$\frac{\text{square feet (aq)}}{\text{jurisdiction population (b)}} = \_\_\_\_ \text{ square footage per person}$$

25. NUMBER OF ITEMS PER CAPITA (O)

$$\frac{\text{holdings (al)}}{\text{jurisdiction population (b)}} = \_\_\_\_ \text{ items held per person}$$

26. PERCENTAGE OF HOLDINGS INTENDED FOR JUVENILES: JUVENILE PERCENTAGE OF POPULATION (O)

$$\frac{\text{juvenile holdings (ar)}}{\text{holdings (al)}} \times 100 = \_\_\_\_\% \text{ of holdings are intended for juveniles (as)}$$

$$\frac{\text{jurisdiction juvenile population (z)}}{\text{jurisdiction population (b)}} \times 100 = \_\_\_\_\% \text{ of population are juveniles (af)}$$

Administration and Finance Performance Measures

27. PER CAPITA SUPPORT (O)

$$\frac{\text{local library funds (at)}}{\text{jurisdiction population (b)}} = \$\_\_\_\_ \text{ financial support per person in one year}$$

A = OUTPUT MEASURES FOR PUBLIC LIBRARIES (ALA)
O = PERFORMANCE MEASURES FOR OKLAHOMA PUBLIC LIBRARIES

Table 1. (continued)

28. LOCAL LIBRARY FUNDS AS A PERCENTAGE OF TOTAL LIBRARY BUDGET (O)

$$\frac{\text{local library funds (at)}}{\text{total local budget (au)}} \times 100 = \underline{\quad}\% \text{ of total local budget given to the library}$$

29. MATERIALS AS A PERCENTAGE OF TOTAL EXPENDITURES (O)

$$\frac{\text{materials expenditures (ad)}}{\text{operating expenditures (av)}} \times 100 = \underline{\quad}\% \text{ of library expenditures in one year are on materials}$$

30. SALARIES AND WAGES AS A PERCENTAGE OF TOTAL EXPENDITURES (O)

$$\frac{\text{salaries and wages (aw)}}{\text{operating expenditures (av)}} \times 100 = \underline{\quad}\% \text{ of library expenditures in one year are on salaries and wages}$$

31. PERCENTAGE OF STAFF PARTICIPATING IN CONTINUING EDUCATION (CE) (O)

$$\frac{\text{employees involved in CE (ax)}}{\text{FTE staff (ap)}} \times 100 = \underline{\quad}\% \text{ of FTE employees are involved in continuing education}$$

A = OUTPUT MEASURES FOR PUBLIC LIBRARIES (ALA)
O = PERFORMANCE MEASURES FOR OKLAHOMA PUBLIC LIBRARIES

Part II: Explanation of Data Elements

a = annual circulation

b = jurisdiction population (population of the community served by the library)

c = estimated annual number of materials used by patrons in the library (based on use recorded during two "typical" weeks)

d = the actual or estimated number of visits to the library during the year

e = actual awareness units (one citizen aware of one library service, as determined by a citizens survey)

f = potential awareness units (the number that would result if every citizen survey respondent were aware of every library service)

g = the number of citizens survey respondents who reported using the library within the last year

h = the total number of citizens survey respondents

i = the number of persons who are registered borrowers of the library

j = jurisdiction population (households) - (number of households in the community served by the library)

k = the number of titles sought by library users, as determined by a materials availability survey

l = the number of titles which were sought by library users and found on the same visit, as determined by a materials availability survey

m = the number of subjects on which library users sought information, as determined by a materials availability survey

n = the number of subjects on which library users sought and found information within the same library visit, as determined by a materials availability survey

o = the number of authors for which library users sought titles, as determined by a materials availability survey

p = the number of authors for which library users sought and found at least one title within the same visit, as determined by a materials availability survey

q = the number of browsers, as determined by a materials availability survey

r = the number of browsers finding something of interest within the same visit, as determined by a materials availability survey

s = the actual or estimated number of reference questions asked during the last year

t = the number of reference questions asked during a sample survey period

u = the number of reference questions asked during the survey period which were also answered within the same working day (based on the judgement of the librarian)

v = annual attendance by persons of all ages at programs provided by the library

w = annual attendance by adults (15 years of age or older) at programs provided by the library

Table 1. (continued)

x = annual attendance by juveniles (14 years of age or younger) at programs provided by the library

y = jurisdiction adult population (adult population--15 years of age or older--of the community served by the library)

z = jurisdiction juvenile population (juvenile population--14 years of age or younger--of the community served by the library)

aa = juvenile (14 years of age or younger) circulation

ab = juvenile percentage of total circulation

ac = juvenile materials expenditures

ad = total annual library materials expenditures

ae = juvenile percentage of materials budget

af = juvenile percentage of population

ag = requests for library materials not immediately available

ah = requested materials made available by recall, purchase or interlibrary loan within 7 days

ai = requested materials made available by recall, purchase or interlibrary loan within 30 days

aj = number of interlibrary loan requests

ak = number of interlibrary loan requests filled

al = number of items held in the library

am = number of hours open within the 8am to 5pm, Monday through Friday "box"

an = number of hours open outside the 8am to 5pm, Monday through Friday "box"

ao = total hours open

ap = number of full-time equivalent (FTE) library staff

aq = square feet of space actually used for library purposes

ar = number of library items held intended for juveniles

as = juvenile percentage of holdings

at = local funds appropriated for library services

au = total annual local budget

av = total annual library operating expenditures

aw = total annual salaries and wages expenditures

ax = number of library employees (excluding maintenance staff) who participated in at least 6 hours of continuing education in the last year

- Are clientele aware of specific services and resources?
- Should the information center provide additional services?
- How important or valuable are the services as perceived by clientele?

Additional data regarding the performance of the library can be obtained as part of the survey to further assess the library's effectiveness.

A second measure appropriate for use in corporate information centers is the measure of *clients as a percentage of jurisdictional population.* A client is a person who uses at least one of the library/information services provided by the information center in a designated time period. The data elements for this measure are collected similarly as those for the awareness measure. The jurisdictional population figure used can be the same and the number of clients is determined by the addition of another question to the awareness survey:

> Has the client used a specific service within a given time period? The number of persons who answer "yes" divided by the number of persons surveyed, comprises the measure of clients as a percentage of jurisdiction population for specific services.

One problem with the transposition of client awareness and usage measures from the public library to the corporate information center is that the "value" of any particular client awareness may not be the same in the two settings. In the public library, all users are assumed to be equal. Wasserman (*17,* p. 380), however, notes that a special library has "fruitful and unfruitful" clientele, determined on the basis of organizational values such as level in the organizational hierarchy.

The "value" of awareness and use of information center services by upper management may be greater than the "value" of awareness and use by others lower in the organizational hierarchy. Thus, calculation of separate client awareness and usage measures for different management levels or different departments or divisions may be desirable if the information center has objectives which are related specifically to those sections of the corporation.

A third performance measure for corporate information centers might be *reference transactions per capita.* A reference transaction is defined as any request for information that requires the use of information center materials or the professional judgment of the information specialist to supply the information (*20,* pp. 37–39). Reference transactions may be conducted (and thus broken down for analysis) as: in-person, by mail, or by telephone and may be from or for any person in the designated jurisdictional population. One of the data elements used in computing this measure—jurisdictional population—has been previously discussed.

The number of reference transactions is a *quantitative* (not qualitative) statistic frequently collected by corporate information centers, as was found in the 1982 study of 301 Illinois special libraries (*8*). This study indicated that 65% of these libraries, which included corporate information centers, recorded regularly or occasionally the number of reference questions handled. The number of reference transactions, divided by the jurisdiction population, comprises the measure of reference transactions per capita.

The PLA manual suggests that the number of reference transactions per capita may be further analyzed by the amount of time spent servicing transactions. This seems particularly appropriate for corporate information centers, where reference transactions may take minutes or days to complete. So, for example, reference transactions per capita could be computed for transactions which take up to an hour to complete, up to 8 hours (1 day) to complete, and over 1 day to complete.

The *reference fill rate* is a fourth measure applicable to corporate information centers and is a crucial measure of the quality of information services provided. The accountability of the librarian or information manager to the corporation for the failure to find or communicate pertinent information, or the communication of erroneous information may require greater accountability than a public or academic librarian. Thus, every effort should be made to determine the degree to which correct and accurate answers are, in fact, provided to clientele.

The reference fill rate can be determined on the basis of sample reference transactions and measures the number of reference transactions "completed" in proportion to their total number. The PLA manual recommends that the perception as to whether or not the transaction was completed be left to the librarian involved. However, measuring in terms of *clients'* perceptions provides more meaningful data, as is noted in Herbert Goldhor's review of the ALA manual (*25*). Furthermore, recent research has shown that unobtrusive tests of reference, which more accurately measure "correct answer full rate," produce surprisingly low fill rates (*26*).

To compute reference fill rate, a client survey would be conducted (*27*). Sample reference transactions could be chosen on the basis of the number of questions asked during sample time periods or by determining a statistically significant number of transactions per year (n) and testing the fill rate for each Nth trans-

action. A client survey could ask if an information product, supplied as part of a reference transaction, met their needs. The term "information product" is used here to include brief answers (oral or written) to reference questions as well as more extensive information packages, such as bibliographies, online search results, or reports. The client survey could be distributed with each information product provided in response to a sample reference transaction. The survey would ask: Does this information product supply the information you need? The reference fill rate would then be calculated as follows:

$$\frac{\text{information products meeting information needs (b)}}{\text{information products delivered (a)}} \times 100 = \_\_\_\ \% \text{ reference fill rate}$$

a = sample number of information products delivered

b = number of products which met the information needs of clients, as determined by a client survey.

An additional aspect of reference service, i.e., *timeliness of information* delivery, measures whether or not information was supplied to clients in a timely fashion. The need to meet information deadlines is especially important in a corporate setting, where it is often better to supply some information by the time it is needed than to supply "perfect" information after a client's deadline has passed.

Data for this measure could be collected by the addition of a question to the client survey used to determine the reference fill rate. The survey distributed with each information product provided in response to a sample reference transaction would additionally ask: Has the information product been delivered by the time it was needed? The timeliness of information delivery could then be computed as follows:

$$\frac{\text{information products delivered on time (c)}}{\text{information products delivered (a)}} \times 100 = \_\_\_\ \% \text{ of information products delivered in a timely fashion}$$

a = sample number of information products delivered

c = number of sample products delivered, which were received by the time clients needed them, as determined by a client survey

This example is offered as a means to illustrate how additional performance measures can be computed for specific information center services by building upon the existing measures and concepts already developed by the various public library performance measures.

Conclusion

Many of the performance measures which have been suggested for use in public libraries can be adapted for use in corporate information centers. Measures of community penetration and the use and quality of information services are particularly important in information centers because such measures are concerned with user services outputs; they indicate the quantity, quality or character of information center activities. Five measures have been discussed in this paper as examples for possible use in corporate information centers:

- corporate awareness of library services;
- clients as a percentage of jurisdiction population;
- reference transactions per capita;
- reference fill rate;
- timeliness of information delivery.

If, for example, the librarian in an information center chose to compute these five performance measures, s/he must determine a figure for the center's jurisdictional population, record the number of reference transactions on a continuous basis and also conduct two surveys: an awareness survey and a client survey. The awareness survey asks a sample of the information center's jurisdictional population what library information services they want, what services exist, and what services they use. The client survey is addressed to recipients of information products provided in response to a sample number of reference transactions. It asks whether or not the information product supplied the information needed and whether or not it was delivered on time.

Although survey questionnaires have been suggested in this paper as an ap-

propriate means of obtaining much of the data for these performance measures, data collection techniques are likely to vary from setting to setting. For instance, use of telephone interviews, various sampling procedures, or in some cases, maintenance of an ongoing data base of the data elements suggested above can be done. Further, corporate approval and "encouragement" of staff to participate in the data collection process is likely to improve response rates and the overall validity of the data collected. Individual circumstances are likely to determine the "best" approach for data collection.

This paper has emphasized the development of performance measures especially for the corporate library/information center and has stressed that the value of such measures is in the context of self-diagnostics and a formal process of planning and evaluation. Performance measures provide indicators of the degree to which information center objectives and corporate goals are being accomplished, assist the corporate librarian to assess which information-related activities contribute best to such objectives, and provide long term trend data so that the degree of change occurring in the library (and its impact) can be measured directly.

Thus, performance measures are best used in conjunction with a broad range of other measures in order that a "complete picture" of information services and operations can be obtained rather than assessing one piece of corporate library services. By carefully selecting and modifying performance measures (See Table I) for use in the corporate library/information center, the librarian has a powerful base by which service objectives can be assessed, services can be modified to better meet the information needs of its clientele, and the importance and impact of information services can be documented. These benefits take on increased importance when the performance measures are part of a formalized planning process.

As noted earlier, the performance measures discussed in this paper are not the only measures appropriate for use in corporate information centers. Other public library measures could be adapted and new measures devised. Clearly, research is needed into the development and testing of performance measures for special libraries. The PLA and Oklahoma manuals resulted from this type of research and the value of these manuals is twofold: they provide a menu from which individual performance measures can be chosen in light of a particular library's goals and objectives; and they explain how to collect the data needed and how to compute the performance measures. Similar manuals for special libraries and corporate information centers are essential and should be developed.

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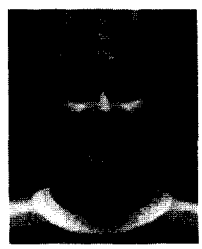

Cutback Management for Special Libraries

Strategies for Library Survival

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■ **When faced with circumstances that threaten the existence of the special library, library managers can utilize a set of management strategies designed to increase the likelihood of library survival. The development of a management technique which combats the impact of organizational retrenchment is discussed. It has practical applications within special libraries and can serve as a tool to assist parent organizations' efforts to survive.**

RARE is the individual working in the special library field who has not heard the phrase "the library is the first to go." When organizations suffer financial losses, they react by reducing any expense not seen as an absolute necessity. Does the special library fit into that category? Rather than leave the answer to chance, library and information center managers need to implement aggressive strategies that ensure library survival in the worst of economic crises. Manageable strategies are available and have been made popular by a management technique referred to as "cutback management."

Cutback management is based on strategies used by managers to "accomplish more with less" (*1*). It is a syndrome that develops when organizations experience retrenchment, which is defined as "the imbalance between the purposes outlined in an organization's strategy and the resources it can mobilize to achieve them" (*2*). When retrenchment occurs, the special library may be eliminated; management must decide whether in-house support services can be justified when output must be emphasized.

In addition to discussing the origin and strategies of cutback management, this article examines methods special library

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and information center managers can use to streamline internal operations while acting as a support to the external, or organizational, cutback management campaign. When internal and external strategies are combined, special libraries can demonstrate to management that the library is essential to organizational survival. Special libraries in financially struggling organizations need not be the "first to go." The key is to understand cutback management and how to work within it—not be ousted by it.

Foundations of Cutback Management

While organizations of every type are subject to occasional financial setbacks, the size and suddenness of funding losses suffered by the public and nonprofit sectors in the early 1980s were unprecedented. Accustomed to a steady stream of funds from federal and state sources, agencies in these sectors experienced growth throughout the 1970s. In the United States, there are currently six to seven million nonprofit organizations (*3*). Several factors, including local tax revolts, a wave of social and health organizations devoted to many new "rights" movements, a larger client population and an overall economic decline, contributed to a new era characterized by fiscal austerity and persistent threats to organizational survival.

Looming larger than all of these developments, however, are the current Presidential Administration's restrictive policies towards spending for domestic programs. The strategy to improve the national economy by reducing federal expenditures has had the single largest impact on the public and nonprofit sectors. With its strong ties to the federal government, these sectors have been buffeted by federal budgets reductions. Had Congress granted all of the Administration's requests for income reductions between fiscal years 1981 and 1985, the nonprofit sector alone would lose $35 billion—about one-fifth of its income (*4*). Fortunately, Congress was not so harsh as to grant them. Yet funding losses are evident. The Urban Institute's Nonprofit Sector Project reports that well over half of the organizations reporting government support have experienced reductions in this support as a consequence of recent federal budget cuts. Another 35% have had no change, which, in times of inflation, translates into a real decline in the value of support (*5*).

Faced with threatening budget reductions, increasing service costs, shrinking local resources, greater numbers of clients, and competition for funds from the swelled ranks of organizations, it was natural for survival-oriented management techniques, known collectively as cutback management, to evolve. Cutback management is not concerned with the causes and rationale for funding reductions. Rather, it is related to management's response in confronting the harsh realities of retrenchment. Cutback management's origins are not attributed to any single individual or organization. What is known about it comes from the experience of organizations creating new designs for "doing more with less."

Strategies for Cutback Management

A review of the management literature on budgetary and fiscal retrenchment indicates that there is no single, overall strategy for conducting cutback management. The strategies will vary because each organization and its degree of retrenchment is unique. While implementing a cutback management plan is an exercise of intellect and leadership, getting people to accept it is a psychological chore. The ultimate design of the plan will reflect the needs of the organization and the ability of the staff to carry it out. In tailoring this plan for survival, managers have an interesting, if not overwhelming, selection of strategies to choose from.

The following classified scheme of cutback management strategies is drawn from reports found in the literature (*6–12*). While many of the strategies originated in the public and nonprofit sectors, most can be achieved with equal effec-

tiveness in the private sector. There are five major classes: 1) *resource development* relates to strategies designed to expand or increase the organization's base of monetary, human, or material resources; 2) *productivity* involves strategies that seek to encourage staff to increase its output and improve job effectiveness; 3) *economy measures* relates to strategies that reduce the organization's fiscal commitments or burdens; 4) *interorganizational cooperation* involves strategies in which multiple numbers of agencies combine various aspects of operations to achieve greater economy or efficiency; and 5) *reorganization,* represents the most radical set of strategies by which agencies restructure organizational design and program operations. Reorganization may use strategies from any of the other classes.

There are several strategies within each class:

I. Resource Development.

a. *Fund raising* involves aggressive efforts to seek donations of funds or material resources from private foundations and corporations.
b. *Fees or fee schedules* involve passing on whole or partial costs of service to client. Schedules that adjust the fee to income are more common in the nonprofit sector.
c. *For-profit ventures* involve the development of a business enterprise by a library; operated independently of that service program. Profits are channeled back into the operational budget.
d. *User contributions* encourage users to make small donations for service received when fees are forbidden.
e. *Legislative advocacy* involves lobbying efforts to encourage the legislature to allocate additional funds to programs—a product of competition for limited resources.
f. *Public relations* involves direct and indirect marketing activities to alert management to the good work done by the library in the hopes of bringing in additional revenue. It is also useful for fund-raising efforts.
g. *Government surplus* involves the acquisition of surplus equipment from the government that can be used for outfitting the office.
h. *Volunteers* may be used to maintain or expand services. Proper training should be provided.

II. Productivity

a. *Technology transfer* incorporates new technology into operations to improve the staff's capacity to increase work load and effectiveness. Examples are word processing, communications systems and automated systems.
b. *Planning systems* based on goals and objectives clarify what targets staff should be aiming for.
c. *Effectiveness/efficiency measures* examine operations to determine areas in which staff and management can improve the quality and quantity of output.
d. *Staff motivation* encourages staff to take greater personal interest in work. It can involve monetary incentives, tying merit increases to performance, performance bonuses/awards or job enrichment techniques.
e. *Participatory management* increases the role of staff in organization management to give members a sense of responsibility for the overall success or failure of the organization.
f. *Staff training* provides staff members with more knowledge about their job, how to do it, and how they fit into the meeting of agency goals.

III. Economy Measures

a. *Technology transfer* incorporates new technologies than can reduce costs. The use of electronic mail systems may reduce costs of traditional mailing, for example.
b. *Operating costs reduction* includes any activity to save day-to-day costs, such as cutting waste, the purchase rather than leasing of equipment, reducing rent through a physical move or purchase, and so on.
c. *Transfer of losses* passes on funding loss to any organization or unit dependent upon you for its funds.
d. *Staff salary* can be reduced through cuts or freezing of current salary levels.
e. *Staff reductions* reduce staff through layoffs or hiring freezes.

f. *Ration services*—libraries can decide to reduce level of service delivered to clients, usually through prioritizing clients by greatest need.
g. *Non-service approaches* involve a subset of strategies designed to reduce demand for service, yet meet needs through means other than direct service delivery. Non-service approaches include tax policy changes, administrative reform, public-private collaboration, promotion of self-help and greater advocacy in the public sector.
h. *Regulatory relief* includes activities which encourage governing agencies to reduce cumbersome regulations and paperwork that hamper staff and result in greater costs.
i. *Redirect clients* by encouraging them to use the services of other community providers, or to make greater use of friends, relatives and neighbors.

IV. Interorganizational Cooperation

a. *Interagency planning* brings together similar organizations to plan cooperatively. The goal is to reduce areas of service duplication and find the strengths of each agency, freeing each to target service more efficiently.
b. *Shared purchasing* unites small agencies to make large purchases, whether for services or administration, thereby achieving economy in bulk purchases.
c. *Shared space* allows organizations to reduce operating costs by sharing rent; it also may lead to shared service agreements.
d. *Shared services* encourage organizations to share service fees for printing, computer timesharing or equipment leasing.

V. Reorganization

a. *Centralization* may be economically advantageous to develop a unified base of operations, rather than having many smaller units spread out through a region.
b. *Mergers*—organizations may enter into legal obligations to combine administrative and operational tasks. The goal is for two or more retrenched agencies to achieve survival through combined resources.
c. *Restructure management* by implementing management systems based on sound financial principles that tie outcome to income (e.g., PPBS, MBO, Zero-Based Budgeting).
d. *Purchase of service*—organizations that now deliver services themselves could provide them more cheaply by entering into contracts for delivery by other skilled providers.

These strategies will not be applicable in all library environments, and some are directed more to overall organizational operations. Still, library and information managers should be aware of these strategies to properly plan for their possible use.

Internal Strategies for Library Survival

Little attention has been given in the library literature to the skills needed to survive periods of retrenchment. While the problems resulting from budget cuts have been reported, there is a dearth of ideas on how to counteract them.

Matarazzo's study of library closings and the operative factors that led to library terminations is essential for understanding and acknowledging the warning signs of impending crisis for your library (*13*). His concept of developing an awareness of "where the organization is headed" is an important one for successful cutback management in the library. Those library managers who fail to implement cutback management at the proper time—that is, when the first signs of fiscal problems develop—may end up being engulfed by retrenchment.

Curtis and Abram also advance our knowledge of the library's vulnerability to retrenchment (*14*). They present some basic guidelines for both recognizing when likelihood of termination is greatest for the special library and what librarians can do to successfully compete for their share of the resources.

Herbert S. White has written several articles on the financial difficulties facing libraries. Yet White acknowledges the in-

ability of library managers to respond to the problem. He states, "It would be nice to be able to say that, in response to financial pressures, librarians throughout the United States responded with imaginative and innovative improvements and efficiencies, resulting in a maintenance of acceptable levels of service even at reduced funding levels. It would be nice to say it, but unfortunately, we can't" (*15*). White captures the essence of the problem: library managers lack the skills needed to fight retrenchment; they want to, but can't. Developing an awareness of how cutback management strategies can be applied in the library environment should enable library managers to say, "I can."

Economy Measures

Libraries and information centers can exercise numerous options to reduce costs. Rising prices of monographs and serial publications have been well-documented. Library managers need to scrutinize their collections to determine which acquisitions can be terminated with minimal disruption in library service. Collection cutting is a fast way to reduce costs, but it must be done with a scalpel, not a hatchet. Cuts must be weighed by probable user reaction. Cutback management is based on good planning and a contingency plan for collection cutting, if and when needed, should be available.

Information service expenses can be reduced by rationing service to library users. To prevent losses from falling too heavily on any one group of users, service can be rationed according to the size of organizational units. If a given unit receives 30% of the agency budget, they should receive about 30% of the library's time and money spent on service delivery. Another approach prioritizes user needs. The library manager determines which staff members are priority users, primarily based upon their ability to serve the best interests of the library. Matarazzo, in his study of corporate library closings, found users consistently claimed they had received good service. Yet these users did not include the high level administrators who would ultimately decide the library's fate. Matarazzo could only contemplate how the libraries might have fared had the library managers made a stronger effort to direct services to the organizational decision-makers (*13*). Prioritizing users, while ethically questionable, remains a sound library survival technique.

Charging back the cost of library materials or services to users is another economy strategy. It is not well-tested in special libraries. The library, because its budget is reduced, passes on losses directly to the staff. Since all organizational departments are impacted by retrenchment, this strategy may keep users away from the library. They won't be rushing to expend their own resources. If used sparingly, this strategy is effective. At best, it can keep users from making requests that are costly to the library but of only passing interest to the user.

Resource Development Strategies

Library and information center managers will benefit from aggressive implementation of resource development strategies. The collection can be expanded by adding materials that are free or low cost. There are numerous sources that lead to free publications. One example is the *Journal of Human Service Abstracts.* Produced by Project SHARE, it is a free source of management literature. It can be used to obtain many documents at no or low cost. Conference papers and article reprints are often provided free by authors, but an aggressive letter-writing campaign must be waged to get to authors before supplies are exhausted. Government documents, if sought soon after published, can usually be obtained for free. Congress, the General Accounting Office and numerous federal agencies are just a few additional sources.

Large academic libraries are a potential source of free, slightly outdated reference tools. Rather than discarding their annual reference materials when the new editions arrive, the large library may be persuaded to donate them to a smaller

library. A library manager can make the right personal contacts for soliciting such donations through involvement in professional library associations at the local level. Those who are concerned that one- or two-year-old reference volumes may lead to misinformation can allay their concerns with the knowledge that a telephone call to a library with the latest edition can always be used to verify results.

Individuals associated with the organization may be a potential source of donated material. Staff members may be persuaded to contribute from their personal collections to the library. Strategies to obtain free materials for the library can result in lower purchasing costs. However, the library manager must prevent the library from becoming a dumping ground for unwanted or unusable items. Every effort should be made to avoid giving the library the image of a storage center for discarded materials. A public relations campaign to show how the library can use donated items to maintain services during retrenchment is desirable.

Library managers in for-profit and nonprofit organizations should also consider strategies to raise revenue. A popular approach in the nonprofit sector is to seek grants from philanthropic foundations. Small special libraries should not expect major grants from large foundations; rather, there are many small, local foundations that are more apt to provide grants of several hundred dollars. A library should base its appeal for funds on its reputation for service to the community. Directories are available that can guide grantseekers to the foundations with a history of giving aid to their type of organization. There are also many publications available to assist grantseekers with proposal writing. Many special libraries in the business sector generate revenue through fees charged for library services. Fees are often charged to non-staff users for database searching, borrowing privileges and information consulting services. As resources diminish, it may become more acceptable for nonprofit libraries to charge fees to the public; nonprofit educational institutions and health care facilities are, in many cases, doing so already.

Working Smarter

Productivity, more than any other set of strategies, seeks to do more with less. A discussion of productivity must focus on the two elements most essential to it—people and equipment.

Improved technology has provided library managers with numerous techniques for speeding up routine tasks or eliminating some altogether. Automated information retrieval systems and automated housekeeping features are readily available to libraries with all types of budgets. Some are costly at first, but cost-effectiveness has been documented with most new types of equipment.

Unfortunately, the library manager cannot upgrade staff members as easily as equipment. Most library managers want more efficient and effective staff and procedures. But what exactly are efficiency and effectiveness and how does one develop them? In order to understand techniques for boosting productivity, library managers need to learn about the concepts of efficiency and effectiveness and how they fit into a productivity plan.

Efficiency is a measure of the ratio of inputs to output; how much did I put in—what did I end up with? Effectiveness, in contrast, is a measure of the activity or service offered in relation to the manifest need of the project or client. The effectiveness of an information activity is measured by the satisfaction level of clients and appropriateness to client need (*16*). For example, if a library user requests background information on a topic and the librarian conducts an exhaustive literature search, the service would not fit the users' need. The resulting work is quite efficient, but a short search to produce an overview paper or a few book chapters would have met the request more effectively and would have required less professional time.

When librarians strive for complete efficiency without giving adequate atten-

tion to effectiveness, the result may be a decline in service quality, staff turnover or burnout, and an inability to mobilize resources—all threats to survival.

Interorganizational Cooperation

As a cutback management strategy, cooperative measures between libraries have always helped lower costs while providing users with much-needed material. Libraries learned long ago what other fields of service are now recognizing—no agency has the resources to offer its clientele everything needed. Interorganizational cooperation is essential to an internal cutback management strategy. Sharing materials, as in interlibrary loan, is the most common form of interorganizational cooperation among libraries. Less frequent attempts have been made to share space, purchasing, and contracted services. As resources dwindle, such arrangements may become more familiar to special libraries.

Cutback management strategies involving agency reorganization offer less feasibility to special libraries. While these strategies often offer greater fiscal stability and more effective service, they are thought of as organizational strategies. It is unlikely that a single unit of the organization could implement any of the strategies on its own. Special libraries with ambitious managers may investigate establishing accountability-based budgeting systems for the library. More ambitious individuals may take cooperation a step further and examine mergers with similar special libraries.

Cutback management strategies may be likened to a menu. There is a wide variety of selections, some which are more familiar and frequently tried, and those that are more exotic and less approachable. There are many more than those few discussed here, as illustrated by the classified scheme. But the choices are there, and the selection is entirely up to the library manager, who must, of course, account for the nature of the parent organization, the library users, and the library's abilities and desire to survive retrenchment. Given the wide range of strategies available, library managers should arm themselves to prevent service reductions should the fiscal crunch occur.

The Library as Aid to Organizational Survival

Despite internal strategies to make the library as efficient and cost-effective as possible, management may continue to view it as a target for elimination. An aggressive campaign must be waged to show management that the library is an inexpendible resource, crucial to the successful outcome of cutback management. To successfully fit into a cutback management environment, the library manager must become an opportunist, looking for ways to achieve the ultimate goal—library survival.

The library manager should take an assertive role in the parent organization's campaign to generate new revenue. For-profit as well as nonprofit organizations have become increasingly dependent on grants and contracts from government, business and philanthropic foundations. In this competitive game, the library and information center can provide the vital edge.

Technical assistance from the library can fall into two categories. First is the crucial area of identification. Determining what grants and contracts are available, from whom, and for what can be readily accomplished by the special library. Trade publications, industry newsletters, *Commerce Business Daily, Federal Register,* and other sources of contract information should be regular reading for the library manager. Know what your organization can compete for and know who within the organization should be alerted to a relevant grant or contract notification.

Since grants and contracts are awarded on a competitive basis, libraries can play an important resource development role by providing the information that can help the organization to successfully compete. Grants or contracts are seldom awarded for a poorly researched or written proposal. Supplying staff with high quality facts and figures is a task the

library can best perform. If needed, resources should be available to indicate proper procedures and techniques for preparing a winning proposal.

Library managers should be on the look-out for reports of new ideas, products, and programs to feed the imagination of proposal writers. Much work must be accomplished before a single grant or contract is won. If the library can take some credit for winning a valuable contract or grant, its status within the organization will be further solidified.

Libraries and information centers are always making tremendous contributions to organizational productivity. Whether it is achieved through intensive channeling of information to staff or by conducting preliminary research, the library aids an organization by ensuring that professional time is spent utilizing information, not searching for it. The emphasis on productivity as it relates to organization cutback management for the library manager need not be achieving it, but on making certain upper level management is aware of it. This effort must be magnified tenfold during periods of retrenchment.

The library manager's goal must be to make staff as dependent as possible on library services, while aggressively marketing the positive values of the special library to the organization's chief decision-makers. Should upper-level management decide to lay off staff or institute a hiring freeze, the organization will experience a work force reduction. This creates another opportunity for the library to involve itself in the cutback management strategy by showing it can offer more than just an information service. By assuming functions of lost staff members, the special library can lend diversity to an organization trying to do more with less.

Functions involving data collection, data analysis, research or writing can be performed by skilled librarians. Providing articles to a company newsletter, participating in public relations activities or operating a staff orientation program are a few examples of how the library can help pick up the slack that is created by losing staff. If library managers seek to diversify in this fashion, they must be cautious not to spread themselves too thin and hamper their ability to maintain library functions.

Questions can be raised about what to do when retrenchment ends. Should the library shed itself of any extra functions? That will be up to each individual library manager, but it never can hurt to keep demonstrating to upper level management that it gets much more for its money by maintaining a special library.

During the course of any organization-wide campaign to combat retrenchment, the library need not be resigned to a passive role. Several examples have shown how the library can support the cutback management program. It is a role libraries may not be accustomed to filling, yet the skills required to aid the organization's effort to accomplish "more with less" are already available to special library managers.

Conclusion

Cutback management offers many day-to-day strategies to help the library manager cope with the fiscal threats that can cripple library services. Advocates of professional library planning have stressed the need for library science to study and integrate more principles from management science. The theories of cutback management are among the management skills librarians need to develop.

Opportunities for learning cutback management strategies, as well as the general concepts of organizational finance and retrenchment, should be offered through library science and continuing education. Before that stage is reached, more research should be conducted to explore how librarians perceive fiscal threats to library survival and their own ability to deal with them. This overview of cutback management will hopefully enlighten special library managers to the necessity of planning not only for growth but for retrenchment.

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Barriers Limiting the Usefulness of Published Information in the Research Environment

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■ **Fourteen barriers which delay or impede the flow of information to the library and to users are identified.**

SAMUEL JOHNSON once stated, "Knowledge is of two kinds: we know a subject ourselves, or we know where to find information upon it." Today, the acquisition of knowledge and information can no longer be as readily assured as in 1775. It has become not only a far more complicated process but also one impaired by many constraints which make the handling of information more difficult, time-consuming, ineffective and inefficient. Indeed, information barriers can even make data inaccessible and lead to unnecessary duplication of research.

The effective handling of published information forms an integral and essential part of the research process. Barriers which delay, disturb or destroy the flow of information—either with regard to quantity or quality—adversely affect research to the detriment of scientific progress.

The following are some of the barriers researchers face when handling published information.

Publishing Delay

Since new research is partly based on the findings of past research, it is important that research results be published without delay. In spite of this urgency, extensive delays are evident. Four types of delays contribute to this barrier:

1) Starting lag—the time between the completion of the project and the start of the manuscript.
2) Author lag—the time required to prepare the manuscript.

This article is based on a paper presented in June 1983 at the SLA New Orleans Annual Conference. At that time the author's affiliation was deputy head, Library Services, Nuclear Development Corporation, Pretoria.

3) Rejection lag—the delay caused by manuscript revision or rejection on first-submission.
4) Publication lag—the time required to publish the manuscript.

According to estimates given in the literature, the starting lag can be two months, the author lag about three months, the rejection lag (which affects one paper in eight) can add a delay of four months, and the publication lag another four months. This adds up to a delay of nine months for manuscripts published in the primary periodical literature and a delay of 13 months if the manuscript was not accepted on first submission. Processing for inclusion in the secondary literature can add another eight months, giving a total of 21 months delay.

Dobrow (*1*) suggests that if publication of research results is delayed by one-and-a-half years or by two years, the value of information decreases by a third and by a half, respectively. The implications of this information barrier for the researcher can be serious. Clearly there is a need for quicker publishing turn around.

Inferior Quality of Information

Because the emphasis in research environments is on publishing quantity rather than quality, the research literature contains contributions of varying quality ranging from the superior to the inferior, the reliable to the inaccurate, the consise to the redundant, and the new to the obsolete. Researchers are confronted not only with contributions of disparate quality but also with a high percentage of publications that contain information of little or no discernible value. Stibic (*2*) estimates that only 10% of the published literature contains new facts and ideas.

Inferior information quality can be viewed as four separate barriers: inferior and substandard information quality; unreliable and inaccurate information; redundant information; and obsolete information. To a certain extent, the referee system used by prestige publications helps to weed out inferior quality information, but this is not a total safeguard. Authors of rejected contributions usually apply for acceptance in other publications, and their bibliographic references are included in indexes and abstracts which aim for comprehensiveness rather than quality of input.

Information Congestion

Information congestion is also known as "information explosion," "information input overload," and "reading overload." The continuing expansion in the volume of published information demands a parallel increase in the information search and handling capacity of the user. Since this capacity is limited, the required search capacity may exceed the available search capacity. Such an overload situation makes information handling and retrieval more difficult and time consuming, causes a decline in information search effectiveness and constitutes a barrier to effective information transfer.

Information Dispersal

The development of a science is accompanied by new contributions to its literature, a dispersal to more outlets, the appearance of a large variety of media, and increasing dispersal to more languages, as well as to more disciplines. Such dispersal implies that the researcher's information searches must cover a greater range of publications, media, languages and disciplines. An information barrier occurs when the researcher fails to spread his searches over as wide an area as the dispersal of his science or discipline demands. Hanson and Line have found that researchers are not always aware of the need to spread a search and that they prefer to consult only a few traditional sources (*3, 4*).

Poor Use of Nonprint

The researcher can experience barriers in the type of media used to carry information. Besides consulting conven-

tional literature, today's researcher has to consult a host of nonconventional literature such as reports, codes, standards and specifications, patents, preprints and reprints, trade literature, conference proceedings, translations not published commercially and technical recommendations. These can be published on either paper or microform, as photographs, maps, slides or computer printouts.

While researchers are reasonably successful in acquiring and using print media, they often experience problems and inconvenience with the use of nonconventional literature. Davies (*5*) has found that their success in handling such material is considered minimal. This can have serious repercussions on research, for nonprint literature presents a large proportion of the holdings of the special library.

Inconsistent Publication Standards or the Lack of Standards

Further barriers to the use of information media result from a lack of conformity to the many accepted international publishing and information transfer standards. For example, periodicals are inconsistent in their use of title; they do not use unique names and they often change their titles, numbering and format. Often bibiliographic details are not reported fully on both cover and title page; the numbering of pages does not start with each volume but with each issue; volume years and calendar years do not coincide; the ISSN is omitted; articles start in the middle instead of at the top of the page; the synopsis, abstract or translation is frequently missing; and the running title is omitted or incorrectly used.

Examples of the lack of application or the incorrect use of standards are, unfortunately, evident also in other information carriers. Williams and Lannon (*6*) have found a lack of standardization within and across databases. Correct and complete bibliographic details are important for the librarian, as well as for the researcher and the research activity. While this barrier does not preclude access to information, it certainly makes it more difficult and time-consuming to locate and handle information.

Information Terminology

The degree of success achieved in the communication of published information depends largely upon a mutual understanding of the terminology used. It is inevitable that the advancement of science and the specialization of research is accompanied by an expansion of the terminology required to describe new concepts, techniques or processes. This contributes to the looseness and instability of terminology, decreases universal understanding, creates problems for information retrieval systems, and makes it difficult for other researchers—even those in associated disciplines—to recognize and understand relevant terminology or information.

Information Ownership

Although it might generally be considered desirable that information for research purposes be accessible to all who need it, the owner of information must often impose barriers to restrict such open access. Unlike barriers which are incidental to the information system, this is an intentional and necessary barrier imposed when research results still have to be verified, when ownership by patent has to be claimed, or for commerical or competitive reasons.

Access to research information is sometimes granted to noncompetitive institutions; yet it is almost as difficult to gain access to information covered by industrial ownership as it is to trace unpublished or nonexistant information (*7*). Furthermore, political or ideological differences can dictate that information be withheld from researchers in foreign countries. While ultimate access to information in such instances is perhaps not excluded, these restrictions make acquisition more difficult, expensive and time-consuming. Copyright is another

form of information ownership, but it seems to protect the publisher rather than the author.

Suspected Existence of Information Barriers

Researchers are inclined to seek information which they expect to find. Conversely, they tend to ignore information which they believe does not exist. Acquired information is, therefore, limited to and determined by the extent of a researchers subject knowledge and information handling experience. If these skills are not soundly developed, there is the risk of exposing the research to the following penalties: 1) displaying ignorance of activities or developments in the subject concerned; 2) missing contributions and information relevant to research; 3) unnecessarily and unintentionally duplicating research to produce already existing information; 4) wasting research effort and causing an overall delay; 5) producing doubtful and outdated research results.

Weak Information Searching Strategy

Information handling in the research process is a constant and complex interaction between source and user which demands a well-developed information searching strategy. This is a skill that is not readily acquired; it matures through training and experience and demands the following attributes in the researcher: 1) knowledge of the subject being researched; 2) a realization of the value and importance of information; 3) sufficient and sustained interest and time to trace required information; 4) adequate search capacity; 5) familiarity with published information sources; 6) familiarity with library stock, available information facilities and services.

Not every researcher possesses these attributes. The following are some contributions from the literature which illustrate this barrier:

- Slater & Fisher (*8*) established that only 3% of the respondents who thought their search approach was systematic stated that their visit to the library was part of their systematic literature search.
- Whereas at least four or even five indexes or abstracts should generally be consulted (*9, 10*) researchers generally tend to rely on only one or two (*4*).
- The rate of failure to find entries in the catalog can be as high as 26% (*11, 12*).
- The rate of failure to locate books on the shelves can be as high as 48% (*13*).
- Information users' knowledge of both primary and secondary information sources and of reference tools is usually poor, and they are not always aware of available library facilities and services (*14, 15*).

In spite of these severe limitations, few users are willing to request assistance from the librarian (*16, 17*) or to delegate their information search (*18, 19*).

Foreign Language Barrier

The foreign language barrier becomes operative when the researcher is denied access to relevant information because it is published in a language he does not understand. To a varying degree, every researcher is exposed to the foreign language barrier. In general, the smaller the proportion of research published in a researcher's own language, the more dependent he is on research published in other languages, and thus the more exposed he is to the barrier.

At the beginning of this century, a reading knowledge of English, French and German assured nearly complete coverage of all relevant publications. Today the use of French and German has declined, and the researcher can expect to have to consult relevant research contributions in Russian, Japanese, Spanish, Polish or even Chinese. It is evident, however, that the foreign language proficiency of the researcher is limited (*20, 21*) and that the underutilization of foreign language material is detrimental to the research activity (*19*).

Science is international; it transcends national boundaries, and the distribution,

acquisition and utilization of information should therefore, not be obstructed or unnecessarily delayed by language boundaries.

Time Constraints

Information handling is becoming more time-consuming for the researcher due to the increasing amount of information, the number of information carriers, and the greater diversity and complexity of information retrieval systems. The time for current awareness and information retrieval is becoming increasingly restricted. Niewalda estimates that 20–25% of the researcher's time is spent on information searches. By not restructuring information handling to maintain the desired effectiveness and efficiency, the researcher runs the risk of missing important developments and information.

Geographical Isolation

Research is invariably clustered around large towns and cities. This clustering effect promotes the research activity for it cumulates and provides the researcher with a large stock of local information facilities and services. Researchers in geographically isolated areas, however, are likely to be confronted by a barrier. Their local cumulated information stock, facilities and services will certainly be more limited. This makes the acquisition of information more time-consuming and difficult. Researchers may, consequently, prefer or be forced to conduct research with only those means immediately available, possibly missing relevant information.

Information Delay in the Library

Published information which is not available or accessible in the library when required, but which becomes available later in the research process, may create a barrier. Of the many contributing factors that can be listed, the following are the most important:

- The required information is not held and has to be acquired from another country. The extent of this delay depends on the existence of union catalogs to help locate holdings, the cooperation received from other libraries, and the speed of the postal service.
- The information was acquired but cannot be found.
- The publication required is an order but is delayed because of long distance, dispatch procedures or advance payment, or copyright requirements.
- The publication was acquired by the library but is not accessible because of processing delays.
- The publication could not be retrieved through literature searches, but was retrievable after publication of abstracts, indexes and translation bulletins, or through references and citations.
- The information is held but only in a foreign language and has to be made accessible by translation.

Conclusion

Besides the important barriers mentioned above, others can be identified and described; for example, weak national information systems, inadequate library facilities and services, information malnutrition—the counterpart of the barrier of information congestion.

In spite of the impressive advances that have been made in library science and information handling, many barriers still impair and limit the usefulness of information. When "putting knowledge to work," it is our prime professional obligation to identify and, as far as is feasible and practical, to eliminate or decrease all barriers between information and the user.

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Burnout

A Survey of Corporate Librarians

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■ **Corporate librarians, like other members of the helping professions, are subject to job stress. To attempt to determine the severity of the problems caused by this stress, the Maslach Burnout Inventory was administered to a group of randomly selected corporate librarians. While the corporate librarians showed some signs of burnout, their average scores were significantly lower in four of six categories compared to scores derived by Maslach for other professional groups. Feeling a lack of personal accomplishment seemed to be the greatest cause of high burnout scores for the sample. The job factors that were found to be most closely related to the problem of burnout were inadequate positive feedback and a lack of control over the operation of the library.**

CONSIDER the following statements: "I'm a one-woman show and I love it. The infinite variety keeps me hopping" . . . . "No rewards exist. Pride in [my] own effort is only factor keeping me afloat in an environment where management is insensitive to and disinterested in the library."

These two statements show a great contrast. It appears as if people from two different professions were discussing their jobs. However, both statements were expressed by people working in corporate libraries. Even within a specialized area of a single profession, workers may have a wide range of experiences, from greatly satisfying to extremely frustrating. How widespread is the feeling that no rewards exist? What are the factors leading to this kind of feeling?

One aspect of this problem that has been receiving increasing attention is the question of job "burnout." As workers face problems beyond their resources and struggle to do a job that is never really done, they may become frustrated and drained emotionally, as well as physically. Most of the studies on burnout have been conducted among such groups as doctors and social workers, but some attention has recently been focused on librarians (*1*).

While librarianship does not usually involve the same type of prolonged, intense, interpersonal relationships found in some other professions, the attempt to meet the urgent informational needs of library users can be difficult and frustrating. Although librarianship has many rewards, it is not a profession immune to burnout.

The only previous study which attempted to measure burnout among librarians was performed by Smith and Nelson in 1982 (*2*). The Forbes Burnout Survey and a series of background questions were administered to 262 reference librarians in large academic libraries. While all of the librarians experienced some stress in their jobs, very few experienced burnout—certainly not to the degree known in many other professions. This is encouraging for librarians. However not all libraries are alike, and librarians in other situations may be more prone to burnout.

One type of library setting that can involve stress is the corporate library. Here, the library's existence is usually justified on the basis of its contribution to the company's profits. However, some managers may not value the library highly enough to allocate to it the resources necessary to fulfill its functions. In this situation, a librarian could never do an outstanding job, regardless of his or her personal efforts. While this is not always the case, such a situation is easily imaginable. For this reason, corporate librarians were considered a suitable subject for this study. The results demonstrated that corporate librarians are susceptible to burnout. Two likely root causes were identified.

Methodology

An impetus to further study was the availability of the Maslach Burnout Inventory (MBI). This measuring instrument, which was designed by Christina Maslach and Susan Jackson to assess job burnout among helping professionals, has been validated (*3*). MBI, supported by a survey of background information, was used to study the problem of burnout among corporate librarians in the United States.* Corporate librarians were limited in this study to those working in libraries designed to support the activities of a profit-making firm. Libraries run by the government for its own and community use and libraries run for academic purposes were excluded.

The sample for this study was drawn from the *Subject Directory of Special Libraries and Information Centers,* 6th ed., (1981) (*4*). Most corporate libraries fall into two categories: 1) business and law, and 2) science and technology. Since the science and technology section of the *Directory* is about three times as long as the business and law section, a similar ratio was maintained for the sample.

A list of random numbers corresponding to the page numbers in these sections was generated, and the first suitable entry on each selected page was included in the sample. A copy of the survey instrument was sent to this sample of 150 corporate libraries with the request that the questionnaire be filled out by the reference librarian and returned anonymously. Sixty-two responses were received—a typical, although not ideal, level of response.

Analysis

Sample Characteristics

Eighty percent of the respondents to the questionnaire were females—about the same as the profession, generally, according to figures published in the *ALA Yearbook* for 1982 (*5*). A third of the respondents were in the 30-40 years age category and another third were in the

*The Maslach Burnout Inventory (MBI) was chosen for this study instead of the Forbe's Burnout Survey because the MBI has been more widely tested and supported. The authors have more confidence in the validity of the MBI because of this. The MBI is copyrighted and all rights to it are reserved by the Consulting Psychologists Press. For more information about the MBI write CPP at 577 College Avenue, Palo Alto, CA 94306.

over 50 age category, expressing a bimodal distribution. The rest of the sample was nearly evenly distributed between the under 30 and the 40-50 years age categories. The males in the sample were, on the average, older than the females; over 50% of the males were over 50 years of age.

Fifty-seven percent of the respondents had a master of library science (MLS) degree; 25% had a BS/BA but not a master's degree; 7% had a nonlibrary master's degree; 5% had a PhD; and 7% had no college degree. Seventy-six percent of the respondents considered library science to be their educational field. Two other prominent fields of study were science and education.

Male and female respondents differed significantly in the amount of time they had spent in their current job. Almost a third of the men had been in their positions for more than 15 years, while fewer than 5% of the women had. Forty-three percent of the male respondents had worked in the library profession for 20 years or more, while fewer than 5% of the females had. A third of the women had been in the profession for less than 10 years.

Burnout Scores

MBI consists of a series of 22 statements about a worker's feelings while on the job. These statements comment on such feelings as exhaustion at work and personal satisfaction with one's efforts. An example is the statement, "I feel very energetic." The respondent is asked to rate how often he or she feels this way (from never to every day) and how intense the feeling is (from very mild to very strongly).

Responses are grouped to give scores on different subscales or aspects of burnout: *emotional exhaustion, depersonalization,* and *personal accomplishment.* Emotional Exhaustion describes a worker's feeling that the job demands more emotional involvement than one is able to give. Depersonalization describes a feeling of distance from one's users, as if they were things rather than people. Personal Accomplishment refers to a feeling of job satisfaction without which a worker may be prone to burnout. Both frequency and intensity scores are computed for each subscale, resulting in six separate burnout scores for each respondent.

Maslach and Jackson make it clear that MBI does not provide a basis for diagnosing the problems of a specific individual. However, the scores are useful for comparison to show variations among and within particular groups. Burnout is a continuous variable; there are no specific points on the scale that divide the "burned out" from the "not burned out." However, to facilitate the interpretation of scores, Maslach and Jackson have arbitrarily divided the range of subscores into high, moderate and low regions. These designations show the potential or likelihood of burnout represented by a particular score. While the numerical scores are more useful for statistical comparisons, the other designations help to identify problem areas revealed by the sample. Both the numerical scores and the word designations have been used as they seemed appropriate.

Table 1. Burnout Scores for Corporate Librarians.

	Frequency	Intensity
Emotional Exhaustion	22.6 (moderate)	15.2 (low)
Depersonalization	8.3 (moderate)	5.8 (low)
Personal Accomplishment*	41.0 (low)	37.0 (moderate)

*On this subscale, higher numerical scores indicate less burnout since high feelings of personal accomplishment decrease the chances of burning out.

Burnout Scores for Corporate Librarians

Average frequency and intensity scores were computed on each subscale from the responses received (see Table 1). For the Emotional Exhaustion Subscale, the average frequency score fell in the moderate range and the average intensity score fell in the low range. Thus, the "average librarian" in the sample would feel emotionally drained on occasion, but the feelings would be mild. The scores on the Depersonalization subscale were similar, with the average frequency score in the moderate range and the average intensity score in the low range.

On the Personal Accomplishment subscale, the average frequency score was in the low range and the average intensity score was in the moderate range. From these average scores it appears that the librarians in the sample do experience some of the negative feelings symptomatic of burnout but they do not experience such feelings very often or very intensely.

Some of the respondents appeared to be experiencing burnout. Out of the sample of 62 respondents, 29 had a high burnout score in at least one of the 6 subscales as seen on Table 2. Most of this group received only one or two high scores, but five individuals had four or more high subscores. The presence of these individuals in the sample shows that corporate librarians are by no means immune to burnout.

The areas in which these high scores occurred are shown in Table 3. On the Emotional Exhaustion subscale, about 10% of the sample received high frequency and intensity scores. On the Depersonalization subscale, this figure rises to about 15%. However, on the Personal Accomplishment subscale, a quarter of the sample received high scores. This indicates that while serious burnout is not a problem for this sample, frustration is concentrated in the area of Personal Accomplishment.

Table 2. Number of Subscales on which Individuals Had High Scores.

# of Respondents	# of Subscales
11	1
10	2
4	3
1	4
1	5
3	6

Librarians Compared to Other Professionals

Maslach has published average scores based on the aggregate data that she has collected from studies on such helping professionals as police officers, nurses, teachers, social workers (*6*). It is interesting to compare the scores of corporate librarians with her data as is done in Table 4. Personal Accomplishment is the area in which the most corporate librarians are experiencing burnout. However, their average score was not significantly different from the score obtained from the other groups. On the other subscales, the average scores of the corporate librarians were significantly lower than the average scores for Maslach's sample. This tends to confirm studies which indicate that librarianship is a relatively unstressful profession and not likely to shorten one's life (*7*).

Factors Related to Burnout

Respondents were asked a variety of questions about their backgrounds. From these data several statistically significant relationships between certain factors and burnout were revealed. Two factors showing strong positive relationships with high burnout scores were the amount of positive feedback a worker receives and the amount of influence the individual has on setting library policies and practices. Burnout and feedback had a Spearman correlation coefficient of .4254, significant at the 1% level. The Spearman correlation coefficient between burnout and influence on library policies was .3471, which is significant at the 5% level. These two factors seem to be

Table 3. Number of Respondents with "High" Scores on Each Subscale.

Subscale	# of Respondents with a "High" Score	% of Respondents with a "High" Score
Emotional Exhaustion		
Frequency	7	11
Intensity	6	9
Depersonalization		
Frequency	12	19
Intensity	12	19
Personal Accomplishment		
Frequency	16	26
Intensity	17	27

Table 4. Librarians Compared with Maslach's Data for the Helping Professions.

Emotional Exhaustion

(Numerical score increases as chance of burnout increases)

	Frequency		Intensity	
	Maslach's Sample	Librarian Sample	Maslach's Sample	Librarian Sample
Mean	24.08	15.19*	31.68	22.61*
S.D.	11.88	8.81	13.84	12.15

Depersonalization

(Numerical score increases as chance of burnout increases)

	Frequency		Intensity	
	Maslach's Sample	Librarian Sample	Maslach's Sample	Librarian Sample
Mean	9.40	5.79*	11.71	8.30*
S.D.	6.90	5.94	8.09	7.79

Personal Accomplishment

(Numerical score decreases as chance of burnout increases)

	Frequency		Intensity	
	Maslach's Sample	Librarian Sample	Maslach's Sample	Librarian Sample
Mean	36.01	37.02	39.70	40.97
S.D.	6.93	7.10	7.68	8.16

The sample sizes for Maslach's statistics are 1,400 on the intensity scale and 1,936 for the frequency scale. The librarian sample size is 62 for both scales.

*Means differ significantly at the .01 level of significance.

closely tied to lack of personal accomplishment, the subscale on which the largest number of corporate librarians had high burnout scores.

Positive feedback and some control over one's working environment, as may be expected, are very important to the corporate librarian's attitudes. Corporate libraries may leave some people without a strong sense of personal accomplishment. When the situation provides the librarian with a sense of personal accomplishment, the chances of burnout diminish.

Other factors showed possible relationships for which there was not sufficient information to actually demonstrate that one existed. Three of the five respondents clustered at the high end of the burnout scale were males. This seems unusual, considering the fact that the sample was predominantly female. However, with such a small sample, we cannot ignore the possibility that this could have occurred by chance. Three of the five high scoring individuals were over fifty years old, but they varied widely in the length of time they had been at their current job and in the profession. These findings are interesting to note, but the data did not allow a direct relationship to be drawn between these factors and burnout.

Some factors which were initially considered as likely causes of burnout proved to be irrelevant. The hours a person works per week, the amount of time spent in direct contact with clients, and the number of years that an individual has been in his job or profession have been shown to be important burnout predictors in other studies, but they were not in this one.

Comments from Respondents

Nearly two-thirds of the respondents volunteered comments on the particularly rewarding or stressful aspects of their jobs. Feedback was the most frequently discussed job aspect. Those who received a great deal of positive feedback felt rewarded, while those who received no feedback or who had to deal with considerable negative feedback felt frustrated. Many other respondents commented that they found great satisfaction in helping clients and in relating to a variety of clients and co-workers. At least half of the comments dealt with some aspect of feedback and interpersonal relationships on the job.

Management's attitude toward the librarian also received many comments. In situations where management did not comprehend the amount of work and skill required to maintain a library, the librarians were frustrated. Many librarians complained that although they were expected to provide valuable services, they were held in low esteem by their superiors and the library had a very low priority. Those corporate librarians whose supervisors were supportive and helpful generally felt good about their jobs.

Inadequate staff was a related problem. Several librarians complained that the job was simply too big for one person. Clerical jobs were often ignored in order to help users, but the library could not offer good service because the clerical tasks had been left undone. As a result, several respondents felt continually behind in their work and frustrated, although they recognized that it was not their fault.

Deadlines and time constraints are also sources of frustration. Librarians complained of having to deal with two urgent requests at once, or with an urgent request for materials not in the library, and of users who want everything "done yesterday."

The respondents' comments substantiate the findings of the quantitative parts of the study. Corporate librarians who receive little positive feedback, who are not allowed involvement in policy decisions directly affecting their work, and who are never able to look back on a job well done are likely to register burnout. On the other hand, those who receive positive feedback and support for their work are less likely to be burned out by the negative aspects of their jobs and are more likely to view them as challenges.

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A Survey of Special Libraries in the Power Generation Industry

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■ **To help develop plan for a new library, a group of special libraries in the power generation industry was surveyed. The results provide a profile of medium-sized technical libraries serving the power industry. Particular attention is paid to innovative practices and to cooperative arrangements with outside resources.**

THE authors were part of a task force convened to develop appropriate and reasonable recommendations for a library at a new Westinghouse Electric facility.* To help in this task, a group of medium-sized technical libraries was surveyed in organizations having comparable subject interests and technology levels—principally in companies associated with the power industry. The libraries were selected from the "Directory of Special Libraries and Information Centers in the United States and Canada," and the survey was carried out in 1982.

*The Westinghouse Steam Turbine-Generator Division is now located at Orlando, Florida. Hilary C. Johnson is now with Stuart Pharmaceuticals, a division of ICI Americas, Wilmington, Delaware.

Methodology

The survey questionnaire asked for information concerning staffing, space, holdings, facilities, and so forth, and focussed specifically on the use of new technology and innovative practices, and on support from groups outside the library proper.

Sixty-nine questionnaires were sent out and 43 responses were received, for a satisfactory return rate of 62%. A breakdown of the organizations sampled is shown in Table 1. Two of the responses were from large corporate R&D libraries. Since they did not fit the sample population, these were deleted from the statistical evaluations.

Statistics of the responses are presented in the form of tables, histograms or graphs, and brief discussions where

Table 1. Breakdown of Population Sampled.

Type of Organization	No. Sent Out	Responses
Electric power utility companies and authorities	29	18
Designers of power plants (Engineers/ Architects)	10	5
Manufacturers of power plant equipment (other than large steam turbine-generators)	11	9
Manufacturers of turbomachinery (including small steam turbines, gas turbines, pumps, fans, etc.)	13	6
Miscellaneous others of more indirect interest	6	5
TOTAL	**69**	**43**

appropriate. Distributions are presented both for direct characteristics of the libraries (e.g., staff, holdings, services) and also for selected ratios between such characteristics. Lastly, correlations are shown between certain characteristics and the size of the user groups.*

User Groups and Staffing

The "approximate number of professionals in the groups served" formed a broad distribution ranging from less than 250 to more than 2000; the median value is in the range 500 to 1,000. Information on the extent to which different professional groups were served is summarized in Table 2.

In 35 libraries of the 41 libraries (85%), the head librarian has supervisory or managerial status. Two distribution histograms describing staffing† are shown in Figures 1 and 2. Median values for professional, non-professional and total staff are 2, 2, and 4, respectively. A median value for "para-professional staff" is 0.5.

Reliance on support from a general (i.e.:, outside of the library) clerical or word-processing group for routine library operations is shown in Table 3.

Library Size, Holdings and Facilities

The distribution of libraries by floor area is shown in Figure 3; the overall median is just under 2,600 square feet. It is noteworthy, though, that the distribution is not smooth; it seems a almost as though there are three populations: "small" libraries averaging 1,500–2,000 square feet; "medium" libraries averaging 2,600–3,300 square feet, and "large" libraries with over 5,000 square feet. Our sample contained none in the range of 4,100–5,000 square ft.

Books (Figure 5) form a skewed distribution, with the highest values far greater than the median value of 7,000. It is not possible to report separately on bound volumes of periodicals: Many libraries reported that they had no bound periodicals; some gave only a combined total for books and bound periodicals. For ths reason, Figure 6 shows the distribution of the combination of books and

* Respondents were given the option of indicating ranges rather than precise values for some characteristics (for instance, floor area), and mean values in that range had to be assigned to these for statistical analysis.

† In evaluating library staff, each part-time member was counted as 0.5 person. In the histograms, a residual of 0.5 was rounded off to the next whole number.

Table 2. Distribution of Effort and Resources Among User Groups.

User Group	No. of libraries serving this group*	Percent of library's effort and resources devoted to the specified user group 1-10	11-20	21-40	41-70	71-100
		Number of libraries in each effort category are tabulated below.				
Research/Dev	35	5	4	12	5	2
Appl. Sci./Engrg	41	3	4	11	9	7
Mfg/Production	19	10	1	2	1	—
Bus./Financial	34	15	8	3	—	—
Marketing/P.R.	31	18	4	1	—	—
Personnel/Mgt.	38	22	8	—	—	
Other	6	3	—	—	—	—

* The number in this column is more than the sum of the other columns because some respondents only checked off categories of users without estimating distribution of effort.

Table 3. Utilization of General Clerical Services.

Degree of support	# libraries	% of responses
Substantial	5	(12%)
Some	10	(24%)
Slight	9	(22%)
None	17	(42%)

Figure 2. Distribution of Professional Staffs.

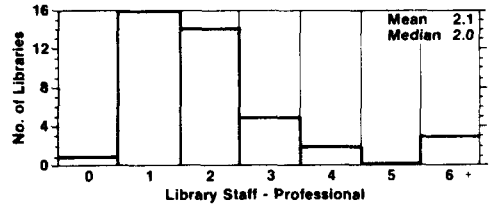


Figure 1. Histogram of Size Distribution for Total Library Staffs.**

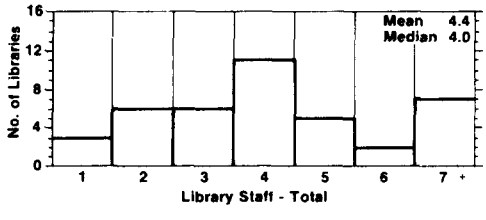
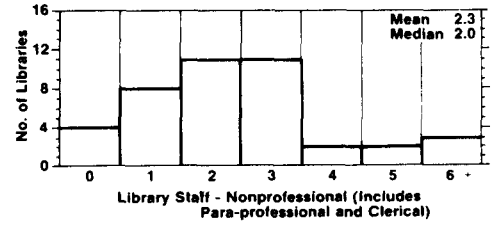


Figure 3. Distribution of Nonprofessional Library Staffs.



** The interpretation of this histogram is that in the group of libraries surveyed 3 each had a total staff of 1; 6 each had a total staff of 2; 6 each a total staff of 3; 11 each a total staff of 4, and so on.

bound periodicals, which we call "volumes" and which is an indication of total stack space.

Periodical subscriptions (Figure 7) form a smooth, clean distribution curve which reveals that 300 subscriptions can be regarded as a typical or average value for this sample. The numbers of reports vary over a huge range; their distribution is uneven and shows no significant peak.

The number of seats for library users is shown in Figure 8. The distribution is very broad, with a peak, mean and median all just under 20. The results for some types of equipment and working facilities are shown in Table 4.

Table 5 shows the number of libraries offering specific services. It lists services which could be checked off in the questionnaire, plus some of the "write-ins" for "other."

Figure 4. Distribution of Library Size by Floor Area, in Square Feet.

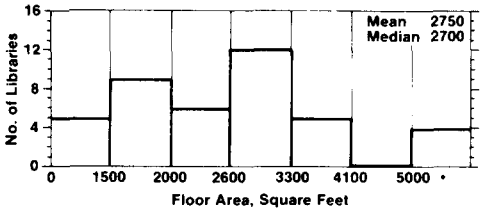


Figure 5. Distribution of Book Holdings, in Thousands.

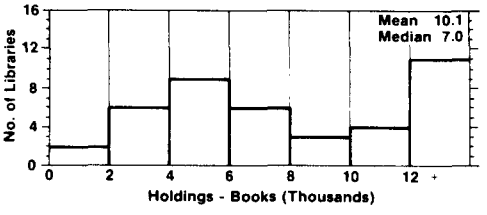


Table 4. Equipment and Work Facilities Reported.

Number of Pieces of Equipment & Work Facilities	No. of Responding Libraries
Microform readers and reader printers	
0	5
1	8
2	11
3	8
4 or more	9
Computer terminals	
0	13
1	17
2	10
3 or more	1
Copy machine	
Yes	26
No	15
Enclosed workroom for technical processes	
Yes	16
No	25
Sink for technical processes	
Yes	10
No	31

Table 5. Services Provided.

Services	# Library Respondents
Administration of internal report system	15
Keywording of reports	23
Inputting of reports into computerized retrieval system	23
Purchase of books/reports/papers for individuals	38
Regular library bulletins	26
Regular acquisition lists	22
Conduct in-house computer searches	31
Arrange for outside computer searches	27
Selective dissemination of information	32
Abstracting	11
Quick reference service	39
Other (including those below)	18
Generate in-depth bibliographies	2
Circulate or route periodicals	4
Reference checks; information evaluation	2
Circulate external current-awareness materials	1
Index daily clipping service	1
Distribute and update microfiche catalog	1

Figure 6. Distribution of Holdings in Terms of "Volumes" Including Both Books and Bound Periodicals.

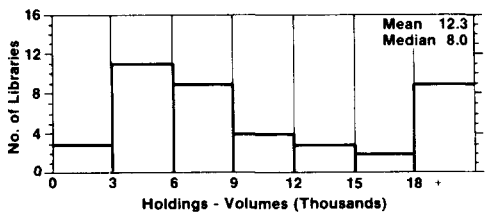


Figure 7. Distribution of Number of Periodical Subscriptions.

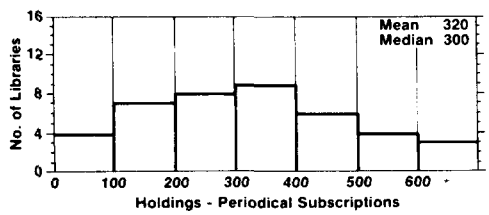


Figure 8. Distribution of Number of Seats for Users Including Study Carrels.

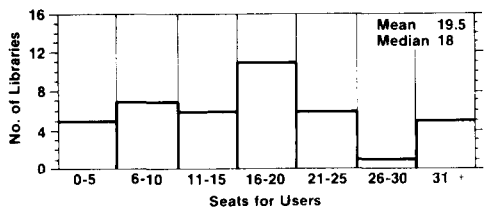
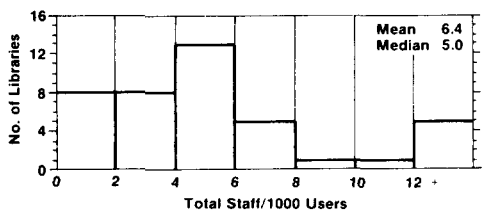


Figure 9. Distribution of Ratios of Total Staff to Users, in Thousands.



Use of Modern and Innovative Methods, and Outside Resources

Of the sample of 41 libraries, 29 stated that they had substantial microform collections. Table 6 shows the categories of holdings in which "significant portions" are on microform. Industry standards (2 libraries), vendor catalogs (2 libraries), union list of periodicals, technical record books, and drawings were identified by some responders under "other."

Thirty-seven of the responding libraries used some forms of computerized operations. The response breakdown is shown in Table 7. Among the "other" in this group were interlibrary loan (2), electronic mail (2), periodicals routing, periodicals holdings, subscription records, announcement bulletins, and staff activity reports.

The questionnaire also asked, "Are you using any innovative or unusual methods or systems to improve services or efficiency or to reduce space requirements?" Eighteen of the libraries responded positively to this question. Abbreviated versions of some of the responses are listed on the following page.

Table 6. Utilization of Microform.

Materials on Microform	# of Respondents
Back Volumes of Periodicals	18
Books	3
Internal Reports	13
External Reports	21
Catalog	7
Other	8

Table 7. Computerized Operations.

Operations	# of Respondents
Literature Searching—external database	34
Literature Searching—internal database	8
Catalog	15
Circulation	8
Order-purchase records	4
Other	9

Table 8. Comparison between Libraries That Have Special Arrangements with Outside Resource Libraries and Those That Do Not Have Such Arrangements.

Characteristic	Median Values for Libraries	
	With Special Arrangements	Without Special Arrangements
Number of libraries	16.0	25.0
Size of user group	1,400.0	700.0
Professional staff	2.0	2.0
Total staff	3.75	4.0
Floor area, sq. ft.	2,950.0	2,300.0
Books	6,500.0	7,000.0
Volumes	7,150.0	8,000.0
Periodical subscriptions	300.0	300.0
Seats for users	18.0	18.0
Total staff/1,000 users	2.7	5.7
Floor area/users	2.1	3.3
Books/users	6.8	11.4
Subscriptions/1,000 users	196.0	429.0
Seats/1,000 users	18.0	23.0

- Use of OCLC.
- Computerized serials check-in and distribution.
- Computerized keyword catalog and on-order file.
- Computer output microfilm catalog.
- Automation of basic operations of ordering, record-keeping and catalog, but *not* circulation.
- Online in-house microcomputer system.
- Subscription to commercially supplied microfilms of vendor catalogs.
- Subscription to U.S. DOE reports in microfiche.
- Filing microfiche reports alpha-numerically by accession number (e.g., N-number) and reliance on published indexes (e.g., TAB, IAA) for retrieval.
- Routine conversion of selected journals to microfilm cartridge form.
- Use of high-density expanding shelves.
- Use of document delivery services and of information brokers.
- Use of internal skills data base.
- Training films; orientation films and brochures; worksheet forms for surveying needs.

Lastly, the questionnaire elicited information on "customized" relationships with nearby larger resource libraries (such as university libraries), providing for their direct use by library staff or users (see Table 8). The distances to the nearest major technical/scientific resource library were reported as follows: 11 libraries are less than 3 miles away; 16 are 3–10 miles away; 9 are 10–30 miles away; and 5 libraries reported a distance of more than 30 miles from the nearest major resource library.

In 18 of the 41 organizations sampled, the library user groups are encouraged to make substantial direct use of this outside resource library, and in 16 of the 41, the library surveyed has established special relationships with these resource libraries. Some of the special arrangements described can be summarized as follows:

- Close relationship with professional staff.
- Library staff or all professional employees have borrowing cards for outside library.
- Special borrowing privileges; for instance waiving of overdue fines and borrowing of reference material, within limits.
- Special arrangements for photocopy service.
- Reference service.
- Rush service, delivery or courier service.
- Communication through electronic mail.
- Microfiche copy of holdings.
- Industrial liaison arrangement, with internship programs and data sharing.

Statistics of Ratios Between Selected Characteristics

In evaluating libraries, it is of interest to study the relationships between some of their characteristics. Figures 9 through 15 present the statistics of ratios between selected pairs of the previously mentioned direct answers to questions.

From Figure 9, we see that the median ratio of total staff to 1,000 users is about 5, or 200 users per staff member. From Figure 10, the median floor area per user is about 3 square feet. From Figure 11, we see that the median number of books per user is about 8, but the mean is about

Figure 10. Distribution of Ratios of Floor Area (in Square Feet) to Users.

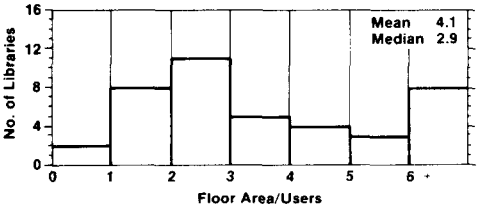
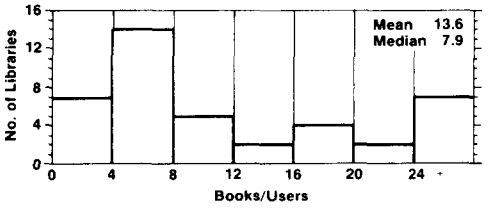


Figure 11. Distribution of Ratios of Number of Books to Users.



14; this indicates that a significant number of libraries have much larger ratios, as is also evident from the skewed (almost double-peaked) distribution histogram.

The same type of distribution is found for periodical subscriptions (Figure 12), with a median of less than 300 and a mean of more than 500 subscriptions per 1,000 users. The distribution of the ratio of "volumes" (i.e. number of books plus bound periodicals) to periodical subscriptions (Figure 13) is also skewed, but tails off smoothly: the mean and median are both just under 40. Figures 14 and 15 show symmetrical, smooth distributions for the ratios of seats to 1,000 users, and seats to floor area (in thousands of square feet), respectively.

Figure 12. Distribution of Ratios of Periodical Subscriptions to Users, in Thousands.

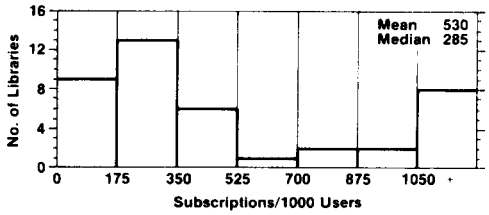


Figure 13. Distribution of Ratios of "Volumes" (Books plus Bound Periodicals) to Periodical Subscriptions.

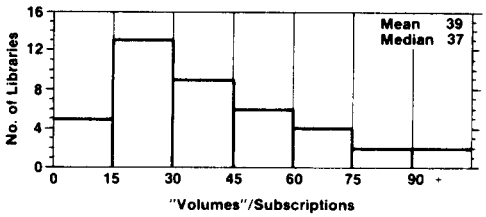
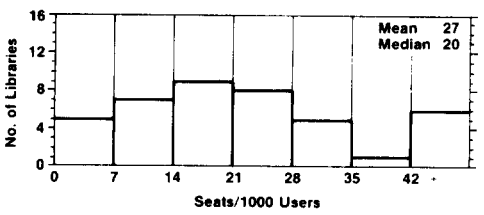


Figure 14. Distribution of Ratios of Number of User Seats to Users, in Thousands.



Correlation Between Number of Users and Selected Other Characteristics

The evaluation of ratios such as "staff members/users" or "books/users" might be taken to imply that there is an adequate or a minimum desirable value for these ratios, regardless of library size and user group size. If that were so, the average trend for staff size, library size or holdings would be directly proportional to the size of the user group.

To investigate this point, average trend or "best fit" relationships were determined, using linear regression analysis, between several of the characteristics and the size of the user group, and are plotted in Figures 16 and 21. Although the scatter of individual points about these lines is large (as indicated by the low correlation coefficients "r" given on each graph), the lines show that the assumption of direct proportionality would be wrong.

This, indeed, is what one logically would expect: If a library is to be useful at all, it must have a minimum number of resources regardless of how small the user group is. Figures 15 through 20 show that a library with a zero or minimal user group, if it followed the "average trends," would still have a staff of one professional and one nonprofessional, an area of 1,800 sq. ft., some 6000 books, almost 300 periodical subscriptions, and 10 seats for users. These values increase with the size of the user group, but not proportionately. Periodical subscriptions, for instance, show virtually no correlation with user group size in the libraries sampled. It must again be emphasized that there is considerable scatter about these trend lines, and no doubt some libraries with resources less than those listed provide useful service.

Figure 15. Distribution of Ratios of Number of User Seats to Floor Area, in Thousands of Square Feet.

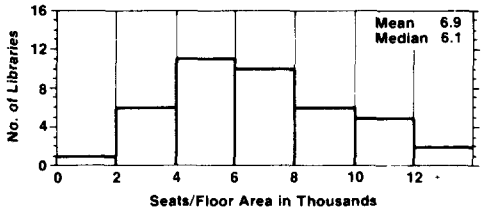


Figure 16. Regression Line of Total Staff Versus Size of User Group.

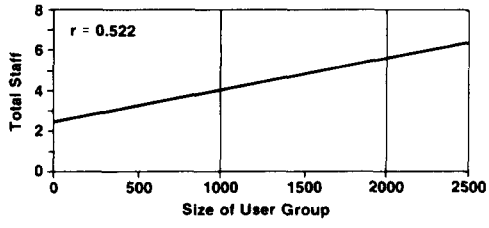


Figure 17. Regression Line of Professional Staff versus Size of User Group.

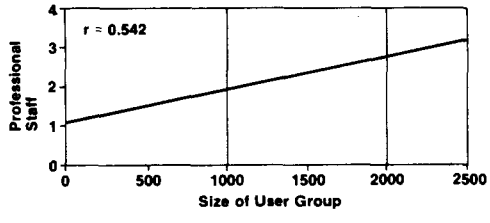
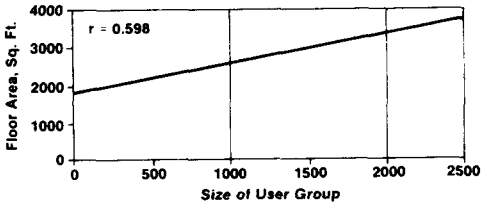


Figure 18. Regression Line of Library Floor Area versus Size of User Group.



Correlation of Library Characteristics with Utilization of Nearby Resource Libraries

Finally, it may be of interest whether the special arrangements with outside resource libraries are correlated to library size or holdings. One way of investigating that is to break up the total response sample into two groups—those having special arrangements with a nearby outside resource library, and those having none. The results, shown in Table 8,

Figure 19. Regression Line of Book Holdings (in Thousands) versus Size of User Group.

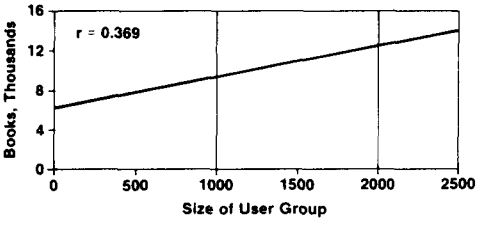


Figure 20. Regression Line of Number of Periodical Subscriptions versus Size of User Group.

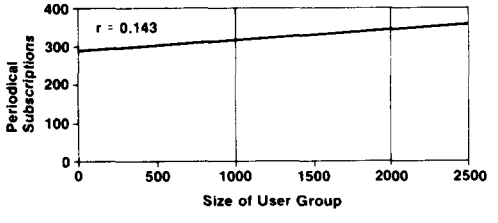
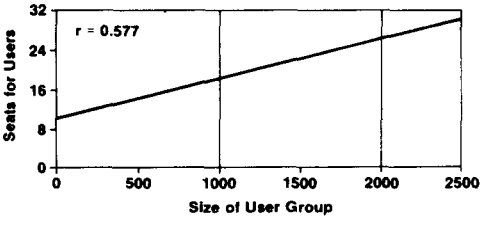


Figure 21. Regression Line of Number of Seats for Users versus Size of User Group.



show that there are only slight differences in the median values of major, direct characteristics between the two groups, except for the size of the user group. The libraries *with* special arrangements tend to be those with larger user groups and, consequently, have smaller ratios of staff to users, books/users, periodicals/users, and so on.

Summary and Discussion

The median values from this survey offer a profile of medium-sized special libraries in the sector of the power industry surveyed. This profile can be summarized as follows:

Number of professionals in user group	700
Library staff, total	4
Library staff, professional	2
Floor area, sq. ft.	2600
Books and bound periodicals	8000
Periodical subscriptions	300
Seats for users	18
Number of microform readers	2
Number of computer terminals	1
Number of copy machines	1
Enclosed workroom and sink	39% and 25%
Substantial microform use	Reports and back issues of periodicals
Computerized operations for	External database literature searching and catalog
Use of outside clerical and work processing group	Slight
Special arrangements with nearby resource libraries	39%

The power industry is characterized by a technology level of considerable complexity but rather slow change and development, by a strong dependence on empirical information and on internally accumulated experience and, in many instances, a limited assignment of resources for library and information services.

The results presented do not apply to libraries in central R&D or other concentrated facilities of large corporations involved in the power industry, since such libraries were deliberately excluded from the statistical analysis. The authors also assume that these results would not be representative of fast-developing, high technology industries (such as aerospace and electronics/communications), nor of those industries whose operations are inextricably dependent on thorough information services (such as chemical and pharmaceutical).

Conclusions

A profile of a "typical" special library in the power industry has been presented to serve as a yardstick for evaluation and possibly as a tool for improving library resources. The increasing trend toward substantial use of microforms and some form of automation is evident from the results of the survey.

Copies of the complete survey report are available from F.J. Heymann, Westinghouse Steam Turbine-Generator Division, The Quadrangle, Orlando, FL 32817.

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The Emerging Role for the Librarian in Data Administration

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■ **Recent advances in the development and use of data base management systems have created a new and far more central role for librarians. This results from the increased recognition of the importance of information requirements determination and the data dictionary/directory. As the use of DBMS becomes standard, and as data administration becomes increasingly recognized as central to business planning, there will be a greater demand for those skilled in developing and amalgamating user views, and for those with DD/D experience. These are major opportunities for librarians who have a knowledge of the appropriate terminology and who acquire some background in data processing and database management systems.**

Advances in the development and use of database management systems (DBMS) and decision support systems (DSS) have created real but hidden job opportunities for librarians, particularly special librarians. DBMS have developed to the point where a detailed knowledge of their workings is no longer needed. Instead, greater importance is being attached to information requirements determination and data administration—which are in their essentials composed of classic library skills. The other requirement for successful information systems implementation is a detailed knowledge of the organization, the context in which it operates, and the information it uses. This combination of library skills and a knowledge of the organization is best met by the experienced librarian or information officer within the organization.

When direct access storage devices (DASD) appeared in the form of disc

storage, direct access rather than sequential access (as in tape storage) allowed new ways of storing data effectively (*1*). DASD permitted prompter access but were more expensive than tape per item of data stored. The logical notion arose to store an organization's data and to make the information available to all users, rather than to require each organizational unit to maintain its own data on tape, frequently with great duplication.

DBMS provide a common, nonredundant store of data to be accessed by multiple users for various purposes. The key words are "common" and "various". The complexity of a database management system arises from the goal of accommodating various users. This distinguishes a DBMS environment from the bibliographic information retrieval environment familiar to librarians. In a bibliographic information retrieval system there are various users, but they all subject the system to the same use—the location and display of bibliographic records.

The data base management system is the software package that stores and retrieves common data. It requires a data definition language (DDL) to identify to the DBMS software what the data to be stored "look like," what their characteristics are and which keys will be used to retrieve data elements. The DBMS then can store the data and construct the index structure that will allow data to be retrieved when required.

A data manipulation language (DML) is used to search and retrieve the data. DML also has interfaces with higher level languages such as PL 1, Fortran and Pascal. Once data have been retrieved the information can be manipulated at will. The programmer and the data supplier or creator must know both DDL and DML, but end users who merely search, select and modify data need to know only the DML. DMLs are not dissimilar to bibliographic search languages such as Orbit or Dialog.

A DBMS also contains a data dictionary/directory (DD/D), the directory of data in the DBMS and its specifications, and an index or dictionary (thesaurus) that records the intellectual description of the data including variant terminology. Ideally, if an engineer in Connecticut has entered data, a production manager in Delaware can find them, even if different nomenclature is used. The directory component of the DD/D is a data processing function, but the dictionary component is a library-type function.

DBMS operate by normalizing data; that is, by breaking data down into their smallest constituent parts and relating those parts to each other so that relationships are maintained and data structures can be built up as required for each user. "User views" of the data—how the users see the data and their relationships—are assembled into sub-schemas, which in turn form schemas to arrive at an overall representation of the data and the relationships of their components (*2*).

There are three methods of structuring the data to physically represent its relationships: hierarchical, network, and relational. Early models of DBMS tended to be hierarchically based. They were supplanted by network-based structures, and now most new DBMS being developed are relational (*3*). These data structures are not a component of conventional bibliographic information retrieval systems and are *terra nuova* for most librarians.

A central concept in DBMS philosophy is that of data independence—the independence of the logical data structure, as perceived by each user from the physical structure of the data maintained by the DBMS. Each user's view is theoretically independent of every other user's view. DBMS act as the interface between the logical data structures and the physical data structure. If the data have been normalized, logical views of data may be changed, expanded and added to without having to make major changes in the physical structure of the data.

DBMS were first conceived of as data processing tools that allow data to be stored nonredundantly. In addition to saving storage costs they promoted consistency, ease of update and allowed ap-

plications programmers to handle data more efficiently. Furthermore, data were no longer the slave of a program and the program's documentation. Once data were entered in the DBMS and reported in the DD/D, they were available to others.* Existing data were less likely to be duplicated by the user or programmer; one programmer did not have to track down another to find a data format, or worse, to try to decipher the documentation of someone who had left the organization.

As information systems matured, however, DBMS have come to be viewed as more than merely tools for the applications programmer. The end user, engineer, manager and others can use DBMS directly to access data. If additional software is written tying together the DML with other data manipulation routines the resulting product is termed a decision support system (DSS). For example, special spread-sheet packages such as Visicalc permit the user to retrieve data and then ask "what if" questions, e.g., what would the picture look like if sales to South America fell 10% while sales to Japan rose 20%? DSS is the latest buzzword; if you are still talking about management information systems, it is time to update your vocabulary.

Information Requirements Determination

With the increasing sophistication of information systems designed for business environments, the realization has finally dawned that information systems are only as good as the degree to which they fit users' (*4*) needs and that the determination of those needs is not straightforward. This last axiom is, of course, not new to library professionals.

In the library field, there is an extensive body of literature on the reference interview—the technique of pulling back the onion-like layers to get from the visceral to the conscious and from the formalized to the compromised user need (*5-12*). The business community, by contrast, has only lately recognized that it takes skill and determination to ascertain what users' real information needs are. Even Ackoff's classic analysis, "Management Misinformation Systems" (*13*) which elaborates various errors in designing and implementing information systems, only hints at the problems involved in what the business community calls "information requirements determination."

There are two fundamental approaches to information requirements determination: top-down and bottom-up. Top-down approaches start by analyzing what has to be accomplished, in terms of the organization's goals and objectives. The requirements of the information system are then deduced based on this analysis. This is the classic system analytical approach. A number of top-down methodologies have been developed: strategy set transformation, decision analysis, input/process/output analysis, critical factor analysis, stage assessment, and so on (*14-19*). They are all similar in fundamental approach.

Most information systems design proceeds from the bottom-up process of identifying what the users do, what they need and what they might do if they had the appropriate information when needed. This process of eliciting from users their information needs and the development of user views and sub-schemas is identical to the reference interview in its essentials. In reality, top-down and bottom-up approaches complement each other. The top-down approach determines the goals, objectives and general outlines of the system. It generates the fresh approach which questions present ways of doing things and identifies opportunities not yet addressed. The actual design of the system proceeds in a bottom-up fashion to meet those goals and objectives.

In DBMS terminology, the bottom-up approach is described as the generation of user views and the integration of those views, first into sub-schemas and then into the overall schema. This terminology

* This availability is not always a boon; DBMS usually incorporate various privacy and security restrictions.

is unfortunate. The term "user view" implies that it is as easy as taking a snapshot—simply talk to the users and find out how they perceive the data. In reality, it is not nearly that simple.

One of the fundamental precepts of systems analysis is that one does not want to reproduce the old system in a slightly more automated fashion. Rather, one wants to examine, as well, what might be done differently and more efficiently once the environment, the problems or the objectives have changed.

A central concept in DBMS philosophy is that of data independence. The independence of the logical data structure is perceived by each user from the physical structure of the data maintained by the DBMS.

The corollary is that information requirements determination, like the reference interview, is not a simple process. It requires an understanding of what the user does and what the user takes for granted: it involves working with the user to discover what might be done more efficiently if more or different information could be provided in another format or in a more timely fashion.

Such probing frequently will not be neutral and dispassionate. Information systems design has the potential for radical restructuring of jobs and responsibilities. Job boundries have frequently been defined by limitations on transferring information (*21*).

The restructuring of jobs is a sensitive issue. Some jobs—hopefully many—will be enriched, but there will inevitably be losers as well as winners. There will also be concern and apprehension about the possibility of "disenrichment." The analyst cannot expect objective, disinterested cooperation. The process of information requirements determination impinges directly upon the most important aspects of the user's job—its scope and, ultimately, its status.

Traditionally, analysts who have solicited user views and determined information requirements have been drawn from the ranks of applications programmers. The reason is that, until recently such analysts needed to know in some detail the workings of their organization's DBMS in order to map data relationships onto their system's idiosyncracies. Since newer systems more closely approach true data independence, this requirement is fast disappearing. Ex-programmers, however, are not the ideal persons to interact with the system users to determine their information requirements. Applications programmers tend to be a self-selected group of people whose motto might be, "Tell me what you want clearly and then leave me alone to write the code."

Information system users, just like library patrons, are not clear and unambiguous. It is the analyst who must determine the requirements. Librarians, by contrast, have a service orientation; indeed, library service is still part of the name of several library schools or of their degree programs and was part of the name of many more before the trend developed to incorporate phrases such as "information science" and "information management." Furthermore, the reference interview is part of the common culture of librarianship, taught in every reference course and in every online database course. Thus, librarians—particularly special librarians—are attuned to the process of information requirements determination, both by self selection and by training.

The Data Dictionary and Data Administration

The data dictionary is the index or catalog to the data in DBMS. The same skills are used in maintaining a data dictionary as in cataloging and indexing. Precisely the same syndetic structures and tools are used. This basic identity is best conveyed by an anecdotal example. In an article in *Datamation* (*23*) entitled, "You Mean I Can't Just Plug It In?" on the problems

of interfacing microcomputers with corporate main frame systems, the authors sought to explain the data handling function of the DBMS resident on the main frame computer. It is revealing that they chose the local public library and its systems of indexes and catalogs as their analogy to the DBMS.

One of the principal attractions DBMS offer to many organizations is that they force some degree of documentation upon the programmers. If they create new data to be stored in the DBMS, they must, to anthropomorphize a bit, tell the DBMS about the data, or at least about the processing aspects (field, type and size, data type, etc.), the directory component of the DD/D.

DBMS were first conceived of as data processing tools that allow data to be stored non-redundantly. In addition to saving storage costs they promoted consistency, ease of update and allowed applications programmers to handle data more efficiently.

The database administration should also enforce the dictionary component of the DD/D: what is the significance of the data, how should it be called, and how might it be searched for? Such documentation, or more properly the lack of appropriate documentation, has always been the achilles heel of data processing efforts. Programmers are notorous for their disinclination to document. The reasons are numerous. Programmers prefer coding to documenting; that is why they are programmers. They tend to think of documentation as a clerical function beneath their professional dignity. Even if they regard documentation as a necessary evil without which the job is incomplete, there is always the pressure to get on with the next job, or to make an emergency patch and then return to the documentation. Librarians, in contrast, are documentalists by profession. The need and the opportunity could hardly be more apparent.

Knowledge of the Context

To test the potential of careers in data administration for librarians, the authors interviewed senior data administrators in various organizations including an international bank, a pharmaceutical company, a major financial and management consulting firm, a computer manufacturer, and a major travel and financial services firm. The idea was positively received (*24*). The image of librarians presented a stumbling block (*25*); however, once the nature of modern library functions and modern library education was explained, their germaneness to the problems of data administration was quickly perceived.

One point that repeatedly surfaced in these interviews: technical skills and communications skills must be augmented by a thorough knowledge of the organization and of the business it is involved in. In this area, the librarian has a major point of leverage. What better way is there to get to know an organization than to be one of its librarians or information officers? In the process of handling information requests and finding out the context of those information requests, the librarian is constantly learning about the company and its information requirements. Special librarians, then, are in a particularly attractive position to take advantage of these opportunities.

Further Potential

There is yet a further potential for library careers in data administration. That potential is represented by the phrase "enterprise analysis," (*20*) a term recently coined by IBM to replace what they had previously called business systems planning (*26*). The essence of the notion of enterprise analysis is that for an enterprise to perform well, it must first analyze just what business it is in. Then the enterprise needs to analyze what decisions must be made to be successful in that business. Finally, the enterprise should analyze what information will be needed to successfully and correctly make those decisions.

We can see a powerful ally taking form in the shape of enterprise analysis. Any concept which so eloquently identifies information as central to successful conduct of an enterprise's operations—indeed its very existence—is certainly one to be welcomed.

The data dictionary is beginning to be identified as a central tool for enterprise analysis (*20*). Once the enterprise is defined and the decisions to be made and the information needed are identified as well, the data dictionary is used to track and maintain that information. The librarian is the logical person to maintain the data dictionary. Here is a role that is far more central to the organization and more closely allied to the major decisions to be made than any role that has heretofore been available.

The restructuring of jobs is a sensitive issue. Some jobs—hopefully many—will be enriched, but there will inevitably be losers as well as winners. There will also be concern and apprehension about the possibility of "disenrichment." The analyst cannot expect objective, disinterested cooperation. The process of information requirements determination impinges directly upon the most important aspects of the user's job—its scope and, ultimately, its status.

Ramifications

The opportunities for librarians to stake new turf are clear and exciting. However, not many information professionals are seizing them for the reason that the job opportunities in information requirements determination and in data dictionary/data administration operations are not being offered by librarians to librarians in the pages of *Library Journal* or the *SpecialList*. The jobs that open within what is perceived to be data processing are advertised in D.P. sources and, for the most part, are offered to and filled by data processing persons.

To move into these jobs, librarians must sell their expertise. They must look in the *New York Times* and in *MIS Week* for companies which are recruiting for MIS/DSS positions. Special librarians who are already within these organizations have a particular advantage—they know the territory of their company.

To sell themselves and to make a convincing case librarians must know the basic concepts of the DBMS/DSS field and they must be able to use the terminology convincingly. To this end, a section on additional readings has been included at the end of this article which annotates several sources of information on DBMS and DSS, and the authors have prepared an article for the data processing community (*27*).

There is one particular caution that must be stressed. Librarians are familiar with what might be termed data structures of the first stage—index and catalog type structures such as the inverted files on which systems such as Orbit, Dialog and Stairs are based, and which serve to get one to a particular record. Although DBMS make use of such indexes or inverted files, they also make use of what might be called data structures of the second stage, the previously mentioned hierarchical, network and relational data structures.

These data structures serve to interrelate the various files and records so that complex and varied segments can be handled and complex responses synthesized.

The difference can be hinted at by the following gedanken experiment. Imagine trying to ask a system such as Dialog the following query: What are the names and addresses of researchers in the field of research productivity? The data are probably in the data file, but the system could only retrieve records describing articles about research productivity. The data have not been normalized or structured to describe authors, publishers, and so on as separate entities. To have credibility in the data processing DBMS world, one must be cognizant and conversant with the process of normalization—the decomposition of data down into its most basic components—and with the data structures that link and allow subsequent reconstitution of the data. An article on specifically this topic is in press in *Information Technology and Libraries* (*3*) and other appropriate sources are described in the postscript.

Those who convey the impression that they regard record-oriented information retrieval systems such as Dialog or OCLC as the state of the art will instantly destroy any credibility they might have had. Suitably armed with the appropriate knowledge and terminology, however, the librarian is in a position to do some moving and shaking. Find out who is doing what in your organization with regard to data administration. Arrange a meeting. Discuss problems of information requirements determination. Who is doing the job? Who do they anticipate hiring in the future? Perhaps a logical route is for junior staff in the library to take information requirements determination jobs and for the library to hire replacement staff. An even better route is for data processing to subcontract information requirements determination jobs to the library. Who is maintaining the data dictionary? What plans are anticipated?

Of the two opportunity areas, information requirements determination and data dictionary, the latter is far more critical. The information requirements determination function, like that of systems analyst, will be a perennial need; indeed, information requirement determination

is a form of systems analysis. The earlier librarians stake out the territory the better, but the territory will continue to be there and to be stakeable. The data dictionary, by contrast, may be stakeable turf now, but it is not likely to continue that way for long. Because of the impact of enterprise analysis, the role of maintaining the data dictionary will soon be perceived as prime territory and will not readily be relinquished once its importance becomes apparent. Librarians must move swiftly if they are to stake out this highly desirable property.

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Additional Readings

There is a dearth of good material about DBMS and data administration written for the non data processing professional. Listed here are some of the materials which the authors have found to be useful. The best introductions are, unfortunately, not very accessible. They are the overview sections contained in the Auerbach and Datapro subscription series on systems software. Of the two, Auerbach seems to focus more on DBMS and data administration. Auerbach has a looseleaf service specifically entitled, *Data Base Management.* Datapro has a more general service entitled *DataPro 70: The EDP Buyer's Bible* which also discusses DBMS.

The recent textbook *Introduction to Modern Information Retrieval* by Gerard Salton and Michael McGill, contains a chapter (9) on data management systems which is excellent in what it covers, namely hierarchical and network structures, but it essentially ignores relational structures and the processes of normalization.

The standard and probably the best introduction to relational concepts is the textbook by C.J. Date, *An Introduction to Database Systems* (3rd Ed.) in which chapters 3, 4, 14 and 28 cover the concept of relational structures in some detail.

For the topic of enterprise analysis, the January 1982 issue of the *IBM Systems Journal* is entirely devoted to enterprise analysis, and contains several excellent articles, some of which are cited in the bibliogaphy to this paper.

The first author has an article specifically on 'stage two' data structures entitled "Data Relationships: Bibliographic Information Retrieval Systems and Database Management Systems (DBMS)" to appear in *Information Technology & Libraries.* Preprints are available from the author.

A good review of DBMS is "Database Management Systems" by Michael A. Hufenberger and Ronald L. Wigington, of *Annual Review of Information Storage and Retrieval* 14: Chapter 7, pp. 153-190 (1979) Martha Williams (ed.), Knowledge Industry Publications, Inc., White Plains, N.Y.

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The Nature of Information and Its Influence on Libraries

Pat Molholt,

1983/84 President, SLA

WE LIVE in the early stages of a curious age—curious because its label, "The Information Age," involves our domain so intimately, yet our profession so little. Despite a pervasive and increasing reliance on information, there is no corollary increase in the use of libraries. They continue to be viewed as a luxury, an expense factored into the overhead, with few measures of benefit available to offset the all-too-tangible costs. Although some special libraries provide exceptions to these generalizations, there is real cause for concern.

Our own reaction to the information age parallels that of society in general. There is information overload—stuffed mailboxes, piles of paper and multichannel television; confusion—how do we sort out the useful stuff, how do we control it, which personal computer do we buy, does it matter; resentment—against the technology which is still not user-friendly and, in so many forms, threatens our jobs.

The expectations we have formed for the importance of our work are not coming to fruition. Perhaps if we look more closely at the strange and slippery commodity—information—that we deal with, we can better understand both our problem and our potential. Examining the nature of information and how it operates in the society that bears its name may help us set a course.

Harland Cleveland, Director of the University of Minnesota's Hubert H. Humphrey Institute of Public Affairs, in an address to the World Future Society in 1982, outlined the inherent characteristics of information. He applied the following seven adjectives to it: human, expandable, compressible, substitutable, transportable, diffusive, and shareable. What did he mean, and what effect do these qualities have on how our profession deals with information?

Information is *human.* It is given life because someone observes it, remembers it, analyzes it, uses it, and passes it on. Unlike traditional resources, such as coal and timber, it does not exist independent of human perception.

As librarians or information managers we may wish to draw the inference that since humans are an integral part of the information process there will be a role for us. We could easily become enamored of that idea, just as we may take comfort in knowing that no technology or medium has, to date, replaced the printed word. But that line of reasoning is thin and fast fading. The usefulness of the printed word has been pushed nearly to

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This talk was delivered March 21, 1984, before the members of the Washington, D.C. Chapter.

its limits, and by the turn of the century vast amounts of information will never be expressed in printed words, not in a book nor on a screen.

Information is *expandable.* Anne Branscomb, attorney and telecommunications consultant, says of it, "The more we have the more we use, and the more useful it becomes." The process of scientific research is one of gathering and using information to create new information to feed the cycle further. And, although the purpose of some information renders it useless if applied late, the information still has value. Finding out at 12:10 that the last train left at 12:05 didn't help you make that train, but it expanded your knowledge and gave you information useful on another day.

There appear to be no limits to the expandability of information. The largest libraries in the world only hold a small portion of it. So, we say, let's keep collecting it and we'll assure ourselves of a role. It is impossible for that tactic to work; information cannot be collected at or near the rate it is produced and, more seriously, it can be no more than warehoused. Humans constitute the limits to the useful expansion of information; the capacity of individuals to process information and the time available in which to do it are the bottlenecks to the growth of this resource.

The Fifth Generation computers, the non-von Neumann machines, are addressing the problem of how fast information can be processed, analyzed, and integrated. To put it most simply, these computers have a whole series of small, specialized processors which handle different parts of one problem in a parallel, simultaneous fashion. They are brain-like in that information is shunted back and forth—the "answer" arrived at by one processor becomes a piece of the problem being handled by another, and on and on. The results can take the form of complex geological modeling systems pointing out gas and oil reserves, or of models of engine parts subjected to normal and abnormal stress.

This digression illustrates that, although information seems to have no limits, its movement from information to useful knowledge does have serious limits which are not easily transcended, either by humans or machines, since the latter rely on humans to break down the problem to be processed.

The continued, rampant collection of this expanding resource renders us increasingly incapable of handling what we are collecting. The clear implication here is that we must focus on access to information, more than acquisition of it, and, of equal importance, we must be in the forefront of designing information systems. Our experience in understanding the structure of information, as well as the requirements imposed by users, enables us to act as important links between the technicians and the users.

Information is *compressible.* We can summarize it and condense it until it risks becoming trivial. The phrase "time flies" stores hours and hours of memories and examples, each unique to the individual, whereas a theorem as brief as area $= \pi r^2$ was compressed from masses of data and observation.

What happens when a rich mine of data is severely compressed? Some detail, some information is lost. Generalizations overlook a percentage of cases while accommodating the majority. That which is ignored or unknown can be trivial, relatively interesting, or crucial.

One of the most interesting challenges we face is dealing with "lost" or ignored information, and more specifically, allowing for serendipity. The opportunity for chance connections in a tightly defined, highly structured system is minimal. We need to consider our responsibility in this area, particularly if we develop our role as collaborator in system design work. We must help users "browse" or find the full, original source of that which has been abbreviated.

Information is *substitutable.* It can substitute for capital, labor, or materials. Daniel Bell, sociologist and author, made clear in the late 60's that we were already a post-industrial information-based society. Information in the form of applied technology has replaced workers who previously helped grow, or extract, or

make things. Farming, mining, and manufacturing have been made less labor-intensive by the application of information creating better tools and more efficient and effective methods of performing the jobs—including the use of robots. Information can also substitute for energy, using design and control to squeeze more out of fuels, helping our resources last longer.

Surely, we say, information as the very "stuff of our profession" cannot substitute us out of the system! Unless we move to understand what is substitutable and why, we run a high risk of being moved out as the Fifth Generation computer moves in. In this context, it is necessary to examine the educational system, its goals and methods. In an information society the goal of education must be teaching individuals how to find, organize, and apply information to a myriad of problems—both daily, recurring ones and larger ones involving complex scientific questions.

Is the education system structured this way? No more so than the library is. I can at least point with hope to a recent meeting held between academic librarians and the U.S. Department of Education, Office of Educational Research and Improvement. The topic was the much-discussed report on secondary education, "A Nation at Risk", and the question was, "what is the role of the library in the education process?" There was unanimous agreement that schools should worry less about how to program a PC and concentrate more on what information is, how it can be organized, and how it is most effectively used.

Change in schools and libraries is far from adequate to the task of incorporating the technology of information, the "gee whiz" gadgets, let alone to an understanding of what the information society is about. Individuals acquire a form of capital in the education process. The capital is not a material good but a set of skills which make their work useful and valuable in a society dominated by the manipulation of information. Do schools turn out people sensitive to the need for bringing information to bear on problems and skilled at integrating what they find out—in short, who learn how to learn? We know, in our own work, the importance of such skills.

There is a pattern of evolution in the application of knowledge to problems. The first step is discovery; the second is applying the discovery to a problem to reduce labor. Third, the processes are improved to decrease waste and use fewer resources, and, last, the discovery changes our very life style.

As with libraries, the basic methods followed in education are unchanged despite the introduction of new technologies. We have done things "better" or "faster" but, basically, not differently. There is a pattern of evolution in the application of knowledge to problems. The first step is discovery; the second is applying the discovery to a problem to reduce labor. Third, the processes are improved to decrease waste and use fewer resources, and, last, the discovery changes our very life style. By example, consider the first communications satellite which contained less than a quarter of a ton of materials, much of it copper. This device replaced the transatlantic telephone cable which linked North America and Europe and contained more than 150,000 tons of material, much of it copper. That leap, with its reduced use of resources and increase in capacity, was the application of knowledge in the form of technology.

Steps two and three, the application of technology to reduce labor and the saving of resources, clearly relate to information being substitutable. Step four, changing

our life style, has not really occurred.

Our libraries and education systems seem to be stuck on the third step. It will be wise for us to monitor and encourage change in education systems and to have closer involvement in the education process.

Information is *transportable.* It used to travel only with people in letters and manuscripts, taken from place to place. Or it was communicated directly by word of mouth and, eventually, indirectly by telephone. It now travels at the speed of light, sent and received nearly independently of people, from computer to computer. Information on the thickness of steel going through the rolling process is gathered by a computer and sent to another computer where it is analyzed and fed back, in the form of a correcting maneuver, to the computer-driven rolling machines.

We must focus on access to information, more than acquisition of it, and, of equal importance, we must be in the forefront of designing information systems. Our experience in understanding the structure of information, as well as the requirements imposed by users, enables us to act as important links between the technicians and the users.

This transportability is, of course, a constant fact of life for information managers and is usefully compatible with the idea of access versus acquisition of information. It is essential that we understand the need to place increased emphasis on what we can access rather than what we can collect. When we fully integrate this idea into our libraries, we will then have the means to view our collections in different terms. We can stop counting objects and, instead, devise new measures based on the ever-expanding, highly transportable nature of information.

Information is *diffusive.* This is one of its most interesting properties: it leaks. Because it is based on the human mind, is compressible and easily transportable, it literally cannot be kept in the usual vaults of secrecy. And, the more it leaks, the more we have, the more we use, etcetera, etcetera. Information also leaks because of the peculiar hazard in selling it. If I describe to you everything about a particular car—size, color, all the details of its engine, brakes, and steering system—you will still need to buy the car for it to perform as a car. The marketing of information, however, presents special problems—describe it to the prospective buyer and she or he has it!

Last, and perhaps its most interesting and most unique property, information is *shareable.* Things are exchanged; if I give you my pen, you have it, I do not. On the other hand, if I give you an idea, we both have it; we may do entirely different things with it, but we share the idea.

To librarians, information has always been for sharing. In most cases, if it was not to be shared we didn't want it. We understand the use and re-use of this resource, but does the marketplace? We find it hard, for instance, to devise effective pricing systems for information, either to finance our operations or in our role of "retailers" to the authors who create new knowledge. This is a long-standing problem that requires far more research than has been seen to date.

With these seven adjectives, Cleveland has described a resource which fits poorly into the usual market principles. Though prone to obsolescence and costly to produce, it is neither perishable nor scarce; when it spills it often becomes more useful, and even when you sell it you still have it, although its value may have changed.

The nature of this resource holds vast implications for the information age and

sets it apart from other ages. We are dealing with:

- a commodity which does not depreciate, with all that implies for our tax structure and accounting principles;
- a resource which is freely available unless artifically impounded, while economic theories focus on scarcity;
- an intangible which can render some people jobless and force whole organizations to restructure in order to survive;
- a resource that thrives on reuse, repackaging, recycling; one which has been growing exponentially and under completely unconventional rules;
- a resource which has, as an important aspect of its use, something uncontrollable and unpredictable—serendipity.

Having talked about these characteristics and drawn some implications leaves us with a puzzling challenge. Our business, the information business, is everyone's business. Who, then, is responsible and for what? The familiar boundaries of "I produce, you sell and she buys" do not work. How well we understand the rules that apply to this resource, and what it means to be an information society, will determine how effective we are at becoming leaders in it.

The dynamics and characteristics of information cause a society based on it to face constant change, ambiguity, and uncertainty. Our role is to help scientists, managers, and others to cope with the overabundant flux. We must collaborate, particularly with those outside our profession. The puzzle is very large and cannot be solved by one person or one machine. We all have bits and pieces. Working together and communicating clearly will move us into major new roles.

Our task is learning to cope with the permanence of instability.

CALL FOR PAPERS—76TH ANNUAL CONFERENCE

Special Libraries Association in Conjunction with The Canadian Association of Library and Information Services
June 8-13, 1985, Winnipeg, Manitoba, Canada

"The Information Specialist: A Bridge to the New Communications"

The 75th Conference in New York was line Janus looking both forward and backward. The 1985 Conference in Winnipeg will be looking only forward to the new exciting world that awaits the information specialist.

Librarians have always been information specialists, and in today's technological world this specialty is becoming increasingly important. During the 1985 Conference we want to stress the role and scope of the information specialist. . . .

as a bridge . . .
link . . .
catalyst . . .
interface . . .

with the emerging forms of communication and technology. The individual in this environment is

a creator . . .
interpreter . . .
facilitator . . .

for the information seeker.

You are invited to submit any paper which illustrates the conference theme. We will also consider multi-media presentations and poster sessions provided they follow the conference theme. General papers will be presented at the contributed papers sessions. Very specific papers will be referred to the appropriate divisions.

To have a paper considered, the following guidelines must be met:

1. A 250-500 word abstract, submitted with the form below, which accurately conveys the scope of the paper, its depth, conclusions, and the way it contributes to the conference theme must be submitted by **September 14, 1984.** Full text of the paper is due **April 2, 1985.**
2. Papers must not have been presented previously to any national or international group or have been previously submitted for evaluations.
3. Papers will be accepted only if the author expects to be present and only if the abstract has been submitted for evaluation.

All papers are the property of Special Libraries Association and will be considered for publication in *Special Libraries.*

To:
Jane I. Dysart
Information Resources
Royal Bank of Canada
Royal Bank Plaza
Toronto, Ontario, Canada M5J 2J5
Attached is an abstract
of my proposed paper
for the 1985 SLA
Conference.

Name: _____
Organization: _____
Mailing Address: _____
_____
Telephone: _____
Tentative Title: _____
_____

Scholarship Fund Contributions Received Jan-Dec 1983

H. W. Wilson Foundation	$ 5,000.00
Estate of Florine A. Oltman	1,000.00
Anonymous Trust Income	703.95
Standard Oil Company of California	300.00
Public Utilities Division (in memory of Florence E. Carlton)	300.00
Jean Deuss	110.00
Federal Reserve Librarians	55.00
Elinor Alexander	50.00
Martha J. Bailey (in memory of Frank McKenna)	50.00
Patrick Bova	50.00
Evelyn Butler	50.00
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Rhoda M. Jackson	25.00
Margaret J. Linden	25.00
Anita Newell	25.00
Barbara C. Richards	25.00
Frances J. Rugen	25.00
Total Other Contributions Under $25.00	1,426.00
Total	**$ 9,564.95**

Audit Report
January 1, 1983–December 31, 1983

To the Board of Directors
Special Libraries Association, Inc.

We have examined the statement of assets, liabilities and fund balances of Special Libraries Association, Inc., as of December 31, 1983, and the related statements of revenues, expenses and changes in fund balances and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the financial statements referred to above present fairly the financial position of Special Libraries Association, Inc., as of December 31, 1983, and its revenues, expenses and changes in fund balances and changes in financial position for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Weber, Lipshie & Co.
Certified Public Accountants
March 9, 1984
New York, New York

STATEMENT OF ASSETS, LIABILITIES AND FUND BALANCES
DECEMBER 31, 1983

	Total All Funds	General Fund	Nonserial Publications Fund	Scholarship Fund	Special Programs Fund	Building Fund
ASSETS						
Current assets						
Cash (Note 2)	$ 815,926	$ 632,236	$ 21,367	$ 25,889	$35,915	$100,519
Marketable securities, at cost (Notes 1 and 3)	245,990	160,738		85,252		
Accounts receivable, net of provision for doubtful accounts of $650 in General Fund, $850 in Nonserial Publications Fund	61,907	34,715	26,044	881	267	
Interfund receivable (payable)		100,209	(101,819)			1,610
Inventory of paperweights, nonserial publications and insignia (Note 1)	159,096	23,315	135,719	62		
Prepaid expenses	53,838	49,264	4,574			
Total current assets	1,336,757	1,000,477	85,885	112,084	36,182	102,129
Marketable securities, at cost (Notes 1 and 3)	59,375	38,821		20,554		
Furniture and fixtures at cost, net of accumulated depreciation of $72,703 (Note 1)	33,105	33,105				
Other assets	33,304	33,304				
	$1,462,541	$1,105,707	$ 85,885	$132,638	$36,182	$102,129
LIABILITIES AND FUND BALANCES						
Current liabilities						
Subscriptions, dues, fees and contributions received in advance (Note 1)	$ 341,956	$ 332,231	$ 8,573	$ 261	$ 71	$ 820
Accounts payable—trade	48,470	48,470				
Withheld taxes and accrued expenses payable	20,133	15,531	4,602			
Income taxes payable (Note 1)	17,859	15,369	2,490			
Total current liabilities	428,418	411,601	15,665	261	71	820
Lease commitment (Note 4)						
Fund balances	1,034,123	694,106	70,220	132,377	36,111	101,309
	$1,462,541	$1,105,707	$ 85,885	$132,638	$36,182	$102,129

See accompanying notes to financial statements.

STATEMENT OF REVENUES, EXPENSES AND CHANGES IN FUND BALANCES
YEAR ENDED DECEMBER 31, 1983

	Total All Funds	General Fund	Nonserial Publications Fund	Scholarship Fund	Special Programs Fund	Building Fund
Revenues						
Dues and fees	$ 612,830	$612,830				
Subscriptions and advertising	165,223	165,223				
Net receipts from conference, less allocation below	209,106	200,386				$ 8,720
Net receipts from education program	34,574	34,574				
Net receipts from mailing list service program	36,469	36,469				
Interest, dividends and net gain on sales of investments	104,946	79,742	$ 1,660	$ 14,775	$ 2,891	5,878
Sales of nonserial publications and related advertising	114,920		114,920			
Gifts	51,614	5,000		9,565	7,481	29,568
Miscellaneous	6,319	6,300		19		
	1,336,001	1,140,524	116,580	24,359	10,372	44,166
Costs and expenses						
Allotment of funds to sub-units	133,536	133,536				
Salaries, wages and benefits (Note 1)	412,955	412,955				
Office services and occupancy costs	167,085	167,085				
Professional fees and services	49,222	49,222				
Travel and meetings	41,201	41,201				
Program services and promotion	62,310	62,310				
Costs of periodical publications sold, including allocation below	180,028	180,028				
Costs of nonserial publications	80,055		80,055			
Scholarships, stipends and grants	18,250			13,250	5,000	
Miscellaneous	13,464	13,457		7		
Depreciation	18,978	18,978				
Allocation of above expenses to						
Costs of periodical publications	(27,171)	(27,171)				
Conference	(42,758)	(42,758)				
Other funds and programs	(12,946)	(30,851)	17,905			
	1,094,209	977,992	97,960	13,257	5,000	
Excess of revenues over expenses before provision for income taxes	**241,792**	**162,532**	**18,620**	**11,102**	**5,372**	**44,166**
Provision for income taxes (Note 1)	**21,100**	**18,610**	**2,490**			
Excess of revenues over expenses	**220,692**	**143,922**	**16,130**	**11,102**	**5,372**	**44,166**
Fund balances—beginning	**813,431**	**582,464**	**54,090**	**121,275**	**30,739**	**24,863**
Fund transfers		**(32,280)**				**32,280**
Fund balances—end	**$1,034,123**	**$ 694,106**	**$ 70,220**	**$132,377**	**$36,111**	**$101,309**

See accompanying notes to financial statements

STATEMENT OF CHANGES IN FINANCIAL POSITION
YEAR ENDED DECEMBER 31, 1983

	Total All Funds	General Fund	Nonserial Publications Fund	Scholarship Fund	Special Programs Fund	Building Fund
Funds provided						
Operations						
Excess of revenues over expenses	$220,692	$143,922	$16,130	$11,102	$5,372	$44,166
Charge not affecting working capital						
Depreciation	24,290	24,290				
Funds provided by operations	244,982	168,212	16,130	11,102	5,372	44,166
Decrease in marketable securities	19,800	12,897		6,903		
Transfer to building fund		(32,280)				32,280
	264,782	148,829	16,130	18,005	5,372	76,446
Funds applied						
Purchases of furniture and fixtures	3,808	3,808				
Increase in other assets	10,545	10,545				
	14,353	14,353				
Increase in working capital	$250,429	$134,476	$16,130	$18,005	$5,372	$76,446
The changes in working capital were represented by an increase (decrease) in:						
Current assets						
Cash	$103,811	$ 21,779	$ 1,659	$ (1,921)	$5,083	$77,211
Marketable securities	56,701	37,089		19,612		
Accounts receivable	26,872	9,741	17,165	(301)	267	
Interfund receivable (payable)		22,647	(21,621)			(1,026
Inventory of paperweights, nonserial publications and insignia	54,938	23,315	31,630	(7)		
Prepaid expenses	7,723	6,889	834			
	250,045	121,460	29,667	17,383	5,350	76,185
Current liabilities						
Subscriptions, dues, fees and contributions received in advance	(18,181)	(25,832)	8,556	(622)	(22)	(261)
Accounts payable—trade	1,714	1,714				
Withheld taxes and accrued expenses payable	6,224	3,733	2,491			
Income taxes payable	9,859	7,369	2,490			
	(384)	(13,016)	13,537	(622)	(22)	(261)
Increase in working capital	$250,429	$134,476	$16,130	$18,005	$5,372	$76,446

See accompanying notes to financial statements

SPECIAL LIBRARIES ASSOCIATION, INC.
NOTES TO FINANCIAL STATEMENTS

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The accounting policies that affect the significant elements of the Association's financial statements are summarized below.

Operations
The Association encourages and promotes the utilization of knowledge through the collection, organization and dissemination of information. It is an association of individuals and organizations with educational, scientific and technical interests in library and information science and technology.

Marketable Securities
The marketable securities of the General and Scholarship Funds are combined and managed as one fund for investment purposes, with participating percentages in income and gains and losses based on respective participation accounts at the end of the year. Marketable securities reflected as current assets are valued at the lower of cost or market and those reflected as noncurrent assets are valued at cost. It is the Association's intention not to utilize the noncurrent portion of these assets in the normal course of operations.

Inventory
Inventory of paperweights, nonserial publications and insignia is stated at the lower of average cost or market.

Depreciation
Depreciation of furniture and fixtures is provided on the straight-line and accelerated basis at various rates calculated to extinguish the book values of the respective assets over their estimated useful lives.

Subscriptions, Dues and Fees
Except for subscriptions to the periodicals "Specialist" and "Special Libraries," membership in the Association is based on either a December 31 or June 30 year. Dues, fees and subscriptions are credited to income as earned.

Pensions
The Association has a contributory group annuity defined contribution retirement program with an insurance company covering substantially all qualified employees. There is no unfunded past service cost to be paid by the Association. Pension expense for the year was approximately $15,900.

Donated Services
A significant amount of the Association's functions are conducted by unpaid volunteer officers and committees. The value of this contributed time is not reflected in the accompanying financial statements because it is not susceptible to objective measurement or valuation.

Income Taxes
The provision for income taxes is based on unrelated business income, which consists of net advertising income and net mailing list service income. The Association's remaining activities are exempt from Federal income taxes under Section 501 of the Internal Revenue Code.

2. CASH

The Association's total cash assets include $745,574 in savings accounts, of which $38,565 is in time deposit accounts having maturity dates in April 1985 and July 1986, and are subject to interest penalties upon early withdrawal.

3. MARKETABLE SECURITIES

See Table 1 on next page.

4. LEASE COMMITMENT

The Association occupies offices under a noncancellable operating lease which expires in 1987. The lease provides for minimum annual rentals of $24,000, plus certain taxes and maintenance costs.

Table 1. Marketable Securities

Marketable securities consist of the following:

	Cost	Market
Current assets		
Cash	$ 41,769	$ 41,769
Common stocks	184,421	230,483
U.S. Government obligations	19,800	20,118
	$245,990	$292,370
Non-current assets		
U.S. Government obligations	$ 19,750	$ 20,950
Corporate bonds	39,625	26,025
	$ 59,375	$ 46,975

Special Programs Fund Contributions Received Jan–Dec 1983

Michigan Chapter, SLA	$ 1,850,00
Minnesota Chapter, SLA	1,200.00
St. Louis Metropolitan Area Chapter, SLA	600.00
Baltimore Chapter, SLA	500.00
Princeton-Trenton Chapter, SLA	475.00
Long Island Chapter, SLA	390.00
Western Michigan Chapter, SLA	350.00
Rio Grande Chapter, SLA	325.00
Southern Appalachian Chapter, SLA	325.00
Alabama Chapter, SLA	295.00
IBM Corporation	200.00
Mid-South Chapter, SLA	165.00
Omaha Area Chapter, SLA	125.00
Mrs. W. F. FitzGerald	100.00
Quaker Chemical Foundation	100.00
Doris Lee Schild	100.00
Judith Leondar	30.00
David R. Bender	25.00
Frances J. Rugen	25.00
Total other contributions under $25.00	300.90
Total	**$ 7,480.90**

Reviews

Operation Function Analysis—Do It Yourself Productivity Improvement, by William Bruce Bumbarger, New York, Van Nostrand Reinhold Co., 1984, 270 p. $24.95

According to the author, Operational Functional Analysis (OFA) is a participative, do-it-yourself productivity improvement method, applicable throughout the entire organization, and, specifically useful in the knowledge work areas and the activities they interface with it.

OFA draws on a concept first developed by Larry Mills of the General Electric Co., a major contributor to Value Analysis. Some have said that OFA will succeed quality circles, now so popular in many U.S. industries, as a means of motivation.

This book is a practical handbook. There are no equations or complex mathematics. Unfortunately, it is so basic that it lacks a bibliography and has few references. This is one of the faults of this well-written book; when readers seek further related references, they find none.

On an upbeat note, the book stresses creative and original approaches to improved productivity. One of the major changes that has occurred in the past decade is a shift from the old, industrial, authoritarian methods to the new, participative approach by the worker to improve productivity.

Essentially, OFA combines good psychology and industrial engineering. The major thesis of the book stresses that real, honest-to-goodness productivity improvement cannot be imposed from outside the organization; the workers themselves, ultimately, have the fate of their company in their own hands. This may be easier said than done, because the do-it-yourself method may be more painful than appears on the surface. To discard old habits is as difficult as when an inveterate cigarette smoker has to give up smoking.

Bumbarger stresses that customers' needs can best be charted by work flow in a network of demands and those functions permitted to meet the demands. If we are able to understand the network of clients' needs and to integrate our own company structure to meet those needs, we can achieve permanent improvements in our organization. Functions and operations are the major blocks of the author's concern. According to Bumbarger, functions are the large work elements, which in turn are composed of smaller operations. To improve the productivity of knowledge work, it is essential to understand the functions and allied operations.

The author also discusses interorganizational work flow between all components of the company. Starting in engineering and right down to the shipping department is a target of OFA. Unfortunately, there are managers in industry who seldom get off their seat, do not know the basic functions described, and do not know the people who work for them!

The author stresses the need to collect information on all levels. Of specific need is to interview employees to determine where they fit on the team. Bumbarger tells us not to limit our interviews to supervisors, lead workers, and senior "experts" of all varieties, but to interview those people who carry out the day-by-day work. He tells us to find out what really happens, not what is supposed to happen. Good advice . . . but what does this information mean? The author devises a method to condense information, evaluate it, derive real meaning and, most important, identify the potential productivity improvements. Planning work programs is given a great deal of attention.

What are the real benefits of using OFA? The author tells us that overall production performance improves dramatically; design engineering has a greater understanding of the customer's requirements; by placing purchase orders for needed parts using OFA system, the need for expediting critical parts is greatly reduced since the planning and design functions performed optimally. Improvements in inventory control, reduction of missing shipments improves the overall quality of the organization. Finally, Bumbarger maintains that, through OFA, this particular company reduced the man-hours of effort and elapsed cycle time for handling quotations of service parts, which in turn resulted in appreciable improvements in both internal productivity and customer satisfaction.

The author is well-qualified to write this book. His background includes seventeen years' experience with the General Electric Co. After leaving General Electric, he became a consultant, and in 1977 he organized the Bumbarger Group in Atlanta as a consultant

in participative productivity to industry as well as to government.

This reviewer recommends this book for all libraries where manufacturing and quality control are essential elements.

Larry Chasen, Manager-Library
General Electric Company
Space Systems Division
P.O. Box 8555
Phila., PA 19101

Turning Around: Keys to Motivation and Productivity, by Beverly A. Potter, Berkeley, California, RONIN—The Independent Author's Network, 1983, 267 p. $19.95.

Change can be difficult. Giving up old and established work habits can be a difficult process. Implementing changes effectively can lead to progress and success. Changing for the sake of changing, without specific goals and motivation, can lead to disaster for an organization.

Since this book is concerned with behavior control or how to utilize scientific knowledge to manage people more effectively, the question of ethical right or wrong presents itself. Dr. Potter says: "Who determined that this is an appropriate goal for this person? And during this scrutiny I discovered that I had assumed a godlike role by thinking I knew what was best for another person. The specific issues of concern to psychologists differ greatly than that facing business and managers. And I am not so presumptive to assume that I know the right uses of control within the organization. At best I can only pose a few of the questions and hope that those in a position to control others in the workplace will seriously ponder these questions."

The author points out that not everyone is motivated by the same incentive. What types of incentives in the long range view are best to "turn people around as producers?" One particular point which appealed to this reviewer is her comments on the need of compassion by managers in realizing their goals and objectives.

Much of this book deals with self-management. Of particular interest is the management of stress. Michael Maccoby, a noted psychologist, interviewed hundreds of successful corporate leaders. One of the amazing findings he made was that half of the people he interviewed had high levels of chronic anxiety. Three sources of the tension were discovered: 1) worry that important projects would not succeed; 2) worry that they lacked essential knowledge about their jobs; and 3) worry that they would lose control and look bad or do something wrong.

Stress has become a major national problem, specifically in the industrial area. Today, we can safely say that stress can produce heart disease and the author speculates that cancer could possibly be triggered by stress. Dr. Potter suggests that "health maintenance days" replace sick leave days, or maybe companies in the future will consider health spas with exercise room and hot tubs as essential as the need for cafeterias.

Returning to Michael Maccoby, in intensive interviews with 250 corporate leaders, he divided "Qualities of the Head" and "Qualities of the Heart," and this is what he discovered:

QUALITIES OF THE HEAD

Ability to take initiative
Satisfaction in creating something new
Self-confidence
Coolness under stress
Cooperation
Pleasure in learning something new
Pride in performance
Flexibility
Open-mindedness

QUALITIES OF THE HEART

Independence
Loyalty to fellow workers
Critical attitude to authority
Friendliness
Sense of humor
Openness, spontaneity
Honesty
Compassion
Generosity
Idealism

The startling aspect of these findings is that work environment stimulates the development of only some of these qualities. Qualities of the Head are reinforced by work; the Qualities of the Heart are not, and remain underdeveloped and dormant.

Other important areas covered by this book include:

- Behavior Management
- Managing Personnel Selection
- Managing Authority: How to Give Directives
- Managing Meetings
- Managing Conflicts

One particularly fascinating portion at the end of the book deals with job burnout. Job burnout, Dr. Potter says, is a motivational problem. Any situation in which employees feel they can't win and feel helpless to change is a potential burnout situation.

Dr. Potter admits that this is a serious national problem and offers this excellent advice to management:

> "When and how you pay attention to employees is important. Often, managers forget about the power of personal attention, the most universally potent motivator. Notice and comment about good work. The effective managers are alert for and acknowledge small improvements. A job well done or thank you note that comes days or weeks after quality performance has little clout. This is why Christmas bonuses, for example, fail to influence motivation. They arrive too late. The sooner the reinforcement is administered, the greater the impact on future performance."

Although there has been a glut in the book publishing market in psychology/motivation/production, this reviewer feels Dr. Potter has contributed substantially to the literature with fresh insight, specifically in the area of motivating by kindness and compassion. The book is well indexed and provides suggested readings and bibliography for those readers interested in expanding their knowledge on this subject.

Larry Chasen, Manager-Library
General Electric Company
Space Systems Division
P.O. Box 8555
Phila., PA 19101

Banking and Finance Collections, edited by Jean Deuss, New York, Haworth Press, 1984, 164 pages, tables. $29.95, Text Edition. ISBN 0-86656-252-4

This volume is both interesting and informative. The historical origins of the major financial libraries of the United States and Canada provide fascinating reading, and the outline of valuable reference material needed to pursue financial research is very comprehensive.

The book is divided into ten sections, each authored by a different expert. Nine of the sections discuss finance collections, while the tenth features a bibliography of books of interest to special collections of all kinds.

The evolution of the libraries of the Federal Reserve System, the American Bankers Association and Standard & Poor's Corporation provides some intelligent insights. Although the libraries have many things in common, they also have some unique features. The Federal Reserve Library has Annual Reports from governmental agencies and volumes of Bank Directories dating back to 1922. The ABA Library has an important collection of theses written by students of the Stonier Graduate School of Banking and the National Graduate Trust School. Standard & Poor's Research Library presents a backfile of most S & P publications.

One of the most readable sections explains the Wells Fargo Corporation Archives Files beginning from 1852, when the company was founded, to the present. The archivists were responsible for solving the mystery of the rightful owner of a vast acreage of land sitting atop rich oil and gas deposits worth several million dollars.

The editor has carefully included a selection of the best banking literature published. In addition, the other contributors mention material that would be of value to information professionals.

This book is presented well and is a useful addition to any library, but it is a must for business, economic or finance collections.

Deborah Naulty
Information Specialist
Federal Reserve Bank of Philadelphia

LETTERS
(continued from page 10A)

Correction

The article "Union Listing Via OCLC's Serials Control Subsystem" by Terrence J. O'-Malley in the April 1984 issue of *Special Libraries* omits the ninth member, one of the founding members in fact, of NEOMAL, the Cleveland Health Sciences Library. We were also one of the first medical library members of OCLC and Ms. Jeri Gross, our Serials Librarian, has been a main force in the work O'Malley describes.

Robert G. Cheshier
Director, Cleveland Health Sciences Library of Case Western Reserve University and Cleveland Medical Library Association

Learning from the Past

I hope every member has had the opportunity and time to read the unbiased and succinct account not only of SLA's beginning but also its ups and downs through the years by our librarian-historians, Williams and Zachert.

This survey of the past to almost the present succeeds in spotting the high points in the development of our Association. The authors adding their interpretation of events, have widened our horizons, thus enabling us to follow the changes and to place each in its own perspective.

Being privileged to have known many of those librarians responsible for policy decisions in the early years, the comments made by the authors help me to appreciate all the more the contributions made in building a solid yet flexible foundation for the operation of the Association.

Having been involved during the middle years of SLA's growth enables me to recognize the worth of the author's interpretation of events added to my own understanding. It is in this area that I should like to pay tribute to Ruth Savord for guiding us through the years of expanding pains of the Association. Her background and wisdom were available at a time sorely needed to keep SLA on the paths evisioned by its founders.

In the not so active years following retirement, I have watched with much interest and understanding the emphasis given to various facets of the Association's growth and how well following administrations have met the needs.

Although Williams and Zachert make no claim to having written a definitive history of Special Libraries Association, they have, unquestionably, given us a solid framework upon which the history can be built to mark the Centennial Celebration.

Irene Strieby-Shreve
West Lafayette, Ind.

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Availability: May 1984. Via BRS

Publishers, Distributors, and Wholesalers

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Availability: September 1984. Via BRS.

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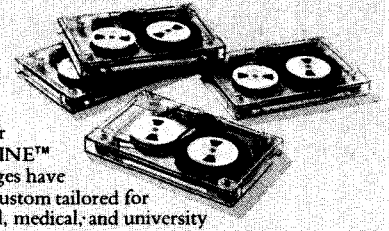

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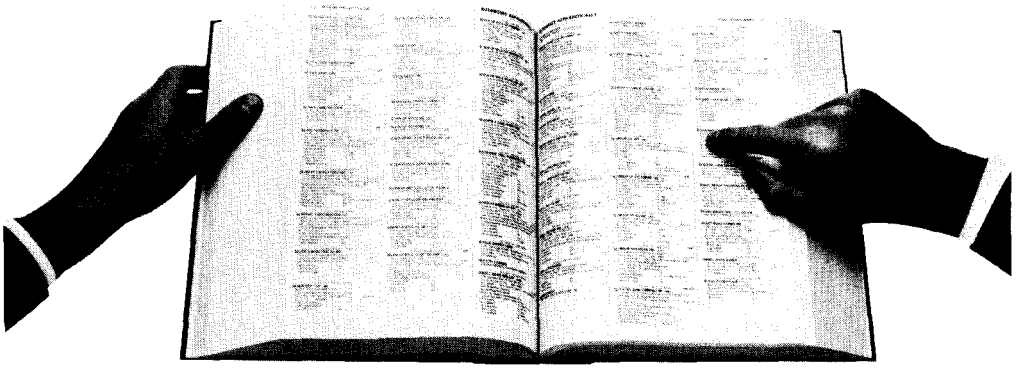

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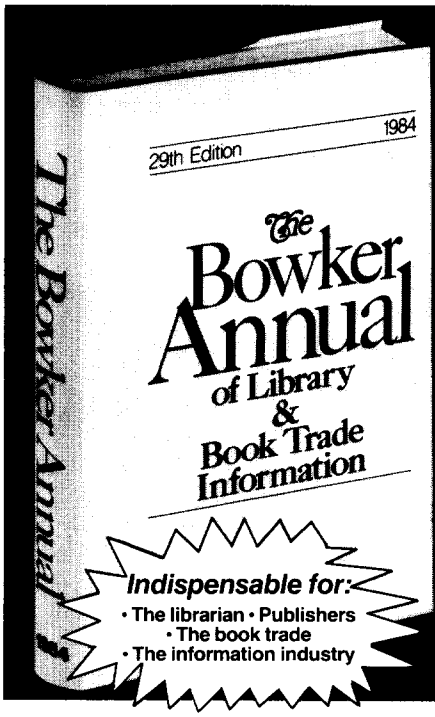

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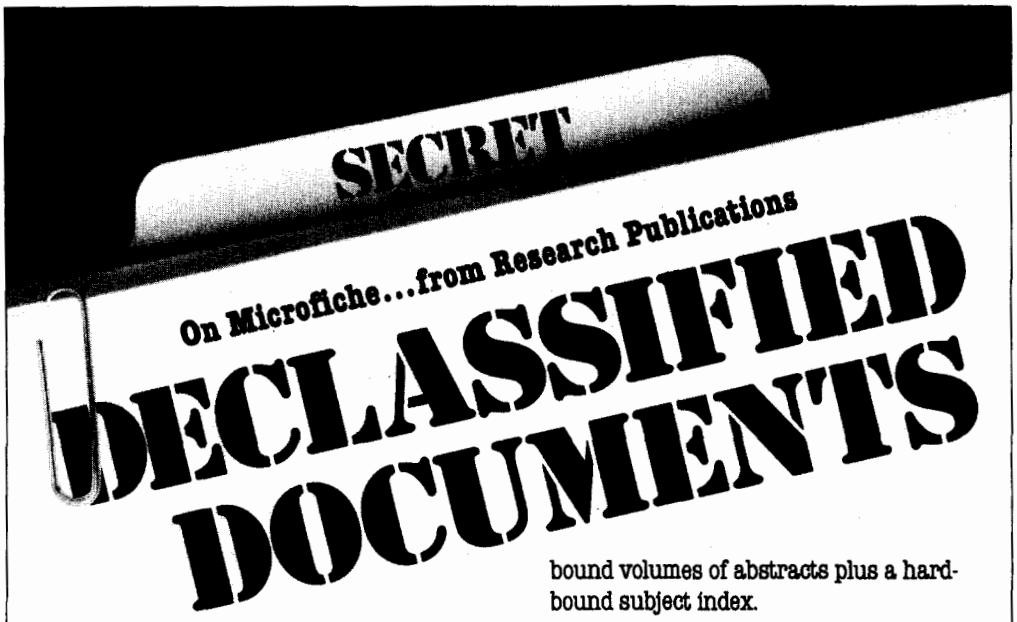

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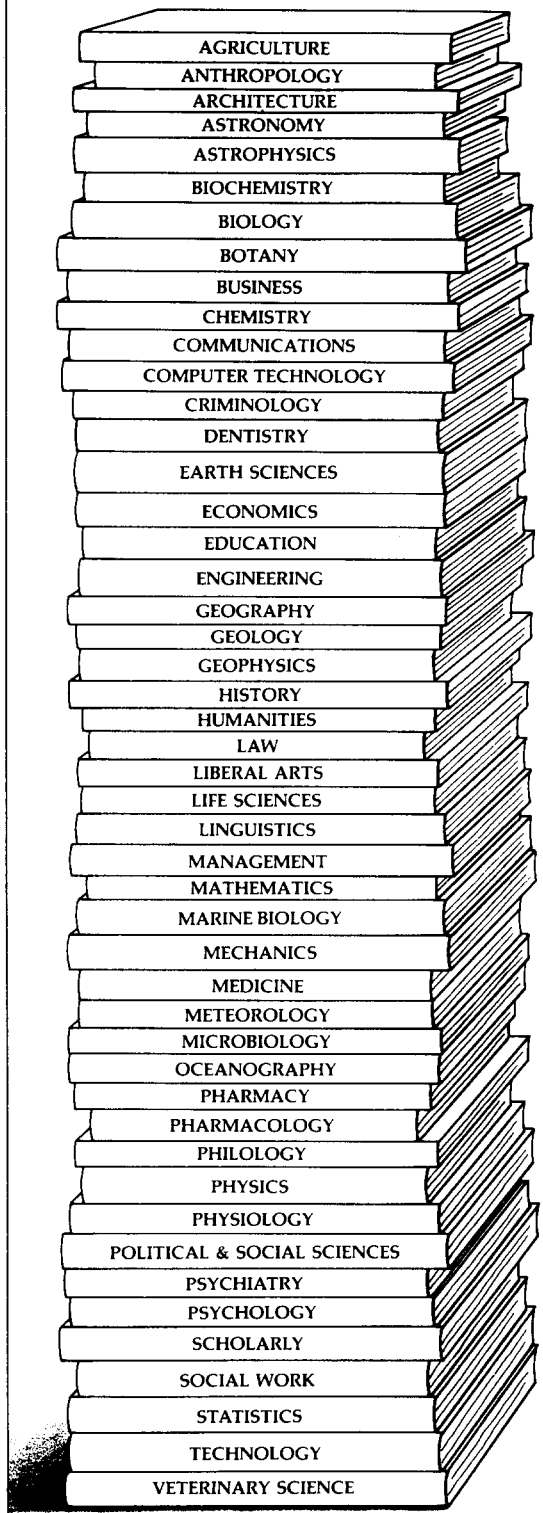

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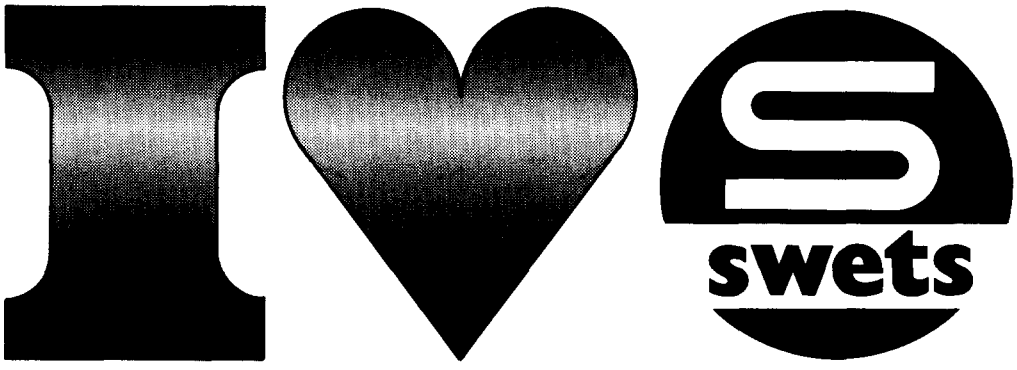

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