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The author identifies good organization and management as a vital factor in library operation. He attempts to acquaint the reader briefly with the history and development of management science from the Classical theorists and Scientific Management school through the Human Relations school up to the modern behavioralist and problem-oriented approach. He shows the influence of these different approaches on library management up to the present and suggests ways in which library managers could make further use of the vast body of theory and research in the management field. He recommends more utilization of existing knowledge along with further research by librarians into management problems.

The Library, all will agree, is a form of organization. An organization may be defined as that which coordinates a large number of people to perform explicitly defined objectives which the individual cannot perform alone. It emphasizes rationality, effectiveness, and efficiency in the achievement of organizational objectives.

One of the most important factors in the successful fulfillment of library function is good management and organization. Wilson and Tauber, in The University Library, concluded that "the success of the library in performing its appropriate function depends, in considerable measure, upon the nature of its administrative organization."1


Mr. Oh is project assistant at the University of Wisconsin Medical School Library. He wishes to express his gratitude to Virginia Holtz, Medical Librarian there, and to Professor Alan C. Filley, Associate Director of the Industrial Relations Research Institute at Wisconsin, for having read the manuscript of this paper and for having made useful suggestions upon it.

In order to fulfill library objectives, then, there is little doubt that librarians should be aware of the continuing development of an accurate theory of management and organization, and its proper application to the real world as reflected in current management practice. The role society now demands of the library has become so great that libraries will have to advance in many areas in order to keep up to these expectations. The following paragraphs outline the field of management and organization up to the present and offer some of the new guidelines and insights that have been developed for the consideration of students, library administrators, and teachers of library science.

Main stream of library management literature drawn from Classical Organization theories. Library literature shows that library management has drawn heavily from classical organization theories. These theories can be divided into two different schools of thought. The first is what students of library management and organization call Scientific Management and the second may be called Classical Organization theory.
In 1912 Frederick Taylor and his associates promulgated the Scientific Management theory. The basic assumption of their philosophy was that workers are economically motivated. The worker will respond with his best efforts, they promised, if material rewards are closely related to work efforts. They focused their attention on the production unit, or shop, and they considered the workers from a physical standpoint, as adjuncts to their machines.

This emphasis on motivation by material reward popularized the prescriptive approach to efficient organization and the conduct of routine work. Examples of this approach are the famous time and motion studies, incentive pay plans, and specialization according to function. Managers were taught that improved organizational efficiency automatically increases profits and reduces waste, resulting in more material rewards to workers. They expected these principles to help them achieve the desired efficiency.

In the 1930's Fayol (in translation), Mooney and Reiley, Gulick and Urwick, R. C. Davis, Max Weber, and others originated Classical Organization theory. This school, unlike Scientific Management, embraced the whole organization rather than an isolated production unit or shop. It considered organization units or departments to be coordinated parts in a system.

In this theory, the main principle is the division of labor. From this all the other elements flow. It advised managers to break down complicated jobs into more specialized activities. This was supposed to result in more highly skilled workers who could carry out their jobs more efficiently. Under this principle of specialization, work was divided according to the task, process, type of clientele, geographic area, and the like.

Classical Organization theorists balanced division of labor by the principle of unity of command. Authority through unity of command resulted in "pyramids" of control. The chief executive exercises his authority through descending chains of command. The problem of span of control arises in this situation, as well as supervision, departmentalization, and levels of authority. It is hardly necessary to mention that this school also emphasizes the formal aspects of organization.

Present-day library management is discipline-oriented. All this should have a familiar sound to students of library management. There is little doubt that most library management and organization courses still depend heavily on these classical theories for the bases of formal organizations. The nature of such theories has caused students of library science to view library administration from a heavily discipline-oriented rather than problem-oriented viewpoint.

Among the familiar terms, principles, and ideas we have adopted from classical theory are "static," "prescriptive," "discipline," and "authority." Some definitions should be helpful in illustrating how classical theories have influenced library management.2

"Static" describes something which is fixed and unchanged during a long span of time. Filley and House explain that "Static theories usually suggest that A causes B. That is, factor A is both necessary and sufficient for result B." For example, the statement that a good salary scale attracts competent librarians means that a good salary scale is both necessary and sufficient to attract competent librarians.

"Prescriptive" describes a statement concerning what should be done or what should take place. A characteristically prescriptive statement in library management might be that library staff members work more efficiently with two fifteen-minute coffee breaks per day than with no coffee breaks at all.

2 See forthcoming article in Management International by Robert J. House and Alan C. Filley: "Science, Theory, Philosophy and the Practice of Management."
“Discipline-oriented” management theory results in the division of management principles among various fields of operation. One group of experts knows the principles of library management, another group knows the principles of hospital management, and so on.

“Authority” refers to the right to give commands from the top down. Such a system of authority is usually defined by an organizational position chart, in which, for example, the chief executive of a library commands a director of technical services, who commands the head of a cataloging department, who commands the head of a subject cataloging division, who commands individual catalogers, who command typists.

Weaknesses of the classical theories. The organization of libraries in this complex modern society owes much to the theoretical framework which the early classical theorists have provided. But it is important for librarians to be aware of the weaknesses in these theories on which they rely so heavily.

The influence of Classical theories in library management has resulted in a “principles” approach to organization. Some modern theorists question the validity of principles if they are defined as permanent universal laws. Strother goes so far as to say that “there is very little solid evidence for the universality of principles of organization. As a matter of fact, there is very little evidence as yet that there are any principles of organization, universal or otherwise.”

Another important defect of Classical theory is its undue emphasis on the formal aspects of organization. Based on the assumption that the worker’s human nature leads him to seek the utmost material gain, it neglects entirely the effects of individual personality, informal groups, intra-organizational conflict, and the decision-making process on the formal structure.

It is well for librarians to be aware that the principles of Classical organizational theories were formulated by successful managers by generalizing from their own experiences, and that they have not yet been subjected to rigorous empirical testing. March and Simon point out that “perhaps the most critical failure of classical administrative science is that it does not confront theory with evidence. . . . The theories tend to dissolve when put into testable form.”

Human Relations school. The Human Relations school developed in the 1930’s, compensating for some of the deficiencies in the Classical theories. The Human Relations school has its origins in the Classical school, but its main emphasis is on the individual and the informal group in the formal organization. The importance of this school is that it is mainly oriented towards and based on empirical research. The theories, however, are still static, discipline-oriented and prescriptive. The source of authority is still the formal organizational structure.

These shifts in focus from the formal to the informal aspects of organization reflect shifts in organizational characteristics and in management philosophy. In the early days of small-scale industrial activity, the idea that hard work and superior ability promised success in industry was widely accepted. The industrious worker could expect someday to establish his own factory and acquire the right to exercise authority over his employees. But when industry grew and the modern world became more complex, the early concepts of organization no longer gave a true picture. Probably hard work and superior skills are still important ingredients of success in complex modern organizations, but today one of the most important qualities of

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all seems to be skill in human relations. A pioneer study was done at the Western Electric Company's Hawthorne works in Chicago between 1927 and 1932. From it, came some results that generally disagree with many of the Classical organizational "principles." It showed that the quota of production is set by social norms, not by economic desires. It demonstrated that workers are more motivated by social rewards and sanctions than by economic incentives; that workers in their acts are influenced by the group; and finally, that wherever formal organization exists, both formal and informal norms exist and the informal norms are established by informal leaders. 5

As a result of this study, much further research has been done in the field of human relations. After World War II, such research became quite commonplace. From these studies a large body of theory has developed relating to motivation, coordination, leadership, informal status, communication, and so on.

In general, human relations theory relates organizational structure and work to the social needs of the employees. If the organization makes employees happy, the argument goes, it will gain their full cooperation and effort, thus reaching optimum efficiency.

Library management and organization have not yet taken full advantage of the theories of the Human Relations school, although such phrases as "staff participation in library management," "communication techniques," "decentralization," and so on are frequently used.

Criticism of the Human Relations school. The Human Relations school assumes, like the Classical theories, that worker satisfaction and productivity do not have to conflict. Modern theorists generally disagree with the view that the workers' needs and organizational needs can be perfectly harmonized. The conflict between the worker and the organization, they hold, is inevitable, like autonomy vs. discipline, superior vs. subordinate, and formal vs. informal relations.

The Human Relations school does not regard the worker as an economic man who will increase his productivity for material rewards. It does not emphasize the formal aspects of organization. Rather, it encourages management to let employees develop social groups on the job, develop employee participation in management, democracy in the organization, communication with informal leaders and groups, and the like. Modern theorists, however, have criticized the "unrealistic happy dream" of being able to manipulate the work group by such inexpensive gifts as affection, esteem, prestige in work, and so on.

Research in the field of human relations suffers from incompleteness. There is a lack of integration of the many facets of human behavior that have been studied.6 Modern theorists charge that too much of the empirical research done by the Human Relations theorists has been confined to business and industry. They also claim that it is biased in favor of management in many instances.

Modern organizational theory. While Classical and Human Relations theories still prevail throughout most of the management and organization discipline, there has been a growing dissatisfaction with the deductive, prescriptive, and "principles" approach to management and organization. While the major emphasis on modern organizational theory and research dates from the 1950's, it originated in 1938, when Chester Barnard, the father of behavioralism, published a book called The Functions of an Executive. The behavioralists, including M. Haire, C. Argyris, R. Stogdill, and

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others, are primarily interested in research and theory in regard to individual and group behavior. They operate in various fields, or disciplines, such as business, psychology, political science, and sociology.

A second group of researchers including A. Gouldner, A. Etzioni, P. Selznick and others, is primarily composed of sociologists who are interested in subjecting classical organization theory to empirical testing. Unlike the behaviorists, these scientists usually investigate the total organization rather than small groups.

A third category, led by H. A. Simon, R. Cyert, J. G. March and others, is the management science group. These scholars base their research primarily on actual observation of the phenomena in question followed by abstract analysis of the results. They "build models"—systems of ideas which are supposed to represent and approximate real life situations, and from which they attempt to prescribe and predict.7

These modern organization theorists, unlike the theorists of the Classical schools, tend to emphasize empirical research and description and generalization from large bodies of concrete data. They do not present absolute statements but confine themselves to general statements of probability. Their empirical theories depend heavily on statistical formulations and tests.

The source of authority, according to modern theorists, is political rather than economic. That is to say, authority does not come from an employee's defined position alone, but from many other sources as well, such as competence, personality, loyalty of subordinates, and the like. The modern approach does not, like the Classical and Human Relations schools, limit its research to business and industry, but rather it studies every kind of organization, from social clubs and prisons to military organizations and churches.

1. The modern organizational school is problem-oriented rather than discipline-oriented. In other words, for any particular problem it chooses to study, it takes advantage of the findings of anthropology, sociology, economics, political science, mathematics, and so on. It does not try to be rigidly prescriptive, to advise what must be done if certain goals are to be achieved. It limits itself largely to descriptions of the phenomena it studies.

To borrow a summary of modern organizational analysis from Etzioni, modern theorists are concerned with:

1. Both formal and informal elements of the organization and their articulation.
2. The scope of informal groups and the relations between such groups inside and outside the organization.
3. Both lower and higher ranks.
4. Both social and material rewards and their effects on each other.
5. The interaction between the organization and its environment.
6. Both work and nonwork organization.8

- Stogdill's Theory an example of modern contributions. Ralph Stogdill's theory of individual behavior and group achievement9 is a good example of a modern theory which can contribute valuable new insights to library management. Unfortunately, it is not possible to describe the entire theory and all its ramifications in this brief article, but

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7 These classifications of modern organization theory are drawn from A. C. Filley's unpublished ms., chapter four, "The Evolution of Management Theory," p. 18-19.


perhaps the following examples will illustrate the kinds of new ideas that could be gained by further study of modern management literature.

Stogdill’s theory synthesizes and explains the results of more than eight hundred research studies. One of the most revolutionary new ideas he proposes is that managers should never measure the output of their organization in terms of productivity alone. The output of a catalog department, he would say, should not be measured solely in terms of the number of books cataloged or cards typed and filed. The manager should be equally concerned with developing an eager and responsive staff which can be depended on under difficult as well as favorable conditions. Only in achieving a balance between these different kinds of output can a manager really attain optimum efficiency. He should never sacrifice the intangible output of his organization for the sake of impressive statistics, or vice versa.

Stogdill’s theory is particularly successful in resolving the conflicts between Classical theorists and behavioralists. The behavioralists have minimized the importance of formal organizational structure. The Classical theorists, in contrast, have always tended to feel that the more completely defined an organization’s structure is, the more efficiently that organization will function. Stogdill, however, has shown convincingly that an intermediate amount of structure leads to optimum efficiency and the greatest satisfaction and freedom among employees. If the employees of a library are not clear about what rules they are expected to follow, what hours to keep, to whom they are responsible, what and how much they are expected to do, and so on, they will waste a great deal of time just checking, confirming, seeking approval to do one thing or another, and generally trying to find out what is expected of them. A structural vacuum such as this may well be filled by informal group norms which do not contribute very much to organizational efficiency.

On the other hand, if the routines of library work are very rigidly prescribed and supervised, the employees will become bored and frustrated. While they may be pressured into higher productivity over the short run, the resulting dissatisfaction will cause a net reduction in productivity in the long run.

With an intermediate degree of formal structure, the employees will know exactly what is expected of them but will also be left some choice as to how they use their time and carry out their tasks. This will contribute to optimum total output. This new approach should be seriously considered both by library managers who seek to avoid making rules at all costs, and those who would like to reduce every activity to a written routine.

Some managers of the old school feel that informal group relations have no place on the job. While they find such activities hard to control, their ideal is to eliminate them entirely. An economically motivated worker, they argue, should not want to waste valuable time in, and is not being paid for, such activities. The behavioralists feel, however, that a staff member who is not so restricted will be happier and therefore more efficient.

None of the research done on this subject has fully supported either side. Employees do not give their best efforts to organizations which try to extinguish all social contact on the job. And yet, if they are left almost completely alone, they may be perfectly happy and very unproductive. The Classical and Human Relations schools had assumed that workers’ needs and organizational goals did not conflict, and they could not explain these discrepancies.

Stogdill draws an important connection between structure and output. Un-
der intermediate degrees of formal structure, when the needs of the employees and of the organization are harmonized, the existence of informal groups actually contributes to efficiency.

For firm believers in extensive division of labor, Stogdill's theory offers a warning. Classical theorists assumed that because the assembly line method of working increases productivity it should be accepted wholeheartedly by employees. This has not proved to be the case. Studies show that the boredom and frustration of employees who must do the same tiny, undignified, and automatic motions day after day tends to cause an over-all drop in long-run efficiency. Experiments in job enlargement have had very promising results. While extreme division of labor may give short-run benefits, people tend to do better work when their jobs have enough challenge in them that they can take some pride in doing them well. This pride and the satisfaction the employees can take in their work must also be considered part of the output of the organization.

**Conclusions and some suggestions.** It should be emphasized that the Classical and Human Relations theories must not be undervalued. These remain the basic framework of our management discipline. H. Koontz wrote that:

> Every thoughtful business executive who wants to make his practice of management more effective should be concerned with the development of an accurate and useful theory of management. Any art—and managing is surely one of the most important arts—is improved by the discovery, understanding, and proper application of theory by those who know how to use it.10

Library managements and students of library management could benefit also by taking advantage of the latest developments in management and organization theories. We have already drawn heavily on classical and human relations theories for our management of libraries and training of librarians. These dynamic new developments will no doubt be absorbed into library management as well.

Many libraries, unfortunately, have been criticized for ineffectiveness, bad service, and other defects. Some librarians have come to feel that libraries will always receive criticism from patrons who do not understand their problems. Criticism seems to have become an accepted part of library life. One scholar has suggested that libraries can survive in spite of criticism only because they are social institutions occupying a monopolistic position. Could they survive, however, if libraries became commercialized and began to compete as business organizations? Libraries, like any other public service institution, have an obligation to manage themselves as efficiently and effectively as possible.

Organizations differ in their characteristics and goals but some of their essential qualities, such as efficiency, effectiveness, and survival and growth are similar. A broadening of scope and study of the problems librarianship has in common with many other kinds of organizations would prove fruitful. Many academic disciplines have now become problem-oriented in their management and organization courses. For example, at the University of Wisconsin, courses in organization and administration in the school of commerce, the sociology department, the engineering department, and the political science department draw material from the same bodies of theory and research. Library schools could perhaps improve their practices in the matter as well.

In 1933, Pierce Butler warned that:

> Unlike his colleagues in other fields of social activity, the librarian is strangely uninterested in the theoretical aspects of his profession. He seems to possess a unique immunity to that curiosity which elsewhere drives modern man to attempt, somehow,
an orientation of his particular labors with the main stream of human life.\textsuperscript{11}

One might ask if this statement still applies to the library profession.

The importance of research in library management cannot be denied. Empirical research could give new dimensions and insights into the ways libraries should operate. It can give choices of action, suggest desirable action, and give predictions of possible outcomes. If librarianship is to advance as an academic discipline as well as a profession, it must put more emphasis on its research obligations in the field of management. E. J. Reece has observed that:

It must have meaning, for example, to find even a few leaders recognizing that the attitudes of librarians to administration has been hamperingly empirical; that their professional literature on the subject has been scant and immature; that research so far has imparted little to its history and rationale; that the administration of libraries does not differ materially from that of other organizations; and that librarians could profit from the knowledge and experience gained and the practice tested in other fields where administration is requisite.\textsuperscript{12}


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\textbf{BIBLIOGRAPHY}
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Polish Books in America and the Farmington Plan

A sample of books published in Poland was studied to see how effectively they were being acquired into American libraries. The results were compared with the acquisition rate by American libraries of books from countries covered by the Farmington Plan. More than one-fourth of the Polish books sampled had been acquired, a figure which compares favorably with those obtained from Farmington Plan nations. Polish book importations will doubtless increase.

The main purpose of this paper is to answer the following question: "What is the extent to which titles from a country not included under the Farmington Plan are represented in United States libraries?" Or, in other words, does the exclusion from the Farmington Plan or similar cooperative ventures negate the adequate coverage accomplished through the uncoordinated efforts of individual libraries? To answer this question this paper will attempt to:

1. determine and analyze the American acquisition of titles from a "non-Farmington" country;
2. compare the findings with the Farmington Plan reports;
3. draw conclusions.

Since it would be an insurmountable and actually meaningless task to check the holdings of all "non-Farmington" countries' books in United States libraries, it is necessary to limit this study to one country only and pursue a depth study encompassing all titles published in that country during a particular period. Poland was selected for this investigation. The value of Polish publications to the United States audience is not merely to record the achievement of Polish scholarship in the fields of philosophy and mathematics, historical, classical, and philological studies; other considerations include the extensive Polish reading public in the United States, the special interest in East Europe generated by the current political situation, and the growing concern for Slavic studies in many universities and research institutions.

Among the sixty major countries of the world, Poland ranks eleventh as a book producing country. Its total book production for the year 1952 was 6,632 titles; only ninety-six titles less than its closest competitor—the Netherlands—and 5,208 titles less than the United States, which produced 11,840 titles during the period. It is worth noting that in 1952 Poland produced 265 titles per million inhabitants, the Netherlands 673, and the United States seventy-four titles. In per capita book production Poland ranked twelfth in the world for 1952.

In 1955 Poland produced 7,199 titles, of which 5,823 were first editions. In the same year the United States produced

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Mr. Nitecki is with the library of the University of Ibadan, Nigeria.

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12,589 titles, of which 10,226 were first editions.  

**METHOD**

The major concern of this paper is with two related problems: (1) What observations can be made about the actual acquisition of Polish books by individual libraries? (2) What kind of coverage of recent Polish publications is exhibited by the entire United States? Answering one question without the other means either overlooking the importance of specific collections or ignoring the larger question of accessibility of Polish materials by United States readers and researchers.

As phrased above, however, these questions do not immediately point to feasible approaches which can elicit meaningful answers. Rather than deal with an over-all estimate of holdings, actual holdings will be checked against total titles published. It is hoped that such information will not only facilitate dealing with chief concerns, but also contribute to the answers to such further questions as the following:

1. Are holdings of Polish books in the United States adequate as far as the total output and value of Polish publications is concerned?
2. Insofar as the interest or demand for Polish publications will vary from area to area and from institution to institution, does actual acquisition follow the ups and downs of demand?
3. Since acquisition of books in Polish may create problems and difficulties, are there libraries whose holdings indicate that they have apparently resolved such problems?

In selecting a period for study, trends in Polish publishing suggested the more flourishing years beginning in 1957. Concurrently, the period could not be so recent that sufficient time would not have elapsed from the publication dates to allow individual libraries opportunity for acquiring and cataloging such materials. The combination of these two concerns led to the selection of the period beginning April 15, 1957, and ending August 17 of that year.

In order to insure that the most complete list of titles published during the above period be used, investigation of the various sources of titles was undertaken. Poland is currently producing eighteen major book trade catalogs, of which six are of general nature and twelve are limited to specific fields such as medicine, literature, etc.

Of the six general catalogs three are still somewhat selective: *Kwartalnik wydawniczy* specializes in juvenile literature; *Nowe książki* selects monographic works only, excluding all serials and “minor” publications; *Nowości wydawnictw Polskich* limits itself to new books issued by the export booksellers.

The remaining three general book trade catalogs are:

3. *Zapowiedzi wydawnicze* (publication announcement), which has been published weekly since February 4, 1952, by Dom Książki in Warsaw. It is an official organ of Centralny Zarząd Księgarstwa (Central Board of the Book Trade). It, like *Kartkowy katalog*, is published on one side of a leaf only; it gives complete bibliographic description, series notes, and it is annotated with indication of the level of reading and suggests possible readers by educational standards.

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5 *Nowe książki* (New Books) issued semimonthly since October 1949 by Polskie Wydawnictwo Gospodarcze in Warsaw.

6 *Nowości wydawnictw Polskich* (New Polish Publications) issued monthly since 1953 by Prasa i Książka in Warsaw.
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<th>Applied Sciences</th>
<th>Humanities</th>
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<td>320</td>
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</table>

List of Abbreviations of Thirty-Three Libraries Used in the Study:

- CaBVaU: University of British Columbia, Vancouver
- CLU: University of California at Los Angeles
- CST-H: Stanford College library; Hoover Institution on War, Revolution and Peace
- Cy: Yale University
- CU: University of California, Berkeley
- DA: U.S. Dept. of Agriculture library
- DI: U.S. Dept. of the Interior library
- DLC: U.S. Library of Congress
- DNLM: U.S. National Library of Medicine
- DS: U.S. Dept. of State library
- IC: Chicago public library
- ICF: Chicago natural history museum
- ICU: University of Chicago
- InU: Indiana University
- IU: University of Illinois
- MB: Boston Public library
- MH: Harvard University, Cambridge
- MH-L: Harvard University—law school library
- MH-P: Harvard University—Peabody museum library
- MH-SD: Harvard University—graduate school of design
- MiD: Detroit public library
- MiDW: Wayne State University
- MiU: University of Michigan
- NeU: University of North Carolina
- NIC: Cornell University
- NN: New York public library
- NNC: Columbia University
- NNM: American museum of natural history
- OCI: Cleveland public library
- PP: Free library of Philadelphia
- WaU: University of Washington
- WU: University of Wisconsin
Zapowiedzi wydawnicze seemed to be the most suitable catalog published in Poland during the time of the study and was therefore used as the final source of titles to be checked against the holdings of United States libraries.

In the period under study Poland produced the total of 1,309 titles. These can be divided into: 1,110 monographic titles; 141 music titles; and 58 children's literature titles. The monographic titles include 228 reprints and textbooks.

It was assumed that United States libraries would not give priority to children's literature, reprints, translations from one modern language into another, nor to precollege textbooks from foreign countries. It was also believed that music (sheet music and songs) and sheet maps would be too specialized for a general library to acquire. Therefore, all titles in children's literature, music, textbooks, translations, and reprints were eliminated, allowing concentration on the resulting list of 882 titles. This list, referred to as "First Edition Titles," was then checked against the National Union Catalog, 1958-1962. The resulting data were organized with respect to individual libraries, specific areas of study, or other meaningful categories, to permit a relatively exact estimate to be made of the over-all acquisition of Polish books by United States libraries.

Polish Holdings in America

According to the National Union Catalog only thirty-three libraries possess any of the titles on the list (see Table 1). These range from nine libraries which have one volume each, to Harvard and Wayne State, which have approximately one hundred titles apiece. In all, 332 out of 882 titles are represented in United States libraries, in other words, 37% per cent of the total number of first editions published in Poland during the aforementioned period. In addition, duplications of these titles account for an added 225 volumes, bringing the total number of volumes to 557 (see Table 2).

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<tr>
<th>Titles</th>
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<tr>
<td>13</td>
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<tr>
<td>2</td>
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<td>16</td>
</tr>
<tr>
<td>332</td>
<td></td>
<td>557</td>
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</table>

1. General Distribution. Excluding the miscellaneous category (Sports and Travel), only two libraries have coverage in all four major divisions: the Library of Congress and the New York public library. Harvard's coverage is incomplete, with heavier concentration in the social sciences and humanities, only one title in the pure sciences, and none in applied sciences. The University of Chicago and Wayne State have coverage in three of the four major areas. Twelve libraries have coverage in two major areas, while sixteen libraries have one or more titles in one category only.

Generally speaking, the strongest and most widespread coverage is in the humanities, represented in twenty-three libraries by 320 volumes. Next are the social sciences represented in nineteen libraries by 167 volumes. Following this are the pure sciences with 23 volumes scattered among nine libraries, and then the applied sciences with 44 volumes divided (quite unequally) among only six libraries.

2. Specific Holdings. Table 3 contains the specific holdings, broken down into subjects, of each of the thirty-three libraries. None of the titles on the original list in the fields of archaeology, psychology, sociology, maps, technology, dictionaries, librarianship, and sports are represented in the United States libraries. The Library of Congress ac-
### TABLE 3. Holdings of Polish Books Published During Period of Study:
**By Subject Matter and Per Cent of Total Published**

<table>
<thead>
<tr>
<th>Subject Matter</th>
<th>Total Published</th>
<th>Titles Held in U.S. Libraries</th>
<th>Per Cent Held</th>
<th>Volumes Held in U.S. Libraries</th>
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<tr>
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counts for the total United States holdings in botany, chemistry, business finance, general social sciences, industry, transportation, and travel. Fiction, history, and philology books, the best represented, are held in twenty, seventeen, and ten libraries respectively, while the bulk of the medical books (28 out of 34 in the entire country) are held by the National Library of Medicine.

A further estimate of the coverage may be obtained by examining title holdings of the United States as a whole (see Table 3) in relationship to the total Polish output during the period. For example, not only is the United States fiction holding large (217 volumes) but these also represent 142 different titles or 77 per cent of the total number published. Similarly, the meager holdings in philosophy and religion actually exhaust the titles published during this period.

It would be dangerous to generalize in such cases where only a few titles were actually published. However, in fields like law, medicine, history, and philology, holdings include 50 per cent or better of a much larger total number. The earlier statement that the United States has no titles in several areas is more significant with regard to such fields as technology, where 51 titles were actually published, than in the cases of psychology, sociology, maps, and librarianship wherein fewer than ten titles each were published. Other holdings of interest are in art and architecture, where the United States has 42 per cent of the thirty-two titles published; in theater and films, where 54 per cent of sixteen titles are held; and economics with 41 per cent of twelve titles.

Because of budgetary limitations, libraries can seldom acquire every book justified by general principles. In one sense, each book acquired must be able to stand the test of affording an affirmative answer to the question, "Is this book more valuable than some other book not in the collection?" This is not at all a simple question since the value of a book is often, to a greater or lesser degree, a function of the total collection—e.g., is a twenty-volume encyclopedia more valuable than the sum of the twenty volumes considered separately, or is a masterpiece of historiography on twelfth-century Poland wasted in a library which has little other material on Polish history?

Thus libraries must and do develop detailed acquisitions policies. Ruggles and Mostecky summarize one such formulation with respect to Russian materials. The library (unnamed) collects: (1) material directly related to the courses offered by the college; (2) classics of Russian literature and materials connected with their historical, social, philosophical, and religious background; (3) basic bibliographies, reference aids, and language tools; (4) basic materials for fundamental studies in the fields of social science and humanities, not for extended research; and (5) materials supplementing the existing special collections. However, the authors' investigation suggests that this example is almost unique with reference to East European collections.

Few libraries have clear acquisition policies, let alone detailed sets of criteria for selection. Many improvise or follow the line of least resistance, buying what is readily available, i.e., offered by their dealers. The lack of policy and system in the selection process was particularly evident among university libraries, possibly because of the broad and often unpredictable interests of faculty and graduate students.
RELIABILITY OF FINDINGS

A general question must be asked concerning the reliability of these findings with particular concern for the small number of libraries which have reported holdings of titles published in first editions during the period of the study. In all, 2,422 libraries in Canada and the United States are expected to report to the National Union Catalog. This study discovered only thirty-three libraries with books in Polish. While it is possible that these thirty-three exhaust the libraries which currently acquire Polish books, some effort had to be made to check it. Such an effort could not be overly systematic without enlarging the scope of the paper. However, certain steps were taken which should prove adequate.

Our line of thought was as follows: are these thirty-three libraries, in fact, the only ones acquiring Polish books? Do others acquire them without reporting, or is it simply accidental that the study concentrated upon one period during which other libraries happened not to have made acquisitions from Poland? This lead to the question as to which libraries of the 2,389 remaining might have been missed in the study.

A list of those libraries having over a million volumes in 1953-1954 shows that, while these thirty-three libraries include eleven with over a million volumes each, there were eight which our study ignored. An attempt was made to discover if those libraries holding more than one million volumes in 1953/54, but not among the thirty-three mentioned above, have reported any holdings whatsoever of Polish books. Of these libraries, only two were found which reported each holding one Polish title (Princeton and Northwestern) and three smaller libraries with one each (University of Southern California, University of Virginia, and the Army War College). titles but that the number involved is not large. In addition, three of the largest libraries (Johns Hopkins, New York University, and University of Pennsylvania) This led to the belief that other libraries do, in fact, acquire and report Polish plus eight smaller ones have reported holding one or another of the Polish Academy of Science serial publications. Thus, while there may be some laxity in the extent of reporting holdings to the National Union Catalog, no blanket failure to report is evident, and the findings for the thirty-three libraries can well serve to speak for the United States coverage. If the holdings of all libraries are not recorded, it is probably partly due to the time lag between the time of cataloging and the date of the actual printing of the National Union Catalog. It is likely, also, that some of the remaining volumes not reported were acquired after the title already appeared in the NUC and are, therefore, duplications.

A further opportunity for judging the reliability of the findings emerges out of the data compiled by Ruggles and Mostecky. Their information about the holdings of Polish titles is derived from estimates given by the libraries themselves and is specific as to over-all holdings independent of publishing or acquisition dates. In fact, they include 122 libraries beyond those located by the present study, which have some Polish holdings. (See Table 4.) However, only twenty of these have over five hundred}

---

13 The method used is somewhat arbitrary and makes no claim of being thorough. Beginning with the authors of books which are held by three or more libraries in the United States, we checked to see if other books by these authors were held in libraries besides our thirty-three. Since Polish names are uniquely spelled, locating any one author in the NUC brings to the investigator's attention numerous other Polish authors so that several hundred Polish titles currently held in United States libraries can be quickly checked for symbols of libraries other than the thirty-three. By and large the same thirty-three libraries continually recurred with only occasional new ones.
TABLE 4. NUMBER OF LIBRARIES HOLDING POLISH TITLES—COMPAED

<table>
<thead>
<tr>
<th>Estimated Holdings</th>
<th>Those Located by Our Study</th>
<th>Not Located by Our Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 100</td>
<td>2</td>
<td>64</td>
</tr>
<tr>
<td>100-500</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>500-1,000</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>1,000-2,500</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2,000-5,000</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5,000-10,000</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>20,000-25,000</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>25,000-50,000</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Not listed</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>30†</td>
<td>122</td>
</tr>
</tbody>
</table>

*As reported to and quoted in Ruggles and Mostecky.
†This total differs from the earlier quoted 33 libraries since all the Harvard libraries are considered here as one library.

volumes. A good many are large public library systems, which, only doubtfully, could alter significantly the conclusions of this study. Although beyond the scope of this paper, contact was made with that library in this category having the largest holdings, the YIVO Institute for Jewish Research in New York. The librarian could not confirm the exact reliability of the five thousand to ten thousand volumes which Ruggles and Mostecky report as being held there, but other facts make it seem likely. The library was begun in the 1930’s to collect all material (in all fields regardless of level) which deal with problems of Jewry. Such materials in Polish have been purchased quite consistently from Poland, with an estimated seventy volumes added during the past year. (Books in Yiddish published in Poland are deposited free of charge).

In considering the phenomenon of such highly specialized research libraries as YIVO, it may be theorized that their awareness of and responsibility to the national library scene may not be as strong as those of general research libraries. As a library, the YIVO no doubt feels that it has most, if not all, of the materials with which it is concerned, and it is quite likely that this is true. However, insofar as it does not make known its holdings through the usual means (i.e., the National Union Catalog), the value of the collection is diminished. But this statement must probably be further qualified: although researchers in indirectly related fields (e.g., the Polish labor movement) may never quite discover the usefulness of this library; although those seeking a particular book held solely by this library may never find it; nonetheless serious researchers in such topics as Jewish history, culture, etc. may be counted upon to reach its catalog and stacks without the help of the National Union Catalog.

This leads to a final question: if there are Polish titles which a number of libraries apparently agree are valuable, why do not more libraries have them? A main reason may be the problems of acquiring and cataloging books in a language as unfamiliar to most Americans as Polish. Certainly, however, the degree to which such difficulties are overcome is directly related to the extent of the interest or demand for such materials. Therefore, it might be predicted that, with today’s growing interest in Slavic studies (taking this field out of its previous specialized realm into the sphere of near-necessity for any large research library), there will be an improvement in library facilities to handle the acquisition of Polish books.

FARMINGTON PLAN

What degree of assurance then exists that all valuable Polish books have been acquired by some United States library?
Such a concern would not be primary if Poland were included under the Farmington Plan.

The Farmington Plan is an experiment in specialization by voluntary agreement among American research libraries. Its objective is to make sure that at least one copy of each new foreign book and pamphlet that might reasonably be expected to interest a research worker in the United States will be acquired by an American library, promptly listed in the Union Catalog at the Library of Congress, and made available by interlibrary loan or photographic reproduction.14

The plan was originally drafted in 1944 and began to go into operation for France, Sweden, and Switzerland, beginning with 1948 publications.15 By the end of 1953 the plan included ninety-nine countries, having gone beyond its original scope of dealing only with publications in the Latin alphabet, with sixty American libraries participating.16 The plan has arrangements for its continued extension to new areas, subject to ratification by the Association of Research Libraries.

Volumes costing more than $25 are not automatically supplied; in addition, publications in certain areas are excluded, namely: books primarily of interest for format, juvenile literature, newspapers, precollege textbooks, reprints, offprints, sheet maps, sheet music, translations, and government documents. The participating libraries are required to send to the National Union Catalog at the Library of Congress a preliminary catalog card within one month of the receipt of each volume.

Neither Poland nor any other East European country is included in the plan. However, volumes from included countries on the history of Poland have been assigned to the University of Virginia libraries, and materials in various languages (other than Polish) on Polish languages and literature having been assigned to the Harvard College library.17

It is significant to see to what extent the features of the Farmington Plan exist with respect to Polish publications despite their not being included within the plan.

With respect to over-all coverage, there are only limited figures on the number of titles acquired under the Farmington Plan to compare with the findings of this study of Polish holdings. Making use of what figures are available,18 it is found that in 1951, 350 titles were acquired from Norway solely through the operation of the Farmington Plan. Total published titles during the year were 2,773. In 1952, 265 out of 2,704 titles were similarly acquired. In other words, 12.6 per cent during the first year and 9.8 per cent during the second were acquired as a result of the Farmington Plan. For Belgium we know the number of titles acquired during the years 1949-52, but we have only total publication data for 1953-55. By using the highest number of titles acquired during any known year and the lowest known number of titles published during the succeeding period, we still only get 11.6 per cent purchased from Belgium under the plan. During the period of the present study, 332 titles were acquired out of the total number of 1,109 published in Poland—25.1 per cent of the total titles are held somewhere in the United States. Thirty-seven and six-tenths per cent of all the titles issued in first edition are held, including 64.11 per cent of humanities and 45.94 per

15 Ibid., p. 23.
17 Edwin E. Williams op. cit., p. 79.
18 Ibid., p. 61.
cent of the social science titles. Only the pure sciences are not up to this remarkable level.

While the percentages for Polish titles are not exactly comparable with the percentages pertaining to Norway and Belgium, since the latter do not include the additional titles acquired through means other than the plan, Polish holdings are relatively—and when considered by themselves, quite—substantial.

The advantage, resulting from being included within the Farmington Plan, of knowing immediately where books in any field are held, is absent in the case of Polish books, except to the extent that titles in certain areas tend to locate themselves naturally in certain libraries. For example, all the medical titles can be found at the National Library of Medicine (although six titles can also be found at other places). Such “natural” distribution cannot completely compete with a planned distribution. It may, however, be further pointed out that of the thirty-three libraries herein studied five are governmental libraries (all but the Library of Congress being quite specialized), and two are museum libraries and therefore also specialized, yet all provide a start toward finding a book in Polish (or any other language) in a particular field.

The greatest failing pointed up by these findings is the time lag before, or complete absence of, reporting Polish titles to the National Union Catalog. Whether imperatives, as incorporated into the Farmington Plan, to report holdings would or would not eliminate this situation is difficult to say. Ruggles and Mostecky also note this failing with respect to the entire body of East European literature, and provide some of the reasons behind it.

In some cases librarians were too self-conscious of the peculiarities of their rules and practices; sometimes there has been a failure in communication between the chief librarian and his cataloging staff. Or often, as was freely admitted to the investigators in several instances, a library deliberately withheld reports on its holdings because if they appeared in the National Union Catalog, the library would be flooded with interlibrary loan requests.10

While these findings demonstrate that considerable duplication exists (225 volumes out of 557 held in the United States are duplicates—see Table 2), this may not have been “unnecessary” duplication. For example, exactly one-third of the duplicate copies (75 out of the 225 mentioned above) are fiction titles, purchased by large university libraries and large public library systems. There are no duplications in the pure sciences.

Thus, looking at the larger picture, Polish publications fare rather well in the United States. Ruggles and Mostecky assert that most librarians take

... a very negative view toward the suggestion that the Farmington Plan concept be extended to include Russian and other East European materials. The reason most commonly adduced was that there are so few libraries engaged in extensive acquisitions programs in East European publications that the responsibility for collecting comprehensively in assigned subject fields would impose excessive burdens on each of the participants.”20

This argument, by itself, is difficult to accept since the Farmington Plan already includes Cambodia, Korea, Laos, Pakistan, Siam, and Vietnam,21 countries of undoubtedly more specialized interest. Ruggles and Mostecky themselves feel that if the present need is not sufficient to warrant some such cooperative scheme, future needs will make it neces-

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10 Melville J. Ruggles and Vaclav Mostecky op. cit., p. 119.
11 Ibid., p. 27.
sary.22 The assertion made earlier in this paper that interest in this area is increasing (and the subsequent data demonstrating the beginnings of that increase) add backing to their position.

Channels for book importation from Poland are good. At present there are thirty-four Polish institutions participating in exchange programs with United States institutions.23 In addition, physical difficulties of importing book purchases from Poland are almost nonexistent.24 There appears to be little doubt but that this commerce will increase.

23 Ibid, p. 66-68.
EDWARD T. O’NEILL

Sampling University Library Collections

Two promising sampling techniques have been developed for large library collections. The first is based on the locations which the books occupy. All possible locations which a volume can occupy are numbered. The resulting sample can then easily be taken from the number locations. This technique has been found applicable to many library sampling problems. In the second method the sample is drawn from the shelf list. For this method the shelflist cards are assigned numbers, and it is the cards that are sampled. This technique is useful only under special circumstances. Both techniques have been used to sample the Purdue University libraries, and the results have been encouraging.

The actions and decisions which are made daily in library operations, as elsewhere, are based on the information available to the decision maker. The better the information on which the decision is based the better the decision will be. Sampling techniques provide a powerful means which the librarian can utilize to improve the information which is available to him.

While sampling techniques can be used to obtain a great variety of information, the methods which will be discussed here will concern only printed library materials. In the design of the sampling plan, several factors must be considered. First, it is necessary to determine exactly the purpose or purposes of the sample. It is also necessary to define precisely the population from which the sample is to be drawn. There are two basic frameworks from which the sample can be drawn: from the locations which the material occupies and from the shelf list. Sampling the locations has been found to be generally more efficient than sampling from the shelf list. The remainder of this paper will deal mainly with simple random location sampling.

Random sampling is, in general, a method of selecting \( n \) items out of a total of \( N \) items so that each possible sample of size \( n \) has an equal chance of being the sample selected. In practice the sample is usually drawn one at a time without replacement. In sampling very large populations, however, the sampling fraction is so small that sampling with replacement can be used with very little loss of precision.

The concept of simple random sampling is easy to understand, and the analysis of the sample is straightforward. The actual sampling, however, can be difficult. Most random sampling procedures require that each of the items in the population of \( N \) items be numbered from 1 to \( N \). This requirement makes the selection of the sample relatively easy, but it may be quite difficult to apply such a numbering system to the population. The only way such a system could be implemented for library sampling would be to number individually every item in the population.

Mr. O’Neill is in the School of Industrial Engineering at Purdue University. This paper was read at the 1965 annual meeting of the American Society of Engineering Education in Chicago.
The task of numbering a collection of several hundred thousand volumes would be immense, if not practically impossible.

In library sampling it is desirable to relax the requirement that the items be numbered from 1 to \( N \). All that is required is that each item have a unique number. If a location is defined as any site which is, or could be, occupied by an item belonging to the population being sampled and a unique number is assigned to each location, then each item in the population will have a unique number associated with it. The numbers associated with the locations will be referred to as location numbers. The problem of numbering all \( N \) items in the population has been changed to that of assigning a unique number to each of the locations.

While there are several ways to develop the set of location numbers, a nested system seems to be practical. The design of the shelving units usually dictates the limits on the others. It is rare that a single-faced shelving unit would have over ten sections of shelves; therefore ten is a useful limit to set on this value. As for the number of positions per shelf, it is difficult to set an absolute maximum, but for practical purposes a hundred positions per shelf seems to be satisfactory.

The task of relating the set of location numbers to the physical locations is relatively simple. Let the indices \( i, j, k, l, m \) identify the location defined by the \( m \)th position on the \( l \)th shelf in the \( k \)th section of the \( j \)th unit in the \( i \)th area. All the locations can then be uniquely described by a set of indices. If \( A \) is the location number, and:

\[
A = 1,000,000(i-1) + 10,000(j-1) + 1,000(k-1) + 100(l-1) + (m-1). \tag{1}
\]

The set of indexes are then completely determined from the location number, such that the indexes are the largest integers which satisfy the following conditions:

\[
i < \left[ \frac{A}{1,000,000} \right] + 1
\]
\[
j < \left[ \frac{(A-1,000,000i)/10,000}{1,000} \right] + 1
\]
\[
k < \left[ \frac{(A-1,000,000i - 10,000j)/1,000}{100} \right] + 1
\]
\[
l < A - 1,000,000i - 10,000j - 1,000k - 100l + 1 \tag{2}
\]

Since the location number and the set of location indexes are just different means of representing the same location, they can be used interchangeably.

If \( \epsilon \) is the number of areas in the collection, the set of location numbers contains all the non-negative integers which are less than \( \epsilon \times 10^6 \). Since this set of location numbers is much larger than the set of actual location, many of the

---

1 Although there is no theoretical limit on the number of areas within the collection, if the number of areas becomes too large it may be practical to define a region which would include a group of areas.

2 Limiting a shelving unit to no more than ten sections would force a larger unit to be arbitrarily divided into two or more units for sampling purposes.
location numbers will not have any physical location associated with them. In assigning the location numbers to the locations, the only numbers which must be directly assigned are the area numbers and the unit numbers. This job is relatively easy because the number of areas is usually small, and the units are usually arranged in an orderly fashion within the areas. Some problems are encountered in areas where wall shelving is used since, in this type of shelving the unit is often poorly defined. Once the units are numbered, all the locations within the units can be numbered very simply. An easy way to do this is to number the sections from left to right, the shelves from top to bottom, and the position from left to right.

A location is said to be valid when the location is occupied by an item belonging to the population being sampled. If the location is unoccupied, or if it is occupied by material which is not part of the population being sampled, the location is said to be invalid. A location number is valid if, and only if, the location number represents a valid location. There are two classes of invalid location numbers; (1) the location numbers which have no physical locations associated with them, and (2) the location numbers which represent invalid locations.

What is wanted in random location sampling is a random sample of the valid locations. The invalid locations are of no interest. To select randomly a valid location, location numbers are randomly chosen until a location number is found which represents a valid location. Repeating this process \( n \) times will yield a random sample of \( n \) locations.

The numbering system described above includes almost all the possible locations in the library system. To make the numbering system meaningful it was necessary that many invalid location numbers be included; thus a high percentage of the location numbers are invalid. In the Purdue University libraries, for example, it was found that only about 3 per cent of the location numbers were valid.

There is a way to check the location numbers to eliminate a high percentage of the invalid location numbers before the sample is collected. If some of the characteristics of the storage system are known, these can be used to divide the location numbers into two groups; those that are known to be invalid and those that may be valid. The more that is known about the system, the easier it is to classify a location number as invalid. If

\[
\begin{align*}
\alpha_{ijkl} & = \text{the number of positions on the } l\text{th shelf in the } k\text{th section of the } j\text{th unit in the } i\text{th area,} \\
\beta_{ijk} & = \text{the number of shelves in the } k\text{th section of the } j\text{th unit in the } i\text{th area,} \\
\gamma_{ij} & = \text{the number of sections in the } j\text{th unit of the } i\text{th area,} \\
\delta_i & = \text{the number of units in the } i\text{th area,} \\
\epsilon & = \text{the number of areas.}
\end{align*}
\]

Then for example, if all the \( \alpha_{ijkl} \) were known, it would be possible to separate out completely all the location numbers which were associated with unoccupied locations. For the set of location indexes \( "i, j, k, l, m, " \) if the positions index \( m > \alpha_{ijkl} \) then the location number is invalid. The check can be made at several levels as shown in Table 1.

The effectiveness of the prechecking technique decreases as the level increases. This increase in effectiveness is offset.
However, by the large increase in the amount of information required at the lower level checks. The choice of the level depends on both the size of the sample to be taken and on the physical arrangement of the library collection. Usually the choice is limited to levels II, III, or IV, with level III generally felt to be the most satisfactory.

If the check is made at a level higher than level I, some control is lost since all the variables are not controlled. There is a fairly simple way in which partial control can be gained over the variables not included in the prechecking without requiring too much information. Let

\[ \xi_i = \max_j \left( \max_k \max_l \alpha_{ijkl} \right) \]

\[ \eta_i = \max_j \left( \max_k \beta_{ijk} \right) \]

\[ \lambda_i = \max_j \gamma_{ij} \]

This yields three more conditions that are required for the location number associated with the location indexes “i, j, k, l, m” to be valid:

\[ m \leq \xi_i \]

\[ l \leq \eta_i \]

\[ k \leq \lambda_i \]

If any of the conditions are not satisfied, then the location is not valid. It is obvious that all or some of these requirements will be redundant depending on what level the check is made.

The technique of checking appears to be quite effective and is easily adaptable to high speed computers. In a large sample taken in the Purdue University libraries, a presort at level III increased the percentage of valid from an estimated 3 per cent before sorting to 42 per cent after the sort. Even if the \( \xi_i, \eta_i, \) and \( \lambda_i \) are only estimates of the true maximums, the checking technique is still highly effective.

Previously only the sampling of shelved materials has been considered. It must be remembered, however, that library materials can be in one of three places; (1) on the shelves of the library, (2) checked out of the library, and (3) in the library but not on the shelves. This third class would include both the material which was actually in use in the library and the material which was waiting to be reshelved.

The techniques developed for sampling shelved materials can be extended to include the materials which are checked out. This requires that each item which is checked out of the library have a location number associated with it. The idea is that every book which is checked out is represented by some form of transaction record. In most libraries, each volume of material which is checked out generates a corresponding transaction record. These transaction records are commonly stored in one or more files of some type. By assigning a location number to each transaction record, the transaction record can be treated as the other locations with one exception. From the transaction record it is only possible to find out what material “occupies” that location. The actual material may still have to be located and physically examined.

The locations have a special meaning when they are part of the checkout file. Generally the checked-out items can be treated as an area, although several areas can be used if required. It is usually convenient to define a file unit as a single drawer. Then the section, the shelf, and the position are effectively just positions within the file drawer. Other interpretations can also be placed on the location number within the file, and the choice of the system to be used is largely a matter of convenience.

The third group of material, that which is in the library but not on the shelf, may present very difficult problems in the assigning of location num-
bers in open stack libraries. In closed stack libraries this group can be grouped with and treated similarly to the checked-out material. In open stack libraries, there are so many possible locations that it is virtually impossible to assign location numbers to them. A convenient solution is just to exclude this material from the sample. While excluding this material introduces some bias, it may not be significant; and this bias can be reduced by taking the sample at a time when the number of books in this group is smallest, such as during vacation periods or at night.

As an alternate to location sampling, it is also possible to draw the sample from the shelf list. The method of sampling the shelf list is straightforward. It can, however, be very time consuming if a large sample is to be taken unless the required information is recorded in the shelf list. Assume the shelf list consists of \( D \) drawers with a maximum of \( H \) cards per drawer. A random sample of the cards can be obtained by randomly selecting a drawer and randomly selecting a position, between 1 and \( H \) within the drawer. Since \( H \) is the maximum number of cards per drawer, there will be many cases when the position selected does not exist. When this occurs, a new drawer and position must be selected. If another position within the same drawer is selected, then a bias would be introduced into the sample.

The above procedure will yield a random sample of the cards in the shelf list. Unfortunately, this is not a random sample of all materials covered by the shelf list unless there is a separate card for each volume. This is particularly true of periodicals. Since several volumes are often represented by a single card, a random sample of the card is actually a cluster sample of the volumes. The question often arises as to the necessity of including all the volumes of the cluster in the sample. The way in which the cluster is treated depends largely on both the purpose of the sample and the policy which was used in the construction of the shelf list. It is generally advisable to consult a statistician for advice on this phase of shelf list sampling.

Both the shelf list and the locations sampling have been used to sample at the Purdue University libraries. Each technique has some advantages which under special conditions make it superior to the other technique. However, the shelf list sampling was found to be much more time consuming than location sampling. The use of the shelf list sampling would be recommended only under special circumstances.
ALICE T. COPELAND

Philosophy Journals as Current Book Selection Guides

In an effort to determine the adequacy of book review coverage in the fields of philosophy, thirteen philosophy journals were studied for a period of one year, and the books reviewed in them tabulated. These reviews were also correlated with library review media and compared with reviews during the same period in the Library Journal and Choice. Results indicate that comprehensive coverage is available only in the philosophy journals.

"Just naming some of the topics covered by the Dewey classification in the field of philosophy suggests a major problem: ontology, cosmology, epistemology, teleology, positivism, nominalism . . . philosophy is a very technical subject, indeed." In so saying, Carter and Bonk, in their book, Building Library Collections, have put their fingers on the crux of the selection problem in the field of philosophy.

The college or university librarian who is expected to take full responsibility for the completeness of a collection in philosophy, without help from the departmental specialists in the field, has a problem indeed. Not only are the areas within the field many and diverse, but also the terminology itself demands intimate knowledge of this complex discipline. Common sense is not enough here, in a field where even terminologies such as "realism" and "idealism" have meanings totally different from ordinary usage.

The current tools discussed in this paper are those which the librarian might regularly use to fill out the collection. Even if a good relationship were assumed between department and library, a broad interest on the part of the department cannot necessarily be assumed, because, although one might hope that this would be the case, departments do change, and the subject specialty of its present members must not unbalance the collection as a whole. In other words, if a department becomes heavy with men interested in the philosophy of science, the librarian's job becomes that of making sure that the collection includes works in aesthetics and philosophy of religion. The librarian can never abdicate responsibility for a collection in a subject field, however esoteric and technical that field might be; he must keep abreast of the subject matter as best he can and keep the general collection in order.

It is with this purpose in mind that the current reviewing tools available in the field of philosophy were analyzed; first in terms of the journals themselves, and secondly in terms of a study of the books reviewed in them. Many of these journals cover foreign books, some even having reviews written in foreign languages; the journals are published all over the world. Some of the reviews, however, lend themselves more to philosophical debate than to use as a library tool.

In all cases, of course, the reviewing tool is only as good as the specific re-
viewer. Reviews vary from person to person and from topic to topic; generalization is almost impossible. The Journal of Philosophy, for example, publishes only first-rate philosophical papers, but in the review columns one has to decide whether a particular philosopher is writing a first-rate review or whether he is grinding his own philosophical ax.

Another problem in using professional journals for current book selection is that often books are reviewed in them long after the book is actually published. Not all are guilty of an undue time lag and in the long run, a book that is worth having and which had not been ordered upon publication is worth having later.

Because of this time lag, and because of the difficulty in reading all of the journals in all areas for which a librarian finds himself responsible, would the librarian be justified in relying solely on library reviewing tools to fill out the collection in philosophy? In order to answer this question a comparison was made of the coverage of books reviewed in philosophy journals with those reviewed in two widely used library tools, Library Journal and Choice. Also noted are the journals which are covered by Book Review Digest (BRD), Book Review Index (BRI), and the Index to Book Reviews in the Humanities (IBRH). It is interesting to note the comment by Frances J. Kirschenbaum that of all the subjects indexed in the Index to Book Reviews in the Humanities, "Only the field of philosophy is at present well covered." The books referred to as reviewed in the philosophy journals were reviewed in 1964 only, thus giving a survey of one complete year's coverage.

NOTES ON REVIEWING IN THE PHILOSOPHY JOURNALS

Journal of Aesthetics and Art Criticism. Published quarterly (two issues only in 1964) by the American Society for Aesthetics at Wayne State University, the College of Liberal Arts, the University Press, and the Cleveland Museum of Art. The American Society for Aesthetics was "organized in 1942 for the advancement of philosophical and scientific studies of the arts and related fields." This journal is included in society membership.

The 1964 fall issue was completely devoted to articles in honor of the former editor of the journal and had no book reviews. The winter issue included long signed reviews with the name of the college of the reviewer. It included reviewers from the Cleveland Museum of Art.

About fifteen books are reviewed in an issue, only one of which in the winter issue was strictly a philosophy book; the others were in art and literature. It may be that this journal would not be valuable in the field of philosophy, depending upon the arrangement of courses in aesthetics in the particular school.

Journal of Symbolic Logic. Published quarterly by the Association for Symbolic Logic, Inc., with support from UNESCO through ICSO and from institutional members. It comes out three times a year, in March, June, and September.

It reviews both books and journal articles. The reviews are in English, but they include articles from foreign language periodicals. Each issue contains reviews of four or five books which are scattered among reviews of articles. Current bibliographies of individual authors are compiled, e.g. Ernest Nagel had a listing of nine books and articles.

The September issue was devoted to abstracts of papers given at the annual meeting of the Association and had no reviews. This is a technical field and has technical reviews. Cross references from journal articles abound.

Journal of the History of Philosophy. Published twice a year by the University of California Press. "The Journal of the
History of Philosophy is an international journal which publishes articles, notes, discussions, and reviews about the history of western philosophy, broadly conceived. . . . Publishes material in English, French and German." And hopes for Spanish and Italian in the future.

This journal has long signed reviews, occasionally in French. It is apt to have long quotations from the book in the original language even though the review may be in English.

The section called Book Notes has capsule annotations for about four books per issue. "New Translations" lists and annotates about six. "New Editions" has about nine. It also contains a section called "Books Received" which lists many more but without comment.

Journal of Philosophy (BRD, BRI, IBRH). This is one of the leading journals in the field, published fortnightly at Columbia by the Journal of Philosophy, Inc. (every four weeks in July and August). The October and November issues contained agenda and papers for the American Philosophical Association meetings. Some issues have no reviews; others have one or two. All are long, signed philosophical reviews. Occasional sections list "New Books" with the length varying from nine to fifty of the unannotated lists. February 27 issue listed "Paperbacks, Reprints, and Anthologies"—four of them; October 29 cited "Reprints and Selected Writings."


"New Books" contains long signed reviews, almost exclusively in philosophy. It includes foreign language books, although they are reviewed in English.

"Received Also" section is one which lists about sixty-six books, a larger percentage of which are in psychology than are the reviews, and which also includes foreign language books.

Philosophical Books. Issued three times a year, January, May, October, by the Leicester University Press.

This is the only journal devoted exclusively to book reviews. It averages about twenty-three an issue. Shorter articles tend to be more to the point of the book—-are less apt to be philosophical dissertations.

The journal lists collections separately, although without review, at the end. It tends to be up-to-date, even the January 1964 issue had only 1963 books. The October issue reviewed only 1964 books.

The Philosophical Review (IBRH) (BRI contemplated). Quarterly journal, edited by the Sage School of Philosophy, Cornell University. Published January, April, July, and October.

This is a first-class journal with high reviewing standards. Articles are signed and university origin is given—some of the outstanding names in American and British philosophy appear in these pages. Mostly American books are reviewed, with a sprinkling of British and French imprints in the year 1964. Most of the books which were reviewed in 1964 were published in 1962.

The section entitled "Books Received" gives current listing of some one hundred books per issue.

For the most part these are long critical articles, often consisting of philosophical critiques on the part of the reviewer. The use of regular size print in the Book Review section makes it easier to use.

The Philosophical Quarterly (IBRH). Published by the University of St. Andrews for the Scots Philosophical Club. Four times a year: January, April, July, and October.

The January issue was devoted to books on Greek philosophy, both articles and book reviews. Other issues covered all areas and many countries, including foreign language books.

Most of the books included in the 1964 issues were published in 1962, a few in 1963. It has a "Books Received" section
with some one hundred current books. The reviews are long, critical, and signed.


Fewer books were reviewed than has been the case in other journals (about three to five an issue) but all were 1963 imprints in the year 1964. "Books Received" varies from thirteen to eighty-four. These are signed articles, mostly British and American books, some others. Prices are given in British currency even if the books are published in America.

*Philosophy and Phenomenological Research* (IBRH). "A Quarterly Journal" but 1964 had only two issues: September and December—a symptom of the times as regards journals. Published for the International Phenomenological Society by the University of Buffalo Foundation, Inc.

This tends to be more up-to-date than some of the other journals—almost all of the books reviewed in 1964 were published in 1963. The reviews consist of short, signed articles. They are perhaps less apt to be philosophical exegeses than book reviews. It contains between twenty-three and twenty-five an issue.

All books reviewed were American except for two French books in the second issue.

*Philosophy East and West*. A quarterly journal of Oriental and comparative thought. Published by the University of Hawaii Press. "Articles in the field of Oriental and East-West comparative philosophy from all parts of the world." Articles are in English; editors have offered to translate if the original author cannot.

"Books reviewed are limited to those in the field of Oriental and comparative philosophy." It contains about four or five per issue. "Books Received" are not so limited, but most of them do pertain to these fields. It lists about forty books an issue.

The books reviewed in 1964 were from 1960-1963. They included authors and publishers from all over the world, with a heavy emphasis on the Far East.

A section called "Current Periodicals" lists articles in various journals within the field of Oriental and comparative philosophy. Occasionally a full table of contents is published. Titles in Chinese and Japanese are transliterated. It has a helpful bibliography of foreign journals, although only the city is given and not the name of the publisher. Journals are included from Calcutta, Bologna, Madras, Tokyo, etc.

The October issue had a "News and Notes" section which gave a bibliography of Chinese philosophy in Germany since 1950. It did not include Germans working in America.

This would be very helpful in a college or university with many foreign students, or with a particularly strong department of eastern philosophy.

*Philosophy of Science* (IBRH) (BRD) (BRI contemplated). Official Journal of the Philosophy of Science Association. Published quarterly by the St. Catherine Press, Bruges, Belgium, although an American publication—it is sponsored by the Institute for the Unity of Science and by Section L of the AAAS, with Richard Rudner of Washington University, St. Louis, as the editor.

The January issue had no book reviews, but contained short abstracts from *Inquiry*, and the British Journal for Philosophy of Science, 1962-63, which included two "Review Discussions" and two recommended books on the subject. The April issue had seven book reviews; none in July. The October issue had not been received at the time of this study.

*Review of Metaphysics* (IBRH). "The Review of Metaphysics is devoted to the promotion of technically competent definitive contributions to philosophical knowledge. It is not associated with any school or group, not the organ of any association or institution; it is interested in persistent, resolute inquiries into root
questions, regardless of the writer’s affiliations.” A list of sustaining institutions, some thirty of them, is given on the back.

A somewhat different approach is given to the reviewing section. It consists of summaries and comments, a brief résumé, report or criticism written not by outside reviewers but by members of the staff, with some outside help. They are short concise comments, much more like annotations than reviews. They review mostly books in 1963 or 1964 because of this, and are therefore more up-to-date. Each volume reviews some forty to eighty books.

There is a section on doctoral dissertations, 1964, listing by university the name, title, and advisor of each in the field of philosophy.

A section called “Critical Studies” gives long essays on previously published books and philosophers. Metaphysics is a fairly broad term and a few books included are by Sartre, Bonhoeffer, T. S. Eliot and C. S. Lewis, whom we tend to think of primarily in connection with other fields.

**Comparative Analysis**

The philosophy journals published in 1964 contained reviews of 493 books. Of these, 336 were listed in one journal only, leaving 157 which were duplicate entries. Some were listed in two journals, others in three or four, but none in more than four. Two of these journals, *Aesthetics* and *Philosophy East and West*, had no books at all that were listed in our journals of philosophy, although two of the twenty-one books in *Philosophy East and West* were listed in *Library Journal*.

A breakdown of the division of the listings is given in Table 1. As can be seen, *Philosophical Books* is the only one that has a large percentage covered in other journals, thirty-six as compared to twenty-seven which are covered only in it. It must be remembered, however, that this is strictly a reviewing journal, with short annotations which are in general very helpful. To disregard it because the majority of books are covered in other journals would be both to discard a useful tool as well as to neglect the twenty-seven books that are not covered elsewhere.

A second point to consider is how many of these journals are covered in the regularly used library reviewing tools. Since philosophy journals are so technical in their presentation for the most part, would it not be helpful to find reviews in, for instance, *Library Journal*? Another gain would supposedly be the fact that *LJ* and other general tools come out more promptly with their

### Table 1. Comparison of Books Reviewed in Philosophy Journals, 1964

<table>
<thead>
<tr>
<th>Journal</th>
<th>Single Journal</th>
<th>Two Journals</th>
<th>Three Journals</th>
<th>Four Journals</th>
<th>Total</th>
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<td>1</td>
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<td>2</td>
<td>2</td>
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<td>3</td>
<td>1</td>
<td>31</td>
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<tr>
<td>Mind</td>
<td>17</td>
<td>26</td>
<td>8</td>
<td>2</td>
<td>63</td>
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<td>11</td>
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<td>44</td>
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<tr>
<td>Phil. and Phen. Research</td>
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<td>5</td>
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<td>33</td>
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<td>Phil. East and West</td>
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<tr>
<td>Phil. of Science</td>
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<td>20</td>
<td>4</td>
<td></td>
<td>123</td>
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<td>9</td>
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<td>14</td>
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<td>Symbolic Logic</td>
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</tr>
<tr>
<td><strong>Totals</strong></td>
<td>336</td>
<td>105</td>
<td>42</td>
<td>10</td>
<td>493</td>
</tr>
</tbody>
</table>
book reviews, and one could avoid the time lag of the philosophy journals. To check on this possibility the philosophy sections of LJ were studied for both 1964 and 1963, in case the earlier reviewing had picked up more books. Of the total of 493 philosophy books, only a total of nineteen books were covered in both years of Library Journal—thirteen in 1963 and six in 1964. Clearly Library Journal offers no adequate substitute for the reviewing of the philosophy journals.

As a secondary check the available issues of Choice were also consulted; it began publication in March 1964. In spite of the limited number of issues published, a slightly higher number were found here than in LJ—a total of sixteen books covered, nine of these in Review of Metaphysics, two in Philosophical Books, and five from both of these. This hardly seems generous, however, when compared with the total of 123 books in the Review of Metaphysics alone.

Only two books were reviewed by both Choice and Library Journal. Undoubtedly some of the other books on philosophy would have been covered in earlier issues of Choice, had it been published in 1963, but even if one were to double the number and assume a total of thirty-two books covered in the two-year period, Choice would be but a first step toward finding the 493 philosophy books reviewed by the journals in this field in 1964.

The librarian must decide how broad a coverage of reviews he will read in order to do his selection in any one field. Perhaps staff size will not permit the careful reading of all thirteen journals cited. Perhaps it will be decided that aesthetics is not really in the field of philosophy and can be excluded. Perhaps the size or interest of the student body would warrant the exclusion of Philosophy East and West. Perhaps the small number of books covered in Philosophy (a total of seventeen, nine of which had been picked up by other journals) would mean that one could be put aside. The same could perhaps be said for Symbolic Logic, although this is a valuable reference journal for the profession; it is the only one to review articles, and in terms of bibliography within the subject it is invaluable. A journal like Mind, although many of its books are covered by others, is nevertheless one of the leading journals in the field and to deprive oneself of its point of view and undoubted authority is something that ought not to be done lightly.

Philosophy is a complex subject, and to cover it adequately in a college or university library requires a large number of specialized journals, a large number of titles to be considered, and a staff able to distinguish a “good” philosophy book from a “bad” one. Surely with a “good” philosophy department much of the decision-making will be done by teaching faculty, but the librarian must face the fact that it will take a great amount of care and reading and work to build up a first-rate, or even a second-rate collection in this field.

<table>
<thead>
<tr>
<th>Philosophy Journal</th>
<th>No. of Titles 1964</th>
<th>Library Journal</th>
<th>Choice</th>
</tr>
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<tr>
<td>Aesthetics</td>
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<tr>
<td>History of Philosophy</td>
<td>46</td>
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<td>28</td>
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Librarianship in Iran

Iranian library development is of recent origin, and the establishment of a national library association is now being attempted. Trained people are badly needed to effect modern library administrative practices. Library materials are also needed to support curricular programs and to stimulate research, and the status of librarians needs improvement. Career opportunities in Iran are unlimited.

Perhaps typical of many developing countries, Iran has a limited history of library development and no concept of modern librarianship. In recent months, in the attempt to organize an Iranian Library Association, it was found that there were no more than a half dozen Iranian-born librarians with professional degrees; all of these held positions in the capital, Tehran. The improvement and development of libraries throughout the country has only recently begun, largely through the advice and assistance of foreign librarians on short-term assignments. Since such assistance is temporary and limited, it is obvious that Iran’s crucial need is a “crash” program for the training of those who can become the nucleus of a new profession of librarianship. At the present time, because of long-standing traditions and the attached prestige, most of the academically promising young people go into medicine, engineering, or careers growing out of a major in economics. Such professions have status, provide security, and offer the best promise of employment. While there have been provincial colleges in Iran for some years, university education as we know it is a relatively recent development.¹

¹Not until 1934 were the separate “colleges” of the present University of Tehran consolidated; Pahlavi University, Shiraz, succeeded the provincial University of Shiraz, founded in 1952.

Mr. Deale is Director of Libraries, Beloit College, Beloit, Wisconsin.

The desperate need for trained personnel can best be illustrated by the example of Pahlavi University in Shiraz which has no permanent director of libraries, no centralized book collection, no centralized library budget, and no professional Iranian staff. Five libraries, operating more or less independently, have little control over either book funds or the purchase of periodical subscriptions. The deans of the various faculties (agriculture, arts and sciences, engineering, and medicine), allocate book and periodical funds by departments. The situation is not much brighter at the University of Tehran, where, in spite of a central library, there are some thirty-odd departmental collections with little over-all supervision or control. University administrators, with many problems demanding their attention and time, cannot be wholly blamed. With little concept of the meaning of library service to students and faculty, and with no one to point out the basic and significant role of libraries and librarians in the academic community, it is understandable that the profession has been ignored or neglected for so long.

In tentative reports presented at a midwinter Fulbright conference concerned with the problems of Iranian higher education,² Margaret L. Hopkins, Fulbright consultant to the University

of Tehran, and the author emphasized the crucial need for the training of professional Iranian librarians. The alternatives (which should be pursued simultaneously during the next few years) are: (1) study abroad for the best qualified university graduates interested in a career in librarianship; and (2) establishment of a four-year and a five-year program in library education. Both consultants have outlined and recommended proposals for the establishment of such programs. While it is not likely that the Ministry of Education (Tehran) will approve two programs, there is no reason why Iran could not support both. There are medical and dental faculties in Tehran, Shiraz, and Meshed; why not more than one school of library service?

In the proposals recommended to the administration of Pahlavi University, the report of Lester Asheim, director, ALA International Relations Office, was followed. Dr. Asheim spent a week in Shiraz during October 1965, talking with librarians, administrators, and others. In his carefully written memorandum to the Chancellor and Vice-Chancellor, he urged a program of library education in three stages. The first stage, currently in operation, is the conducting of library science classes for present library personnel. The second stage, which has the approval of the Pahlavi University administration, will be to institute a department of library science within the college of arts and sciences next year (1966-67), and offer a major subject concentration. “The third step—and we are agreed that this is the ultimate objective towards which present plans and commitments should be directed—will be the establishment of a professional school of library service, which will offer its own degree, and provide course work at the fifth-year level for full professional qualification beyond the under-

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4 Memorandum to Chancellor A. Alam and Dr. Z. Ghorban, Vice-Chancellor, Pahlavi University, Shiraz, Iran (October 20, 1965), mimeographed.

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4 Asheim Report, p. 3.

5 Ibid.
outside sources. Its student body is bilingual, with courses being taught in English. Simultaneous with the development of a program of library education, the university must give serious attention to the condition of its various libraries. While well-trained personnel are needed to increase the effectiveness of library service and physical needs cannot be overlooked, good libraries consist of books and related materials that implement the curriculum and stimulate research. Good libraries do not just grow; they must be carefully built and given thoughtful direction by trained experts (both librarians and teaching faculty) if the cumulative results are to be significant. Students and faculty deserve a strongly supported library program if they are not to be deprived of one of the basic, essential ingredients of an academic community.

The challenge and opportunity for librarianship in Iran is unlimited. There are no hide-bound traditions to overcome, except within the field of education itself; there is evidence of interest by the Iranian government in all forms of educational advancement (including libraries); and there is a variety of opportunities waiting for the graduate looking for a new adventure and a satisfying career. With the acceleration of Mohammad Reza Shah's program for the elimination of illiteracy, there will be increasing need for books, libraries, and librarians at all levels. If, at both the secondary and university level, Iranian students are given the chance to learn about career opportunities in librarianship and if they can be assured that it will have status and remuneration comparable to other developing professions in their progressive country, there is little reason to believe that many young men and women would not choose to contribute to the progress of their country by preparing themselves for a future in librarianship! Of course, these are rather big "ifs" that will require the dedicated efforts of Iranian educators and administrators, with the guidance and assistance of foreign consultants.
ROBERT BALAY and JOHN GARDNER

An Inexpensive Information Retrieval System Using Coordination of Terms With Edge-Notched Cards

The retrieval system described was designed for a collection of approximately six to ten thousand documents of a wide subject range. After an analysis of the available cheap forms of manual information retrieval systems a unique method of combining coordinate indexing, together with McBee Keysort aperture cards was developed. This method also had the capability of quickly reproducing the results of a search by the use of the Keysort cards as duplicating masters and a special Handiprinter. The system was proved to be eminently practical in operation, and its main advantages were its simplicity, the clerical and professional staff time-saving it offered, and the opportunities for deep analysis of subject matter that it offered.

Research libraries are often made the depository for unique collections of documents which present unusual features of organization or subject matter, and for which ready-made cataloging is not available. Methods devised to index and control such collections are sometimes elaborate and expensive. In this paper, by way of contrast, we describe an information retrieval system which is both inexpensive and entirely manual in operation and which features random filing, coordinate indexing, and a quick means of reproducing the results of a search.

Planning

Part of the technical information center at General Precision Aerospace consisted of a collection of proposals, amounting to about six thousand items, which had never been cataloged. A card catalog had been started some years earlier, but the only subject access it provided was a title index, and the catalog had not been kept up to date. Consequently a great deal of new material had never been indexed, and to make matters worse, portions of the card catalog had been destroyed. The proposal collection was used steadily (about fifteen queries per week) and it grew fairly quickly, since a copy of every proposal submitted by the Aerospace Group was deposited in the technical information center. Proposals were filed

Mr. Balay is at the Kresge Science Library, Wayne State University, and Mr. Gardner is at the Technical Library, Sandia Corporation, Albuquerque, New Mexico. The work described in this article was performed when the authors were employed by General Precision Aerospace, Little Falls, New Jersey.
An Inexpensive Information Retrieval System

in alphanumeric order by the proposal code and could be found in most cases only if the requestor knew the code number. A quarterly listing of proposals submitted, issued by the publications department, provided access by title but only in chronological order of publication; hence the listing had to be searched item by item.

Since a great deal of the research conducted by the group was reported only in this body of proposal literature and was not readily available in any other place, the need for some sort of index to the collection was apparent. Accordingly, we began to investigate existing methods of information retrieval. Before doing so, however, we formulated a set of requirements for an acceptable system. These were:

1. The system had to be under the control of the technical information center, so that it could be used at any time.
2. Because of the shortage of staff time, the system had to operate with an absolute minimum of clerical effort.
3. The system had to permit indexing in depth, or coordinate indexing and searching techniques, or both.
4. The system could not demand refiling of the collection in any other than its current order, both because of the confusion that would occur during refiling and because the clerical time involved would be intolerable.
5. The system had to be inexpensive.
6. The system had to be simple so that a great part of its operation could be trusted to clerks, of whom little training would be required.
7. Extreme speed of retrieval would not be necessary; ten to thirty minutes of retrieval time per query would be acceptable.

With these requirements in mind, we proceeded to examine the available systems.

Requirements (1) and (5) at once eliminated the use of systems requiring computers or data processing equipment. The use of Termatrex or one of its imitators was seriously considered, since it satisfied most of the requirements; but this class of retrieval device was rejected because it would exceed the available funds (5) and would require refiling the collection (4). The conventional library card catalog, while flexible and inexpensive, does not permit coordinate indexing (3) and demands a great deal of card handling, typing, and filing (2). Finally, Uniterm cards, the most attractive of the existing systems, chiefly because of their simplicity and low cost, were rejected because of the filing and posting time involved (2) and because their use would have demanded a reordering of the collection (4).

In this way the readily available systems were found, for various reasons, unsuitable for the needs of the collection, and we were forced to design a unique system. Edge-notched cards had been considered during our analysis of existing systems, but the methods in use were either very complex or admitted of too few coding positions. If the coding capacity of the cards could be increased while their operation was simplified, edge-notched cards could be made to satisfy our needs.

Edge-notched cards may be used in one of two ways: either the card represents a subject and documents are coded around its edge, or the card represents documents must either be filed by their Uniterm number or a file correlating Uniterm numbers with the document shelf list must be created. Either method uses up clerical time.

In the Uniterm system, documents must either be filed by their Uniterm number or a file correlating Uniterm numbers with the document shelf list must be created. Either method uses up clerical time.

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- In the Uniterm system, documents must either be filed by their Uniterm number or a file correlating Uniterm numbers with the document shelf list must be created. Either method uses up clerical time.
- See, for example, Gerald J. Cox and others, "Punch Cards for a Chemical Bibliography," Chemical and Engineering News, XXIII (September 25, 1945), 1623-26.
- Wagner's terminology (p. 481) is perhaps preferable here; for "documents" he uses "individuals," for "subjects," "characteristics."
a document and subjects are coded around the edges. In the first application, the cards make up an inverted file and cards must be kept in strict alphabetical order. This application resembles the Uniterm method and would incorporate the disadvantages of Uniterm which were described above. The second method has two advantages: it does not require refiling the collection of documents, and it permits coordinate retrieval by providing a means of comparing subject terms. Terms are compared in this application by passing the sorting needle through the deck of cards a few times; thus, if one were searching for digital integrating accelerometers, the needle would be passed through the entire deck of cards at the position coded for “accelerometer,” a second time through the smaller group of cards thus selected at the “digital” position, then a third time through the remaining cards at the “integrating” position. The cards which drop out after this final sort will be the ones which deal with the subject under search.

By employing this second method, edge-notched cards could be made to satisfy most of our requirements: they were inexpensive, they allowed coordinate indexing and retrieval, they did not require refiling the collection, and they would be under the control of the technical information center. It was found that their use could be greatly simplified by reserving all the punching positions for descriptor codes and by using only direct coding. A drawback still seemed to be the small number of notching positions available; even the larger 5 x 8 inch cards contained only about two hundred and fifty holes, and if each hole represented a subject, the system would be restricted to two hundred and fifty subject terms. A solution—to expand the number of notching positions by using combinations of holes—was quickly hit upon, and the proposed system now seemed to satisfy our requirements. It was therefore decided to adopt the system.

**CARD DESIGN**

The final card design, which evolved over a period of two months, is shown in Figure 1. The card layout was developed with the assistance of a representative of McBee Systems, and after the approval of a dummy, a quantity was ordered, printed, and delivered. On the cards the two rows of notching positions are divided into two parts, a primary index along the lefthand margin and a secondary index around the other three margins. Each descriptor is assigned a two-part number, the first part being punched in the primary index, the second in the secondary index. Thus the term “reconnaissance,” coded 6/58, will require a punch at the 6 position in the primary index and at the 58 position in the secondary index. By using combinations of holes in this manner, the 234 separate coding positions on the card can be made to accommodate 8,360 subject entries. Space is provided on the card for recording the descriptors used and their code numbers.

Another feature of the card is the aperture on which the title and other bibliographic information are typed. The aperture is covered with a special duplicating paper plate; before typing...
the bibliographic notation on this paper, the typist backs the aperture with a sheet of hectograph carbon, supplied by McBee Systems; when the notation is typed, a reproducible master is deposited on the back of the aperture paper. This can be reproduced on 3 x 5 cards for making auxiliary or supplementary indexes, or the cards resulting from a search may be reproduced to form a bibliography. A portable spirit-type duplicator, called a Handiprinter, which consists of a pad and roller together with a tubular spirit tank serving as a handle (see Figure 2), is sold by the card manufacturer for this purpose. The Handiprinter is filled with spirit and the damp felt pad is passed over the card on which one wishes to reproduce. The aperture card is then laid face up on the moist paper, the Handiprinter is rolled over it, and the information typed on the master is transferred to the paper.

INDEXING

One of the aims of this retrieval system was to use as little time—both professional and clerical—as possible. Accordingly, some shortcuts were adopted. Since it is rare to see an author's name on a proposal, this item was eliminated from the bibliographic notation. Because all the items to be indexed were proposals, and all originated at General Precision, there seemed to be no reason for recording this information. This left only four items to be recorded in the bibliographic entry: the proposal's code number, its date, its title, and the agency to which it was addressed.

All typing was done by a clerk from information provided by the cataloger. Descriptors and their codes were written directly on the Keysort card (an average of 10-15 descriptors for each document) and the bibliographic particulars were marked on the title page of the document with appropriate symbols (title in " ", date circled, and proposal number and addressee underlined). The report, with the Keysort card enclosed, was then passed to a clerk who typed the bibliographic information on the card according to a predesigned format and notched the appropriate numbers on the edge of the card. The document was then returned to the shelves and the Keysort card filed with others already prepared. Since the documents on the shelves were kept in proposal code order, they constituted a shelf list of the collection; there was, therefore, no need to file the Keysort cards in any particular order or to refile them in a special order after they were used, and they could be kept in random sequence.

Subject control was maintained by two devices: a numerical code list and an alphabetic descriptor list. The numerical code list was prepared in advance and consisted of a sequential listing of code numbers, thus: 1/1, 1/2, 1/3, . . . 1/95; 2/1, 2/2, 2/3, and so on. When a new descriptor was used, a code number was assigned from this list, and the number was then crossed off so it
could not be used again. The descriptor was written on a 3 x 5 card with its code number and filed alphabetically. The cataloger assigned descriptors and code numbers from this file or made up new cards with new code numbers when new descriptors were required. The file was reviewed periodically for synonymous terms for a trial period during which 150 proposals were indexed. If it had been considered necessary, title and addressee indexes could have been prepared using the Handiprinter. These indexes would have been arranged in alphabetical order.

SEARCHING

To query the system, the indexing procedure is reversed. The requestor announces his needs and is quizzed about his topic in accordance with good reference practice. Descriptors are arrived at which characterize his needs. These terms are noted, looked up in the alphabetical descriptor file, and the corresponding code numbers noted. The pack of Keysort cards is then needled for these code numbers.\(^9\) Two passes are required for each descriptor, one in the secondary index, one in the primary index. If more than one descriptor is being searched, the term likely to occur least often is needled first in order to reduce the number of cards to be needled on passes two, three, four, and so on. This process provides comparison of terms, the effect being similar to that obtained in the Uniterm system where document numbers on descriptor cards are compared.

It should be pointed out that it is seldom necessary to needle twice for each term being searched. For example, if one is searching for documents on the fabrication of ceramic diodes for microelectronic modules in severe environments, a descriptor list such as this might be compiled:

<table>
<thead>
<tr>
<th>DESCRIPTOR</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic</td>
<td>6/60</td>
</tr>
<tr>
<td>Diode</td>
<td>2/58</td>
</tr>
<tr>
<td>Microelectronic</td>
<td>6/37</td>
</tr>
<tr>
<td>Modules</td>
<td>1/13</td>
</tr>
<tr>
<td>Environment</td>
<td>9/71</td>
</tr>
</tbody>
</table>

To conduct the search, one might disregard the needling strategy described above and proceed arbitrarily, needling in the secondary index 60, 58, 37, 13, and 71, and in the primary index 6, 2, 1, and 9. In practice it would not often be necessary to make as many passes as this example enumerates; after the third or fourth pass, the pack of remaining cards will ordinarily be reduced so that their titles can be scanned quickly without making further passes.

CONCLUSIONS

The information retrieval system described here has proved satisfactory in operation. Its simplicity makes it easy for clerical assistants to understand and operate; it provides a form of coordinate retrieval; and it offers a number of clerical shortcuts (random filing of cards, single typing of bibliographic citation, a means of quickly reproducing citations to make up bibliographies) that result in a great saving of clerical time.

It is not, however, in its present form, suitable for large collections. Unlike Uniterm, which for a given search considers only those documents entered on the Uniterm cards chosen, the system described here considers every indexed document in the collection during every search. As the collection grows, so does the file of Keysort cards, and the time and labor involved in needling becomes correspondingly greater.\(^9\) The system

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\(^9\) The needling procedure is fully described in several places; for example, by Robert S. Casey and James W. Perry, “Elementary Manipulations of Hand-Sorted Punched Cards,” in Robert S. Casey and others, eds., Punched Cards: Their Applications to Science and Industry, 2d ed. (New York: Reinhold, 1958), p. 12-29.

\(^9\) One device adopted to reduce needling time was to use only shallow punches until they were exhausted, then assign code numbers requiring deep punches. Thus, numbers 1/1 through 1/95 were assigned, then 2/1 through 2/95, and so on until 22/95. A deep punch, of course, requires two passes, a shallow punch only one.
might be adapted to larger collections by color-coding the cards to represent large subject areas, but for the present it seems advisable to limit the size of collections for which the system is used to ten thousand documents.

False drops have presented some problems. If one is needling, for instance, for terms coded 3/45 and 7/68, cards coded 3/68 and 7/45 will drop out also. In practice this has not been found to be a serious hindrance. Rarely are more than ten items turned up by a search, particularly if one has been careful to define the subject carefully, and it is a simple matter to scan the titles and reject the unsuitable cards. Most queries are so specific that several terms are required to describe them adequately, the multiple passes needed lower the number of documents yielded by a search and provide a cross-check to lower the number of false drops.10

This retrieval system is recommended for libraries having small special collections and has as its main advantages coordinate retrieval and low expenditure of clerical time.

NOTE: The authors would like to express their thanks to McBee Systems for their help with those aspects of this article specifically pertaining to their equipment.


Annual CRL Index

The annual index for CRL and its ACRL News issues will be published this year in the December ACRL News issue. Since the news issues of CRL are not at present available on subscriptions, subscribers copies of title page and index for volume XXVII will be available on request after December 10, from the ACRL office, ALA Headquarters, 50 E. Huron St., Chicago 60611.
Library School Instructor Evaluation

Since 1960 students have been asked to evaluate all courses taken in the Drexel library school. Results of the evaluations are tabulated and implications are discussed; they are also compared with similar studies in other disciplines and at other institutions. Summer school courses were better liked than those taken during the year; women instructors scored higher than men; courses in specialized library work ranked higher than others.

In 1960 the Drexel Institute of Technology graduate school of library science initiated a program of evaluation of faculty members by students. Student ratings are obtained for each section taught by full-time instructors during their first three quarters at Drexel, and for the first four courses taught by part-time instructors. Normally the evaluations are obtained in the last class meeting before the final examination.

The evaluations are intended to serve three purposes. Primarily, it is hoped that the ratings will aid the instructor in improving his teaching methods by pointing out specific areas needing improvement and by revealing to the instructor his students’ reactions to him, both positive and negative, since “only by accident will the teaching of a man ignorant of the reaction of his class be effective.”1 Second, the ratings assist the administration in judging faculty members’ effectiveness. A third purpose is to give students a voice in school administration.

Since the 1920’s, and especially in the last two decades, student evaluation of instructors has received increasing attention from educators and researchers. In general, this research has shown student evaluation to be reliable and valid. In his survey of the subject in the Handbook of Research on Teaching, H. H. Remmers cites various studies which have shown that student ratings were not appreciably influenced by the difficulty of the course, by the halo effect, by the grades given to raters, or by the instructor’s popularity in extracurricular activities. Remmers cites further studies showing when twenty-five more ratings were averaged they were as reliable as the better mental and education tests, and when alumni graduated ten years earlier were asked to rate their college instructors, their ratings agreed substantially with those of the same instructors by students currently enrolled.2

The use of student evaluation is apparently widespread: in 1960 Stecklein cited evidence that 320 colleges and universities in the United States had used student ratings.3 Despite the amount of attention given student ratings on the undergraduate level, however, this subject has received little at-

3 Ibid., p. 368.
tention at the graduate level and apparently none in library science. Yet it would seem that ratings might play a particularly important role in library education since, like instructors in other professional schools, most library school instructors have been trained primarily as professional practitioners rather than as teachers, and sometimes "the teachers drawn from the ranks of the profession are inadequately prepared for teaching." For the instructor with little experience or training in teaching methods, student ratings can point out areas on which he must concentrate to increase his effectiveness.

With the hope that a study of the results of student evaluations might provide insights into the problems of teaching library science on the graduate level, a study was made of the five-year Drexel evaluation program. The data upon which the study was based were limited in several aspects: in the first place, since ratings were generally obtained only for part-time and full-time instructors while they were still relatively new to the job, they do not necessarily provide a representative sample of all sections taught; second, the form of rating sheet has undergone slight modifications; and third, in a few cases not all of the data was recorded on the master sheets.

The evaluation forms filled out anonymously by the students consisted of a list of attributes generally recognized to be associated with effective teaching. For each attribute students were asked to rate the instructor on a four-point scale—excellent, good, fair, and poor. The rating unit was the individual class section, so if an instructor taught three class sections in a given quarter he received three separate ratings. In compiling the scores for each section a master sheet was made which recorded the number of times each point on the grading scale was marked for each attribute. The total number of marks for each point on the grade scale was then figured. The final rating score was the percentage of all the marks which were at the excellent and good points of the scale. For instance, if thirty students in a section made a total of 200 evaluation decisions, 180 of which were at the excellent and good points of the scale, the instructor's rating for that section was 90 per cent.

Also recorded on the master sheet was a list of all voluntary student comments and the rank of that section compared with all other sections rated that quarter. At the end of the quarter—after all course grades had been turned in—a re-

<table>
<thead>
<tr>
<th>Scores</th>
<th>All Ratings</th>
<th>Ratings for Part-Time Instructors</th>
<th>Ratings for Full-Time Instructors</th>
<th>Ratings for Women</th>
<th>Ratings for Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>96-100</td>
<td>30</td>
<td>17 (12.34)</td>
<td>13 (11.81)</td>
<td>14 (12.06)</td>
<td>16 (12.59)</td>
</tr>
<tr>
<td>91-95</td>
<td>40</td>
<td>22 (16.46)</td>
<td>18 (16.36)</td>
<td>23 (19.82)</td>
<td>17 (13.38)</td>
</tr>
<tr>
<td>86-90</td>
<td>39</td>
<td>21 (16.04)</td>
<td>18 (16.36)</td>
<td>16 (13.79)</td>
<td>23 (18.11)</td>
</tr>
<tr>
<td>81-85</td>
<td>32</td>
<td>14 (13.16)</td>
<td>18 (16.36)</td>
<td>17 (14.65)</td>
<td>15 (11.81)</td>
</tr>
<tr>
<td>76-80</td>
<td>31</td>
<td>18 (12.75)</td>
<td>13 (11.81)</td>
<td>17 (14.65)</td>
<td>14 (11.02)</td>
</tr>
<tr>
<td>71-75</td>
<td>31</td>
<td>8 (8.64)</td>
<td>13 (11.81)</td>
<td>11 (9.48)</td>
<td>13 (10.23)</td>
</tr>
<tr>
<td>66-70</td>
<td>19</td>
<td>13 (7.81)</td>
<td>6 (5.45)</td>
<td>7 (6.03)</td>
<td>12 (9.45)</td>
</tr>
<tr>
<td>46-65</td>
<td>24</td>
<td>13 (9.87)</td>
<td>1 (9.77)</td>
<td>11 (10.00)</td>
<td>7 (5.51)</td>
</tr>
<tr>
<td>26-45</td>
<td>7</td>
<td>7 (2.87)</td>
<td>7 (5.26)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>Per Cent</th>
<th>No.</th>
<th>Per Cent</th>
<th>No.</th>
<th>Per Cent</th>
<th>No.</th>
<th>Per Cent</th>
<th>No.</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>243</td>
<td></td>
<td>100.00</td>
<td>133</td>
<td>100.00</td>
<td>110</td>
<td>100.00</td>
<td>116</td>
<td>100.00</td>
<td>127</td>
<td>100.00</td>
</tr>
</tbody>
</table>

4 Thelma Eaton, "Who is a Good Library School Teacher?" Improving College and University Teaching, II (May 1954), 26.
port was given to the instructor on an evaluation form, and a copy was kept by the administration.

The study considered separate course ratings representing 243 sections taught by eighty-four instructors. In analyzing these ratings the following questions were considered.

1. What was the range for individual instructors' scores? The scores ranged from 28 per cent to 100 per cent with the mean being 81 per cent shown in Table 1. Twenty-nine per cent of the ratings were above the 90 per cent level and an equal number below 75 per cent. The widest range for the scores of an individual instructor was 47 points, from 42 per cent to 89 per cent; however, the range of most instructors was considerably narrower, with the average range for instructors rated twice being seventeen points and the average for those rated three or more times being twenty-five points. Only one instructor was included in both the best twenty-five and the poorest twenty-five ratings.

2. Did a pattern of movement exist in the scores of individual instructors or the ratings as a whole? At Colorado State College of Education a survey of ratings taken over a period of years found that most instructors made significant improvements with successive evaluations. Riley cites three other studies which found a definite improvement in the performance of faculty members. At Drexel, however, no such trend was apparent, and while some of the instructors did receive successively higher ratings, as many received successively lower ratings or had such varying scores as to show no pattern of movement. Therefore, while Drexel faculty members on a whole learned their teaching weaknesses their resulting teaching seemed no more—or less—effective than before. Of course, this generalization hides the group which did improve and the group which was already very high. As a matter of fact, the mean score of 81 per cent excellent and good was itself a quite satisfactory score. But minorities scored low or else had declining scores and were not invited to teach again.

| TABLE 2. MEAN SCORES OF FACULTY RATINGS BY YEARS AND QUARTERS |
|-------------------|-----|---------|
| **Year:** | **N** | **Mean Score** |
| 1960-61 | 26 | 81.2 |
| 1961-62 | 46 | 80.5 |
| 1962-63 | 43 | 83.5 |
| 1963-64 | 60 | 80.5 |
| 1964-65 | 56 | 76.2 |
| **Quarter:** | | |
| Fall | 52 | 79.0 |
| Winter | 54 | 78.8 |
| Spring | 43 | 78.3 |
| Summer | 77 | 82.5 |

Table 2 shows that the ratings as a whole have recently shown a downward trend. While the average ratings for the first three years ranged from 80.5 per cent to 83.5 per cent, with the academic years 1963-64 and 1964-65 the average score declined to 76.2 per cent. Whether this trend represented an increasingly critical and able student body or a somewhat less effective faculty is not clear.

3. Was there any connection between favorability of ratings and time of year? In the Colorado State College of Education survey summer school courses were rated higher than those taught during the regular college year. The same trend was evident at Drexel where summer quarter course ratings averaged 82.5 per cent while fall, winter, and spring quarter averages were 79 per cent, 78.8 per cent, and 78.3 per cent respectively.


“Relation of Class Size and Other Factors . . . . . . .” op. cit., p. 102.
More striking than a comparison of average scores, however, was the fact that while summer quarter ratings accounted for only 28 per cent of all the ratings they accounted for 68 per cent of the twenty-five highest ratings.

4. Which groups of instructors scored highest? A comparison was made of the scores received by women (48 per cent of all ratings) and by men (52 per cent). Table 3 shows the mean rating for women (81.7 per cent) to have been slightly but not significantly higher than that for men (79.2 per cent). Male instructors made up half of the top twenty-five instructors but two-thirds of the bottom twenty-five instructors.

A similar comparison was made between part-time and full-time instructors. Again the difference was slight, with the mean rating for part-time being 78.9 per cent and for full-time being 82.2 per cent. Part-time faculty members tended somewhat more than full-time to scatter to either extreme. They represented 55 per cent of all ratings but had 60 per cent of the top twenty-five ratings and 68 per cent of the bottom twenty-five. In general, sex and part-time or full-time status appeared to have

### TABLE 3. COMPARISON OF PART-TIME AND FULL-TIME, AND OF MALE AND FEMALE INSTRUCTORS

<table>
<thead>
<tr>
<th>Ratings:</th>
<th>Mean Score</th>
<th>Per Cent of All Ratings</th>
<th>Per Cent of Highest 25 Ratings</th>
<th>Per Cent of Lowest 25 Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-Time Instructors</td>
<td>82.8</td>
<td>45</td>
<td>40</td>
<td>32</td>
</tr>
<tr>
<td>Part-Time Instructors</td>
<td>78.9</td>
<td>55</td>
<td>60</td>
<td>68</td>
</tr>
<tr>
<td>Male Instructors</td>
<td>79.2</td>
<td>52</td>
<td>52</td>
<td>64</td>
</tr>
<tr>
<td>Female Instructors</td>
<td>81.7</td>
<td>48</td>
<td>48</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

### TABLE 4. PERCENTAGE OF RATINGS FOR WHICH EACH ATTRIBUTE SCORED HIGHEST

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Ratings</td>
<td></td>
</tr>
<tr>
<td>Ratings for Part-Time Instructors</td>
<td></td>
</tr>
<tr>
<td>Ratings for Full-Time Instructors</td>
<td></td>
</tr>
<tr>
<td>Ratings for Male Instructors</td>
<td></td>
</tr>
<tr>
<td>Ratings for Female Instructors</td>
<td></td>
</tr>
<tr>
<td>Effectiveness in putting subject across</td>
<td>34</td>
</tr>
<tr>
<td>Usual preparation for class</td>
<td>16</td>
</tr>
<tr>
<td>Use of examples</td>
<td>4</td>
</tr>
<tr>
<td>Stimulation of thought</td>
<td>3</td>
</tr>
<tr>
<td>Tolerance toward student difference of opinion</td>
<td>25</td>
</tr>
<tr>
<td>Spirit of helpfulness in and out of class</td>
<td>25</td>
</tr>
<tr>
<td>Has motivated me to do my best work</td>
<td>1</td>
</tr>
<tr>
<td>Balance of lectures, class discussion, student reports</td>
<td>0</td>
</tr>
<tr>
<td>Stimulates exchange of ideas</td>
<td>2</td>
</tr>
<tr>
<td>Assignments reasonable in length</td>
<td>3</td>
</tr>
<tr>
<td>Knowledge of and familiarity with subject</td>
<td>50</td>
</tr>
<tr>
<td>Organization of material</td>
<td>5</td>
</tr>
</tbody>
</table>
TABLE 5. PERCENTAGE OF RATINGS FOR WHICH EACH ATTRIBUTE SCORED LOWEST

<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>All Ratings</th>
<th>Ratings of Part-Time Instructors</th>
<th>Ratings of Full-Time Instructors</th>
<th>Ratings of Male Instructors</th>
<th>Ratings of Female Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness in putting subject across</td>
<td>18</td>
<td>25</td>
<td>10</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td>Usual preparation for class</td>
<td>9</td>
<td>11</td>
<td>6</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Use of examples</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stimulation of thought</td>
<td>29</td>
<td>29</td>
<td>28</td>
<td>35</td>
<td>21</td>
</tr>
<tr>
<td>Tolerance toward student difference of opinion</td>
<td>11</td>
<td>5</td>
<td>18</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Spirit of helpfulness in and out of class</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Has motivated me to do my best work</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Balance of lectures, class discussion, student reports</td>
<td>6</td>
<td>8</td>
<td>3</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Stimulates exchange of ideas</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Assignments reasonable in length</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Knowledge of and familiarity with subject</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Organization of material</td>
<td>31</td>
<td>33</td>
<td>28</td>
<td>34</td>
<td>26</td>
</tr>
</tbody>
</table>

little bearing on teaching effectiveness, but the interesting clusters at extremes are hard to explain.

5. In what characteristics were instructors rated highest? Lowest? The strongest characteristic was "knowledge of and familiarity with subject," which was a strong point on half of the ratings. "Tolerance toward student difference of opinion" and "spirit of helpfulness in and out of class" were each strong points on 25 per cent of the courses. Table 4 shows no other characteristics to be rated highest on more than 10 per cent of the courses.

The weakest characteristics were "organization of material" (31 per cent), "stimulation of thought" (29 per cent), and "effectiveness in putting subject across" (18 per cent) as seen in Table 5.

It is interesting to compare Drexel strong and weak points with the results of a large-scale rating program carried out among undergraduates at Brooklyn College and reported by Riley, Ryan, and Lifshitz in *The Student Looks at His Teacher*. In the Brooklyn study, as at Drexel, the highest scoring characteristic concerned knowledge of subject matter. Similarly, at Brooklyn the poorest scoring characteristic was "encouragement of thinking," and at Drexel "stimulation of thought" was one of the weakest points. Despite these correspondences, however, there was a significant difference between Drexel and Brooklyn instructors on "organization of subject material"—the third best characteristic of ten at Brooklyn, but the weakest at Drexel.8

There were several differences in the weakest and strongest characteristics by sex and by full-time status of faculty members. For instance, while almost one-fourth of the full-time instructor ratings were strong in "usual preparation for class," this was a strong point for only one-eleventh of the part-time instructors who usually had full-time jobs elsewhere in addition to their Drexel teaching. On the other hand, ratings for part-time instructors were 50 per cent higher than for full-time on "knowledge of and familiarity with subject." Students also considered part-time instruc-

8 Riley, Ryan, and Lifshitz, *op. cit.*, p. 82.
TABLE 6. RATINGS OF TYPES OF COURSES

<table>
<thead>
<tr>
<th>Type of Course</th>
<th>Mean Score</th>
<th>Per Cent of All Ratings</th>
<th>Per Cent of Top 25 Ratings</th>
<th>Per Cent of Low 25 Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>81.0</td>
<td>19</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>Library Materials</td>
<td>78.9</td>
<td>15</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Cataloging</td>
<td>79.8</td>
<td>12</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Administration</td>
<td>79.1</td>
<td>11</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Special Types of Service</td>
<td>82.3</td>
<td>14</td>
<td>28</td>
<td>16</td>
</tr>
<tr>
<td>Backgrounds</td>
<td>77.0</td>
<td>12</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Children's Work</td>
<td>88.6</td>
<td>10</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Information Science</td>
<td>79.8</td>
<td>7</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Basic Required</td>
<td>79.2</td>
<td>29</td>
<td>12</td>
<td>28</td>
</tr>
<tr>
<td>Intermediate Required</td>
<td>79.5</td>
<td>25</td>
<td>12</td>
<td>28</td>
</tr>
<tr>
<td>Electives</td>
<td>82.0</td>
<td>38</td>
<td>72</td>
<td>36</td>
</tr>
<tr>
<td>Information Science</td>
<td>79.8</td>
<td>7</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

6. Were electives rated higher than required courses? Although it may seem natural for students to have been more favorably inclined toward the courses they elected to take than toward required courses, the studies done at Brooklyn College and at Colorado State College of Education found no important difference here. At Drexel, as shown in Table 6, elective courses had a slight but not significantly higher mean than basic and intermediate required courses.

7. Which courses were most highly rated? When considering the scores of groups of courses the most obvious pattern was the high ratings given to courses dealing with library service to children and young people in school and public libraries. The seven courses in this category were offered twenty-five times for an average score of 88.5 per cent, eight points higher than the overall average. Also, special types of library service, such as medical, law, special, college, etc., were unusually well represented among the top twenty-five courses. It is possible that the somewhat more favorable ratings given school and children's librarianship courses were related to the similarly favorable ratings given in summer quarters, since during summer quarters the percentage of students and of courses in school and children's librarianship is relatively high.

For single courses, the highest score for a required course rated more than ten times was for "Basic Reference Materials" with a mean score of 86 per cent. The lowest mean score for such a
course was the 74 per cent received by "Library in Society," a required course on the history and sociology of libraries.

8. *Is there any relationship between class size and ratings?* Although class size was not a significant factor in the ratings at Brooklyn and Colorado, small classes at Drexel were rated more favorably than large ones, as Tables 7 and 8 show. The average class size at Drexel was twenty, but the average class size for the highest twenty-five ratings was only 14.2. It should be noted, however, that the average class size for the twenty-five lowest courses—18.76—was also somewhat lower than the over-all average. The mean score for classes having ten or fewer students was 86 per cent, compared to the over-all average of 81 per cent. While small classes comprised only 10 per cent of all ratings, they made up 40 per cent of the twenty-five highest ratings. Furthermore, of all small classes, more than half received scores of 90 per cent or above.

Library science instructors are faced with many teaching problems. In addition to the fact—mentioned earlier—that many of them have had little or no training in teaching methods, they must teach classes made up of students with
TABLE 8.25 LOWEST RATED COURSES

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Part-Time or Full-Time</th>
<th>Male or Female</th>
<th>Course</th>
<th>Effective or Required</th>
<th>Class Size</th>
<th>Year</th>
<th>Quarter</th>
<th>Rating Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>P</td>
<td>M</td>
<td>Introduction to Cataloging and Classification</td>
<td>R</td>
<td>8</td>
<td>61</td>
<td>Fall</td>
<td>28</td>
</tr>
<tr>
<td>F</td>
<td>P</td>
<td>M</td>
<td>Audio-Visual Materials</td>
<td>E</td>
<td>18</td>
<td>62</td>
<td>Spring</td>
<td>34</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
<td>M</td>
<td>College and University Library Service</td>
<td>E</td>
<td>23</td>
<td>61</td>
<td>Summer</td>
<td>36</td>
</tr>
<tr>
<td>U</td>
<td>P</td>
<td>M</td>
<td>College and University Library Service</td>
<td>E</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>P</td>
<td>M</td>
<td>Library Methods Analysis</td>
<td>R</td>
<td>28</td>
<td>61</td>
<td>Summer</td>
<td>37</td>
</tr>
<tr>
<td>JJ</td>
<td>P</td>
<td>M</td>
<td>Selection of Library Materials</td>
<td>E</td>
<td>13</td>
<td>65</td>
<td>Winter</td>
<td>39</td>
</tr>
<tr>
<td>FF</td>
<td>P</td>
<td>M</td>
<td>Selection of Library Materials</td>
<td>R</td>
<td>15</td>
<td>62</td>
<td>Summer</td>
<td>42</td>
</tr>
<tr>
<td>FF</td>
<td>P</td>
<td>F</td>
<td>Reference in Science and Technology</td>
<td>R</td>
<td>12</td>
<td>64</td>
<td>Spring</td>
<td>46</td>
</tr>
<tr>
<td>GG</td>
<td>P</td>
<td>M</td>
<td>Reference in Social Sciences</td>
<td>R</td>
<td>25</td>
<td>64</td>
<td>Fall</td>
<td>48</td>
</tr>
<tr>
<td>HH</td>
<td>F</td>
<td>F</td>
<td>History of Books and Printing</td>
<td>R</td>
<td>9</td>
<td>65</td>
<td>Winter</td>
<td>51</td>
</tr>
<tr>
<td>HH</td>
<td>F</td>
<td>F</td>
<td>Reference in Social Sciences</td>
<td>R</td>
<td>33</td>
<td>62</td>
<td>Summer</td>
<td>52</td>
</tr>
<tr>
<td>II</td>
<td>P</td>
<td>M</td>
<td>College and University Library Service</td>
<td>E</td>
<td>31</td>
<td>65</td>
<td>Spring</td>
<td>54</td>
</tr>
<tr>
<td>HH</td>
<td>F</td>
<td>F</td>
<td>Library Administration</td>
<td>E</td>
<td>35</td>
<td>65</td>
<td>Winter</td>
<td>56</td>
</tr>
<tr>
<td>AA</td>
<td>P</td>
<td>F</td>
<td>Search Strategy</td>
<td>E</td>
<td>12</td>
<td>62</td>
<td>Fall</td>
<td>56</td>
</tr>
<tr>
<td>Z</td>
<td>P</td>
<td>M</td>
<td>Methods of Research in Librarianship</td>
<td>E</td>
<td>19</td>
<td>63</td>
<td>Winter</td>
<td>56</td>
</tr>
<tr>
<td>EE</td>
<td>P</td>
<td>M</td>
<td>Reference in Humanities</td>
<td>E</td>
<td>17</td>
<td>62</td>
<td>Spring</td>
<td>57</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>M</td>
<td>Library in Society</td>
<td>R</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>M</td>
<td>Library in Society</td>
<td>R</td>
<td>13</td>
<td>64</td>
<td>Winter</td>
<td>59</td>
</tr>
<tr>
<td>HH</td>
<td>F</td>
<td>F</td>
<td>Methods of Research in Librarianship</td>
<td>R</td>
<td>17</td>
<td>65</td>
<td>Spring</td>
<td>59</td>
</tr>
<tr>
<td>Y</td>
<td>P</td>
<td>M</td>
<td>Advanced Reference</td>
<td>E</td>
<td>11</td>
<td>65</td>
<td>Winter</td>
<td>60</td>
</tr>
</tbody>
</table>

widely varying backgrounds, library experiences, and goals in librarianship. Furthermore, there is the constant problem of achieving a happy balance between theory and practice. Add to this the lack of adequate textbooks and it seems clear that the task facing the library science instructor is not an easy one. At Drexel it is felt that the student rating program is an important method of helping the instructor do an effective job. While ways of improving the rating sheets are constantly being sought the program itself has proven successful.
Holdings and Expenditures of U. S. Academic Libraries: An Evaluative Technique

The current acquisitions expenditures and holdings of the nation’s academic libraries as a whole are examined relative to the numbers of students and faculty for the period 1952-1962 by the use of random sampling and multivariate analysis. The formulae which are derived from the data serve two functions: they describe existing national behavioral patterns; and they permit one to measure his institution’s performance against that of other, similar institutions. It should be noted that the evaluative technique developed measures individual library performance against observed behavior rather than against a predetermined arbitrary standard.

It is becoming increasingly evident that librarians and academic administrators must seek objective performance standards to substantiate, in part at least, the need for the budgetary increases which will be required if the library is to remain a viable part of the educational program. Librarians must in any event make recommendations concerning such increases. These recommendations are usually expressed numerically and implicitly convey an aura of precision. They may take the form of a given percentage of the total institutional budget, a dollar amount of expenditure per student, a minimum gross number of volumes to be acquired within a certain time period, or perhaps a given number of volumes per student.

In general, it may be stated that a librarian’s recommendations derive from two basic sources:

1. an intimate knowledge of the short-term educational changes at his institution, e.g., the planned institution of a new degree program which will necessitate acquisitions in an area not heretofore well developed. Such recommendations are clearly \textit{ad hoc}, are not easily analyzed, and therefore will not be considered in this study;

2. the application of some standard of long term growth. While it is theoretically possible to establish a standard or benchmark of growth \textit{in vacuo}, in practice one usually compares one’s own collection to those of other institutions, or to some arbitrary standard established by an independent agency such as ALA.

In order that any such comparison be acceptable and convincing to an administrator, it would appear requisite that

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the criteria of comparison be unambiguous, quantifiable, and reasonable. In other words, one should relate his performance to those institutions which are comparable in clear-cut definable ways, rather than to those institutions with which one may subjectively like to compare himself.

It is the purpose of this study to provide the policy-maker with such quantifiable, unambiguous means of comparing his own performance with other, similar institutions and, as a byproduct of this effort, to provide information concerning the performance of the nation’s academic libraries taken in toto, which may be of value to present and future standard-makers.

**Part One**

Before entering into a discussion of the techniques to be employed in the study, it is necessary to select the following:

1. the criteria by which we shall consider one institution comparable to another; and
2. the criteria for comparative library performance.

The criteria for (1) appear to present the greatest difficulties. Such things as educational philosophy, quality, and orientation are extremely difficult to measure. We have chosen instead three variables which have the virtue of being easily measured and which also are frequently considered to be relevant for comparative purposes:

1. The size of the undergraduate body is frequently the first relationship considered when the question of library size is raised. It is interesting to note that the value of this type of relationship has been questioned by Ellsworth.\(^1\)

2. It has been a truism in the library profession that the great universities with the great faculties are the ones with the great libraries. It must follow, then, that the size of the faculty (the one quantifiable aspect of a faculty) be included in this analysis.

3. It can be said, from the point of view of the library, that graduate students are more nearly like faculty than are undergraduates in terms of their need for research material. In addition, within the past decade graduate programs have often been the source of the greatest growth within the universities; hence, graduate students shall be considered as a separate category in this study.

Since the past decade has seen a substantial and unequal growth in these variables, it was decided to observe them over an interval of approximately ten years. While the selection of these particular variables may seem arbitrary, they do give us an unambiguous and, we feel, valid source of comparison of institutions. The statistical results to be provided shortly will amply confirm this opinion.

With respect to the library performance criteria, we have selected only two: (1) holdings; and (2) expenditures for current acquisitions. These are entirely quantifiable and seem to be commonly cited. It might be noted that current acquisitions measured in volumes might have been used instead of current expenditures, but such data are not readily available and for practical purposes, expenditures will serve equally well. We have eliminated other current and capital expenditures because of their high degree of variability, which proscribes any useful comparative analysis. Consider, for example, two institutions with the same holdings and acquisitions rate: one may be decentralized and/or more heavily staffed in the public service division; or it may pay for such services as maintenance from the current administrative budget. Again, it should be pointed out that no attempt has been made to evaluate such subjective factors as the appropriateness of the collection

to the institution or its value to the library user.

PART TWO

Now that the criteria of performance and comparison have been selected, the nature of their interrelationship must be determined. On the surface it would seem as though a simple linear correlation would suffice; but, as we will show by means of an example, this technique can lead to erroneous conclusions because it ignores the complexities of these interrelationships. (The example will also introduce those readers unfamiliar with correlation technique to the concepts basic to the more sophisticated relations which will be established.) Consider the relation between a library’s expenditures for books and the number of its undergraduates. To measure the degree of relationship between these two variables, a sample of academic libraries was drawn for 1952 and for 1962.\(^2\) The sample excludes two-year colleges, vocational schools, extension schools of state universities, and other similar non-degree-granting institutions. The expenditures and the number of undergraduates associated with these libraries was obtained, and a correlation was run between the two variables. The resulting coefficients of determination for 1952 and 1962 were, respectively, \(r_{52}^2 = 0.53\) and \(r_{62}^2 = 0.48\), which means that 53 per cent of the variation, or differences, in expenditures by these libraries in 1952 and 48 per cent in 1962 can be explained by variation in the number of undergraduates.\(^3\) These values are quite large, which means that we can be almost certain that if we had examined all twelve hundred libraries at each time period, we would have found a reasonably high coefficient of determination for each year.\(^4\)

Since \(r^2\) is rather large, we would seem to have support for the hypothesis that libraries regard the size of the undergraduate student body as a criterion for determining the size of their book budgets; or possibly the converse hypothesis, viz., that the size of the budget is a determinant of the size of the undergraduate student body; or, perhaps still better, that these two factors interact, producing the observed relationship. Notwithstanding the existence of this strong relationship, we are not required to accept any of these hypotheses, however. The relationship could be, and indeed in this case is, a spurious one. To indicate why this is so, and to illustrate the difficulty involved in the use of two-variable correlations, it is necessary to consider another relation, that between expenditures and the number of faculty. For 1952 and 1962 the coefficients of determination are, respectively, 0.71 and 0.80. This means that 71 per cent of the variation in expenditures in 1952 and 80 per cent in 1962 can be explained by

\(^2\) A simple, statistically random sample of approximately three hundred institutions was drawn for each of the years. The population consisted of approximately twelve hundred such institutions. For these and later computations, part-time persons (undergraduates, graduates, and faculty) are given a weight of one-half. The data used throughout this study are taken from The American Library Directory (20th and 24th editions; 1954 and 1964); and American Universities and Colleges (6th and 9th editions; 1953 and 1964). It should be noted that the data are not reported for exactly the same years. Student enrollment and faculty data pertain to the Fall of 1951 and 1962; holdings and expenditure data, mostly to 1952-53 and 1962-63.

\(^3\) \(r^2\) can be defined in two meaningful ways: (1) it is a measure of the degree of association between two variables; its minimum and maximum possible values are, respectively, zero and one; (2) \(r^2\) is a ratio, the denominator of which is the measure of average error associated with predicting, without "assistance," the value of a particular dependent variable (expenditures), and the numerator of which is the amount by which this error is reduced when one has the assistance of information concerning the relationship of the dependent variable to some independent variable (such as number of undergraduates). Thus, 100\(r^2\) measures the percentage reduction in average error of prediction associated with the introduction of an independent variable to help in predicting the value for the dependent variable. The range of \(r^2\) is, again, zero to one, since the minimum reduction in errors of prediction is zero and the maximum cannot exceed 100 per cent.

\(^4\) Precisely, there is less than one chance in forty that \(r_{52}\) is less than 0.45 or that \(r_{62}\) is less than 0.40 for all twelve hundred academic libraries.
variation in the size of faculty. These coefficients, too, are quite large\footnote{There is less than one chance in forty that $r^2$ for 1952 and for 1962 would be less than 0.65 and 0.75, respectively, for all twelve hundred libraries in the population.} and would seem to lend support to one of the three hypotheses cited above, adapted, of course, to the new independent variable, size of faculty. Which of the hypotheses are correct?

Some light is shed on the problem when a third relation is considered, that between the two so-called explanatory variables, number of undergraduates and faculty. The evidence shows that these two variables are, themselves, closely related; normally, the more undergraduates there are, the more faculty there are. (The coefficients of determination for the two years are, respectively, 0.70 and 0.67.\footnote{There is less than one chance in forty that the real coefficient is less than 0.64 for 1962 and less than 0.60 for 1962.} Since expenditures are closely related to the number of faculty, and since the latter is closely related to the number of undergraduates, we may well get a close relationship between expenditures and undergraduates which is purely the effect of the number of faculty. More concretely, though probably less correctly, a library’s expenditures as well as the number of undergraduates may be determined by the number of faculty.\footnote{An oft quoted analogy can stand service here: There is a very close relationship between the number of storks nests found in various sections of northwestern Europe and the human birth rates in those same sections—the more nests, the more human births. Mamma may have been right, but there is one other explanation of merit, etc., that the number of storks nests and the number of human births are both correlated with the number of buildings present in an area, and that this latter variable (number of buildings), in fact, is the determinant of the other two.}

Clearly, two-variable correlations would be inadequate, or rather, misleading descriptors for our purpose. The obvious alternative, and the one we propose to adopt, is to use a multivariate analysis. This proposed procedure will allow us to isolate the separate effects of each of the independent variables and,

\[ V_{52} = 51,700 - 105U - 37G + 1640F \]
\[ s = 276,700 \]
\[ R^2 = 0.71 \]
\[ V_{62} = 27,100 - 9.6U - 59G + 969F \]
\[ s = 147,600 \]
\[ R^2 = 0.75 \]
\[ E_{52} = 847 - .07U - .04G + 115F \]
\[ s = 20,700 \]
\[ R^2 = 0.71 \]
\[ E_{62} = 5910 - 4.7U + 39G + 279F \]
\[ s = 57,000 \]
\[ R^2 = 0.82 \]

\[ V, E, U, G, \text{ and } F \text{ refer, respectively, to number of volumes, dollars of expenditure for current acquisitions, and number of undergraduates, graduates, and faculty. The subscripts indicate the years to which the equations apply.} \]

$R^2$, the coefficient of multiple determination, has essentially the same meaning as its two-variable counterpart, $r^2$; it measures the reduction in errors of prediction of $V$ and $E$ which result from using the three independent variables, $U$, $G$, and $F$. For example, the average error associated with predicting the size

\footnote{The random samples, of size three hundred each, were derived from the sources cited earlier.}
of the library collection in 1952 is reduced 71 per cent by virtue of our using the first regression equation as the predictor. The fact that $R^2$ is less than one indicates that there are other variables which determine, or are related to, the number of volumes; but since $R^2$ is as high as it is, one can be reasonably confident that he has found the three variables which explain the largest proportion of interlibrary variation in number of volumes held. These three variables taken together, therefore, may be regarded for the purposes of this study as the criterion to be used for the determination of the number of volumes held by United States academic libraries in 1952. Parenthetically, it should be noted that no cause and effect relationship is implied or intended: the three variables, U, G, and F may have determined V; V may have determined them; or V, U, G, and F may have been mutually determining.

The other coefficients of determination given above are at least as large as the first one; hence, all four of these multiple, linear regressions are satisfactory predictors. These regression equations, themselves, warrant examination. The numerical values attached to the U, G, and F symbols (the slope coefficients) are of particular interest. Generally speaking, the value of the slope coefficient is a measure of the average increase in the dependent variable, V or E, associated with a one unit increase in the value of the associated independent variable, U, G, or F, assuming the other two independent variables do not change. For example, conceive of two libraries whose undergraduate and graduate student bodies were the same in 1952 and whose faculties differed in size by one person. The one having the larger faculty on the average had 1,640 more volumes and spent $115 more on books.

The values in parentheses beneath the slope coefficients, the so-called standard errors of the slope coefficients, are also of interest. If one adds and subtracts twice the standard error from the value of the slope coefficient, he obtains a range of values which very likely will contain the true slope coefficient value; i.e., the value which would, in fact, have been obtained had the regression equation been derived from data for all United States academic libraries. For example, one can be fairly sure that the increase in expenditures associated with a one-person increase in faculty in 1952 was between $93 and $137.

So much for the meaning of the equations and their associated values. What of significance do these statistics tell us? The strikingly important fact to be derived from them is that the size of faculty was the overwhelmingly important variable associated with both the size of the collection and the level of expenditures of these libraries. The singular lack of importance, or rather negative influence, of the undergraduate is also of considerable interest. In 1952 those libraries whose graduate and faculty personnel were of similar size, but whose undergraduate student size was the larger, had between 83 and 127 fewer volumes per undergraduate student. For number of volumes in 1962 and for expenditures in both time periods, the value was close to zero, indicating for these variables that the undergraduate’s influence here was probably negligible. The relationship of V and E to G is of a mixed character. Those libraries having larger graduate enrollments, ceteris paribus, may have had fewer volumes in 1952—though, the large standard error makes this uncertain—and very likely had fewer volumes in 1962. In 1952

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9 There is less than one chance in forty that $R^2$ for all twelve hundred libraries would be less than 0.67.

10 More precisely, there is approximately a 95 per cent chance that the following statement is correct: With respect to all United States academic libraries, the average increase in E in 1952 associated with a one-person increase in faculty was between $93 and $137.

11 The s values, the residual standard deviations, will be brought into use in Part Four.
Expenditures of U.S. Academic Libraries / 483

there seemed to be no relationship between graduates and expenditures, but in 1962 there was a decided, though small, positive relationship.

The four equations under discussion thus describe the typical behavior of libraries in 1952 and 1962; i.e., they show the state of the world in these two time periods. But what of the changes which occurred between these two times? What do the equations tell us? Consider the equations dealing with number of volumes. Between 1952 and 1962 the coefficient of F declined from 1640 to 969. This means that on the average 671 fewer volumes were added to the collection per unit increase in faculty in 1962 than were added in 1952. The coefficient of G also declined, but much less than that of F; and that of U actually increased. Thus, one can say that the faculty of 1962 had a much smaller effect on the library collection of 1962, that the graduate student had a slightly more negative effect, and that the undergraduate had a definitely less negative effect. So much is true. It is important, however, that one not infer from these changes in coefficients that the typical library of 1952 was transformed into the typical library of 1962, and that the changes in these three coefficients reflect that transformation. One cannot draw this inference because the 1952 and the 1962 regressions are based on different populations. The coefficients for 1952 (1962) are average values which describe the performance characteristics of the typical library of the population of 1952 (1962). Hence, the changes in coefficients will reflect both changes in the performance characteristics of the typical library and changes in the library population itself. In general, an average value, such as a regression coefficient, can change because of changes in the values of the elements making up the average or because of a change in the number of elements contributing to the average. The latter represents a change in the composition of the population. To take a specific example, suppose libraries associated with small graduate schools have lower-valued G coefficients than libraries with large graduate schools; and suppose over time the majority of libraries that come into existence have small graduate schools. Then, even if the G coefficients of each and every library, large and small, stay constant, the average value—the one generated by our sample—will decline in going from the 1952 regression to the 1962 regression. As the ice melts, one’s scotch gets weaker, but the alcohol content of the two ingredients, taken separately, does not change. Here it is seen that the decrease in the G coefficient arises solely from the increase in small graduate programs. The individual classes of libraries experience no change in coefficient—i.e., the −5 and −69 values apply to both 1952 and 1962.

For some purposes, such as comparing one library’s response to changing enrollment and faculty size with the response of other libraries over the course

Some of the changes in population were quite dramatic. For example, the mean number of volumes per library, based on our sample data, increased by 24,149; while interlibrary variability (measured by the standard deviation of number of volumes) almost halved. Mean per annum expenditure per library increased by $46,025, while interlibrary variability in expenditure increased about 350 per cent.

<table>
<thead>
<tr>
<th>Size of Graduate Program</th>
<th>1952</th>
<th>1962</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Schools</td>
<td>G Coefficient</td>
<td>No. of Schools</td>
</tr>
<tr>
<td>Large</td>
<td>10</td>
<td>−59</td>
</tr>
<tr>
<td>Small</td>
<td>50</td>
<td>−5</td>
</tr>
</tbody>
</table>

Weighted Mean Value of G (where G represents the sum of the coefficient times its own number of schools, divided by the total number of schools):

1952: \[-37 = [(−5)(10) \times (−69)(10)] \div [10 \times 10]\]
1962: \[-59 = [(−5)(10) \times (−69)(50)] \div [10 \times 50]\]

A numerical example may be of value. The following table contains one of the many possible sets of G coefficients which are consistent with the −57 and the −59 values generated by the regression equations for number of volumes. (Of course, we do not know what the values of the coefficients for large and small libraries actually are, but certainly the values given here are not unreasonable.)
of time, it is necessary to eliminate the influence of changes in the composition of the library population. The obvious and conventional method for neutralizing population changes is to hold the population constant while drawing the sample; that is, one would examine the same set of libraries in both time periods. To this end, a sample of the libraries which were in existence in 1952 was selected, and the corresponding V, E, U, G, and F values were then obtained for 1952 and for 1962. From these two sets of data a new set was created by subtracting each 1952 observation from its corresponding 1962 observation. This new set, consisting of the changes in V, E, U, G, and F, produced the following two regression equations:

\[ V' = 27,200 - 16U' + 125G' + 629F' \]

\[ (8.4) \quad (26) \quad (72) \]

\[ s = 132,700 \]

\[ R^2 = 0.55 \]

\[ E' = 14,800 - 3.5U' + 93G' + 270F' \]

\[ (4.2) \quad (13) \quad (36) \]

\[ s = 67,310 \]

\[ R^2 = 0.58 \]

The symbols have essentially the same meaning as before. The prime indicates that we are considering the changes in V, E, etc., between 1952 and 1962. How does one interpret the slope coefficients? Consider the coefficient of F' for volumes. Imagine two libraries with undergraduate and graduate enrollments that increased by the same amount between 1952 and 1962; and suppose the faculty of the one increased somewhat more than the other. The library whose faculty increased more acquired approximately 630 more volumes per extra faculty person. In other words, the school whose faculty grew more rapidly, *ceteris paribus*, had increased its book collection by 630 volumes per added faculty member between 1952 and 1962.

One notes that the changes in faculty size dominate the changes in volumes and expenditures, that the changes in undergraduate enrollment, abstracting from changes in the other two independent variables, exerted little influence. Of some interest is the enhanced status of the graduate student. Those schools whose graduate programs were expanding were adding substantially to their collections and also to their book-purchasing budgets. The positive G' coefficient for volumes implies that libraries were responding to the general expansion of graduate schools, and were adding, per student, approximately 125 volumes to their collections. But this raises a question: How can it be that the G (not G') coefficient was significantly lower in 1962 (−59) than it was in 1952 (−37)? One can only conclude that the positive G' tendency was offset by the initiation and expansion of graduate programs on the part of schools which, on the average, possessed small collections.

**Part Four**

The indexes of national performance which have been provided by our six regressions have direct relevance to one's own library. These regressions permit one to compare his own library's performance to that of other, similar libraries. The regressions also permit one to determine the level of expenditure or the size of the book collection which would be required if his library is to attain a particularly desired ranking among libraries of its own class. The procedure for the first case is quite simple. For the particular V, E, V', or E' comparison that one is considering, he computes a statistic, \( t^* \), as follows:

---

14 If this is not done, one might misinterpret the statistical results. The first example in Part Four will make this clear.

15 Each of the regressions is based on a statistically random sample of size 150. One could have based the samples on the 1962 library population. The selection of 1952 was arbitrary but presumably not important.
where \( y \) is the value associated with one's own library; \( y^o \) is given from the regression equation; and \( s \) is obtained from the collection of statistics which are attached to the regression equations. After deriving the \( t^o \) value, one consults a special table, usually referred to as the table of the \( t \) probability distribution, which can be found in any ordinary statistics textbook. For the reader's convenience, an extensive summary of the relevant portion of that table is given below.\(^{16}\) One consults the table to determine where his \( t^o \) value falls within the table's array of \( t \) values. The corresponding percentile value then tells one where he is located with respect to other, similarly circumstanced libraries.

For convenience, let us refer to our own institution as Mythical U. Table 2 contains the essential statistical data for our university.

\(^{16}\) One would enter a really extensive \( t \) table at 300 degrees of freedom for \( V \) and \( E \) values, and at 150 degrees of freedom for \( V' \) and \( E' \) values. (Usually some interpolation is required.) The values in Table 1 are an average of the two; but since the differences are quite small, no appreciable error can arise from using these approximations.

### Table 1.

<table>
<thead>
<tr>
<th>Percentile Corresponding to ( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.61</td>
</tr>
<tr>
<td>2.35</td>
</tr>
<tr>
<td>1.98</td>
</tr>
<tr>
<td>1.65</td>
</tr>
<tr>
<td>1.29</td>
</tr>
<tr>
<td>0.84</td>
</tr>
<tr>
<td>0.52</td>
</tr>
<tr>
<td>0.25</td>
</tr>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>-0.25</td>
</tr>
<tr>
<td>-0.52</td>
</tr>
<tr>
<td>-0.84</td>
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<tr>
<td>-1.29</td>
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<tr>
<td>-1.65</td>
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<tr>
<td>-1.98</td>
</tr>
<tr>
<td>-2.35</td>
</tr>
<tr>
<td>-2.61</td>
</tr>
</tbody>
</table>

The percentiles (column 6) are then obtained by entering Table 1 with the appropriate \( t^o \) value. For example, \( t^o = 0.62 \) falls between the \( t \) values, 0.52 and 0.84, but is closer to the former; i.e., our \( t^o \) value is closer to the 70th than to the 80th percentile.

What, then, do we learn about Mythical U? We discover that in 1952 only about 30 per cent of the libraries which were in the same class as Mythical U—i.e., possessing approximately the same numbers of undergraduates, graduates, and faculty—had a book collection which was larger than Mythical U's, and that only about 5 per cent of the libraries in Mythical U's class in 1962 had a collection which was larger than Mythical U's collection at that time. On the other hand, the university's expenditure level did not occupy as high a ranking as its collection. Moreover, its ranking declined drastically, and in 1962 was well below the average for its class. What are we to infer from these seem-
TABLE 2.
STATISTICAL DATA FOR A HYPOTHETICAL UNIVERSITY

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>Volumes</th>
<th>Expenditures</th>
<th>Undergraduates</th>
<th>Graduates</th>
<th>Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Full-time</td>
<td>Part-time</td>
<td>Total*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,800</td>
<td>600</td>
<td>3,400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>170</td>
<td>600</td>
<td>470</td>
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<td></td>
<td></td>
<td></td>
<td>290</td>
<td>40</td>
<td>330</td>
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<td></td>
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<td></td>
<td>170</td>
<td>600</td>
<td>470</td>
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<td></td>
<td></td>
<td></td>
<td>290</td>
<td>40</td>
<td>330</td>
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</table>

* Part-time counted at one-half of its actual value.

TABLE 3.
SAMPLE LAYOUT FOR COMPUTING PERCENTILES

<table>
<thead>
<tr>
<th>Variable</th>
<th>y</th>
<th>y*</th>
<th>s</th>
<th>t*</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1952</td>
<td>390,000</td>
<td>217,000</td>
<td>276,700</td>
<td>+0.62</td>
<td>Over 70</td>
</tr>
<tr>
<td>V1962</td>
<td>524,000</td>
<td>286,100</td>
<td>147,600</td>
<td>+1.61</td>
<td>Under 95</td>
</tr>
<tr>
<td>E 1952</td>
<td>$ 40,000</td>
<td>$ 36,260</td>
<td>$ 95,100</td>
<td>+0.18</td>
<td>Under 60</td>
</tr>
<tr>
<td>E 1962</td>
<td>$ 95,100</td>
<td>$113,500</td>
<td>$ 67,310</td>
<td>+0.16</td>
<td>Under 60</td>
</tr>
<tr>
<td>V1952</td>
<td>+ 134,000</td>
<td>+ 75,580</td>
<td>+ 132,700</td>
<td>+0.44</td>
<td>Under 70</td>
</tr>
<tr>
<td>V1962</td>
<td>+$ 55,100</td>
<td>+$ 44,460</td>
<td>+$ 67,310</td>
<td>+0.16</td>
<td>Under 60</td>
</tr>
</tbody>
</table>

ingly contradictory statistics? One very reasonable hypothesis is that the 95th percentile value arose from shifts in the characteristics of the libraries belonging to Mythical U's class—specifically to the presence of a larger proportion of schools with small collections—and that the 40th percentile value arose from these schools with small collections trying to catch up. Thus, the improvement in the one rank and the deterioration in the other in no wise reflect either favorably or unfavorably upon the university. Of course, if the new entrants to Mythical U's class have higher standards, on the average, than the earlier set of libraries had, then ultimately the university's position both in terms of expenditures and in terms of its book collection will be less favorable than it was in 1952. Now suppose that one abstracts from these changes in class composition; what then can be said of our university? We note that the additions which Mythical U made to its collection, V', ranked slightly under the percentile value for V in 1952. The same is true of E'. We also note that the rank of E for 1952 was much less than that of V for the same year. These statistics show that Mythical U was not adding to its collection in sufficient amounts to maintain its 1952 rank for library collection. Even if the class composition had not changed, Mythical U would most likely have held a lower rank in respect to its collection in 1962.
We now turn to the second use to which the regression analysis may be put, that of determining the particular expenditure or acquisitions level which is consistent with a predetermined percentile ranking. A numerical example will illustrate the technique to be employed. Suppose that the 1962 Mythical U decided to embark upon an expansion program, and suppose that it wished to maintain an exact 95th percentile ranking with respect to its library collection, how much would its collection have to grow so as to maintain this rank? Suppose plans call for an expansion in undergraduate enrollment of five hundred, in graduate enrollment of six hundred, and in faculty of eighty-six. (The latter increase would maintain approximately the same student-faculty ratio.) These values allow us to generate the number of volumes held by the typical university of this new size.

\[ V = 27,100 - 9.6(3550) - 59(1,300) + 969(426) = 329,400 \]

A 95th percentile value implies \( t = 1.65 \). We solve the \( t \)-equation for \( y \).

\[ t = 1.65 = \frac{y - 329,400}{147,600} \]

whence, \( y = 572,900 \). Thus, if Mythical U is to be ranked in the 95th percentile, it will have to add 572,900 - 524,000, or 48,900 volumes to its collection. Of course, the reliability of this estimate depends upon the extent to which the national performance standard does not change; i.e., the extent to which the 1962 regression equation continues to be valid.

**CONCLUSIONS**

The statistical data presented in this study have contained some surprises. One might not have expected the undergraduate to have been as unimportant as he turns out to be, nor that the faculty would be so overwhelmingly important. The “oughts” and “shoulds” uttered by library administrators take on new meaning and may well require respecification, given that we now know something of what academic libraries in this country are and have been doing. Of course, the approach outlined in this study does not constitute a full solution to the administrator’s problems. It only gives him the means with which to formulate those “shoulds” and “oughts” which involve measurable comparisons with other institutions. For the wide range of problems that do not admit of interinstitutional comparisons, the librarian will still have to search his own soul.

At a higher level of consideration, it is worth observing that academic libraries are highly predictable institutions—at least as far as the size of their collection and of their expenditures for books is concerned. With just two variables, the number of graduate students and the number of faculty, we can explain more than two-thirds of the interlibrary variation in volumes and expenditures. Hence, it is not unreasonable to suppose that a still better predictive equation can be developed by the introduction of new variables, with or without a reformulation of the definition of the existing two significant variables.17

In general, one achieves greater predictability when the objects of measurement are consistently and precisely defined. We recognize that the raw data used in this study have shortcomings by scientific standards. The size of \( R^2 \), however, strongly indicates that, despite their deficiencies, the data were adequate for our purposes.

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17 Technically speaking, one can always increase \( R^2 \) by adding more independent variables. With a sample of size \( n \), \( n-1 \) independent variables always yield \( R^2 = 1.0 \). One stops adding variables when the increase in \( R^2 \) is no longer statistically significant. Beyond this point, the increase in \( R^2 \) is regarded as trivial.

This is a sane book in the insane world of academic librarianship. Temperate and calm, it is eminently readable, has a useful "reading list," and is adequately indexed. Without entering the soggy field of library philosophy and arraying our Big-endians against our Little-endians, Dr. Wasserman, presently dean of Maryland's graduate library school, believes we must adapt the machine to do our data processing even while we wait, in civilized expectancy, to be shown whether it can indeed retrieve information from large general collections at a price we can afford. His evaluation of the advantages automation will bring and his words of caution regarding expectations and operations are judicious and thoughtful. The academic librarian would do well to force the book upon his computer science people and the faculties of his science departments. It might spare him the vast amount of gratuitous but frequently fatuous advice he receives in such quantity.

The author looks both backward and forward. He notes the belated impact the computer has had on libraries. He also examines the Florida Atlantic experiment, the Columbia-Harvard-Yale medical libraries project, and a few of the other attempts to cope not only with the so-called information explosion, but, more importantly, with the burgeoning record-keeping accompanying it. He reports, but does not really judge, or even evaluate, these efforts. Since his book was conceived there have been small indications, at least, that some of the efforts are not achieving the success we had hoped they would. None of us is likely to tout his failures, but Dean Wasserman pays indirect tribute to those who have made our mistakes for us. Dean Wasserman briefly but specifically surveys coordinate indexing, the key-word-in-context indexes, MEDLARS, and selective dissemination of information. This is a useful summary, but more important is his recognition of the profession's desperate need for user studies. He is probing one of our sore spots here, but performing a service the while.

The various roles our professional organizations, the computer companies, research scientists, and business and industry have played in bringing us to an awareness of what computers can do for librarianship are touched on. While recognizing, but not belaboring, the fact that librarians are wary of computers, Dean Wasserman, perhaps in charity, does not finger the library schools as the villains of his piece. He recognizes that our whole profession suffers from the fact that for years non-selective admission policies and low financial rewards have produced librarians sketchily educated in the genteel disciplines (English, history, music, or even, heaven forbid, French!) who are hostile to machine techniques. He has sympathy for the human problems involved, but is hopeful that an increasing awareness of the need for experimentation and change will move us further along the road from amateurism to professionalism.

If the book has a fault, it is that his comments on the quality of the new men—that exciting bunch of madmen and mechanics, dreamers and scholars—who hopefully will give us the leadership we need so badly, are curiously understated. Perhaps he is going out of his way to reassure those of us who do not know COBAL from Cockney that we need not fear for the traditional value and functions of librarianship. In fact, the growing number of lively young men like those in the select Committee on Library Automation is one of the bright spots of the profession. Not only have they "savvy" and style, but they know library problems and have demonstrated an impressive professional competence. A few of them are even bookmen!

Paul Wasserman merits our thanks for his "observations."—Stuart Forth, University of Kentucky.

To ask of a multilibrary survey “what are its conclusions?” is naive these days. They deal with cooperation and the interdependence of libraries. Ask, rather, about the libraries surveyed, or the sponsoring organization, and you will be better able to assess the value of the surveyor’s recommended levels and techniques of cooperation.

The present survey was commissioned by the Ontario Library Association, but paid for by a direct provincial grant since it was expected that this report would form the basis for new legislation. Its scope was the broadest possible: all types of libraries—public, university, college, school, special, and government. Can a provincewide “plan” for a province of six million people and four hundred thousand square miles, incorporating all these diverse types of libraries, be presented in under two hundred double-spaced typescript pages?

This is not to suggest that each square mile demands a square inch of report space, but rather to ask what such a report might be expected to include of: (1) background information; (2) isolation of problem areas; (3) principles to be observed in finding solutions; (4) technical and administrative details of suggested solutions; and (5) supporting statistical evidence.

It would be kind to suggest that much of the first could be omitted since Ontario’s librarians are perfectly aware of it. But why omit the important historical framework of, say, the independent religious college libraries and then spend half a page on such trivia as Ontario’s scenic spots? The problem areas are identified: geographic imbalance, administrative inefficiency of small units, lack of ready communication even among nearby libraries, and lack of provincewide coordination. A less superficial treatment, however, might have lent a greater air of authority through more obvious attention to local circumstances than to a procrustean use of old published statistics and generalized norms.

The principle of cooperation is certainly valid, but the surveyors ride it so hard that one wonders if they even considered the tempering role of tradition, of day-to-day work efficiency, or of library purposes. In proposing concrete steps toward an integrated library system, this report unfortunately falls between two stools. It specifies many solutions in administrative detail rather than leaving the principles to be worked out as the time of application and the local circumstances demand. This approach is not in itself bad, but every proposed solution becomes suspect when it is found that the ramifications of some have not been thought out carefully enough by the surveyors to indicate their impracticality. Of particular interest here is the fact that the province’s academic librarians are now on record as severely critical of many aspects of the report’s view of their place in the grand scheme.

This is unfortunate, for the approach and conclusions of the “St. John Report” are not in general poor or invalid. And for Ontario’s libraries, the report has already had the salutary effect of increasing certain provincial grants and of obtaining press headlines. Should one ask for more? For readers of this journal, this report will tell something about Ontario’s conditions and needs, very little that is new or detailed about the practical operation, of cooperative efforts, and much about how not to write a survey report.—Ronald Hagler, The University of British Columbia.


In the Spring of 1965 the Atlanta University school of library service, with the cooperation of the Emory University division of librarianship, sponsored a conference on “The Role of the Library in Improving Education in the South.” To provide an opportunity for defining the role of the library in the South’s efforts to solve a variety of economic, educational, social, and cultural problems; to communicate to nonlibrary groups the need for joint concern as well as the fact that libraries can make a significant contribution to programs designed for social betterment; to consider specific methods of planning and implementing all types of programs concerned with advancing the cause of education in the South: these were the purposes of this conference which was made possible by a
grant from the Rockefeller Foundation. The volume here under review—edited with an introduction by Hallie Beachem Brooks and published in an attractive format—brings together the papers presented at the conference and the discussions which followed them.

The various papers presented at the conference provide much information, and much food for thought; they merit a careful reading by all who are concerned with and interested in the South and things Southern. Monroe C. Neff (North Carolina State Department of Community Colleges) considers those forces and factors which will provide “A Sound Environment for an Evolving Social Institution.” Lawrence L. Durisch (Tennessee Valley Authority, Knoxville) and Reed Sarratt (Southern Education Reporting Service, Nashville) define the South in terms of her social-economic-cultural and educational aspects. Archie L. McNeal (University of Miami, Coral Gables, Florida) describes and analyzes the role of the library in relation to the South’s social-economic-cultural problems. Virginia Lacy Jones (Atlanta University school of library service) defines the role of the library in relation to the South’s educational problems, and suggests that librarians “need to go ‘way out’ at times and perhaps appear to be impractical, to get our feet off the ground—perhaps to attempt the impossible with verve and spirit and faith.” Ruth E. Warncke (deputy executive director of the American Library Association) provides an evaluative summary of the conference, pointing out its strengths and weaknesses.

Leon Carnovsky (graduate library school, University of Chicago) delivered the conference’s banquet address, in which he dealt with “Libraries and the International Scene.” Thus, while the conference was concerned appropriately and primarily with problems of the American South, its planners wisely chose to include a place on the program for a consideration of the world beyond the South.

In The Role of the Library in Improving Education in the South we have a thoughtful and thought-provoking consideration of an important topic. Both those who attended the conference and those who were not so fortunate will welcome the publication of these proceedings.—John David Marshall, University of Georgia.


The University of Delhi, one of the younger universities in India, was incorporated in 1922. The major growth of the university and its library, however, has taken place since 1939, and particularly after 1942 when Shri S. Das Gupta assumed the post of librarian following a period of training under S. R. Ranganathan. The development and expansion of the university since that time has been remarkable. From 1945-1965, the enrollment increased 840 per cent, reaching a high of 29,550 in the academic year 1964-65. The book collections in the same period increased by 462 per cent, and the total expenditures for the library 995 per cent. A new library building was erected and occupied in 1958 and now houses 168,263 volumes. The total book resources of the university, including the departmental and college libraries, total 872,034 volumes. A brilliant future is anticipated for the university as it assumes an increasing role of educational leadership in India and becomes an important cultural link between India and other countries.

This survey was made at the request of the University of Delhi, acting on the suggestion of Professor S. Das Gupta, the librarian, by Carl M. White, who served as a Ford Foundation consultant during the period of the survey. It is a penetrating study backed by an impressive amount of supporting data in the form of statistics and opinions from faculty and librarians on various aspects of the library problem. Dr. White brings to the analysis of the library’s needs the knowledge and perspective gained through wide experience as director of three major libraries in the United States—the University of North Carolina, the University of Illinois, and Columbia University. A significant feature of the study is the evidence of wide consultation with concerned individuals in the university community. Suggestions and opinions gathered

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by means of questionnaires and conferences lend weight to the evidence presented and to the final recommendations which follow each chapter and are summarized at the end.

The survey covers in detail primarily the libraries under the jurisdiction of the University of Delhi librarian. This excludes the libraries of the thirty-five constituent and affiliated colleges of the university. In discussion of over-all planning, however, these are brought into the total picture, and a separate study of the relationship of the college libraries to the main library is recommended. The college libraries, with a total of 631,000 volumes, are under the administration of the individual colleges and ordinarily serve only their own clientele. It appears from one of the tables that the campus colleges spent 770,511 rupees on their libraries in 1964-65, as compared with 798,448 which was spent on the university library. On the other hand, a comparison of the distribution of use made by students of all the libraries, indicates that 52.9 per cent relied principally on the university library as compared with 21.9 per cent who reported the college libraries as having their principal patronage. In a long range program to bring the college libraries into the main stream of library development in the university, several suggestions are made. The first is a cooperative project under which the college libraries would provide a catalog record for a central union catalog in the university library for every book acquired. This would seem to be an absolute necessity in order that maximum use be made of the book resources of the university. A second recommendation is for a coordinated administration of the college and university libraries. A third recommendation, while a more radical departure from the present arrangements, may have special appeal in view of the increased enrollments expected and the demand for more space for books and services. This is to build a centrally located library to serve all undergraduate students. This would offer better book collections, to be used by more people, less duplication, a wider range of services, and the means of providing a more competent staff.

Caution is recommended in the creation of departmental libraries, on the grounds that if these are to be generously provided with books and adequately staffed, they become too costly and in the end will undermine the proper role of the university library itself. Instead, it is suggested that the university consider the divisional library idea, placing the collections in broad subject divisions, “creating units large enough to be viable, manning each unit with librarians with special knowledge of the literature.” It is pointed out that the advancement of knowledge and the development of new fields has blurred the lines which formerly separated departments of study, making the narrowly defined unit no longer efficient.

To carry out the suggestion of the divisional approach, a separate science library building is recommended and the conversion of the main library into two divisions, one for the social sciences and one for the humanities. The physical location of the departments of science is favorable to the idea of a separate library facility, and it is predicted that such a unit “would make possible the creation of a science library of national importance.” The main library building could be remodeled to become a “scholar’s workshop” for the social sciences and the humanities.

Several fundamental recommendations are made relating to the government of the university library, all of which seem necessary to the creation of a centrally administered university system of libraries. Among them are the following: (1) making the university library official owner of all library materials, however acquired by the university; (2) establishment of bibliographical control over all such materials; (3) formally delegating the powers of management now vested in the Library Committee to the librarian and making him answerable directly to the vice-chancellor.

Dr. White begins his study with the premise “that library service of high quality is the heart of an academic program of high quality.” The report is frank and factual in its evaluation of what is needed to achieve this end, and at the same time pays tribute to the substantial foundations that have been laid.—Rudolph Gjelsness, University of Arizona.

To the overwhelming majority of American academic and public librarians, classification is known and valued only as a convenient device for arranging on the shelves the books and pamphlets that are their physical stock in trade. While they consider it desirable to find together all the books dealing with the same subject, the finer points of sequential arrangement of various subjects are frequently dismissed as being of relatively little importance. Whether, on the one hand, botany should be followed directly by agriculture, zoology by animal husbandry, physics by engineering, or, on the other hand, botany, zoology, and physics should be grouped together as natural sciences and should as a group precede the techniques associated with them, is an issue that is more important to the scholars than to the librarians. Committed as we are to the dictionary catalog with alphabetically arranged specific subject headings, we look upon the classification mainly as a system of addresses for locating individual books.

To such a public this book will be somewhat of a revelation. Here are the proceedings of the Second International Study Conference on Classification Research, held in Elsinore, Denmark, in September 1964, under the auspices of the International Federation of Documentation, or FID. (The first conference was held in Dorking, England, in 1957.) Assembled together were classificationists—the aficionados' name for classification-makers—and classification theorists from India, Poland, Britain, the United States, and points between. To the members of this group classification is a basic tool of information retrieval, not just book or document retrieval. Their work utilizes mathematics, logic, semantics, sociology, engineering. Classification they define as "any method creating relations, generic or other, between individual semantic units, regardless of the degree in hierarchy contained in the systems and of whether those systems would be applied in connection with traditional or more or less mechanized methods of document searching." Their discussions are studded with phrases like depth classification, theory of integrative levels, idea plane, notational plane, verbal plane, paradigmatic and syntagmatic relations, mathematical models.

A study of the papers given at this conference and the discussions that followed will widen our horizons and stretch our brain cells; it will show why in parts of Asia and Europe classification is said to be the most if not the only truly professional activity in library and information science.

Of special interest to American librarians is Richard S. Angell's paper "On the Future of the Library of Congress Classification."

Pauline Atherton's editorial ministrations in transcribing and editing the tapes are masterly. She has combined work of authors, translators, and rapporteurs into a cohesive whole by altering "the discussant's words to fit my own taste and inclinations," and in extenuation quotes a colleague: "Why not print the words exactly in the confused and illogical order that they were conceived by those who uttered them? By suppressing the inanities and chopping out the vicious asides which are the most productive part of conferences, you editors create the impression that a conference is a sane, orderly process, an impression that drives impressionable youngsters into more interesting activities." Be that as it may, the printed record is impressive.—*Benjamin A. Custer, The Library of Congress.*
A student is about to dial the phone in his dorm room. He's going to use it to study French by calling the Learning Lab. At the same time other students will be dialing lessons in Biology, Government, Speech ... any subject the university has scheduled for that period. Through the telephone, universities can extend their Learning Lab facilities economically to every dormitory room, so students can take full advantage of a university's opportunities.

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| 1. What % of research is unintentionally duplicated because adequate literature searches were not done? | a. 12%  
|   b. 22%  
|   c. 45%  
|   d. 68% | a. 22%  
| 2. Of all the scientists who ever published, what % are still publishing? | a. 25%  
|   b. 50%  
|   c. 75%  
|   d. 90% | a. 25%  
| 3. What % of scientists never search the literature?                     | a. 25%  
|   b. 32%  
|   c. 57%  
|   d. 72% | b. 32%  
| 4. What organization has the world's largest bank of computer tape files of published scientific information? | a. NLM (National Library of Medicine)  
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| 5. The number of scientific papers is doubling every                      | a. 3 years  
|   b. 10 years  
|   c. 25 years  
|   d. 35 years | a. 3 years  
| 6. The average paper is cited                                            | a. 1.5 times a year  
|   b. 3 times a year  
|   c. 5 times a year  
|   d. 11.5 times a year | b. 3 times a year  
| 7. The average paper by a Nobel Prize winner is cited                     | a. 3 times a year  
|   b. 10 times a year  
|   c. 22 times a year  
|   d. 160 times a year | b. 10 times a year  
| 8. What is the largest single multidisciplinary scientific index published today? | a. Index Medicus  
|   b. Chemical Abstracts  
|   c. Referativnye Zhurnalny  
|   d. Science Citation Index  
|   e. Biological Abstracts  
|   f. Engineering Abstracts  
|   g. U.S. Government R&D Reports | a. Index Medicus  
| 9. What is the average number of references cited in a scientific paper? | a. 3  
|   b. 9  
|   c. 17  
|   d. 28 | a. 3  

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- **cat.(s)** - catalog(s)
- **coll.** - college
- **ed.** - editor, edition
- **L.(s), ln.(s)** - library(ies), librarian(s)
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