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Automatic Indexing Processes

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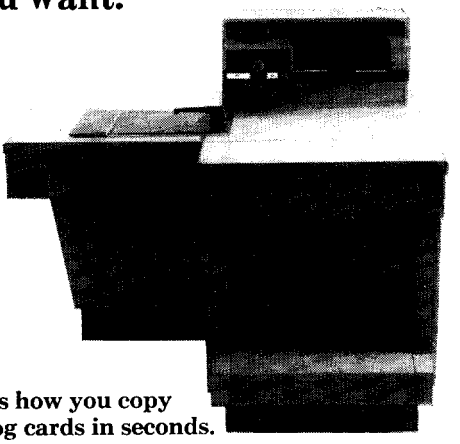

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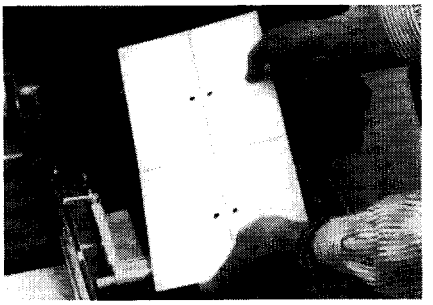

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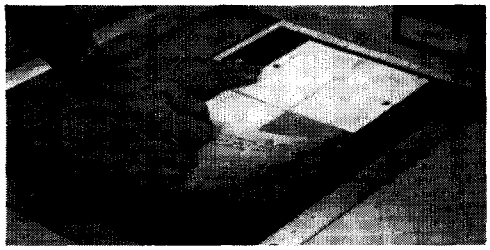

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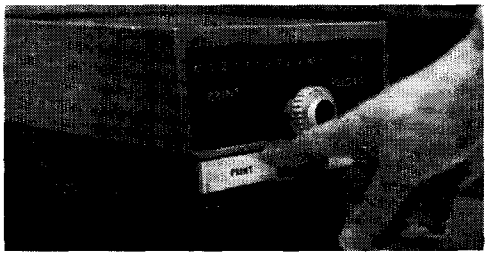

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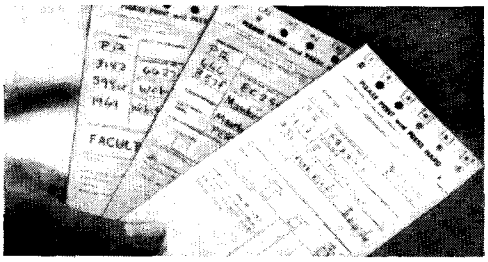

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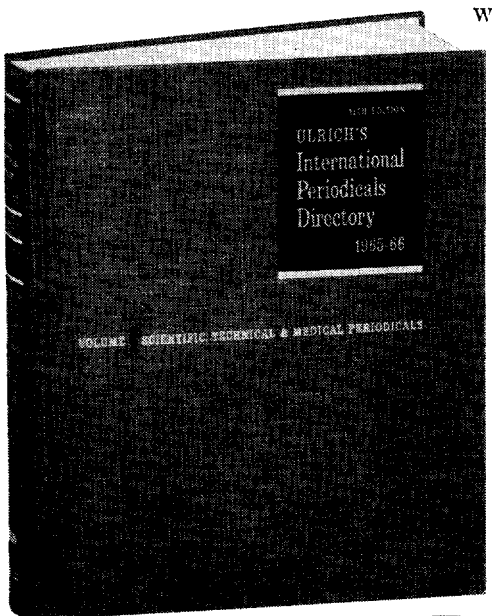

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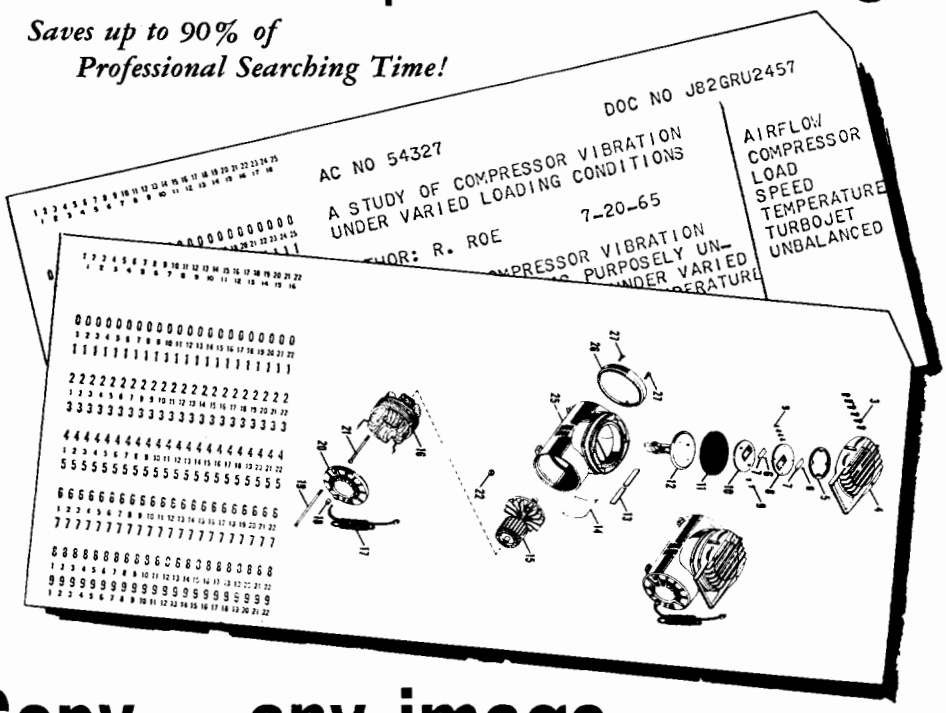

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As in the past, the librarian is able to process only a very small proportion of his library inputs and has to rely on data centers and other indexing-abstracting services to process the bulk of his materials; thus it becomes increasingly important that their outputs be compatible. As a result, government agencies and technical societies are undertaking programs leading to the standardization of bibliographic materials.

Centralization of Library Processing

I. A. WARHEIT

LIBRARIANS HAVE been interested in centralized processing for a very long time. Some of the professional literature I examined in preparation for this paper was over 20 years old and some was published in 1965. Actually the question of centralized bibliographic services has been with us for well over a century; for effective utilization of centralized indexing goes back to the first time a librarian used an early issue of *Chemisches Zentralblatt*. Essentially, the need and desire for effective centralized bibliographic processing has always been present. No one is really opposed to it, if it is done right. Although the reasons for support are rather obvious, it is well to repeat them here. Also, one should be aware of some new developments, which make centralization even more desirable and in fact imperative. The specifics will be developed in the following papers.

The essential tasks of a librarian are to build and organize his collection and set up the catalog, indexes, and other finding tools so he can efficiently fill specific requests from his clientele. This necessity to organize everything to suit parochial, specific needs greatly influences the librarian to do specialized processing. But this ideal of individualized specialized processing is no longer feasible. In fact, in modern times, except for very specialized libraries, specialized processing has never been really carried out.

The librarian has always been hospitable to cooperation and coordination and the establishment of standards. Even the most individualistic librarian has appreciated certain standards such as the 3 x 5 catalog card, descriptive cataloging formats, and the standard filing rules. It is really only in subject analysis of material that real differences of opinion make themselves felt. For many years there was much interest in special classification schemes for special collections. Many librarians developed their own schemes, there was a flourishing literature on the subject, and usually every library school featured it in its curriculum. Today, specialized classification is pretty much a dead issue. Partially this is because there is less reliance on classification for finding materials. The large, general classifications are more detailed, and a librarian simply does not have the necessary time to devote himself to constructing and maintaining specialized class schedules.

Why Standards Are Needed

Today, the librarian is not only accepting general classification schemes but he is also beginning to demand standardized subject analysis. The reasons for this are many.

1. AREA OF RESPONSIBILITY: Today the librarian is responsible for furnishing information that goes far beyond his immediate collection. He has to supply materials from the totality of available information. A client no longer says, "Do you have this in the

This is the keynote speech presented at a panel entitled "Cooperation through Automation: The Future in the Nuclear Science, Engineering, and Metals/Materials Fields," which was sponsored by the Nuclear Science and Engineering Sections of the Science-Technology Division and the Metals/Materials Division at the 56th Special Libraries Association Convention in Philadelphia, June 8, 1965. Three of the papers given at the panel follow. Dr. Warheit is Senior Systems Analyst, IBM Systems Development Division, San Jose, California.

collection?" but rather simply asks, "Will you get this for me?" He doesn't really care if the item is owned by the library or not. With current finding tools, communications networks, central data centers, and available reproduction methods, a requester expects to be furnished all the items he wants and needs.

The librarian thus must be able to get at a literature he does not control and is, therefore, dependent on others for the bibliographic control of this material. Again this is nothing new. Only today it is a very much larger problem than it used to be, and it is a much larger problem for the special librarian than for the public or even the academic librarian.

2. QUANTITY: The sheer physical growth of literature has made specialized, individual processing too expensive. More is being published both formally and informally. In fact, it is the latter, represented by reports, memoranda, and other unique separates, that is causing the greatest increase in the volume of material the librarian must handle.

3. SUBJECT COVERAGE: Not only has there been an increase in the volume of literature, but users' needs have been extending into more subject areas. Modern science and technology are much more interdisciplinary than they used to be. Furthermore, with the greater use of the individual report and journal article, the information being handled is much more specific. Greater detailed subject knowledge is required to process this material. The documentalist and subject specialist have played an increasing role in the library. A much higher quality of subject analysis is needed for effective library service.

The general librarian finds that he cannot afford to process the enormous mass of information to which his clientele must have access. Nor is he adequately equipped to process the great variety of very technical and detailed subject matter he must supply. The librarian may have excellent training in one or two specialities, but it is too much to expect him to be an expert in everything he is called upon to handle.

4. SPEED OF SERVICE: Material is being demanded on an ever decreasing time scale. Information is consumed faster. In a sense it has a shorter half life. People seem to learn about documents before they are even published. AEC and NASA, for example, try to send their microfiches to their member libraries before *Nuclear Science Abstracts* and *Star* reach their readers. In other words, there is practically no time available for even the most rapid bibliographic processing.

5. SPAN OF RESPONSIBILITY: In the past, a library user came to a central facility—the library. Today a librarian is often called upon to serve widely scattered personnel in a large and complex organization. Library users are often remote and must be served indirectly by mail, phone, and messenger and through branch libraries, part-time clerks, and secretaries. It is, therefore, difficult and often impossible to provide a user the necessary bibliographic tools and aids a librarian might be able to fashion for a central collection. The isolated requester must depend on published indexes and abstract bulletins—on tools produced by centralized services.

For all these reasons, the librarian must provide more and faster and better service to more people. He must have access to large masses of very technical literature, which is very widely scattered and which he cannot control directly. The professional librarian is being spread very thin, and he is being forced to look for better methods.

Compatibility Between New Techniques and Services

To meet these increasing demands, the librarian is not only working harder but is making use of new tools and enlisting the services of other organizations. Technology is providing him many new tools for processing, communicating, and disseminating information. These range anywhere from an office copying machine to a computer. As is true with so many of these complex and expensive tools, he has to share them with others and, in many instances, is dependent on special technical personnel, whom he doesn't control, to perform the necessary services.

But more important than these mechanical and electronic devices, the librarian tries to do a minimum of processing and have some data center do it for him. The concept of the centralized information service has a fascination for the non-librarian, for the person who is new to the technical information

business. The many Congressional hearings and reports by various Presidential committees attest to this. These centers seem like a simple and easy solution to those who have never been exposed to the grubby details of trying to provide library service.

However, there is a great deal of merit, if not in the grandiose, all-embracing centralized service on the Russian model, at least in the more traditional discipline or application-oriented documentation center. These information or data centers identify and often even supply documents. They make the announcement bulletins, indexes, abstracts, and other searching tools an individual requester can use. The problem is to produce products most suitable for the literature searcher. And an increasingly important requirement is that the products from these various sources be compatible—not only that they be compatible but that they be user-oriented and that they be understood by the user-librarian.

The sad history of some of the major information services is that they have been designed without the ultimate user in mind. Weird and contrived file systems, special secret codes and so-called "machine languages," esoteric compaction techniques that can be used only by special, unique computers, tricky language analysis routines, which seem to be better adapted for demonstrating the cleverness of the machine than helping the searcher, the crazy coding and avoidance of plain language to save tape and make the program run faster, and, what is worst of all, the great neglect of the central problem, namely indexing, have all greatly delayed and hindered the adoption of the newer tools and methods that can be beneficial to the librarian and the library user.

There is a great need for intelligibility between the various services a librarian must use. Interchangeability of inputs is becoming serious. In the past when the "processor" was a human being, the trained librarian had little difficulty in searching simultaneously *Gmelin* and *Chemical Abstracts*. Today the inflexible machine simply will not be able to read NASA tapes, *Index Medicus* tapes, and ASM tapes in their varying formats, bit codes, and file organizations.

The central processing agencies are beginning to realize that serious problems of compatibility must be overcome before their products can be effectively used. The Clearinghouse has been working on standards for descriptive cataloging of technical reports. There have been studies to reconcile thesauri and authority lists used by the AEC and the Defense Documentation Center. The American Society of Metals and the Engineers Joint Council are working together to develop common standards for the *Review of Metals Literature* and *Engineering Index*. There is similar widespread activity in the medical-biological field. There is a struggle going on to develop a standard system for indexing chemical structures. The political science people are now starting to search for some standard system.

In the field of reproduction, work is also going forward. Mil-D specifications for aperture card reproduction of engineering drawings are now an industry-wide standard. Of more interest to librarians are the developing NASA-AEC standards for microfiche.

Each aspect of all these cooperative efforts could and has consumed a whole conference. The important thing is that the librarian, who in essence is the real user of all these centralized services, be an active participant in developing these systems. If he isn't, then, as has so often happened in the past, he will be handed inferior products that are not only uneconomical to use but are often useless.

Centralized processing is here to stay. We can't do without it. Let's get it done right.

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Features of computer input compatibility are considered using library catalog records as an example. A common input can be utilized to meet different local needs if a computer can identify the input elements, i.e., each unit of catalog card data, and be programmed to manipulate the elements to produce output in a different format. Achieving program compatibility among different types and models of computers is more difficult and costly at the present stage of hardware development.

Compatibility of Computer Input and Programs

HILLIS L. GRIFFIN

I AM SURE librarians feel properly at home with the topic of common input since they have used it for so many years. I refer, of course, to the Library of Congress printed cards, which have saved so much cataloging time for so many libraries through the years. The cards serve as a common cataloging input, generated by one library to a standard specification and used by other libraries, which may modify the information to suit their unique needs and requirements.

With more libraries placing their operations on a computer, librarians are again considering the problem of a common input in relation to computer systems. They are looking for an L.C. card that can be read by a computer to save the time required to re-key this information for entry into a machine system. If all libraries used the L.C. input without alteration, there would be no problem, and the task would be relatively easy. But most libraries change the L.C. input in some way, major or minor, and it is at this point that the need arises for a common input that can serve as the means for achieving an uncommon output, which can be edited and adapted to the needs of an individual library.

This type of input has two functions: *1)* it serves as a guide to cataloging an item and *2)* after some major or minor surgery at the hands of the cataloger, the card itself may be used as the catalog document for an item. If the surgery is major, the entire card may have to be retyped; if minor, offending information can be crossed out or some new information added.

Certain repetitive steps are performed with the card in any event. The typist must locate the call number and perhaps type it in the upper left hand corner. The title must be typed across the top of the title cards, and subject headings must be placed in a similar position on subject entry cards. Because we know where pertinent information is located on the unit card, we can bring it out and relocate certain items of information on certain types of cards that serve well-defined purposes in the catalog.

The concept of identifying the various items of information within an entry is an important one. We don't have to write "author" before the author's name because we (and our library users) are intelligent human beings. Wouldn't it be nice if a computer were bright enough to look at a card and cull these little tidbits of information out of it? The problems of converting a card catalog to punched cards or punched paper tape would be solved. We would

Mr. Griffin is the Information Systems Librarian, Library Services Department, Argonne National Laboratory, Argonne, Illinois. *He presented this paper at a combined session of the Science-Technology Division's Nuclear Science and Engineering Sections and Metals/Materials Division at the 56th Special Libraries Association Convention in Philadelphia, June 8, 1965.*

simply be able to feed the card catalog into a computer; it, in turn, would put out this information in some machine-readable form upon which it could operate and go on to print the catalog.

Present computers, unfortunately, require input data in a form they can read. The librarian, then, must initially oversee the preparation of the input in the form of punched cards or punched paper tape before it can be accepted by a computer. While this may be no more trouble than typing a single catalog card, it still consumes time. My feeling is that it takes less time to prepare a unit entry to a computer than it does to prepare a full set of cards for a catalog, even if they are LC printed cards requiring only the typing of call numbers and tracings. The reason is that a computer, given a unit entry, can be programmed to generate additional records automatically for subject, title, and added entries.

Identifying the Individual Elements of Information

The basic problem of preparing universally usable computer records is that of identifying each element of the input record. An author must be so identified to a computer, which should know whether he is a corporate or personal author through some coding scheme. The title must be identified, as must the classification number, Cutter number, imprint, pagination, headings, and so forth. Given such clues, however, the computer can identify and manipulate each of these items of information (or fields) to give the desired end product. Given an input in which the sequence of information is *1)* author, *2)* title, *3)* publisher, *4)* imprint, *5)* series note, if present, *6)* classification number, and *7)* Cutter number, the computer could file this information in any desired sequence within a given entry and could place the entries themselves in any sequence. Note that only the information that appears for each item need be identified. If there is no series note (field 5), the computer can be programmed to sense this fact when it reads a field 6 entry immediately after a field 4 entry.

A list could be produced in call number (field 7 & 8) order by author (field 1) with other fields in normal order, omitting field 4 (imprint) and field 5 (series note) and with the classification number and Cutter number appearing both at the head of each entry (at the filing point) and within the entry itself. This is possible because each element of information in the entry has been identified to the computer, and this identification makes it possible for the computer to manipulate the data to human specifications.

Since it is possible to produce machine input in which each element of information can be identified by a computer it should follow, then, that if it can be identified by one computer, it can also be identified by another computer, and that if the original input conventions are known, it is possible to take this input and translate it into another format. If one wants to accept the original information as it stands, simply translating it into one's own format, a computer can do this extremely rapidly. If one wishes to make changes or edit the input, then a computer can reformat the input, print what it has done in the desired format, and produce a file that may be used to enter changes. One would also have the ability to change only those parts of the data—the classification number and Cutter number, for example—that needed to be changed to make the entry acceptable to one's requirements.

The key to the whole problem of compatibility is identification of each logical element in the entry, plus a knowledge of the conventions that established the information within each element. Given this information some one could, for example, take my magnetic tape file of bibliographic technical report entries and make a file that could be used in his library for all reports with the same report numbers. He could simply keypunch a card showing the report number of each report and use this number to select from my file the bibilographic data for each matching report number.

One example of a general machine-readable input product has been generated as a part of an experimental program within the AEC Division of Technical Information. Citations and descriptors for each item appearing in *Nuclear Science Abstracts* have been punched in machine-readable form. Nearly every piece of information appearing

in the bibliographic part of the NSA citation has been included. This product is then used by several different groups, each requiring different portions of the information. One group may require corporate authors, and another may not. One may require that author's names appear first-name-first, although they are carried last-name-first on the card.

How do we go about satisfying these requirements from a single basic input, making this input serve the needs of many different users, each with different requirements? The problem is merely one of identifying each discrete element of information and tagging it with an identifying code whenever it appears. The information must always appear in the same way, e.g., author's last name first whenever it appears. Each entry must have a master entry identification number, type-codes for each different type of information, and sequence numbers, which tie together the punched cards within each type of information. A type 2 card, for example, is always a title, and type 2 cards with sequence numbers 90-99 are a comment. They may be included as a part of the title (because they are a type 2 element) but may be identified as a comment or deleted entirely because the computer can tell, from the unique sequence number, what they are. If you don't want the comment, have machine instructions in your computer program that will tell the machine to bypass a type 2 card with any sequence number 90-99. If you want to identify it somehow as a comment, have machine instructions in the conversion program that will tell the computer to put the word "comment" in front of this information when it is reproduced.

The basic entry has a fixed limitation on length, but it actually need be only as long as is required for the actual information itself. We have allowed, for example, for a title 6,300 characters long. In actual practice, however, we punch only as many cards as are required to show the title information.

Editing to Satisfy Local Requirements

If the input format is well known and if the discrete items of input information are well identified, it is no problem to edit the original input to meet local requirements. If authors are entered uniformly last name first, then it is no problem to invert them to a first-name-first format for output purposes. It is also quite easy to reduce a long title to a pre-determined maximum length that may be a part of *your* record format. It is quite reasonable to combine rigidly fixed fields for certain information (pagination, date, etc.) while retaining the advantages of fixed-variable length fields for other information that is more variable in length (such as author, title, etc.). This gives extreme flexibility in the input product and makes the editing process considerably easier.

Certain logical steps may also be taken as the result of the presence or absence of certain information. If there is no date, for example, the field reserved for the date in the input record will be blank. The computer can be programmed to print NO DATE or DATE UNKNOWN (or some similar information) on the output record if this is desired. It can also substitute an alphabetic month for a numeric month, e.g., JANUARY for 01/XX/66.

This illustrates that the presence or absence of certain information can be a useful indication to the computer program, because the computer has the ability to test for the presence or absence of any character or characters and to take certain actions as a result of this test. The preceding example shows how the computer can be programmed to take an alternative course of action in the *absence* of certain data as well as in its presence. Certain constant information can be supplied by the program as the result of logical testing, such as the prefix "19" to the date. Spacing of the paper may occur on the printer, the computer may punch a card or write a tape record, or some other action may be taken dependent upon logical testing.

The user output record format need not be the same as the format of the input records, whether it be printed output or machineable records. Suppose that the input is furnished in strings 70 characters long, but that you wish to use this information to write catalog cards at a maximum line length of 47 characters per line. The problem is to break up the long 70-character input string to 47-character output lines without chopping off words in the middle and to indent the first line of the paragraph five spaces. To do this

one would read in the first string of 70 characters and find the position of character 43 (which is the end of the first line with the indentation). If character 43 is a blank, then characters 1-43 may form the first line, and the string can be moved to the output area. If character 43 is not a blank, then the program should test character 42 for a blank, and if this fails, test character 41, and so on back. When a blank is found, the string from character 1 to character (43-n) is moved to the output area, and the address of character (43-n)+1 is stored. This is the address of the first character of the next line. Testing for the end of this line, which is 47 characters in length, begins at character (43-n) + 1 + 47, and the blank testing routine is repeated again until an inter-word blank space is located. When less than 47 characters remain in the work area, the next record of 70 characters may be read in and the process continued to the end of the information for that entry type. In this way the input data is unpacked to the output format. A similar procedure may be used for repacking short strings to longer strings.

Programming Problems in Conversion of Input

The machine problems encountered in such conversion schemes are not difficult on character-oriented computers, such as the IBM 1401 or Honeywell 200, but may prove more difficult—although certainly not impossible—on word-oriented computers, such as the GE 225, IBM 7090, or CDC 160A. The whole procedure is entirely dependent upon proper identification of each segment of the input and upon the fact that this input must be in a certain form. Rigid limitations need not be imposed upon the length of input data fields, although certain fields, e.g., date, lend themselves very readily to fixed fields. It is important to capture and identify all data in the original input if there is even the remotest possibility that it will be of use. The expense of doing this at initial input time is relatively low, but it can be quite costly to have to go back and retrieve this information later.

It is important that full information be given without abbreviation of titles or authors. Standard abbreviations may be used if they are used consistently and are properly punched each time they are used. They may be expanded at some later time if necessary, using a dictionary of abbreviations vs. full spelling in the computer. Actually, the time it takes to compute title length and reduce oversize titles to a maximum number of characters may be more expensive than simply punching them as they stand. The computer may edit them, if necessary, but they can always be retrieved in full if later experience indicates that they should be used in full. Artificial limitations need not be made, given the capabilities of present and projected computer systems.

Compatibility between Computers and Computer Programs

Given proper identification of the input elements, it is not difficult to use a common input and tailor it to local requirements. The only real requirement is that the input format be known to the user and that all conventions be well defined. With this information, it is possible to write computer programs to accomplish the conversion very effectively on almost any computer. When we talk about compatibility between computer programs, however, the waters grow somewhat more murky. Now we are talking about hardware. Computers come in different sizes and configurations, and the differences between computers, even of the same series, may be considerable. In a way, the situation is not unlike automobiles, some of which have their engine in the rear, and some in the front. Some have power steering, and some don't. They all provide transportation, but the parts are not interchangeable.

And so it is with computers and with computer programs. If I write a computer program for my computer and I utilize the special features that are available on it, the program will not operate on your computer, even if it is the same general model as mine, if your computer doesn't have the special features required for operation of the program. If my program requires 16,000 positions of core storage, and you have available only 4,000 positions of core storage, the program will be useless to you. The situation is somewhat analogous to trying to transport in a single trip an entire basketball team to a game in a small foreign sports

car. A bus would do the job very well but a sports car—never!

If your computer is the same as mine and has all the features required by my program, you can obtain the same results I do by using my program as there is some degree of compatibility between computer programs.

Even the so-called common programming languages such as FORTRAN and COBOL have different restrictions for different computers to take advantage of the strong points of each machine. FORTRAN, especially, has become strongly oriented toward user hardware with the introduction of many dialects of the language. COBOL may appear attractive when writing for word-oriented machines, such as the IBM 7090 and CDC 3600, but it compiles a rather inefficient program for a machine such as the IBM 1401. Program optimization is especially important in handling information applications, since there is generally a large volume of input and output. This contrasts with most scientific applications, which have relatively little input or output but a great deal of internal activity within the computer in arriving at the answer.

It is important to realize that all computers don't speak the same language internally. They can all be programmed to do the same job, but the instructions may be different and the approach may be different, depending upon the computer and the instructions available for use on it.

Probably the best answer to program compatibility will continue to be good program documentation, explaining through the use of flow charts and coding sheet comments what is being done at each step in the program. This is especially valuable when changes must be made. Proposed new computer languages and the proposed compatibility of these languages from machine to machine may answer the problem in part, but if your system has six tape drives and my system has two tape drives and eight disk files, it would require not only reprogramming but even, perhaps, a different approach to optimize the system to the hardware available. In short, there is no ready answer to the problem of program compatibility, and probably the best that can be hoped for is that you will be fortunate in finding a good program that will work with your hardware and will, perhaps with some modification, do the job you want to do. Simulators, emulators, and translators only attempt to fool one computer into thinking that it is another, generally at some penalty in operating time. Again, the application determines whether the cost is reasonable or whether reprogramming should be considered.

The Dividing Line

There has been much evidence of, and many words have been written about, the so-called *information explosion,* particularly during the past fifteen years. There is no doubt that we are confronted with a serious situation, not only in physically coping with the volume of paper, but also with the intellectual disciplines involved in the generation, preservation, and utilization of the information itself. The first awareness of the problem, perhaps naturally, was felt by librarians and documentalists. Only recently has this impact been of growing concern to the science-research people themselves.

An analysis of this situation, a summary of which appears in TLD 91-65-071, has been made by a staff member of the Battelle Institute. Several significant conclusions are drawn: (1) that scientists and engineers prefer to delegate to others the task of finding information, while they continue more professionally satisfying work; (2) that professional abstractors and indexers do a more objective job than authors do in identifying information for subsequent retrieval; and (3) that a combination of fantastically huge centralized document depots and a network of specialized information analysis centers, supported by the government but privately operated, will increase in number and importance.

Hence, the dividing line begins to take form between the laboratory research scientist and the engineer, on the one hand, and the technical literature specialist, on the other. Each will have his contribution to make toward the future expansion of knowledge.

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This article, premised on the rapid handling and manipulation of information by computers, discusses the problem of moving information quickly from its source to the user, especially when long distances are involved. It offers wire communication as a solution and describes various terminal equipment that may be used. Sharing a communication network is presented as a way to reduce the cost to individual users.

Sharing Communications Networks

ARTHUR E. JONES

COMPUTERS ARE COMING into their own in their ability to handle large volumes of data. According to the prediction of David Sarnoff of RCA, we will have in the future, "Computers capable of storing all of the information presently contained in all the world's libraries, responding to commands from human voices in different languages, and automatically translating the speech of one country into the spoken words of another."

We read and hear such statements everyday, but the big problem faced by those who are located some distance from a computer is how to get at this store of information. The answer lies in the field of communications. It is fairly simple to communicate with a computer in an on-premise situation, but when the distance is extended a few miles or many thousands of miles, there is the problem of expense. One way to cut down on the expense is to share it with someone.

Possible Communications Networks

A group of libraries or even several groups can be interconnected by the simple device of using the common carrier systems provided by the telephone companies and Western Union in the United States, and RCA, ITT, and others overseas. Each library, using TWX or telex, can dial any other library using the same system and transmit a request or a reply. Each of these systems works much like the telephone exchange, except that the communication is written rather than spoken.

Another way to interconnect is through a leased line, which can have any one of several brands of communicating machines attached to the terminal ends. In sharing a computer, each library could be connected independently with a computer location by a leased communication circuit.

For libraries wishing to exchange information among themselves as well, a device is needed to tie all the independent circuits together and to switch the circuits or the messages so that libraries can talk to each other. There are a number of such switching devices on the market. Without going into detail, this equipment comes in a rather simple form for switching a small number of stations on a single circuit and becomes more complex as it is necessary to switch a larger and more complex network of stations. There is a growing trend to use computers to switch messages or circuits. Why not use the computer that is going to be shared? This is possible, although it might be more desirable to use a smaller buffer computer as the switching device to allow the larger computer to operate more efficiently.

Depending on the location of the libraries to be interrelated, it could be very expensive to have each one independently connected to

A condensation of a paper presented to the Science-Technology Division's Nuclear Science and Engineering Sections and the Metals/Materials Division at the 56th Special Libraries Association Convention in Philadelphia, June 8, 1965, by the Supervisor of Communication Services, Sandia Corporation, Albuquerque, New Mexico.

a computer location. One way to minimize this expense is by having several stations on the same circuit. This setup works well because each station on the line usually needs the line only for short messages scattered throughout the day. By taking turns, all messages can be sent over the same line, and the cost is shared among all users. If traffic increases and another line must be added, it is still an advantage to share.

Still another example of sharing is a network using computer switching and trunking. The trunking concept places several circuits between the two points having the greatest traffic. Then each station is fed into the closest terminal point of the trunk, as the several primary circuits are called. Switching equipment at these terminals searches for an open line and connects a calling station through to the station at the other end.

Input and Output Equipment

Whatever communication system is used, it should be kept in mind that input and output devices come in many specialized forms. Librarians should not hesitate to consider these special features. The display equipment for reference now in use and still on the drawing board promise an almost unlimited ability to retrieve information. Input units are equally diversified.

A typewriter of some kind is usually used in conjunction with a computer. In the past the typewriter has been only an administrative device for control; input and output were handled by off-system preparations or processing of punched cards, paper tape, or magnetic tape. Today a typewriter can be used as direct input/output. With one available unit, a librarian can type an abstract or a catalog card on an typewriter, and the copy will enter directly into a computer. In the process, the copy can be corrected if necessary. After the information is stored, it can be retrieved on this same typewriter; if desired, the information can be revised or added to and then stored again.

With the use of a cathode ray tube and a TV-like screen, graphic information can be displayed for reference and copied if necessary. While information is displayed on the face of the screen, it can be changed either with a device called a light pen or with a typewriter. A requester in a distant reference room can be provided with a TV screen and an automatic page or card turner. When a call is placed at the main reference desk, the proper reference book or tray of cards will be placed in position in front of the camera, and the requester can proceed on his own.

Microfilm, in the form of 35mm reels or aperture cards, can be examined on a TV screen; if the user wishes to retain the information, it can be stored digitally by a computer and retrieved at will. Information from other sources, e.g., a computer or a typewriter, displayed on the system can be converted into completely developed microfilm. Apparently the present equipment was designed with engineering drawings in mind; however, libraries have been using microfilm extensively in the last few years and could utilize this kind of equipment to retrieve and work with information stored on their microfilm reels. Several of the facsimile manufacturers have features by which microfilm can be scanned and transmitted to a distant point. It is received as a half-size to full-size document.

Facsimile offers an excellent, though presently expensive, way to transmit pages of information between libraries. Use of facsimile eliminates what might be called "down time" when the reference document is traveling by mail to and from a borrower. With Fax, a giveaway copy can be transmitted, and the reference document is immediately available for the next borrower.

I have focused attention up to this point on written or pictured information, but it is quite possible that libraries can use a more volatile type of information for certain reference problems. If so, they can telephone a computer, ask a question by signaling with the touch tone dial, and receive a spoken answer. Answers might be limited to such things as informing the caller that a certain periodical has or has not been received, but it's quite possible that there are other good applications.

The more exotic developments in communication for the home may well provide eventual spin-off benefits to libraries. The telephone companies are working with the idea of reading gas and light meters over the telephone line in the still of the night while people are sleeping. Work is going on that

will allow the housewife to pay her bills by phone. She would call the computer at the bank and, by using a touch tone dial, direct that X dollars be deducted from her account and credited to the account of the dress shop or gas company.

Communication Costs

Cost of communication circuits remains a major factor when considering transmitting data and other information over any distance. The cost situation has been changing over the last few years, and it is reasonable to expect a continuing reduction.

Where short distances are involved, there is no great saving advantage to be gained by sharing, but as the miles stretch out, the advantages of sharing increase. Each group planning to share facilities should look at this possibility. Several libraries planning to share a computer at a given location may find themselves grouped around this location. At first, it might appear that each should simply connect directly with the computer location. Upon examination, it will usually be found that sharing a single circuit would be more economical. For example, consider 11 major cities in the area bordered by New York in the north, Columbia, South Carolina, in the south, Cincinnati in the west, and Norfolk in the east. If a library in each of these cities were connected to the Oak Ridge Computer Center, it would require approximately 4,500 miles of circuits, using the air line miles from each point. These circuits would cost approximately $4,450 per month. On the other hand, if all these stations shared the same circuit, the air line mileage would be approximately 1,500 miles at a cost of approximately $900 per month.

Commercial TWX cost is based on 11 bands of distance from the calling location, and the rate is slightly different for each band. The following three samples will give some idea. A call to a place 111 miles to 185 miles away would cost 30 cents per minute in one minute increments. From 401 miles to 550 miles would cost 45 cents per minute, and 2,001 miles and over would cost 70 cents per minute. If traffic between the various points is heavy enough, it will be worthwhile to use a dedicated circuit. Using the minimum mileage in each example given for TWX, the cost of a dedicated line using 100 words-per-minute-equipment would be approximately as follows:

111 Miles—$134 per month
401 Miles—$393 per month
2,001 Miles—$1,120 per month

Perhaps the greatest advantage accruing from sharing is the ability to reach all stations at one time with a single transmission of a message. This saves time lost in retransmission, and in some instances it saves preparing the message over again for transmitting to each location if they are not connected by a network. Information is captured in machine language and can be reused or shared without additional labor. Once a network is justified and in use, there is a tendency to communicate more freely, and this leads to even greater cooperation.

Cooperation implies the sharing of responsibility as well as the sharing of benefits, and there are some responsibilities. For example, networks are normally established because there is a common goal to be reached. Networks, like libraries, are run by a set of rules, and a responsibility exists to abide by these rules. Those contemplating participation in a network must keep logs and trace messages.

Conclusions

To avoid being immobilized by the sheer volume of library acquisitions, libraries need to move quickly to the establishment of fast communication channels so that specialization in one library can be shared economically with others. Special equipment for capturing data for storage, for retrieval, for display, or for transmission is fast becoming a reality. Now is the time to start planning for the use of shared facilities to enjoy the greatest possible interchange of information.

SLA Sustaining Member

This is an addition to the Sustaining Members for 1965 listed in November *Special Libraries:*

MALAYSIAN NATIONAL LIBRARY

Three general types of controlled vocabularies—classification schemes, subject heading authority lists, and thesauri—are compared for the generation of printed indexes and production of stored indexes for internal information retrieval. Problems in sharing vocabularies concern vocabulary structure, subject content, and methods of manipulation or processing. The thesaurus appears to offer the greatest flexibility for various types of indexing and greatest adaptability to varying degrees of automation. Two recent developments in the area of vocabulary sharing are described—the *COSATI Subject Category List* and the joint effort of the American Society for Metals, Engineers Joint Council, and *Engineering Index* to develop parallel thesauri and mutual computer processing systems.

Sharing Vocabulary Control

MARJORIE R. HYSLOP

TWO ASPECTS of information storage and retrieval that are prominent in the minds of documentalists and librarians today are: *1)* automation and *2)* sharing, which carries the connotations of compatibility, convertibility, interchangeability, and standardization. There are many facets to these two aspects, but the one of concern here is the role of vocabularies in systems that can be automated and that can be shared. Mechanized indexing, storage, and retrieval systems exist that do not rely upon controlled vocabularies, and among these are systems that can be automated and shared; permuted title (KWIC) indexes and selective dissemination of information (SDI) systems are two examples. However, the controlled vocabulary is an important tool for increasing consistency of indexing and precision of searching.

A controlled vocabulary in the information retrieval context is an indexing vocabulary—an authority and guide to preferred terminology and a device for showing associations between words.

There are three general types of controlled indexing vocabularies:

1. Classification Schemes
2. Subject Heading Authority Lists
3. Thesauri

There are also innumerable specialized vocabularies or hybrids of these three types that defy any attempt to force them into a general category. For purposes of simplification, problems in sharing will be considered for these three general types only.

There are many points at which vocabularies can be shared and many ways of doing so. Ideally, complete sharing would involve the utilization of the same vocabulary, including identical terms and vocabulary structure, by two separate organizations for indexing separate bodies of documents. Such complete sharing would presume that both organizations serve closely similar purposes and clientele, and this situation is not often encountered in practice. Therefore, sharing is much more likely to be on a partial basis.

The problems involved in sharing fall in three categories, which are discussed in the following three sections.

Vocabulary Structure

It is not the purpose of this paper to analyze the structure of vocabulary building in detail, as this has already been done most effectively (1).* However, basic differences

* See numbered references at end of paper.

Mrs. Hyslop is Associate Director of the ASM Documentation Service, American Society for Metals, Metals Park, Ohio. *This is a condensed version of the paper she presented to the Nuclear Science and Engineering Sections of the Science-Technology Division and the Metals/Materials Division at the 56th Special Libraries Association Convention in Philadelphia, June 8, 1965, but the references have been added.*

in structure of classification schemes, subject headings, and thesauri should be reviewed.

The structure of a classification scheme shows word associations by means of hierarchies or family trees leading from generic terms to more specific terms at various levels. It is a rigid structure, which imposes the well-known problem of terms that may fall in more than one family tree. Thus, the classification scheme offers little latitude for expressing different points of view—a deterrent to sharing.

The structure of a subject heading authority list, on the other hand, is loose, flexible, and simple. Its principal element of structure is the alphabetical array that provides word associations by bringing together all terms of same or similar root spelling. Word associations are also provided by the traditional "see" and "see also" references. Still another structural refinement is the provision of various "levels" of indexing—main entry term plus sub-term, plus sub-sub-term, and so on. Sharing the alphabetical structure of a subject heading list is widely practised.

The structure of the thesaurus (2) combines features of both the subject heading list and the classification scheme. Like the subject heading list, its terms are alphabetically arrayed. Like the classification scheme, it exhibits hierarchy by means of "broader-narrower" term designations, synonymous term, and related term designations. Although the hierarchies are not so discreetly displayed, they go beyond the confines of the traditional classification array by permitting any term to appear in as many hierarchies as may be appropriate. It is, thus, the most versatile of the three types of vocabularies in showing word associations.

Subject Content

While traditional and special library classification schemes have been widely shared as intellectual subject guides for manual systems, the shareability of their precise terminology in an automated system is severely limited by their rigid structure. The same is true of subject heading lists, but for the opposite reason. Their loose alphabetical structure so readily permits insertion and modification of vocabulary terms that, even though the structure may be shared, the tendency is to adopt completely different terminology or languages for each automated system. Sharing of terms in thesauri has been much more widely practiced, as will be noted in the specific examples.

No matter what the vocabulary, two general problems are involved in sharing terminology—*1)* the concepts peculiar to a particular discipline and *2)* agreement on the terms themselves.

The first problem can be illustrated by the fields of metallurgy, chemistry, and nuclear science. In metallurgy, an intricate system of word association is required to represent alloys. For precise indexing and retrieval, alloy hierarchies can be based on composition (aluminum-copper alloys, aluminum-copper-magnesium alloys, etc.), innate characteristics (austenitic steel, dispersion hardening alloys, maraging steels), on properties (heat resistant alloys, magnetic materials), or on applications (bearing metals, brazing alloys). Almost all these hierarchies overlap, and the problem of controlling them in a vocabulary that provides sauce for the gander as well as the goose is not a simple one.

In chemistry a parallel problem is building suitable terminological associations for chemical compounds, particularly organic, and in nuclear science difficulties are concerned with relationships between elementary particles, nuclear structures, isotopes, and symbolic representations peculiar to physics.

In dealing with this problem, not only must all of the word or concept associations required within the detailed terminology itself be provided, but also if vocabularies are to be shared, this detailed terminology must be made to fit within the framework of the broad terminology cutting across narrower fields of interest.

Agreement on selection of terms is both an interdisciplinary and a cross-disciplinary problem. The best way to achieve such agreement seems to be by enlisting the assistance and guidance of groups of experts representing a wide range of subject matter, regardless of whether they know much about vocabulary building, indexing, or classification. Compromises and arbitrary decisions are unavoidable, but once an optimum vocabulary structure has been designed and the opinions of such experts are channeled into this structure, there is hope for developing a usable

and acceptable indexing vocabulary with maximum retrieval potential.

Manipulation to Produce Indexes

The bibliography of documentation and information retrieval over the past ten years is more liberally sprinkled with descriptions of automated information processing methods, techniques, and hardware than with any other variety of published papers. Starting with punched cards, both edge-notched and machine manipulated, the documentalist's interest has inevitably focused on the computer as the ultimate tool for information retrieval and, therefore, for adapting vocabularies to automated indexing.

Problems in manipulation of the three types of vocabularies vary depending upon whether the purpose is to produce a printed index by automatic methods or one stored internally in a mechanized IR system.

Use of classification schemes for producing printed indexes is rare, although not unknown. Some recent work along this line, which utilizes the Universal Decimal Classification, is most interesting. Originally developed for indexing *Meteorological and Geoastrophysical Titles* (3, 4), it has since been extended to *Geoscience Abstracts* (5). A good possibility should exist for adapting the computer programs used to produce the index to other disciplines, which could be based on UDC.

Use of classification schemes for internal information retrieval indexes manipulated by computer has met with little success, although, according to Robert R. Freeman (6) there is, "a need for a fresh look at the use of data processing equipment in conjunction with classification systems in the light of advancing technology. Earlier conclusions, generalized from experience with punched-card equipment, were too pessimistic. Computers can render significant aid to humans involved in improving and using existing classification systems."

The best collection of classification vocabularies (whether automated or not) is undoubtedly that contained in the SLA Special Classifications Center at Western Reserve University, Cleveland (7).

Subject heading authority lists are the time-honored vocabularies for generation of printed indexes, primarily because the alphabetical arrangement is inherent. Examples of computer generated indexes based on subject heading lists are numerous, and new ones are continually popping up. The subject indexes to NASA's *STAR (Scientific and Technical Aerospace Reports)* (8) are a prime example. There appears to be little progress, however, toward sharing either the controlled terminology in the authority lists or the techniques for manipulation.

For internal information retrieval manipulation, subject headings are not being used as widely as for printed indexes, although they can be adapted to computer processing. Perhaps the best known example of this usage is Medlars (Medical Literature Analysis and Retrieval System) of the National Library of Medicine (9, 10).

Subject headings are probably more amenable to computer systems than are classification schemes, and the problems in developing such systems are less formidable. Four other interesting examples are given in the bibliography (11-14).

The thesaurus, because of its versatile structure, can be used equally well for generation of printed indexes and for internal information retrieval purposes. The thesaurus is a relative newcomer to the family of indexing vocabularies, probably first referred to in the documentation literature in 1957 (15). The first actual publication of a thesaurus for the physical sciences was in 1960 —the *Thesaurus of Astia Descriptors* (16, 17). This was followed in rapid succession by others, two of the best known being the AIChE (18) and EJC compilations (19). A number of others are listed in the bibliography, together with some general references on thesaurus principles (20-45).

It is noteworthy that most of these thesauri are generated by computer—a fact that probably leads naturally into their application for computer-generated indexes. In other words, efforts to standardize on automated or mechanized indexing techniques have generally led to the development of new types of vocabularies rather than attempts to force more traditional vocabulary structures into the patterns required by mechanized manipulation.

In general, there are two problems in achieving systems compatibility to permit

sharing of processing methods: *1)* computer techniques are evolving so rapidly that a system that took years to develop and that worked fine yesterday is out of date today, and *2)* computer science and technology is so complex that it is couched in language virtually unintelligible to those conversant with the intellectual problems of indexing and information retrieval.

Computer programs have been written at great expense in money, time, and labor for numerous information processing systems but most have been limited in their application to a single installation. Claims are made that such programs can be adapted to use by other organizations at other sites and for other bodies of knowledge, but these claims are substantiated only by systems that do not require a controlled vocabulary, such as permuted title indexing. Where a controlled vocabulary is involved, it has almost invariably been "to each his own."

This situation, however, is changing. The computer people are learning to converse with and understand more fully the problems of the intellectual organizers of knowledge and vice versa, and unmistakable signs point to the day when general-purpose computer programs will be developed that can be adapted to common vocabulary structures and languages.

Examples of Vocabulary Cooperation

Space permits citing only a few examples of cooperative work trending toward common vocabularies. The first is the *COSATI Subject Category List* (46), which is directed primarily toward unification of subject content, disciplines, and terms rather than manipulation. It was originally developed by a study and analysis on the basis of frequency of the indexing terms employed by AEC, NASA, DDC, and OTS. In April 1964, Datatrol Corporation submitted a report (47) that presented a hierarchical superstructure to be superimposed over the individual vocabularies of the cooperating agencies. The *COSATI Subject Category List,* based upon this earlier work, is a two-level arrangement consisting of 22 major subject fields, with a further subdivision of the fields into 178 groups.

In the development of this subject list, the basic objective was to produce an over-all scheme for subject arrangement for *1)* announcement and distribution, and *2)* management reporting. It is not intended that the list represent the basic subject classification or be used for indexing purposes, but rather it is a subject scheme with a common vocabulary that can be superimposed on existing subject arrangements or compared to subject schemes presently in use.

The COSATI Task Group has accepted as its next order of business the task of establishing guidelines or rules for developing a vocabulary or thesaurus that might serve the agencies. The Task Group does not look to the generation of one great big vocabulary but the development of a thesaural framework, which in all likelihood will be patterned after the EJC structure.

The second example of vocabulary sharing is the joint program of American Society for Metals, *Engineering Index,* Engineers Joint Council, and IBM on development of both printed subject heading indexes and deep indexing for retrieval based on thesaurus vocabulary control (48, 49). This project is addressed primarily toward interchangeability of vocabulary structure and processing methods rather than terminology.

ASM's published index appears in its abstract journal, *Review of Metal Literature,* and *Engineering Index* is issuing two pilot publications representing sub-fields of engineering—namely a "Plastics Section" and an "Electrical/Electronics Section" of the monthly *Engineering Index.* In both the ASM and *Engineering Index* projects, the EJC Thesaurus is used as the basic vocabulary structure.

Since the fields of interest of metallurgy, plastics, and electronics are so widely divergent, no effort is being made to develop common terminology between the two organizations, other than to use terms existing in the EJC Thesaurus insofar as possible. Each organization is in the process of developing a more detailed thesaurus for its fields of interest. This experience illustrates the principle—fairly widely accepted—that a thesaurus of broad terms can be supplemented by "microthesauri" covering details of various subdivisions of subject matter. In other words, the structure of a thesaurus is susceptible to subdivision into fields, disciplines, or subdisciplines, each of which is

organized along the same principles as the main thesaurus.

Joint programs for computer manipulation and processing of the indexing vocabulary structure, for both published index and internally stored retrieval indexing, are being developed. The first of these programs is now complete and in operation (50-52). The identical program is used for both the *ASM Review of Metal Literature* index and the *E.I.* "Plastics and Electrical/Electronics Sections." This computer program can presumably be used for any discipline that develops a thesaurus based on the EJC vocabulary structure.

Work is now also well under way in developing the retrieval program. This is based on a generalized information retrieval program known as the Combined File Search System (CFS) (53). This program also should be widely usable for retrieval systems in other disciplines.

Many other specialized vocabularies are being built along thesaurus principles. One example, where advantage is taken of broad experience in developing a limited vocabulary for company use, is the *Vocabulary of Indexing Terms for Inco Technical Reports* (54), issued by International Nickel Company. The foreword states:

> This vocabulary was developed for the Termatrex system of indexing Inco's technical reports. It is essentially an alphabetical list of possible indexing terms, each of which is accompanied, where relevant, by its related terms, references and scope notes. It is an authority list which shows relationship of terms and helps to bring terms to the attention of the indexer and searchers.
>
> It was built from words appearing in the documents themselves, rather than from any previously designed thesaurus. . . .

Despite the disclaimer in the last sentence, it is obvious that the vocabulary generally follows thesaurus principles.

Another example is the *Euratom Thesaurus* of "Key Words Used Within Euratom's Nuclear Energy Documentation Project" (55). According to L. Rolling, who heads the Document Analysis Group of the Euratom Center for Information and Documentation, one of the main concerns was to obtain maximum compatibility with existing term lists in the nuclear field. He says:

> We therefore derived the majority of our terms from the *USAEC Subject Heading List* and the *ASTIA Thesaurus*. We also achieved convertibility with the English-language descriptor lists of the German centers ZAED (Frankfurt) and DESY (Hamburg). Extensive use was made of the method established by the Datatrol Corporation in its comparison of the USAEC and ASTIA vocabularies.

Vocabulary control is maintained by a magnetic tape dictionary in three parts: *1)* a glossary of terms for indexers, *2)* a set of instructions for converting index terms to thesaurus keywords, and *3)* instructions for adding keywords. This method will permit utilization of the Euratom system by any organization in the nuclear field, a different philosophy in terminology (subject content) being accounted for by using a modified dictionary tape.

Euratom is now planning cooperation with the AEC Division of Technical Information in Oak Ridge, based on Nuclear Science Abstracts and Euratom's indexing system and retrieval program.

Conclusions

Many more examples could be cited where thesaurus compatibility is involved. It appears that the thesaurus holds great promise of providing compatible, interchangeable, standardized vocabularies, amenable to computer processing (56).

Another advantage is that it is recognized as a promising tool for reconciling the viewpoints of the indexer and searcher, which according to Herner (57) is one of the basic problems of retrieval—"finding out where the information is hidden *and how it is labelled*" (italics mine).

As early as 1957 Bernier (15) wrote:

> It seems that the construction of a technical thesaurus (published or not) giving semantic relationships among semantemes is one (but perhaps not the only) way of helping to bring the vocabularies of searcher and documentation system into coincidence or correlation.

The two most prevalent thesaurus vocabulary structures in use today are those of DDC and EJC. A major step forward will be the reconciliation of these two structures.

Another fertile but relatively unplowed field is the development of interchangeable computer programs for generation of indexes—programs for printed subject indexes and the more complex and difficult programs

for deep indexes, which can be stored and manipulated for information retrieval. The prospect for computer compatibility and convertibility is on the horizon, and it should not be too many years before the goal is attained.

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MESSAGE FROM LILLIPUT

The way some of our friends in the library-information fraternity operate, we suspect they might try to buy diamond-studded clothes pins to hang the Monday wash.

This needle isn't pointed solely at those librarians who want to install a real-time computer system for the exclusive use of the library; we will include in our target area those who acquire a library office large enough to satisfy the Chairman of the Corporation Board when stack space is so short that books are stored in crates in the warehouse; those who are more concerned with the decor of the reading room than they are with the quality of the collection; or those who devote their 50-hour work week to the collection and distortion of statistics in lieu of being concerned with service to clientele.

Let's be a little less concerned with keeping up with the Joneses and a little more concerned with our basic objective: bringing information and its users together—practically and economically. Let's not bother to hire a ten-ton truck when a borrowed grocer's cart will do. If is it available at Woolworth's, avoid buying at Tiffany's.

B. LITTLE

An index is, intrinsically, a lexicon of accepted vocabulary that is intended to fulfill three functions: *1)* it condenses the information contained in a document collection, *2)* it provides a bridge by which the language of the author and that of the searcher can be reconciled, and *3)* it is the instrument that governs the searching strategy. This distinguishes what an index *is* from the output that results when an index is *used*. Various forms of "autoindexing" are examined on this basis and are differentiated by the extent to which each of the three indexing functions is performed by automatic processes.

"Autoindexing" and Indexing by Automatic Processes

PHYLLIS B. BAXENDALE

TO ADDRESS a combined audience of ADI and SLA is to be confronted immediately with a language problem—whether to use the newspeak of information sciences or the oldspeak of library science. It is plain that an index is needed to bridge "the semantic gap." Such an index requires entries of the following kind:

library holdings	*see*	data base
subject heading	*see*	generic descriptor
index term	*see*	keyword
index	*see*	thesaurus
see reference	*see*	use

Under these circumstances it is perhaps best to state plainly what an index is and what function an index serves in the information sciences.

Definition of an Index

It is my contention that an index is required for any collection of information placed in a storage and retrieval environment, whether it be a collection of pages in a book or a collection of documents stored in a library or on the magnetic tape of a computer. An index serves three critical functions:

1. It is a condensed key to the information contained in the collection.
2. It bridges the semantic gap between the authors of literature and those who search that literature.
3. As the medium or instrument by which information is searched, it discriminates among the documents of the collection.

An index is a lexicon of allowed vocabulary for a given body of literature for which specified semantic and logical relationships are stipulated. The semantic relationships relate the terminological variants of the allowed vocabulary to the object or concept signified, for example, the semantic equivalence relationship between synonymous terms such as "communication theory" and "information theory." The logical relationship specifies the ordering among the index terms. This may be the simple structure of an alphabetic listing or the complex logic implicit in a hierarchial network such as *Engineering Index* or the second edition of the *MeSH* (Medical Subject Heading) *Index*.

The centrality of indexing to any storage and retrieval system is demonstrable by the fact that the index controls not only the quality of retrieval but also *all* the procedures comprising the information-providing activities of the system. Such activities, in essence, can be regarded as mappings either from documents or questions into the vo-

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cabulary of the index or from sets of documents into some parameter of the index. Thus, when specifying terms by which the subject of a document is described, an indexer maps the content of the document into the allowed vocabulary of the index. On the other hand, when documents are filed, their physical arrangement is a mapping into a selected parameter of the index such as subject heading or author surname. But this simple, yet comprehensive, concept of library processes is somewhat outside the immediate focus of my subject.

Examples of Automatic Indexing

Given, this functional definition of an index, it would seem that "autoindexing," "automatic indexing," and "indexing by automatic processing" would be tautologies for the same concept. That, however, is not true. As used, automatic indexing is an ambiguous term. It is most commonly used to refer to a concordance—on the words of the titles of documents—which has been compiled and printed exclusively by means of a computer. The latter fact causes it to be called an automatic index. It is to this category that the permuted indexes belong, for example the KWIC index being published by Chemical Abstracts. The citation indexes produced by the Institute for Scientific Information are other instances of automatic compilation. While such bibliographic listings admittedly perform a useful and popular service, and while "automatic" is an appropriate description for them, the term "index" is somewhat misleading measured against the given definition. Though titles are, in a sense, condensed keys to the information of the documents they describe, it should be recognized that permuted indexes provide no control of vocabulary either semantically or structurally and therefore do not bridge the semantic gap between author and searcher. That piece of construction work is left to the searcher.

The term "automatic indexing" is also used as a synonym for computer-aided indexing. In this instance, while "indexing" is appropriate, "automatic" tends to be misleading. Conventionally in designing a document retrieval system, one adopts an appropriate index prior to processing the collection, e.g., the Engineers Joint Council's index. However, with a computer at the disposal of the indexer, its reliability and speed as a searching, matching, comparing, and arithmetic device can be exploited in two extremely useful ways. The computer can be used to edit the work of the indexer; it can also help to redesign an index so that it is sensitive to and responds to changes in the information content of a collection.

How is each of these achieved? The first step is to enter the index or authority list into the memory of the computer in whatever detail is required. (The detail must invariably be augmented where the processing is by machine.) Since the computer is to take over the role of editor, the indexer or author can now freely assign terms to a document and allow the computer to determine whether or not an assigned term is allowed by the index, whether or not the spelling of the term is acceptable, and whether the format of the term meets specifications. If desired, cross-references can also be added automatically. For examples of this type of computer-aided indexing refer to Susan Artandi's thesis "Book Indexing by Computer,"[1] and to an article by Mrs. Claire Schultz with the descriptive title "Editing Author-Produced Indexing Terms and Phrases via a Magnetic-Tape Thesaurus and a Computer Program."[2]

Redesigning an index with the aid of a computer capitalizes on the arithmetic features of the machine. Using these, it is possible to keep a running tally on all the activities of the system, e.g., how often a term has been assigned to the documents of the collection, how many questions have used a given term, and so on. When specified thresholds on such empirical data are reached, a computer can indicate that a revision of the index is necessary and can determine the documents that will be affected by the revision. For example, as a document collection grows, when a given index term is assigned to too large a proportion of documents, that term loses power as a discriminator during search. This implies that the concept needs to be subdivided into more specific categories and that the original term should be used to designate a class. To control such circumstances one might specify, for example, that whenever a subject heading or an index term is assigned to one per cent of the docu-

ment collection when the size of the collection reaches the range of 10,000 to 12,500 documents, that the computer program must provide a print-out of the subject heading, together with a list of the accession numbers of the documents to which that heading has been assigned. The use of a range rather than an absolute number would allow the system to continue effectively where the documents being added—and therefore now subject to revision—had already been indexed under the old heading. It would further accommodate the transition period, which always accompanies revision.

Mrs. Claire Schultz cites an example of the use of such techniques in the revision of the *ASTIA Thesaurus*.[3] After the *Thesaurus* had been tried for a year, counts of the number of times each term had been used to index a document were used to structure the terminology into categories. For example blood was assigned to 340 documents and brain to 322, in comparison to 72 occurrences of blood vessels and 99 occurrences of cerebral cortex. In consequence, blood and brain were made into generic descriptors with the more specific terms subsumed under them. Now that the usefulness and the ease of implementation of such computer-aided indexing techniques have been demonstrated, one can confidently predict that they will be both augmented and used more extensively in the future.

Definition of Indexing by Automatic Processing

In "indexing by automatic processing" the starting point is the text, or some part of the text, of the documents of the collection, and the aim is to derive an index by means of computer programs operating on the machine-readable text. Remember the index is to be composed of terms that are condensed keys to the information in the collection and is to specify the semantic and logical relationships that allow translation between the languages of author and searcher. One can ask, what capabilities are required to provide computer programs that will generate such an index? As I see it, there are three, and each of these capabilities must be expressed as a list of non-intuitive, explicit, operational rules by which:

1. To specify what a document is about.
2. To identify and possibly transform alternative structures into a normalized form, e.g.:
   design of computers = computer design
   cup of tea ≠ teacup
   hydrolize (verb) → hydrolysis (noun)
3. To determine semantic relationships among concepts, e.g.:
   equivalence relationship: information theory = communication theory
   generic / specific relationship: information theory / coding

Though no composite of such programs exists today, nonetheless there are limited achievements in areas one and two where concepts from disciplines such as statistical decision theory and computational linguistics are being explored for their adequacy in supplying the nonintuitive, operational rules by which to specify index terms and to determine meaning-preserving transformations among alternative forms.

A brief word about the statistical and the linguistic approaches is in order. Through the methods of statistical decision theory it is hoped to formulate quantitative measures that will separate informative index terms from the non-informative. For example, one hypothesis being tested is that if a word or string of words occurs in an article with a frequency greater than the average frequency with which it occurs in the total collection, that term will be informative. This hypothesis incorporates the concept of information as used in communication theory, namely, that a highly redundant word is non-informative (non-discriminating), while a unique word is informative. To cite an extreme example, the pair of words "of the" can be expected to occur with approximately the same relative frequency in every article of the collection and therefore would be entirely uninformative as an index term, even though the expected frequency would be very high. On the other hand, the relative frequency of the pair of words "magnetic tape" in an article about magnetic recording media would be much higher than the expected frequency within the collection, provided that the collection were heterogeneous in subject-matter. Though this intuitively satisfying hypothesis has, for various reasons, not yet been wholly verified, there are groups

that claim to be using similar concepts to the satisfaction of their customers.

Computational linguists, on the other hand, are looking for language criteria by which to separate informative terms from the non-informative. Here, informative is interpreted as indicating subject content, in contradistinction to the concept of communication theory cited above. Susan Artandi, for example, evaluated a method for selecting index terms for a book based upon the typographic peculiarities of the language of chemistry. Of the quality of the index, it was stated, "The index produced by the computer, although equal in quality to manual subject indexes, was not economically competitive."[1]

Linguistic Experiments at IBM

At IBM we are working with the following hypothesis: since conventional indexes are chiefly composed of word-strings, which are noun phrases such as *recording, high-speed magnetic* and *computers, design of,* then such nominals extracted from the titles, diagram and paragraph captions, or from the sentences of abstracts will provide an informative index for a document. Working with grammatical rules designed around the orthographic features and the syntax of language, we now have an abstract analyzer program, which parses the sentences of technical abstracts into various kinds of phrases such as verb phrases and prepositional phrases, and hence allows the noun phrases to be selected as index terms.[4]

The syntactic procedures for computer parsing are quite different from those required for numeric processing. It is plain that of the information-bearing components of language such as accentuation, word order, meaning, and so on, the computer is restricted to decisions based on orthographic features only. Such features are matched or compared by the computer, and when identified, the prescribed rule is applied. The severity of the restriction to orthographic identifications is apparent when one considers the high degree of homography in English. This is readily demonstrated by citing a common homograph such as "fine," which can belong to any one of three syntactic categories —verb, adjective, noun. The linguist's task is to specify that set of non-intuitive (non-semantic), explicit, operational procedures by which the difference in use can be uniquely identified in a sentence such as: "It was a fine, unobstructed road, yet the traffic court imposed the maximum fine." The rule or set of procedures must be able to make this unique identification in any English sentence.

To do this, the linguist extracts syntactic information from three characteristic features of English. Word modifications or inflections can be exploited to differentiate adjectives from adverbs, from nouns, e.g., gross, gross*ly*, gross*ness*. But note that a word modification is lacking that will allow differentiation between *gross* as an adjective and gross as a noun. Where, in this instance, a human is able to resolve the homography by resorting to meaning, the computer is limited to the form of the word.

Word order is another useful property on which syntactic decisions can be made, as in the sentences "They are going." and "Are they going?" Finally, a class of English words whose function is to express relationships between word strings (and which, fortunately, are not strongly ambiguous syntactically) provides many parsing procedures. For example, the preposition *for* connects an article-adjective-noun string to some other unit of a sentence as in "They did it *for* a good cause."

To indicate the power of procedures based upon the foregoing features of English, consider a nonsense sentence such as:

> Since the gerular lesumation was statively morfed by the dilous ridector, all somonic prosities must be morfed.

It is clear that one can read the example as though it were a meaningful English statement, and this alone is an indication that the reader is identifying certain syntactic clues as he proceeds. For example, when the statement is stripped to its functional words, it becomes clear that such words have a certain predictive power. Thus, the article "the" predicts that a noun will be found before one encounters a preposition or an auxiliary verb.

> Since the _____ _____ was _____ _____ by the _____ _____, all _____ _____ must be _____.

When word modifications are added to

this skeleton statement, it is not at all difficult to determine the syntactic components of the sentence at both the phrase level and the word level.

Since the _____ar_____ation was _____ly _____ed by the ____ous _____or, all _____ic_____ties must be _____ed.

adj noun
[Since the _____ar_____action]
adv past participle
[was _____ly _____ed] [by the
adj noun adj
____ous _____ or], [all _____ic
noun past participle
_____ties] [must be _____ed].

If for purposes of document indexing, it is specified that adjective-noun strings should be extracted from the sentences, we would have three index terms for the sample sentence, namely gerular lesumation, dilous ridector and somonic prosities.

Though the foregoing procedure seems impressively simple, it should be stated that the simplicity is immediately belied when one examines the complex decisions that constitute a rule of the grammar and when one learns that an over-all accuracy of 93 per cent in parsing sentences is currently our best performance. What does this mean for indexing? Simply this, that if strings of adjective-noun forms extracted from technical abstracts are acceptable as index terms, then the parsing algorithm of the abstract analyzer program could select index terms automatically, making seven errors out of every 100 selected. Though I believe we all know of some information storage and retrieval environments where these circumstances might be acceptable, it is plain that greater accuracy must be attained before indexing by automatic processing in the strict sense in which I have used it becomes a reality.

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In Memoriam: Marjorie Baker

The Metals/Materials Division and the New Jersey Chapter have lost an enthusiastic and loyal member with the death of Marjorie Baker in October. She had been in poor health for the last few years; however, that did not deter her from attending the meetings of the Chapter nor SLA conventions, where her keen and discerning mind often gave a fresh viewpoint and brought into focus the pros and cons of a topic.

Mrs. Baker became a member of the Metals Section of the Science-Technology Division in 1948 and was one of the charter members of the Metals Division at its inception in 1953. She served as Public Relations Chairman of that Division the following year and as its Finance Chairman in 1955-56.

Her offices in the New Jersey Chapter included Treasurer from 1956-58; Chairman of the Nominating Committee 1958-59; member of the Consultation Committee from 1959-60, and Chairman in 1960-63.

Among her writings are "A Metallurgical Library Pays Its Own Way," which appeared in *Iron Age,* August 6, 1956; "How to Start a Small Technical Library," first printed in *Special Libraries* in 1954, was reprinted later to fill numerous requests, and in February 1963 was up-dated and included in SLA's monograph *Special Libraries: How to Plan and Equip Them.*

From 1947 until her retirement in the spring of 1965 she held the position of librarian at Engelhard Industries, Newark.

Mrs. Baker accomplished much with her light-hearted, objective approach to life's problems. Her loyalty to her friends and her compassion for the unfortunate, young as well as old, were outstanding.

GENEVIEVE FORD

Diagrams, accompanied by sets of questions, lend themselves to presenting retrieval system design as a do-it-yourself exercise. The value of the exercise is explored, and instructions are given for "playing the game."

Do-It-Yourself Retrieval System Design

CLAIRE K. SCHULTZ

THE FOLLOWING simple diagram does not belittle the problems of designing a retrieval system; it is an attempt to formalize it. It has been said so often it tends to be accepted as a truism, that "almost anything, i.e., techniques and equipment, will work for small systems." That is not to say, however, that "almost anything" will work pleasingly, satisfyingly, during long periods of growth, through many changes of personnel, and so on. The design of small systems needs to be formalized to see the system aspects clearly. Once design is formalized, the rules become evident, but part of the point here is to demonstrate that the problem does not thereby become trivial.

Small systems are important because there are so many of them; there are many more small than large systems, and, according to current discussions,* small systems may one day provide either the input or output, or both, for large information networks. Certainly their design will be important if/or when compatibility among systems becomes an issue. Small systems are highly important for another reason. They are closer to the clientele they serve than are centralized systems; therefore, they are more sensitive to such things as what the user wants, how he asks for it, and how he reacts to different types of service. An information specialist who is a part of a system feels the satisfaction of pleasing users and the discomfort of not pleasing them, thus gaining insight into proper system design.

Operators of reference services, such as those typically found in special libraries, are in an enviable position for evaluating whether a system, either proposed or working, is well-designed; but they may not have the confidence, time, or specialized knowledge of equipment for designing a system by themselves. Their unique knowledge and their important position in the communication of information should not go to waste; they should be at least part of the design or redesign team for the system they represent. The diagram and question sets given here can be used to consider an entirely manual system, or a mechanized one, or any blend of the two; they are meant to stimulate readers to think about system design—for example, the elements of your present system or the one you may hope to have. All systems have a design, whether like Topsy, they "just grewed," or whether they were "totally planned." They are like people, who have personalities whether they tried to develop them or not.

How to Play the Game

The boxes in question sets 1-4 divide the design problem into the three components of any system: input, processing, and output. Each of these three can be broken into the same components *ad infinitum,* but in diagram 1 the secondary breakdown for each box is labeled: *1)* materials, *2)* personnel, and *3)* equipment. This is deliberately a lit-

* For example, the hearings on HR 664 by Congressman Pucinski.

This article is based on an illustrated lecture entitled "Planning and Administering a Small Information Center," which was given to the New York Chapter of the American Documentation Institute in New York City, May 19, 1965. Mrs. Schultz is the Senior Research Associate of the Institute for Advancement of Medical Communication, Philadelphia, and a Past-President of ADI.

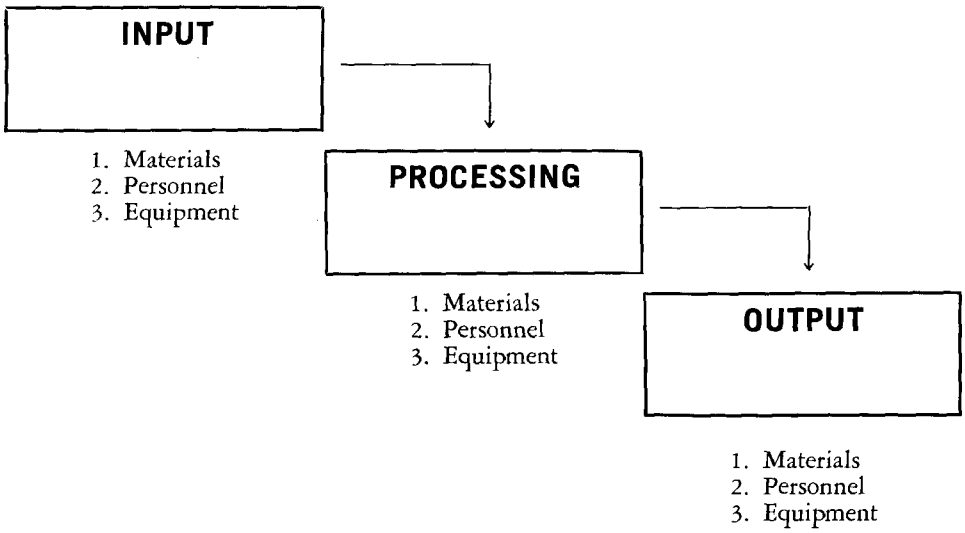

Diagram of Basic Components of an Information Retrieval System

le informal; materials represent input, but ersonnel and equipment can be a part of ıput, processing, or output. The labeling ıkes for granted that the output of one box ecomes the input of the next, until the end f the line is reached. At the end, the output f the retrieval system is, of course, the ıing(s) being retrieved.

For playing the do-it-yourself retrieval sys-m design game, if you do not have a small ɔrary or to keep yourself from getting too ar-out" in thinking up answers for ques-ɔns in question sets 1-3, Table 1 presents me typical parameters you might use as you ı along. Question sets 1-3 are meant to be ed repetitively; the first time the questions e encountered they can serve as an intro-ıction to the methodology of system de-ɜn. If they are asked (and answered) a ɔnd time, they should stimulate more estions; then the player is hooked. Mak-ɜ the answers to one set of questions com-tible with the answers to every other set the system will be workable and feasible o what needs to be done within proper ıits of time and cost) is very challenging. ıt in case a player becomes prematurely smug about his ability to arrive at all the right answers, Table 2 provides a set of anti-dotes for that condition.

Should you find that playing with the diagram and question sets is interesting, you can personalize the game by nar-rowing or expanding to questions/answers pertinent to your own set of parameters. Then you can extend the process by delving deeper into each of the parts, quantifying as you go, e.g., instead of saying, "Yes, my system will include journal articles," say "I'll have about 1000 journal articles to start." This will stimulate the question, "How fast will the collection of journal articles grow?" It may take some work to determine the answer. This is exactly the process any expert system designer follows to gather the statistics and other measure-ments needed for determining what a system is to do, so it can be designed efficiently. The game can become as lengthy and intricate as any game of chess. Playing it cannot hurt anything, and it may give you new insights about your own system and your own in-terest and ability for system designing. *Try it!*

INPUT TO SMALL SYSTEMS

MATERIALS

1. Journal articles?
2. Reports?
3. Our own organization's reports?
4. Correspondence?
5. Laboratory records?
6. Books?
7. Pictorial material?
8. Records from other systems?

PERSONNEL

1. Analysts/indexers/abstracters?
2. Typists?
3. Keypunchers/paper tape typewriter operators?
4. Supervisors?

EQUIPMENT

1. Typewriters?
2. Keypunchers?
3. Paper tape typewriters?
4. Service time on equipment?

Question Set 1

PROCESSING IN SMALL SYSTEMS

MATERIALS

1. Catalog cards?
2. Edge-notched punched cards?
3. Peek-a-boo cards?
4. Tabulating cards?
5. Paper tape?
6. Magnetic tape?

PERSONNEL

1. Operators?
2. Supervisors?
3. Trouble shooters?

EQUIPMENT

1. Human beings only?
2. Mechanical sorters?
3. Electromechanical sorters?
4. Service time on an electronic digital computer?

Question Set 2

OUTPUT OF SMALL SYSTEMS

MATERIALS

1. Source documents?
2. Copies of source documents?
3. References?
4. Bibliographies?
5. Abstracts?
6. Critical surveys?
7. Factual data?
8. Supplemented output such as post-retrieval translations, retrieval from additional systems, etc.?

PERSONNEL

1. Searchers?
2. Clerical assistants?
3. Equipment operators?
4. Supervisors?

EQUIPMENT

1. Typewriters?
2. Electromechanically driven printers?
3. Service on electronically driven printers?
4. Photocopiers?

Question Set 3

DESIGN PARAMETERS

THE TYPICAL SMALL COLLECTION:

1. Size—25,000 to 50,000 documents
2. One or two searches are required of the system per day
3. Two hours or less is a desirable amount of time to spend for each search
4. The average search requires inspection of approximately a five-year collection of data. (If the system has been in existence that long)
5. The three logical connectives *and, or,* and *not* are needed to execute searches, whether by human being or by machine
6. The collection grows at the rate of 10,000 or less documents per year
7. The number of indexing terms used to describe an average document is 12 or less
8. The size of the vocabulary used to describe the collection varies between 1,000 and 5,000 terms if an authority list is used; an uncontrolled vocabulary becomes much larger

Table 1

QUALITY / TIME / COST

1. Who should design the system?
2. How fast do various services from the system have to be?
3. How much use will be made of the system?
4. Will the system *really* meet the needs for which it is being designed?
5. Is it being designed for the right needs?
6. How up to date will it be?
7. What kind of error checks can be built-in to assure quality? Are they worth their cost?
8. Will the system make maximum use of input or processed materials that can be obtained from other sources? Is it being designed for compatibility with other systems? Should it be?
9. Will the system be over or underdesigned? Will it withstand changes in personnel without losing efficiency?
10. Is the system likely to be efficient three years from now? If needs change, can past input be converted automatically for processing by other equipment?
11. How can relative efficiency of alternative systems be assessed?
12. Once the system is operating, how can quality and costs be measured?

Table 2

Automation in the Library!

A Hungarian invention, the Automatic Librarian, makes it possible for one man to handle an entire library. It is based on a punch card system that performs 40 different services. One of the services performed is the marking on the lending slip the date of lending and expiration. During the current year there will be several such machines on trial. Next year, wholesale production is foreseen."

From a review of Automata Konyvtaros (The Automatic Librarian), *Nepszabadsag (Peoples' Freedom),* February 1964, p. 8. In Hungarian. Reprinted in the July 1965 *American Documentation,* p. 265.

Conventional book cataloging techniques were applied to a collection of 10,800 books and monographs. Costs averaged $3.67 per item. In a prior study the author reported an average input cost of $2.99 per report indexed into a machine document address storage system. Since the two systems deal with different size units of knowledge, and because the associated subject authority control for the book catalog was more time-consuming, it is concluded that book cataloging in the situation described is inherently more expensive than is coordinate indexing.

Comparative Costs of Document Indexing and Book Cataloging

L. H. LINDER

IN 1963 it was observed that "performance and cost data on existing large documentation systems are surprisingly sparse, and cost data have rarely included adequate overhead and depreciation accounting."[1] More recently a report on automatic indexing called attention to the lack of objective data on costs of indexing.[2] Clearly there is a need for such data so that choices between systems may be based on cost and other factors.

In 1963 costs for equipment, supplies, indexing, and input labor for 10,000 reports entered in an optical coincidence document address storage system were analyzed and tabulated by the writer.[3] This system used a standard thesaurus of descriptors and coordinate indexing techniques to provide an average of 12.6 access points for each document. The total cost was just under $30,000, and the average cost per report indexed was $2.99. Equipment depreciation was considered, but space occupancy costs were not included, since no precise charges for space had been allocated against the group doing this work. A report of a similar analysis and cost tabulation for cataloging by traditional means a collection of 10,800 books and monographs follows.

In the United States many of the university and research libraries base their subject cataloging on the *Library of Congress Subject Heading List,* and most of them use Library of Congress cards also, or at least the card copy. The advantages of doing this are so well-known that they need not be repeated here. Many special libraries can also benefit from using the *Subject Heading List* and cards to obtain at very little cost the expertise of a skilled group of catalogers and printers.

Books, monographs, and bound serials were the major categories of publications chosen for traditional treatment. Material included was pre-selected from publishers' catalogs, lists, and fliers, from subject and trade bibliographies, and from the *Publishers' Weekly.* After the items were acquired they were turned over to the book catalogers who, with the aid of a part-time assistant cataloged the material. Six man-years of effort were required to complete the task.

It should perhaps be emphasized that book cataloging system is not precisely comparable to a report indexing system, even though their ultimate goals, the retrieval of items of information, are the same. In general they deal with different size units of knowledge and to some extent with different types of information. A book catalog generally leads a user to more broad treatment of a subject, while a report index leads him to more specialized items. Hierarchical relationships are displayed on catalog cards while in many report indexes these relationships are not shown directly, though they may be created by logical manipulation of the index term records.

Furthermore, the process of cataloging book differs significantly from report inde

Dr. Linder is Manager of Technical Information Services at Philco Corporation, Aeronutronic Division, Newport Beach, California. This is a condensed version of the paper he presented at the FID Congress in Washington, D. C., October 15, 1965.

ing, as we have practiced it. A book cataloger seeks to create terms or subject headings that individually characterize the whole book or a large portion of it. The mental makeup of the cataloger is essentially synthetic, and the process is one of synthesis. The report indexer, on the other hand, endeavors to select terms that reflect the smallest aspects of the subject treated in a report. His mental makeup is essentially analytic, and the process is one of analysis. The fundamental difference between the thinking of the cataloger and indexer suggests that for maximum productivity and highest quality of product different specialists may be needed, and our limited experience seems to bear this out.

In the traditional book catalog a typical book averages between five and six access points consisting usually of an author card, a title card, and three or four subject cards. For report indexing access points per report averaged, for us, 12.6 per item; of these, 9.2 were subject approaches. But the advantage of a larger number of access points tends to be offset to some extent by the fuller bibliographical and descriptive information provided on the usual catalog card.

The number of books and monographs in this study totaled 10,800 volumes, of which 5,720 items were first copies and 5,080 added copies. The collection was similar to the report collection in total size, in range of subjects covered, and in proportions of items reflecting the subject emphases.

Cost Factors

Traditional book cataloging can be accomplished with a modest expenditure for equipment. An electric typewriter, two desks, two chairs, and a 30-drawer card catalog cabinet cost $1,392. As in the case of equipment acquired for report indexing, the useful life of the items has been considered to be 12½ years. For accounting purposes this is amortized by the declining balance method, or 1.333 per cent per month computed on the remaining balance. Based on 46 months utilization, this equipment can be considered to have cost $641.26.

Supplies consisted mainly of expendable items such as catalog cards, guide cards, acetate card covers, pencils, typewriter ribbons, labels, and other stationery items. In addition, the *Library of Congress Subject Heading List,* supplement service to keep it up to date, and the Library of Congress classification schedules and changes have been counted here. The total cost of supplies was $2,312.

Labor costs consisted of both professional and clerical salaries and included fringe benefits. The professional portion of the labor was concentrated in one employee. Clerical help was obtained from five different employees. Tasks performed included the descriptive and subject cataloging operations and the creation of the subject authority file, all performed by the cataloger, plus the supporting activities of card and guide preparation, labelling, filing, and file maintenance operations. Detailed allocation of labor costs to each of these activities was not attempted.

Overall costs were:

Equipment amortization	$ 641
Supplies	2,312
Labor	36,671
	$39,624

Allowing for the fact that space occupancy costs are not included, the average cost per item for cataloging 10,800 books and monographs was $3.67. Additionally, it was determined that the average cost of cataloging a book the first time was $5.68, while added copies cost only $1.42 each. This proration of cost was based on the fact that the average time required to catalog an added copy is one-fourth that required for a new item. These costs, of course, include the associated subject authority file creation and maintenance and the clerical tasks referred to above. If the retrieval points provided by this process are examined, it will be evident that the cost per access point averages close to $.95. This is in sharp contrast to our document indexing experience in which access points were provided at an average cost of $.24 each, though it must be remembered that retrieval costs are not necessarily similarly related.

Based on our experience with two rather similar collections, we conclude that for us, traditional book cataloging is a more expensive process than is coordinate indexing of reports. The different size units of knowledge contained in the two collections, the different mental activities required in the two processes, and the time-consuming task

of creating and maintaining a subject authority control file of some 6,600 cards all contributed to this greater cost. As long as these factors are operative, it would seem that conventional book cataloging will continue to exceed the cost of report indexing, as we have practiced it. But cataloging and indexing are only parts of information storage and retrieval systems, and a final evaluation of two such systems must also include measures of comparative retrieval effectiveness and dollar costs for retrieval.

Citations

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3. LINDER, L. H. Indexing Costs for 10,000 Documents. IN: *Automation and Scientific Communication. American Documentation Institute. 26th Annual Meeting, 1963. Papers,* vol. 2. Washington, D. C.: ADI, 1963. p. 147-8

Is This a Problem?

IN A SMALL ROOM, holding one small special library and two people, conflicts are bound to arise. Telephone calls, visitors, researchers, lunch hours, and tidiness can become gargantuan problems.

Take Roger Smith, librarian, who became incensed when Viola, his secretary, was gossiping with a friend while he was searching frantically for an annual report she had placed in her OUT basket.

"Viola," he snapped, "why in tarnation can't you at least confine your conversations to lunch hours or when the senior v-p does not call?"

"I don't have to take such language from anyone," retorted Viola, and she sulked for weeks. She opened the mail and routed the magazines, but made Roger feel sorry that he had ever opened his mouth. She did not say good morning nor good evening. She wrote him notes when she wanted a change in her lunch hour.

Finally Roger, normally a nice guy, easy-going and not too aggressive in managerial instincts, became quite incensed at her attitude. He talked to her late on Friday afternoon.

"Viola, you are here to do a job. You are not working under any whip, but when service is demanded, by any one in the company, we must be prepared to give it. Why don't you just tell people you are busy when your friends telephone to talk to you?"

Viola pouted and said she was not going to be shouted at, and furthermore she felt her friends were her own affair. After all, people came in to see him, and she did not yell at him to stop talking to them.

LOUISE STOOPS

The editor welcomes comments

Reaction to the Problem on Reference Work for Students in the October "Special Libraries"

Students' research for a term paper or thesis? Ah, yes, Louise, that is a problem! While no *deus ex machina* is available to Marjorie, why doesn't she suggest the student come in and use the library during its regular hours when she will be happy to help him? If the subject in question is one about which her library contains no information, she must simply state flatly that she cannot help and give the requester the address of the public library. Should Marjorie be a very confident soul from whom her superiors expect frankness, she should reply that were she to do a student's homework, she would be depriving him of the joy of discovery, the ability to use his ingenuity, and the self-sufficiency required of a good student. Moreover, Marjorie, if she is indeed brave, can tell the would-be parasite that having another do one's homework is very dishonest, akin to copying another's examination paper.

Persevere, Marjorie, this can be solved only by determination or, perhaps, overt stubbornness.

DINA JOHNSON, Research Librarian
Jones & Laughlin Steel Corporation
Graham Research Laboratory
Pittsburgh, Pennsylvania

Government and Libraries

THE RECENT President's Committee on the Economic Impact of Defense and Disarmament headed by Gardner Ackley of the Council of Economic Advisors recommended that government contractors, the federal government, and local communities begin preparing for the shrinking role that defense will play in the national economy. In the future, they state, grants-in-aid to state and local governments—largely in areas of health, education, training and human resources development—will provide the largest area for discretionary increases in federal spending. Libraries have much to gain from the increased funds available.

Some steps have already been taken to aid libraries. The Library Services and Construction Act (P.L. 84-597, as amended) provides for matching funds for the improvement of public libraries. The Elementary and Secondary Education Act of 1965 (P.L. 89-10) authorizes funds for school library resources and instructional materials and supplementary education centers and services. The Higher Education Act of 1965 (P.L. 89-329) authorizes funds for: *1)* the acquisition for library purposes of books, periodicals, documents, magnetic tapes, phonograph records, audio-visual materials, and other related library materials; *2)* library training and research in the field of library and information sciences, including the acquisition, organization, storage, retrieval, and dissemination of information, and reference and research use of library and other information resources; and *3)* transfer to the Librarian of Congress the responsibility to provide catalog information for library materials and to distribute bibliographic information by printed catalog cards and by other means.

Special libraries that are part of educational institutions will directly benefit. Other special libraries will benefit by the orderly application of these acts by producing better librarians and information specialists and by providing more and better organized library and information resources.

Two recent bills passed by Congress that will affect medical and technical special libraries are the Health Science Library Assistance Act of 1965 (P.L. 89-291) and the State Technical Services Act of 1965 (P.L. 89-182).

The Health Science Library Assistance Act of 1965 will authorize the Surgeon General of the Public Health Service to award grants-in-aid to assist in *1)* the construction and renovation of health science library facilities; *2)* the training of health science librarians; *3)* the compilation of existing and original scientific knowledge; *4)* the conduct of research and development in the field of library science; *5)* improving and expanding the basic resources of health science libraries; *6)* initially supporting biomedical publications; and *7)* developing a national system of regional health science libraries. Recent surveys have shown that there are over 6,389 medical libraries in the United States. Hospital libraries and medical libraries associated with educational institutions, which total 4,200, may receive direct benefits. The more than 1,100 medical libraries in research and industrial institutions and the estimated 1,000 federal and other governmental-sponsored medical libraries may also benefit due to the already close-knit cooperation that is a characteristic of the medical library field.

On September 14, President Johnson signed the State Technical Services Act of 1965. At the signing, he said that one day this Act would be known as the "sleeper" of the 89th Congress. It may well be a "sleeper" for science and technical libraries. The Act, which will be administered by the Department of Commerce, authorizes $60 million in federal matching grants to the states over a three-year period to provide a national program of incentives and support for the states individually, and in cooperation with each other, in establishing and maintaining state and inter-state technical service programs, so that the results and benefits of modern science and technology may be effectively used by United States commerce and industry.

To qualify for funds each governor must appoint a designated agency in the state to draw up a five-year plan outlining the state's technological and economic conditions, identifying the general approaches needed to

meet the state's problems, and explaining the methods of administering and coordinating the technical services program. "Technical services" is defined as activities or programs designed to enable businesses, commerce, and industrial establishments to acquire and use scientific and engineering information more effectively through such means as: *1)* preparing and disseminating technical reports, abstracts, computer tapes, microfilm, reviews, and similar scientific or engineering information, including the establishment of state or inter-state technical information centers for this purpose; *2)* providing a reference service to identify sources of engineering and other scientific expertise; and *3)* sponsoring industrial workshops, seminars, training programs, extension courses, demonstrations, and field visits designed to encourage the more effective application of scientific and engineering information.

Nowhere in the Act is there any mention of the library. However, each of the above items encompasses areas in which technical and scientific libraries already play a strong role. Thus, this Act offers librarians an opportunity to express their views to the designated agencies during the planning stage by informing them how scientific and technical information can be effectively utilized through libraries.

ROBERT J. HAVLIK
Research Library Specialist
Library Services Branch
U.S. Office of Education
Washington, D. C.

EDITOR'S NOTE: *This is the first of a new series that will report on legislative and government activities at the national and state levels in the United States and Canada that should be of concern and interest to professional librarians.*

Ad-Hoc Forum for Information Center Administrators

APPROXIMATELY 100 representatives from government, industry, and academia attended the Ad-Hoc Forum of Scientific and Technical Information Analysis Center Managers, Directors, and Professional Analysts, held at the Battelle Memorial Institute, Columbus, Ohio, November 9-11, 1965.

In his keynote address, William T. Knox of the Office of Science and Technology discussed some of the current information activities of the federal government and the more active role it will play in the near future. The increasing need for good information management in a technologically oriented society is a growing challenge, particularly to the information-handling business.

On the evening that will be remembered as well for the "great blackout," Dr. Israel Light of the National Institutes of Health, in his banquet address, focused attention on the importance of educated and trained manpower to efficiently operate information systems. As the technology of communication becomes more complex, the need grows for new curricula to guarantee a continuing supply of young, bright professionals for the information field.

And so it went with speakers, panels, and discussion groups. All were successful in raising a number of problems, but few offered ready solutions. The major problem areas identified included: the procurement of well-trained and competent staff, the measurement of effectiveness of information center operations, particularly in relation to the costs of operation, and, means for facilitating intercenter cooperation.

It should come as no surprise to special librarians that the information center people have identified problems that seem terribly familiar. Maybe we should try hard to enlist these good folk in our common cause.

Additional information on plans for future meetings of this interest group, availability of published proceedings, and, so on, may be obtained from William B. Cottrell, Oak Ridge National Laboratory, Oak Ridge, Tennessee, or Mr. G. S. Simpson, Jr., at the Battelle Memorial Institute.

JOHN SHERROD, Assistant Director
for Systems Development
Division of Technical Information
U. S. Atomic Energy Commission
Washington, D. C.

Nominating Committee Report 1965-1966

The Nominating Committee presents to the Board of Directors the following candidates for office, all of whom have accepted nomination:

President

DR. F. E. MCKENNA, Supervisor
Information Center
Central Research Department
Air Reduction Company, Inc.
Murray Hill, New Jersey

President-Elect

MARGARET E. MADDEN, Librarian
Technical Information Center
Monsanto Chemical Company
800 North Lindbergh Boulevard
St. Louis, Missouri

MRS. ELIZABETH R. USHER, Chief
Art Reference Library
Metropolitan Museum of Art
Fifth Avenue and 82nd Street
New York, New York

Chairman of the Advisory Council

MRS. HELEN REDMAN, Head Librarian
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico

Chairman-Elect of the Advisory Council

THEODORE D. PHILLIPS, Assistant Librarian
IBM-ASD Library
P.O. Box 66
San Jose, California

CHARLES H. STEVENS
Intrex
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, Massachusetts

Directors (Three-Year Term)

(Elect One)

CHARLOTTE GEORGI, Librarian
Business Administration Library
University of California
Los Angeles, California

MARGARET L. PFLUEGER, Chief
Information Section
Division of Technical Information Extension
U.S. Atomic Energy Commission
Oak Ridge, Tennessee

(Elect One)

MRS. MOIRA C. JONES, Librarian
Aluminium Laboratories, Ltd.
P.O. Box 8400
Kingston, Ontario, Canada

MRS. THEODORA ANDREWS, Librarian
Pharmacy Library
Purdue University
Lafayette, Indiana

Director (One Year Term to Fill Unexpired Term)

(Elect One)

GORDON E. RANDALL, Manager
IBM Research Library
Thomas J. Watson Research Center
P.O. Box 218
Yorktown Heights, New York

CHRIS G. STEVENSON, Manager
Technical Information
Battelle-Northwest
Pacific Northwest Laboratory
Richland, Washington

Members continuing to serve on the Board of Directors for 1966-67 will be the Immediate Past-President, Alleen Thompson; Treasurer, Jean E. Flegal; and Directors, William K. Beatty, Phoebe F. Hayes, and Ruth Nielander.

Further nominations, accompanied by written acceptance of the nominee, may be entered by petition of 25 voting members and shall be filed with the Executive Director at least three months prior to the annual meeting.

Respectfully submitted,
ROSEMARY R. DEMAREST, SAFFORD HARRIS, ROBERT J. HAVLIK,
ALVINA WASSENBERG, AND LOIS W. BROCK, *Chairman*

CURRENT CONCENTRATES Of The Library World

Microforms—Problems and Prospects

The production and use of microfiche in this country is already growing at an astonishing rate. Advertisements by two firms now producing microfiche in quantity already list extensive offerings of printed research materials on microfiche. Various image sizes and reduction ratios are now being used in the production of these microfiche and, in the main, reduction ratios tend to be high in order to get the maximum possible number of images on each microfiche. There is a real danger here that unless steps are taken immediately to establish standards for microfiche of printed research materials based on the nature of the materials and the needs of the user instead of on the economics of competition within the industry, the research worker will soon be bedeviled by the same problems that the lack of standardization of micro-images in roll form has brought about.

A primary function of libraries, simply stated, is to place the right book in the right hands at the right time. In an age of microforms and hard copy, due regard must be paid to ensuring that the book in microform is in a form which will be usable. Of what use to the research worker is a book or serial in microform if the reduction ratio used in filming is too high to yield a legible screen image or legible hard copy or if the cost of reading and printing equipment for such microforms is prohibitively expensive?

It must also be remembered that the microfiche is potentially one of the most important media yet developed for the rapid and inexpensive exchange and distribution of scientific, technical and cultural information on an international scale. The much-to-be-desired situation in which any research worker in any part of the world can obtain needed materials quickly and inexpensively from any other part of the world *in a form which he can use* is at last possible of achievement, but only if international standards appropriate to the nature of the materials and to the users' needs are soon promulgated. . . . This will involve a consideration of economic realities as well as technical factors.

While the primary purpose in presenting the ideas contained herein has been concerned with the problem of advancing the progress of standardization of microfiche before a runaway situation is again on our hands—and heads, two other areas where improvements in standardization would also benefit the research worker must also be mentioned.

Since the microfiche is not about to completely supplant the use of roll film, standards—i.e., maximum limits for reduction ration and image size—should be established for micro-images of printed research materials on roll film as well as on microfiche. The second area where useful limits should be agreed upon is in the type size and other details employed in the printing of books and serials. When one considers the fact that most serial literature in virtually all fields of scholarly endeavor is destined to end up in microform, it is high time that steps were taken to make such publications more "photogenic." In the first place, the use of very small type faces, especially type faces having very fine line widths, should be eschewed. Secondly, sensible ratios should be established between overall size, letter height and line width for drawings which must be greatly reduced in size for publication. And thirdly, the choice of colors and combinations of colors used in graphs and maps should take into account the limitations of black-and-white recording media.

Extracted from "Microfiche, Microfilm, and Hard Copy—Problems and Prospects for the Research Worker" by William R. Hawkin in the December 1964 *National Micro-News*, page 106-7.

NLW 1965: The 168-Hour Day

or how the Greater St. Louis Chapter won the $75 first prize in the SLA NLW Publicity Award competition (the $25 second prize swelled the coffers of the Michigan Chapter), by taking a day off and letting George do it. It wasn't that simple, but it was EFFECTIVE. Read about 1965 NLW activities in future issues of *Special Libraries* and start thinking of your own for 1966!

Union Electric

Mrs. Elizabeth W. Owens shows Union Electric Company's library bulletin board with its special message to Librarian-for-a-Day Ann Hahnel.

THE GREATER St. Louis Chapter celebrated National Library Week, 1965 with a project called "Librarian for a Day." When plans were first discussed, our hope was to place feature articles in the local newspapers on some of the outstanding special libraries. This type of publicity is difficult to obtain, so we decided on a unique approach—the person to person touch through school librarians, high school students, and parents. In this way we would reach a very wide audience and tell our story of special librarianship to many who had no idea of its existence. We would let people in general know what special libraries are, where they are, and what they can do. Our aim was not primarily recruitment, but if our program leads to that happy conclusion, the profession will benefit.

Letters were sent to high school librarians in St. Louis and St. Louis County asking them to recommend one of their library assistants to spend a day working in one of the local special libraries. The school librarians were very receptive to the idea, and in almost every case asked if two students could be sent instead of one, as they had a difficult time choosing one student for such a "memorable event."

Thirty-four students were chosen and assigned to duties at Grove Laboratories, Southwestern Bell, McDonnell Aircraft, Monsanto, Federal Reserve Bank, Falstaff Brewery, St. Louis Medical Society, Laclede Gas, Union Electric, Mercantile Library, *Post-Dispatch,* Municipal Reference and Applied Science Departments of the Public Library, Air Transport Command, Aeronautical Chart, and the special libraries of St. Louis and Washington Universities. The students came to the assigned libraries at 9 a.m., were guests of the organization for lunch, and left at 3 o'clock after a busy day of seeing and performing the duties involved in a special library. Students, parents, and the school librarians were extremely cooperative, and this gave us a splendid opportunity to acquaint them with the fascinating and challenging career of special librarianship.

The enthusiasm of the students and parents was heartwarming. Letters of thanks and telephone calls were received by participating libraries. Local newspapers, company publications, and school papers featured the event with stories and pictures.

The Greater St. Louis Chapter feels that this project reached more schools, more families, and more students by the attendant publicity than any other project ever attempted by the Chapter.

ELIZABETH W. OWENS, *Chief Librarian*
Union Electric Company, St. Louis, Missouri

NLW Promotional Aids

National Library Week 1966 is April 17-23, and "Read, Read, Read—Keep Growing" is one of the themes. NOW is the time to order promotion items: poster, 17 x 22", 40¢; counter card, 40¢; pennant, 6 x 19", 15¢; bookmarks, 500 for $2; mobile, $1.50; pocket calendar, 500 for $5. Billboard posters, car cards, records, and films are also obtainable. Direct orders to NLW, P.O. Box 450, Church Street Annex, New York 10046. Correspondence should be mailed to Order Department, NLW, 1 Park Avenue, New York 10016.

Have You Heard . . .

Five $1,500 Scholarships for Special Librarianship

In view of the rising costs of education, in which library education is no exception, the SLA Scholarship and Student Loan Fund Committee, Jackson B. Cohen, Chairman, has recommended that $1,500 scholarships be given instead of the $1,000 awards given for the past several years. The Special Libraries Association Board of Directors has approved the recommendation, realizing that the higher amount is in keeping with current tuition costs. Five scholarships, which are to be used during the 1966-67 academic year, will be awarded to college graduates who have been accepted at accredited graduate schools of library science in the United States and Canada and who have indicated an interest in special librarianship. Another recommendation adopted by the Board of Directors is to allow a scholarship recipient to accept up to a $3,000 maximum financial assistance, including the SLA scholarship, from other sources.

COSATI Adopts Federal Microfiche Standards

Standard specifications governing the reproduction of documents in microfiche form by all federal agencies and their contractors have been adopted by the Committee on Scientific and Technical Information (COSATI) and are now available from the U. S. Department of Commerce through the Clearinghouse for Federal Scientific and Technical Information. These standards, which will permit report users to interfile reports from all agencies and to use the same equipment for viewing or otherwise processing all such reports, include detailed specifications on microfiche size, film characteristics, reduction ratio, material arrangement and placement, legibility, resolution, density, and archival characteristics. The standards can be ordered by citing document *PB 167 630—Federal Microfiche Standards*, 50 cents, from CFSTI, U. S. Department of Commerce, Springfield, Virginia 22151. If the standards are ordered as microfiche, also priced at 50 cents, it should be so specified and an NBS Microcopy Resolution Test Chart will be included. The Chart has the resolution reading indicated both by the pattern recognition method and by the NBS line count method.

Library Survey in New York State

The University of Illinois Library Research Center, Graduate School of Library Science, received a $12,250 grant to conduct a survey of library research and reference sources in the North Country area of New York State. The North Country Library System, Watertown, and the Clinton-Essex-Franklin Library System, Plattsburgh, will sponsor the study on behalf of the recently formed North Country Reference and Research Resources Council, an organization made up of representatives of public, academic, and special libraries in the six-county area. The survey will analyze library resources and study the potential role of the North Country libraries in the state-wide 3-R library network proposed for New York.

Library Scholarships and Fellowships

The University of Chicago Graduate Library School is offering approximately 15 scholarships and fellowships for 1966-67 in amounts up to $4,000. Six predoctoral and two postdoctoral training stipends of $2,400 and $6,500, respectively, for medical librarianship will be available in the near future. A number of part-time research assistantships are also available. Application deadline for scholarships and fellowships is February 1, 1966; assistantships at any time during the year. For information write: Dean, Graduate Library School, University of Chicago, 1116 East 59th Street, Chicago 60637.

Technology in Newspaper Libraries

A report on the future impact of new technology on newspaper libraries was prepared for the Associated Press Managing Editors Association by a committee headed by Edward W. Barrett, Dean of the Graduate School of Journalism, Columbia University. The consensus of the committee was that a truly automated morgue system offers the following advantages: *1)* major savings in total storage space; *2)* protection against deterioration and physical loss of clippings;

3) possibility of meeting simultaneous requests for the same background information; *4)* speedier and more accurate retrieval of information; and *5)* important long-term economies, particularly in the case of a cooperative regional morgue. Comparative costs are also included in the report, which was published in full in the October 14, 1965, *Library Bulletin*. Copies are available from the American Newspaper Publishers Association, 750 Third Avenue, New York 10017.

Books for Asia Needed

The Asia Foundation's Books for Asian Students program continues to seek books in very good condition published in 1950 or after and runs of professional journals. During ten years of operation this program has sent five million volumes and one million journals to thousands of institutions in Asia. The need for additional materials remains great. The program will pay for all shipping: 200 pounds or less, special fourth class rate—books (send postal receipt for reimbursement); over 200 pounds, motor freight (truck), collect. Donations and questions should be addressed to: Books for Asian Students, 451 Sixth Street, San Francisco, California 94103. Donations are tax deductible.

Book Restorer Kit

The Goddard book restorer kit, made in England and now available in the United States and Canada, will restore and preserve leather and cloth bound books. Each kit contains a nine and one-half ounce can of restorer for each type of binding, an applicator, and a velvet polisher. Cost is $5.00 from Manufacturers' Marketing Co., 299 Madison Avenue, New York 10017, or 26 Kelfield Street, Rexdale, Ontario, Canada.

Table-Top Reduction Copier

The first desk-top, dry, electrostatic reduction copier, the Bruning 3000, will be marketed in January 1966 by the Charles Bruning Company, a division of Addressograph Multigraph Corp., 1800 West Central Road, Mount Prospect, Illinois. The machine, which can make from one to 20 copies of letters, business forms, pages from bound books, or three dimensional objects, can also reduce legal size material to letter size copies. The copier operates on standard 110-volt electricity and can make six copies per minute. It is 31¼ inches long, 23 inches deep, and 21 inches high. The cost is $1875, but the machine will also be available on a lease-purchase or rental basis.

Christmas is for special libraries, too. Colorful science book jackets and journal covers were mingled with tinsel and lights to decorate the Christmas tree in the Main Library of the Los Alamos Scientific Laboratory last year. Santa's helpers were Librarian Betty S. Jackson, left, and Clerk Mary Evelyn Hibbetts.

Study Plans for US Medical Library

A $43,250 contract for study and recommendation of a design for a national medical library and information system has been awarded to Herner and Company, Washington, D. C., by the National Science Foundation. The study, which is scheduled to be completed by the end of this year, will be comprised of: *1)* a survey of the existing medical library and information system and evaluation of its effectiveness in relation to the requirements of users; *2)* a projection of future trends in medical information science; *3)* development of preferred and alternate designs for medical information systems; *4)* development of recommendations for implementing the systems design; and *5)* development of a schedule for allocation

of funds for required investigative and development programs.

CLR Grants

The American Library Association has received $7,931 to complete its catalog code project, expected in December. The new code will include provisions for descriptive cataloging and rules for entry and for such non-book material as manuscripts, music, and phonograph records.

The Bureau of Standards' Center for Computer Sciences and Technology will conduct a study of computer (typographic) composition of catalog cards and other library materials with a $25,000 grant. When completed by July 1966, it is expected that the project will produce information not only on library computer-printing applications but also on evaluating library requirements and the transition of important library publications onto computer-based high-speed photocomposer production systems.

Columbia University received $5,175 to develop a cataloging code for library materials in three West Pakistani languages—Pushto, Urdu, and Panjabi. The project will be carried out by Mr. Abdus S. Qasimi, a Pakistani teaching assistant at Columbia, with the help of Professor Maurice F. Tauber of the Graduate School of Library Service.

A grant of $35,500 has been made to the National Archives and Records Service (National Archives Trust Fund Board), General Services Administration, for the Extraordinary Congress of the International Council on Archives to be held in Washington, D. C., May 10-13, 1966. The theme will be Archives for Scholarship: Encouraging Greater Ease of Access.

In Memoriam

EDITH PORTMAN, former Librarian of the Mellon Institute, Pittsburgh, and retired since 1956, died August 19. Miss Portman was one of the organizers and a Past-President of the SLA Pittsburgh Chapter.

Members in the News

DR. DAN T. BEDSOLE, formerly Manager, Technical Library, Aerojet-General Corporation, Sacramento, California, is now Director of Library and Teaching Resources, Austin College, Sherman, Texas.

P. WILLIAM FILBY, former Assistant Director of the Peabody Institute Library, Baltimore, has recently become Assistant to the Director of the Library and Archives at the Maryland Historical Association.

MARSHALL HAROLD FISHER, formerly Librarian at the Technical Institute Library, Northwestern University, is now Senior Technical Librarian, Argonne National Laboratory, Argonne, Illinois.

BURTON E. LAMKIN, former Manager, General Products Division Development Library, IBM, San Jose, California, has recently accepted the position as head of the Federal Aviation Agency library in Washington, D. C.

DONALD A. REDMOND, former Assistant Director of Libraries for Public Service at the University of Kansas, Lawrence, has recently been appointed Chief Librarian of Queen's University, Kingston, Ontario.

HUBERT E. SAUTER, formerly Chief, Technical Services Branch, Scientific and Technical Information Division, National Aeronautics and Space Administration, recently began duties as Deputy Director of the Clearinghouse for Scientific and Technical Information.

Drug Information Association News

Drug information is a very active field these days, judging from the rapid growth of the young Drug Information Association, a new non-profit professional organization formally established in June 1965 in New York City by 30 drug information specialists from the pharmaceutical industry, the Federal Food and Drug Administration, the American Medical Association, and representatives from universities, publishers and consultants in the drug information field. In less than four months from the founding meeting, the DIA staged an ambitious all-day national meeting at the Twin Bridges Marriott Motel in Washington on Saturday, October 9. The keynote address was given by former U.S. Surgeon General Chester S. Keefer, M.D., who was also the recipient of an honorary award at the meeting. Sessions included papers describing or extolling various services by a number of commercial, semi-commercial, and non-profit (government) organiza

tions; drug information activities at the National Library of Medicine, industry, and the American Medical Association were described; at the business meeting it was revealed that in four months the membership had already grown from 30 to nearly 300 DIA members in the United States and abroad, and that the registration even at the meeting was well over 200. Your reporter learned that the idea of the Drug Information Association grew out of a casual conversation between two prominent drug information scientists sitting in the back of a crowded Philadelphia hotel convention room last year; one of the two original founders, Dr. Eric Martin, Director of Medical Communications at Lederle Laboratories and DIA President in 1965, gave an inspiring Presidential Address at the meeting in Washington. In 1966 the President of the DIA will be Dr. Eugene Conrad, Director of Documentation for the American Medical Association. It will be interesting to see the attendance and membership figures as reported at the DIA 1966 Annual Convention to be held just prior to the AMA meeting in Chicago next June.

BORIS R. ANZLOWAR
Pharmaco-Medical Documentation
Chatham, New Jersey

Letters to the Editor

PUBLISHER WELCOMES SUGGESTIONS

The fictitious exchange of letters in the October 1965 *Special Libraries* makes some very significant points—not the least being that suggestions for reasonable improvements in reference sources be communicated to the editor or publisher. As an editor I appreciate these suggestions and take action on them whenever possible. In our *Oceanic Coordinate Index* many forward steps have been taken as the result of user comments to us. For example, at first we showed only the author's name and initials; now we include all authors' names plus their institutional or organizational affiliation. If our indexed material is a book, a conference paper, a translation, a letter, or part of a symposium, it is clearly identified as is the inclusion of data, bibliographies, and translation information.

From the beginning the publishers of the *Oceanic Coordinate Index* aimed at quality, comprehensiveness and currency. Letters from librarians and marine scientists indicate these goals are being realized. Many expressed delight and amazement that the indexing of the papers given at the MTS/ASLO Conference in Washington, D. C. in June was included in our next issue, which was in the hands of subscribers before the end of July.

Far reaching improvements must be undertaken carefully; often an "improvement" creates additional problems. The important thing is that the publisher will never know your grievance unless you write him.

E. SINHA, Ph.D., Editor
Oceanic Coordinate Index
La Jolla, California

UNPROFESSIONAL CLASSIFIED AD

It took SLA years to adopt meaningful professional standards, and I finally thought we had them. However, I am beginning to wonder, after reading in the October and November issues of *Special Libraries* an ad for "Librarian-Secretary."

My first reaction was that this was a typographical error and that it was an ad for a *library secretary*. When I read on, however, I learned that this person was expected to "set up and maintain library and related services" in an industrial laboratory. Although this certainly sounds like a job for a professional librarian, the only skill the ad specifies as *required* is typing. "Some college training in library science or equivalent experience" is only *preferred*.

Surely, this kind of an ad in SLA's official journal makes a mockery of our professional standards. Is our association so much in need of revenue from a 7-line classified ad that it's willing to compromise these standards for $3.50?

I wonder what we would think if we saw an ad in the AMA journal that read under "Positions Open": "Physician-Secretary—set up and maintain a dispensary and related services in new research and development laboratory. Typing required. Prefer some college training in medicine, or equivalent experience in medical work."

Sounds pretty silly, doesn't it? Well, until the day when the term "librarian-secretary" sounds just as silly to librarians (special or otherwise) as "physician-secretary," we really don't have any professional standards.

SAMUEL SASS, Librarian
The William Stanley Library
General Electric Company
Pittsfield, Massachusetts

EDITOR'S NOTE: Mr. Sass is right—we goofed. Hereafter the content of positions open and wanted ads will be screened more carefully.

Off the Press . . .

Book Reviews

Dewey Decimal Classification and Relative Index, 17th ed., 2 vols. Devised by Melvil Dewey. Lake Placid Club, N. Y.: Forest Press, 1965. 2153 p. $30 plus postage (L.C. 65-10445).

The dominant feature of the 17th edition of the *Dewey Decimal Classification* is its strong emphasis on the principle of "subject integrity." More truly hierarchical subject relationships have been achieved by means of numerous relocations of topics, i.e. 746 relocations. This compares with 1,603 relocations in the 16th edition. A few examples are given below.

Documentation, formerly classed in 010, bibliographic science and technique, has been relocated to 029.7, a subclass of library science.

Comprehensive works on communication, including mass communication, were formerly classed in 384. In the 17th edition, 384 is reserved for telecommunication and other systems of communication. Mass communication has been relocated to 301.16, and communication has been relocated to 001.5, a new subclass. The excellent expansion of 001.5 provides subclasses for such important topics as cybernetics, bionics, self-organizing systems, and artificial intelligence.

In the schedule for physical and theoretical chemistry, the expansion of 541.22, molecular structure, provides subclasses for stereochemistry, molecular bonds and valences, isomers and tautomerism, and quantum chemistry. These topics were formerly scattered in various parts of the schedule. The present grouping of subjects is more logical and useful.

It is gratifying to observe that many of the schedules have "kept pace with knowledge." Some of the major changes include the complete revision of the schedule on psychology and expansion of the schedules on aeronautics, astronautics, biology, and electronic and communication engineering. The preparation of a revised schedule on mathematics is anticipated at a future date.

The revised schedule on electronic and communication engineering is particularly welcome since it includes such important topics as microwave electronics and miniaturization. The much needed expansion of 621.3815, circuit electronics, is also noteworthy.

In other branches of engineering are found new subclasses for systems engineering, 620.7; human engineering, 620.8; other branches of light engineering (including lasers), 621.317.

The 17th edition provides for division by principles not previously recognized. There is much greater reliance on zero divisions for special meanings. For example, the revised schedule for analytical chemistry provides subclasses 543.01 to 543.088 for general analysis. Similarly, the schedule for organic chemistry provides subclasses 547.01 to 547.09 for general groupings of organic compounds. In both classes standard subdivisions have been shifted to 001—009.

The Table of Form Divisions has been revised and retitled Table of Standard Subdivisions. It appears in the beginning of volume two. The revised table adheres more closely to the concept of subject integrity, especially in 02 and 08. Notable among the nine total relocations is the relocation of collected essays and lectures to 08.

Another important innovation of the 17th edition is the Area Table, which follows the Table of Standard Subdivisions in volume two. Geographic detail has been removed from the history schedules 930-990 and incorporated in a special table.

Other noteworthy features are an improved Relative Index, the liberal inclusion of summaries within the tables to clarify subject structure and relationships, more centered headings, more scope notes, and fewer cross references and notes of inclusion.

MARIE F. MAROSCIA, Cataloger
Bell Telephone Laboratories
New York City

GARDIN, J. C. *SYNTOL*. (Rutgers Series on Systems for the Intellectual Organization of Information, vol. II, ed. by Susan Artandi.) New Brunswick, N. J.: Rutgers University Press, 1965. 106 p. pap. $3.50.

This volume reports the second in a series of seminars undertaken by the Rutgers University Graduate School of Library Service under a grant from the National Science Foundation. SYNTOL was presented by Dr. J. C. Gardin, Director of the Section on Automatic Documentation, French National Center for Scientific Research. Dr. Susan Artandi, Rutgers—The State University, moderated the two-day seminar held on December 5 and 6, 1963. The book records how well Dr. Gardin fulfilled his assignment.

The uninformed reader must wait until page 42 to find that SYNTOL stands for *Syn*tagmatic *O*rganization *L*anguage. He would have

to read several documents referred to for a complete description, but this thin volume serves a useful purpose in describing, in brief, this system that was devised under a two-year contract initiated in 1960-1962 with the objective of developing a more general program in the field of automatic documentation, independent, to a certain extent, of the content of documents, the kinds of classification or indexing systems, searching methods, etc. At one point Gardin described it as an empty, formal structure.

Contrary to the general trend in automatic documentation, the designers of SYNTOL accepted human indexing as a component of the total information system. The system is at best only semi-automatic, but it is a computer-oriented system with the view of progressively extending the scope of mechanization. The goal was the development of a *general* system of information processing that would rely on human indexing to provide the input and on a man-machine combination for the output.

The method is not designed for any specific machine or device. The minimum mechanical requirement is a sorter or collator of any kind, as in any form of coordinate indexing; however, a computer (medium-size) is needed to avail oneself of representations at the most complex "states" of the system. Here the program takes charge of a large number of clerical operations both at the input and at the output stages in addition to the search operations proper.

Both simple and complex devices have actually been used (although have not been evaluated) in applications of the system—peek-a-boo cards for the less elaborate "states" and computers (IBM 7090) for the more sophisticated ones. The system is designed to accept as input different kinds of "representations," for example, descriptors only, "faceted" descriptors, descriptors and links, etc. as well as different kinds of "lexical organizations."

SYNTOL has been tried only in a limited number of disciplines: physiology, psychology, sociology, and cultural anthropology. It is not extensively used since its design was completed in 1962, tested in 1963, and applications are as yet limited.

Gardin does not consider it to be a major theoretical contribution, insofar as neither the conventions of document representations nor the operations of retrieval, which make up the system, are supposed to have any theoretical basis, only a practical finality.

Gardin expressed the belief that SYNTOL was useful in two respects: *1)* from the linguistic point of view, it provides a formal framework for organizing the representation of scientific data in different kinds of documentation applications, irrespective of the field concerned; *2)* from the logical point of view, it indicates some operations that have been found to be consistently needed for automatic storage and retrieval (with different kinds of document representations) and provides the means (viz., an external language and a program) to carry out such operations with the help of a computer. He makes no claims for the efficiency of the system.

At the outset, he enumerates the most common claims against the system: *1)* document representations, following its conventions, are inadequate, especially from the syntactical point of view; *2)* the kind of semantic organization called for in the system for use in the computer is also inadequate; *3)* too much reliance is placed on human skill to obtain the required form of document representations and semantic organizations; *4)* consequently, more place should be given to techniques of automatic indexing and classification. It is left to the reader to decide if these claims are correct after reading his descriptions of the representation model, the input and output of the system, and the searching methods employed.

A one-year application of SYNTOL in the field of cultural anthropology was conducted by the Centre d'Analyse Documentaire pour l'Afrique Noire (Maison des Sciences de l'Homme) under a contract from the Delegation Generale à la Recherche Scientifique et Technique. The primary purpose of the project was to obtain data for an over-all evaluation of the time and cost factors involved in the implementation of mechanical means for documentation purposes in this field. According to Gardin the system is probably best suited in the following areas: *1)* in fields or disciplines with little or no standardized phraseology, e.g., the description of cultural data, where both large semantic organizations and free syntactical rules are needed to reduce the irregularities of current formulations; *2)* in a "federal" organization of documentation centers where different (sub) systems may have to be used to meet different needs; *3)* in the automatic production of bibliographical journals related to any number and to any kind of subject matters, general or specific.

Conversely, he said the system is probably unsuitable when: *1)* the original presentation of scientific data is standardized to the extent that simple devices will prove sufficient to reduce semantic and syntactical irregularities, e.g., lists of synonyms, "facet" organizations,

etc.; *2)* no technical analysts are available to produce the somewhat complex transformations required by the system (abstracting and indexing); or *3)* emphasis is laid more on rapidity than on quality of output.

The Seminar panel (John O'Connor, Harold Wooster, and Victor H. Yngve) strayed afield occasionally, but the problem of *syntactical relations* was discussed rather thoroughly. Dr. O'Connor raised the case of non-dyadic relations and of their translation into a binary format. The formalization or abstraction process, as far as relations go, could, in his opinion, be pushed to the point where only directed or undirected links would be left in the syntactical structure. The resulting representation could then be treated as a list structure, for which processing methods already exist.

Dr. Yngve asked about the factors that determine the optimum "state" of a syntagmatic system for documentation purposes; the larger the collection, the more sophistication is needed to keep absolute numbers of irrelevant documents within reasonable limits. A second perhaps more decisive factor is the average number of index terms per document: the higher that number is the more likely it seems that structural information will be needed to prevent unwarranted associations.

Dr. Taube, in attendance but not on the panel, was concerned about the use (to him, misuse) of the expression "formal relations." He considered it an inconsistency in qualifying a system of links as "formal" when it is described elsewhere as including, in one of its possible interpretations, e.g., a contract between formal and substantial relations.

As an attendee I was disappointed in the lack of study material provided *before* the seminar convened. The reader of this volume will not have that problem, but he may feel as I do that there is not enough descriptive material provided to understand the system in depth. It is possible that the panel shared my feelings for some of their remarks were almost cursory. Except for Dr. Taube's remarks, the very brief discussion that ended the seminar is scantily recorded. If there had been more time provided for discussion and better reporting of it, the seminar and this volume would have been a greater success. The printed seminar paper and future discussion of it whenever documentalists convene may fulfill the purpose for which the seminar was convened. There is no index and a scanty glossary (six terms) and one example of SYNTOL indexing concludes the volume.

This volume, without the author's seminar paper, will probably not provide a basis for later comparison with similar systems such as Gerard Salton's SMART System. If not, still another long-range effort will fall short of its stated goal.

PAULINE ATHERTON
American Institute of Physics, New York City

Sales Change for LC Publications

Beginning November 1, the following titles, formerly sold or distributed by the Superintendent of Documents, will be handled by the Card Division, Library of Congress, Building 159, Navy Yard Annex, Washington, D. C. 20541: *1)* all LC classification schedules; *2) Subject Headings Used in the Dictionary Catalogs of the Library of Congress* and its supplements; and *3) L.C. Classification—Additions and Changes.* Subscriptions currently in effect with the Superintendent of Documents will continue in force until they expire. The Superintendent of Documents will continue to handle the distribution of United States government documents for depository libraries. Subscribers placing prepaid orders should write in advance for current prices, since prices were subject to change after November 1. All prices are net and are not subject to any discount regardless of purchaser. Payment from foreign countries may be made with Unesco coupons or in United States funds.

Census Data on Tapes and Punchcards

The Bureau of the Census has made available small area statistics in machine-readable form from the 1952, 1956, and 1962 editions of the *County and City Data Book.* The data are provided on 80-column punchcards and IBM 1401 and Univac computer tape. The cost for the complete punchcard file for each edition is $1,000; county data only from each edition on punchcards, $800; complete file from each edition on IBM 1401 tape, $300; on Univac tape, $350. Shipping costs are extra. Orders or information inquiries should be sent to the Chief, Statistical Reports Division, Bureau of the Census, Washington, D. C. 20233.

ABS Computer Issue

The May 1965 issue of *The American Behavioral Scientist* is devoted to "Social Research with the Computer" and contains nine articles by experts in psychology, sociology, political science, and mathematics. The articles show that with the computer, "the potentialities of the human brain are augmented as more factors are more speedily interrelated with one another. By enlarging the span and accelerating the process of combination even intellectual task is affected." Single copies are available at $3.00 each from ABS, 80 East 11 Street, New York 10003.

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Journal Notes

PERPUSTAKAAN MALAYSIA, the official journal of the Library Association of Malaysia (Persatuan Perpustakaan Malaysia), is published semiannually, the first issue appearing in June 1965. The journal, which supersedes the *Malayan Library Journal* and the *Singapore Library Journal,* contains book reviews, articles, news notes on libraries and people, illustrations, and advertising and is in English. The annual subscription price is $6.00 or £2, available from the Library, University of Singapore, Bukit Timah Road, Singapore 10, Malaysia.

"Handbuch der Physik" Index

A useful 19-page author and title index to the published volumes of Flügge *Handbuch der Physik* has been compiled in the Library at Lincoln Laboratory. Anyone needing this may have a copy by simple request to Loyd Rathbun, M.I.T. Lincoln Laboratory, Lexington, Massachusetts 02173.

Current "Book Awareness" Journals

R. R. Bowker Company has begun publishing two monthly periodicals, *Sci-Tech Book Profiles* and *Medical Book Profiles,* which feature in reduced form the title page, table of contents, list of contributors, preface, and all indexes of new professional-level scientific and medical books published each month by American and foreign publishers and distributed in the United States. All of the books listed are cataloged in the American Book Publishing Record, where the author and title indexes contain references to both *Profiles.* The periodicals are 8½ x 11, paperbound, and contain a subject index arranged by Dewey Decimal Classification and an author index that provide page references to the books listed. The sci-tech books include advanced works in pure and applied sciences and selected texts on the college and post-graduate level. The medical books are those dealing with the scientific and clinical aspects of medicine, psychology, and psychiatry.

The yearly rate for *Sci-Tech Book Profiles* is $90; *Medical Book Profiles*, $60; available from the publisher on a two-month, no-risk subscription basis.

New Format for Technical Abstract Bulletin

The October 1 issue of the Defense Documentation Center's *Technical Abstract Bulletin* was published in a new, more readable format. Cataloging and abstract data punched on paper tape was converted to magnetic tape, which the Government Printing Office processed through equipment that selects type styles and sizes and produces copy in column lengths with evenly justified margins. There are now three columns, instead of two, per page. The Clearinghouse for Federal Scientific and Technical Information is planning to use the new process for its *U.S. Government Research and Development Reports.*

RECENT REFERENCES

Prepared by JOHN R. SHEPLEY

Librarianship

SPYERS-DURAN, Peter. *Moving Library Materials*, rev. ed. Chicago: American Library Association, Library Technology Project, 1965. vi, 63 p. pap. illus. $2.50. (L. C. 65-23947)

Formerly published by the Library Associates of the University of Wisconsin-Milwaukee. A manual for library moving operations, large and small. Time and motion study; specifications and contract forms; survey statistics; bibliography.

WOODFORD, Frank B. *Parnassus on Main Street: A History of the Detroit Public Library.* Detroit: Wayne State University Press, 1965. 487 p. illus. $9.50. (L. C. 65-11820)

Centennial history of the Detroit Public Library since its opening in March 1865. Appendices include chronology of events, lists of officials, branch directory. Index.

WYNAR, Bohdan S. *Introduction to Bibliography and Reference Work: A Guide to Materials and Sources* (Library Science Text Series), 3rd ed. rev. Denver: Colorado Bibliographic Institute, P. O. Box 10283, University Park Station, 1965. 257 p. Apply.

Syllabus of a course covering reference work, bibliographies, indexes, encyclopedias and yearbooks, dictionaries, biography, and government documents. Required and recommended readings, lists of reference books, annotated lists of reviews. Index.

Bibliographic Tools

BEBOUT, Lois, ed. *The Texas List of Scientific and Technical Serial Publications, 1965.* Houston: Phil Wilson, 1914 West Clay, 1965. 640 p. $42.50.

Lists over 12,000 titles and more than 50,000 holdings statements of 96 participating Texas libraries. Supplement Program lists new titles and changes; includes three quarterly supplements, annual cumulative supplement, and loose-leaf binder; price $50. (Annual supplement may be purchased separately for $27.50.)

BURMAN, C. R. *How to Find Out in Chemistry: A Guide to Sources of Information* (Commonwealth and International Library, Libraries and Technical Information Division, Vol. 3). New York: Pergamon Press, 1965. viii, 220 p. pap. $2.95. (L. C. 64-8980)

Outlines careers available to qualified chemists and methods of qualification, and provides a guide to the literature of chemistry and other information sources. Covers both Great Britain and the United States. Index.

CLEMENS, Walter C., Jr., comp. *Soviet Disarmament Policy, 1917-1963: An Annotated Bibliography of Soviet and Western Sources* (Hoover Institution Bibliographical Series: XXII). Stanford, Calif.: Hoover Institution on War, Revolution, and Peace, 1965. xxviii, 151 p. pap. $4; cloth $6. (L. C. 65-12623)

820 references published in Russia, Europe, and North America. Part I covers the period from the Bolshevik Revolution to World War II, Part II from 1941 to 1963; Part III lists Communist and Western periodicals, and Part IV Communist, League of Nations and United Nations, and Western bibliographies. Index.

DUIGNAN, Peter, ed. *United States and Canadian Publications on Africa in 1963.* (Hoover Institution Bibliographical Series: XX). Comp. by Liselotte Hofmann. Stanford, Calif.: Hoover Institution on War, Revolution, and Peace, 1965. viii, 136 p. pap. $3. (L. C. 62-60021)

Fourth annual issue. 1,572 entries covering books, pamphlets, and articles on Africa south of the Sahara. Part I is devoted to general topics, Part II to specific regions. Author index.

EL-HADI, Mohamed M. *Union List of Arabic Serials in the United States (The Arabic Serial Holdings of Seventeen Libraries)* (Occasional Paper No. 75). Urbana, Ill.: University of Illinois Graduate School of Library Science, 1965. 61 p unbound. gratis. (Available from Publications Office, 435 Library, University of Illinois, Urbana Ill.)

Answers a need expressed by librarians and students of Arabic studies by listing over 400 titles in their transliterated form.

HAM, F. Gerald. *Guide to Manuscripts and Archives in the West Virginia Collection—Number II, 1958-1962.* Morgantown, W. Va.: West Virginia University Library, 1965. xiv, 147 p. pap Apply.

Additions to the West Virginia Collection since the publication of the first *Guide* in 1958. 437 entries. Index.

KAPLAN, Stuart R., ed. *A Guide to Information Sources in Mining, Minerals, and Geoscience* (Guides to Information Sources in Science and

Technology vol. 2). New York: Interscience Publishers, 1965. xiv, 599 p. $12.50. (L. C. 65-24304)

Part I lists over 1,000 organizations in 142 countries, with addresses, functions, structure, membership, publications, etc. Part II gives over 600 publications and periodicals, including abstracts, bibliographies, dictionaries, directories, handbooks, yearbooks, and journals. Indexes of geographical areas, literature, and organizations.

KENNEDY, Ralph A. *Accounting—Statistical Services—Data Processing* (PACAF Basic Bibliographies for Base Libraries). San Francisco: 1964. iv, 40 p. pap. spiral binding. gratis. (Available from Commander-in-Chief, Pacific Air Forces, ATTN: DPSR, Command Librarian, APO San Francisco 96553.)

Annotated Air Force buying guide with particular emphasis on data processing. Supersedes PACAF Basic Bibliography *Accounting and Statistical Services,* dated 22 July 1960. Author-title index.

MATHEWS, James, comp. *Index to Kansas Magazine, 1933-1965* (Bibliography Series, No. 2). Manhattan: Kansas State University Library, 1965. (iv), 38 p. pap. 50¢.

Author and title indexes to the fiction, nonfiction, poetry, and art published in Kansas annual. Introduction gives a brief history of the four distinct publishing phases of the magazine, which began as a monthly in 1872.

NATIONAL HOUSING CENTER LIBRARY. *International Housing: An Annotated Bibliography* (Bibliography Series #6). Washington, D. C.: 1965. 31 p. pap. spiral binding. $5.

Prepared for the International Housing Committee, National Association of Home Builders. 278 references, most of them recent, all in English and concerning non-communist countries.

Information Handling Techniques

ALTMANN, Berthold. *A Multiple Testing of the ABC Method and the Development of a Second-Generation Model.* Part 1: *Preliminary Discussions of Methodology. Supplement: Computer Programs of the HDL Information Systems* by William G. Brown (TR-1295). Washington, D. C.: U. S. Army Materiel Command, Harry Diamond Laboratories, 1965. viii, 86 p. pap. (Available to qualified requesters from DDC, or apply to Clearinghouse for Federal Scientific and Technical Information.)

Description of a performance test carried out on a first-generation storage and retrieval system developed at HDL. Statistical analysis in preparation.

BAPTIE, A. L. *et al. Microfiche: For Publishing and General Document Distribution.* West Salem, Wis.: Microcard Corp., 365 South Oak St., 1965. 4 p. Gratis.

An outline of microfiche and the microfiche concept, its advantages, uses, and applications. Sample microfiche also provided.

COMMITTEE FOR INTERNATIONAL COOPERATION IN INFORMATION RETRIEVAL AMONG EXAMINING PATENT OFFICES (ICIREPAT). *Third Annual Meeting at the Patent Office of the Federal Republic of Austria, Vienna, September 17th through 26th, 1963.* Baltimore: Spartan Books, 1964. vi, 347 p. $14. (L. C. 64-66168)

Thirty-nine papers and technical reports. Edited by Harold Pfeffer of the United States Patent Office.

LIBRARIAN—Needed to organize and administer a "Special Library" in a large life insurance organization in the Fox River Valley. If you're interested in a challenge and have a Master's Degree in Library Science, this will interest you! Here's what you'd have an opportunity to do: plan and organize the library; administer total library operation; develop procedures; recommend library policy; perform research functions; maintain professional memberships. If you'd like this challenge, send your qualifications and resume in confidence to Box C 13.

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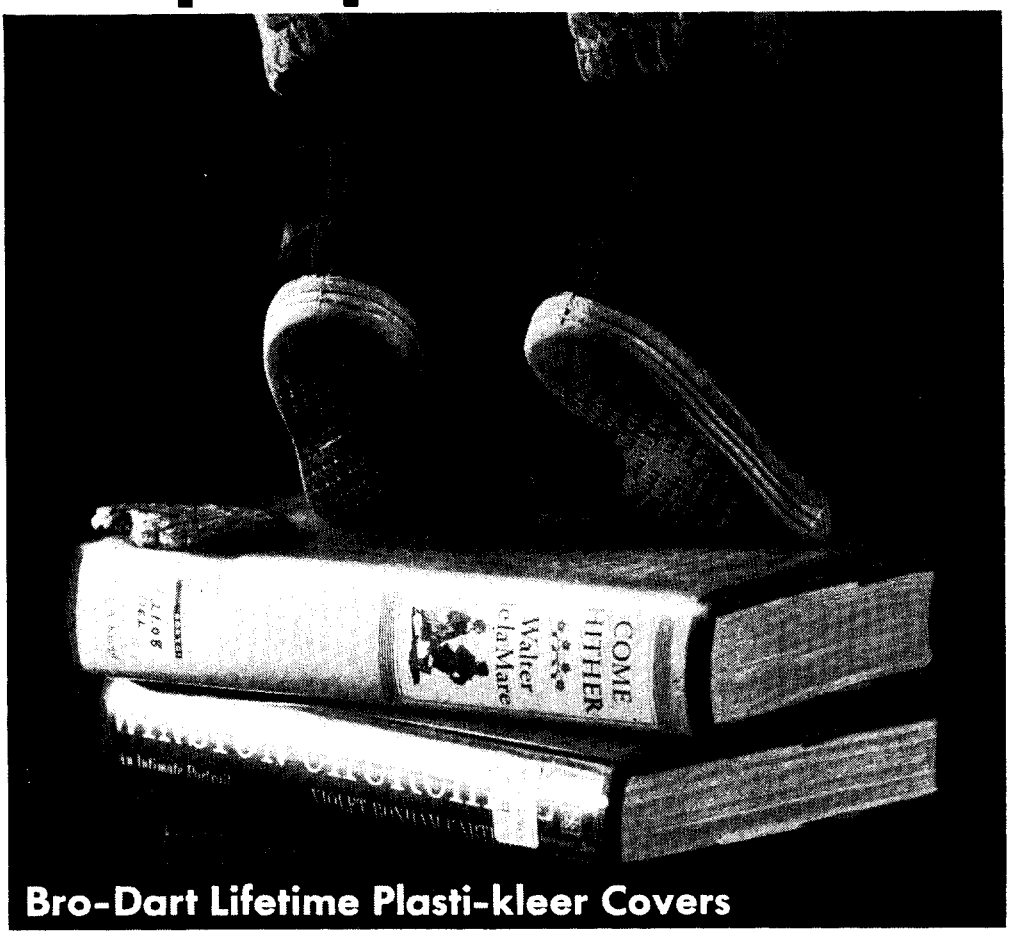

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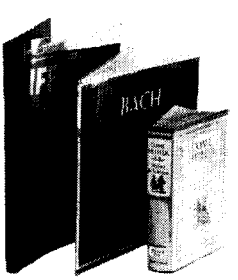

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