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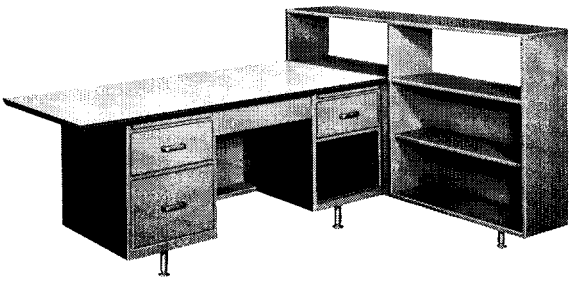

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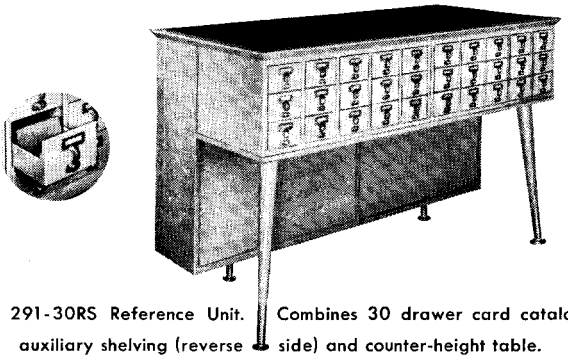

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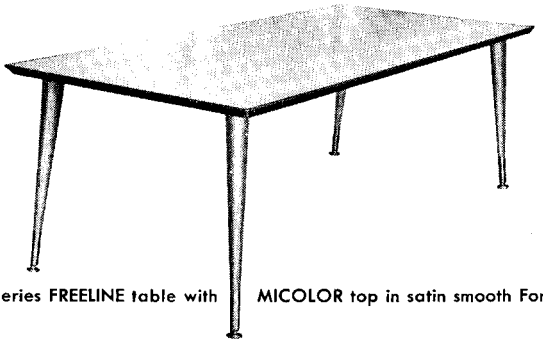

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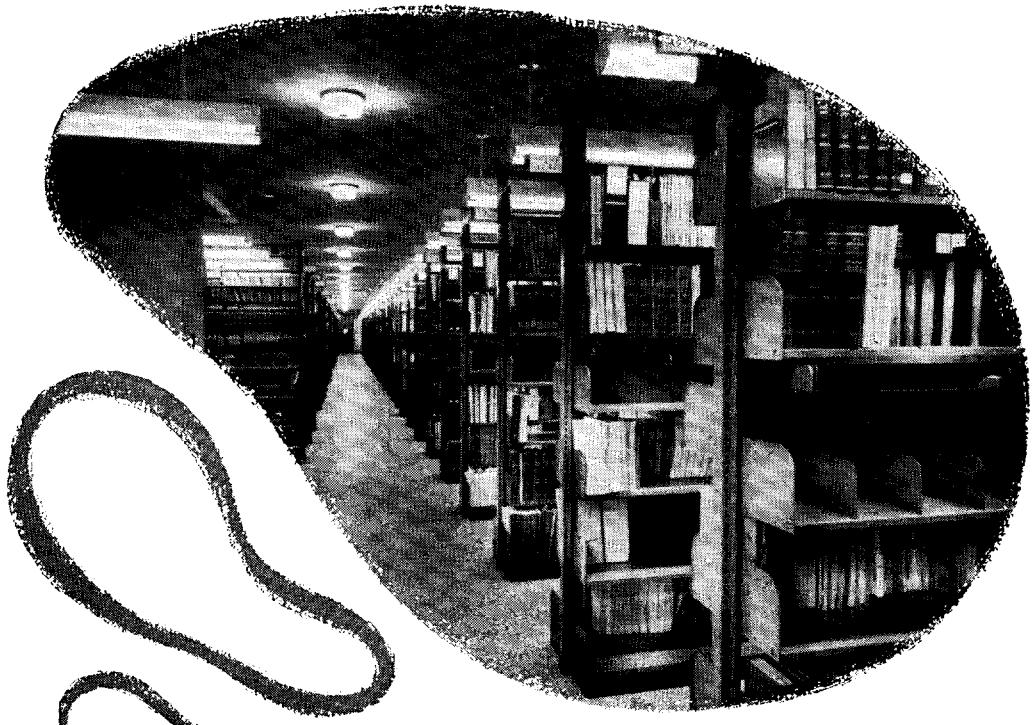

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Special Libraries

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VOLUME 47 JANUARY 1956 NUMBER 1

Indexed in Industrial Arts Index, Public Affairs Information Service, and Library Literature

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WHY SLA COSTS MORE . . .

Over the past decade the Special Libraries Association has shown that it is a vigorous and progressive organization by the initiation of numerous projects, the enlargement of its publication program, and the increase in the number of Chapters and Divisions. For any organization to maintain a continuously expanding professional program, however, it must have the financial means to support its activities.

During the past ten years the income of the Association increased from $36,535 in 1945 to $86,970 applicable to 1954. Expenses over the same period increased from $36,415 to $85,245. However, budgeted expenses for 1955 were $91,325 while income applicable to 1955 was estimated at $87,150; the budget for 1956 shows estimated expenses of $99,250 and income of $87,630. It is clear that income has leveled off while expenditures have continued to increase at an accelerating rate.

Three factors seem to have contributed to the increase in expenditures. One has been the general increase in the price level with which everyone is familiar. The *Consumers' Price Index*, for example, has moved up from 77.2 in 1945 to 114.9 in 1955. Paper and printing costs have increased even more rapidly as librarians know from their increasing book budgets.

A second factor is the increased size and complexity of the organization. Membership has increased from 3,894 in 1945 to an estimated 5,030 in 1955. New Chapters have been organized so that today there are twenty-nine Chapters while there were twenty-three ten years ago. In the same way Divisions have increased from ten to sixteen. Added to the increase in numbers is an increase in the amount of service furnished by the Association to each unit.

A third factor is the growing up of SLA. It is paying more of its own way and depending less on the generosity of other organizations. This change has been partly from choice and partly forced upon us. Much of the work previously done by volunteers is now done by paid staff. As the Association has grown and its activities expanded, it has become impossible for volunteers to carry out the detailed work necessary. We have, therefore, added to the staff at Headquarters. Our official journal is edited by a full-time paid editor and the work load of our executive secretary, admittedly too heavy, has been lightened by the appointment of an assistant. We now have a presentable Headquarters office where people interested in special libraries may and do come from all over the United States and Canada as well as from many foreign countries for information.

Not only is the prestige of the Association growing, but that of the profession of special librarianship as well. No association, however, can enlarge its membership services, increase the number of subdivisions within the association, and expand its influence in its own profession without an increase in costs. If SLA were endowed as are some organizations or had sources of income outside of its regular professional activities, this increase might not have to be borne by the members. Unfortunately, we are not in that happy situation.

Dues furnish the largest part of our income and therefore the Executive Board at its meeting in New York in November 1955 found it necessary to vote an increase in dues. This increase, to be effective January 1, 1957, is dependent upon ratification by the members at the Annual Meeting in Pittsburgh in June 1956. The increase will affect two classes of membership; *Active* dues to be increased from $10 to $15 and *Associate* from $5 to $10. It is hoped that members will give serious consideration to the problems faced by the Association at this time and that any suggestions and comments will be forwarded to our president, Chester M. Lewis.

BURTON W. ADKINSON, *Treasurer*

The Training of the Chemical Librarian: *A Challenge and an Opportunity*

J. H. SHERA
Dean, School of Library Science, Western Reserve University, Cleveland, Ohio

TO THE LAYMAN, the research chemist is a man in a white lab coat, who pours a variety of colored fluids into a test tube, which he heats over a Bunsen burner, thus producing a magical concoction that will bring untold benefits to mankind. If the "man in the street" has, however, been exposed to a course in high school chemistry, he will probably substitute a retort for the test tube, and most certainly he will make sure that H_2SO_4 — the only formula, except H_2O, that he ever remembers — is among the ingredients. But the end product, which is sure to be a precipitate (in freshman chemistry it always is), will be the same.

So, too, the popular stereotype of the librarian is a maiden lady of indeterminate antiquity, clothed in a high-necked shirtwaist, who answers every inquiry with a whispered "No, you can't take it out," or "It's at the bindery."

There may have been a time when there were elements of truth in both of these personifications, but the modern research chemist hasn't touched a retort since he turned in his laboratory notebook for Chemistry I, and the quaint librarian left her circulation desk about the time Max Factor began to pay substantial dividends. No chemist today equates research with invention, and no librarian confuses his profession with custodianship.

Today, one need not expatiate upon the revolutionary changes in chemical research that have taken place since E. E. Slosson first opened the eyes of the public to the achievements of "creative chemistry." In a quiet way, advances in librarianship have been almost equally spectacular. The era that ushered in industrial research brought with it a growing awareness of the importance of the literature search in minimizing wasted laboratory hours.

On college and university campuses, chemistry departments were among the first to recognize the importance of the departmental library, housed in convenient proximity to classrooms, laboratories, and faculty offices. The dependence of the chemist upon the recorded findings of his predecessors and contemporaries has thus been impressed upon the student at a relatively early stage of his academic career, and by the time he sets out, with faltering step, in pursuit of his own research project, he has learned to lean heavily upon at least such standard aids as *Chemical Abstracts* and, if his wife can read German, the *Chemisches Zentralblatt.*

Chemical librarianship, like chemical research, had its origins in ivy-covered walls along the banks of the Charles, beneath spreading elms hard by the Quinipiac, in gothic cloisters beside the Midway, and in countless colleges and universities from Maine to California. Yet today, though the academic world has not surrendered its concern with chemical research, a greater proportion

Paper presented at a meeting of the Chemical Literature Division, American Chemical Society, Minneapolis, Minn., Sept. 15, 1955.

of such investigation is being carried out by industry and government. On this centrifugal movement from campus to factory and marketplace, the chemical librarian has been borne.

Expenditures for Research and Development

The growth of our national expenditure for research and development has been dramatically presented by Raymond H. Ewell of the National Science Foundation in a recent issue of *Chemical and Engineering News*.[1] He points out that expenditures for research and development have been growing at an approximately exponential rate for the past thirty-five years, that the annual expenditure is now almost four billion dollars — as much as was spent for research during the entire period of our national history from 1776 through 1933 — and that in 1953 expenditures for research and development were almost exactly one per cent of the gross national product. The annual growth-rate of the gross national product has, however, been only three per cent since 1910, while that for investment in research and development has been ten per cent during the same period.

Such an analysis shows clearly that, through the years, the gross national product and expenditure for research have advanced together, and this fact suggests some relationship between the two. Certainly, research can contribute to the growth of the national economy by expediting the introduction of new products, by lowering costs of production, by increasing the useful life of commodities, by decreasing maintenance costs, by expanding markets for goods produced, and by improving the utility of by-products. Whether or not, as a nation, we are investing enough in research is a fundamental question to which, at the moment, no definite answer can be provided.

One may assume the existence of an optimum beyond which additional investment in research results in diminishing returns. Ewell suggests that $11.00 of capital investment may be required for every dollar of research, but admits that this "is only a rough guide." He is also of the opinion that of the total national investment in research and development, the five to six per cent devoted to basic research yields the highest return of "economic payoff"; that the returns for industrial and medical research are also very high; and that military research, which comprises about forty-five per cent of the total, ranks lowest in terms of *economic* return, though its political benefits may be quite substantial. It seems reasonable to conclude that the economic returns per dollar invested in research not only are high, but also are definitely increasing; that the point of diminishing returns has not yet been attained; and that nationally more rather than less should, and probably will, be invested in research at all levels.

It is not just possible, it is very probable, that many industries have been overlooking one very effective way of increasing the productivity of their research staffs. Two recently published studies,[2] both sponsored by the National Science Foundation, point to critical manpower shortages in industrial research and development. Such shortages could be greatly alleviated by improvement in the efficiency of research planning through extension of library resources. Well-organized collections, manned by librarians skilled in the use of technical information, would reduce to a minimum the waste and inefficiency that result from duplicated research effort and, at the same time, would maximize opportunity for the identification and pursuit of profitable channels of research activity. No one has as yet derived a formula relating hours spent in the library to hours saved in the laboratory, but that there is such a relationship would not be difficult to demonstrate.

Special Library Growth

There is, however, much evidence that research management is awakening to the benefits to be gained from adequate literature searching by trained specialists. The impact of the increase in national research upon the expansion of the library profession, particularly that of "special librarianship," is apparent from the statistics showing special library growth during the past two decades. The *Special Libraries Directory* for 1935 lists 1,154 libraries, of which (if the subject index is assumed to be a reliable guide) 182, or 15.7 per cent, were directly related to chemistry or chemical technology. This same directory for the year 1953 lists 2,489 special libraries, an increase of 115.6 per cent. Of these, 372 — 15.0 per cent — are related to chemistry. Thus growth in chemical libraries has almost exactly kept pace with the general expansion of all special libraries.

By contrast, the growth in the membership of the Special Libraries Association itself, which rose from 1,100 in 1930 to 4,800 in 1954, evinced an increase of 336 per cent. Thus while the number of special libraries was expanding at a relatively slow pace, the number of librarians employed in those institutions was increasing almost three times as fast. An even more striking situation is revealed by the growth of certain divisions within Special Libraries Association. In 1930 the Commerce and Technology Division had approximately 150 members; in 1955 the Science-Technology Division alone, from which the business librarians had withdrawn, boasted an enrollment of 1,801. To this group must be added the members in the relatively new divisions of Biological Sciences and Metals, both of which include many librarians concerned with the field of chemistry.

At the present time, special librarians in the field of the physical and natural sciences comprise over forty-five per cent of the total membership of Special Libraries Association, and the chemical libraries represent a very substantial portion of this group. Obviously, research in chemistry has played a major role in developing the profession of special librarianship. In addition, one should not forget that during these years the American Documentation Institute and the Division of Chemical Literature of the American Chemical Society were formed — further manifestations of this same trend.

From these simple statistics one may logically conclude that while the number of special libraries has only slightly more than doubled, the personnel needs of those libraries have at least quadrupled. By contrast, however, the number of graduates of accredited library schools in the United States increased from 626 in 1930 to only 1,233 in 1954. Thus, while the number of special librarians alone increased by over 300 per cent, the library schools were able to increase their annual output of *all* trained librarians by only 103 per cent.

Of the 1,233 graduates in 1954, 176, or 14.2 per cent, entered the special library field. This is not a bad showing, but for present purposes it is more important to note that of these 176 graduates, only 30 — 17 per cent — were engaged in science and technology. To present the situation even more dramatically—though well over one-fourth of the members of Special Libraries Association are science and technology librarians, of the total output of trained librarians in 1954, only 2.4 per cent are in science and technology, and the national average for library school graduates entering the "Sci-Tech" field was less than one student per school.[3]

Not since the dark days of the depression, when Carleton B. Joeckel investigated supply and demand in the library profession, has there been a thorough and careful analysis of the library market.[4] Hence there are no statistics available on a nation-wide basis that present a definitive picture

of the opportunities for employment in any one branch of librarianship over a significant period of time. In view of this paucity of data, any fragmentary statistics may be welcomed and may serve to some extent to indicate the volume of the national demand.

Placement Experiences of Western Reserve School of Library Service

In reviewing the following statistics, then, one must bear in mind that what is set forth here represents the experience of but one library school, and that for one very brief time period. Certainly there is no reason to assume that these data, collected at Western Reserve University, are typical of all library schools, but neither is there much reason for assuming that what has been happening at Western Reserve is not being repeated in the other major library schools of the country. Our school is strategically situated in a highly industrialized area at, as the local Chamber of Commerce likes to boast, "the best location in the nation." For years it has offered courses in documentation, special librarianship, and chemical literature; and among library schools it has pioneered in all these fields. Thus one might assume that industries would naturally turn to this school of library science for assistance in staffing their special libraries.

This situation might give Western Reserve certain advantages over other library schools in attracting requests for chemical librarians. But one must also remember that this school was founded fifty years ago as a training school to serve the Cleveland Public Library, and that perhaps as many as eighty per cent of its graduates are now engaged in public library work. Furthermore, over the decades it has earned a national reputation for the training of librarians to work with children and young people, and only in relatively recent years has it added to its course of study specialized training for librarianship in the sciences.

The following data, then, relate only to Western Reserve and are encompassed in the brief time-span of eleven months, from roughly November 1954 through September 1955.* During this period the School of Library Science, working in cooperation with the Western Reserve University Placement Service, received a total of thirty-seven requests for professionally trained librarians with undergraduate or graduate training in the physical sciences. (This figure relates only to requests from business and industrial firms and does not include openings in science and technology divisions of public libraries or positions in departmental libraries in colleges and universities.) Of these thirty-seven positions, Western Reserve was able to fill only three, and only one of the appointees had had any professional experience prior to appointment. The inability to place more candidates derived from the fact that out of a graduating class of some sixty students, the Library School at Western Reserve had only three with academic backgrounds appropriate to the requirements of these positions.

Salaries of Librarians

The salaries offered varied widely, depending on the experience and training of the applicants, but in seventeen of the positions it was stated that the minimum would be at least $4,000. One job description specified a salary range of $6,000 to $7,200. Two of the applicants placed will receive $5,100 each and the third, $4,800.

These figures are in contrast to an average beginning salary of approximately $3,300 to $3,400 for academic

* The author wishes to acknowledge his indebtedness to Margaret Sanders of the Western Reserve University Placement Service for the compilation of these statistics.

libraries and $3,500 to $3,800 for public libraries, though a few of the largest public libraries offer the trained beginner as much as $3,900 to $4,000. In 1954 the national average for all beginning library school graduates was $3,650. Thus one can say that from the very start, undergraduate preparation in the physical sciences is worth at least $500 to the beginning librarian, and probably considerably more if the candidate has a reasonably good background in chemistry or physics.

Many of the requests emphasized a knowledge of modern foreign languages, and all insisted on training in science, with chemistry by far the most popular. Of the total, two specified physics and engineering, and two others preferred specialization in the biological sciences. The need for training in cataloging was stressed in the requirements for seven of the positions, and in three others reference work was prominently mentioned. In all other instances the work requirements were varied.

To summarize these statistics briefly, one might say with accuracy that had Western Reserve been able to attract to its library school students with undergraduate or graduate training in chemistry and related sciences, almost one-half of its graduating class could have been placed in industrial libraries at salaries at least $500 above the present average for beginners without professional experience.

Opportunities for promotion were not precisely specified in the job descriptions, since promotion depends more upon performance than on any automatic scale, but experience over the years has indicated that as the beginning salaries are high in industrial libraries, so the rate of promotion is correspondingly rapid.

Clearly, the library schools have not been exploiting to the fullest possible extent those opportunities which industry is prepared to offer library school graduates. The major reason for this neglect is, of course, the unfortunate fact that the library schools are not attracting college graduates who possess the undergraduate preparation which would fit them for service in libraries operating in the sciences.

All of the thirty-seven positions, and doubtless many more which have escaped this fragmentary survey, will eventually be filled. Whether they are to be filled from the ranks of professional librarians or from other sources is a question that is of primary concern not only to librarians and directors of library schools, but especially to research management. The really important consideration is that they be filled by those who are best qualified to render the kind of bibliographic service that industrial research so desperately needs. There is no value in debating whether the special librarian should be trained in the subject field of his specialty or in librarianship; this is tantamount to asking whether a doctor should be formally trained only in his *materia medica* and left to learn his human anatomy "on the job." Obviously, unless he is trained in both, he will not be a proficient doctor, and very few people would care to place their lives in his hands.

Training of Chemical Librarians

The chemical librarian must be both chemist and librarian, and lacking either half of this unity, he will probably perform his job badly. Few librarians deny that a knowledge of chemistry is essential to proficient service in a library serving chemical research, but unfortunately there are many chemists who argue that a knowledge of librarianship is quite unessential to the effective operation of a chemical library. Such

people are obviously ignorant of what librarianship is, what it can do, and in what the training of librarians consists.

The limitations of this discussion preclude description of the content of specific courses, but it is possible to indicate general areas of concentration and thus define in fairly precise terms the direction which the education of the librarian-chemist must take.

One need not argue here the value of a general education, at the undergraduate level, for all future citizens whatever their careers may be. It is a cause for gratification that, at long last, technical schools have begun to recognize that a solid foundation in the humanities and the social sciences is of value even for engineers. Beyond the general education, however, the undergraduate program must include a substantial amount of subject specialization in chemistry and related fields: physics, mathematics, and perhaps some of the biological sciences. Such studies should include:

1. A solid introduction into the substantive content of the discipline;
2. A presentation of the historical development of the field, emphasizing the "classic" or "landmark" contributions;
3. A careful delineation of the structure of the field, including the directions which the major contemporary theories, research, and investigations may be expected to take;
4. A sound foundation in the terminology of the field, at least of its major divisions;
5. Practice in the use of those bibliographic sources that are essential to at least elementary literature searching. Actual laboratory experience may be held to a minimum, but enough should be provided to familiarize the student with the kinds of problems that the research worker encounters and the types of data he needs to pursue his inquiries to a successful conclusion.

Certain of these courses may, if the situation so dictates, be pursued at the graduate level, though in general it may be maintained that most graduate courses are so highly specialized as to present an uneconomical expenditure of time for those who wish to combine librarianship with training in chemistry.

Here, too, it is appropriate to emphasize the point that a solid general competence in a cluster of related scientific disciplines is far more valuable to the chemical librarian than an intensive pursuit of chemistry itself. Even at the "specialized" level, the practice of librarianship tends toward generality, so that breadth — which is not to be confused with shallowness — is often more important than specialization.

The undergraduate course of study should also include an adequate preparation in the more important modern foreign languages, and again one may assert that even a superficial knowledge of a cluster of foreign languages is probably of greater value to the librarian than "native competence" in only one.

A sound general education, subject specialization in chemistry and a cluster of fields related to it, and competence in the more important modern foreign languages are the essentials of the undergraduate program. To these might well be added such individual courses as the principles of reasoning and the scientific method; logic, preferably both Aristotelian and symbolic; and, if possible, some work on the structure and nature of language as an instrument of social communication.

The major portion of the graduate program should be devoted to training in librarianship, with specialization in the application of librarianship to the needs of the chemist for recorded information. This does not preclude the possibility — or even the desirability — of some graduate study in chemistry and its correlative sciences. We are concerned with the true information specialist, not a chemist turned amateur

librarian. At this stage of training the student has rounded the corner and has become a librarian rather than a chemist. His training must reflect this change.

Library School Programs

However, we do not attempt to defend the traditional library school program. Admittedly, it has often been superficial, technique-ridden, and misdirected; but it is well to remind ourselves that modern chemistry emerged from alchemy and the quest for a magical substance that would transmit baser metals into gold. Librarianship, too, had to find its way, and in doing so it committed its share of blunders. But it is emerging from its "phlogiston era" with considerable speed and vitality, and progress will not be accelerated by constant reminders of past errors.

The graduate program in librarianship should be a dichotomy of "core" subjects and generalized courses. The core should be composed of detailed knowledge concerning the uses of graphic communication in modern society and the role of the librarian, whether general or special, in the system whereby the constituent groups of society communicate within themselves and with each other. The focus of this core must be what we call "social epistemology," that discipline through which we seek to discover how knowledge is produced, used, and disseminated throughout society in support of its culture. "Social epistemology" is primarily historical and philosophical and is necessary for the purpose of providing a frame of reference whereby the librarian may relate his specialization to the social whole.

Subject specialization must not be confused with professional fragmentation, and it must not be promoted at the expense of the proper perspective relating the specialization to the central unity that is librarianship. Such a perspective is to be achieved only through constant emphasis upon those elements or characteristics of librarianship that are common to all bibliographic activity and to all problems of recording, disseminating, and retrieving graphic records in whatever subject fields.

This discipline of "social epistemology" should comprise, roughly, one-fourth of the core program, the remainder being devoted to study in the *acquisition* of *appropriate* materials, the *organization* of these materials for retrieval, and the *use* of the materials so acquired and organized. Because of the increasing interdependence of the sciences, these areas had probably best be taught in terms of broad rather than specific subject fields; e.g., the biological sciences, the physical sciences, the social sciences, etc., leaving to the areas of specialization the task of developing proficiency in the more sharply circumscribed subjects.

Beyond the core lie the programs of library specialization, which embrace a vast array of principles, practices, problems, and techniques of bibliographic organization and library maintenance, servicing, operation, and management. Some of these can, of course, be learned "on the job" and may even best be learned in the practicing situation, but the formal program should at least prepare the student for those problems which he will encounter when he becomes a practitioner. For the chemical librarian, among these "electives" would be such studies as more advanced courses in the bibliography of chemistry; advanced work in literature searching, indexing, abstracting, and other techniques for improving the retrieval of graphic records; the development and evaluation of special classification systems for bibliographic organization; use of machine methods; and administration of the special library.

Obviously, not all of these courses could, or should, be related to chemistry. To provide such specialization, even were it desirable, would confront the library schools with an impossible task and the student with an unrealistically long period of training. Rather, the emphasis should be placed upon *types* of specialization and the problems, techniques, and methods common to clusters of specialties. Enough research has been carried out by librarians to indicate that patterns of use are repeated in the several subject fields, and the student need only be taught a sufficient variety of basic patterns to permit him to generalize these patterns of use and to predict what may be found in any specific pattern as a variation from the general configuration.

Thus even though courses may be offered in fields as broad as "the physical sciences," student assignments and term projects may be tailored to the specific needs and interests of the individual. Surely there can be left to the student some responsibility for application and adaptation of basic concepts to his chosen field, and it is certainly not unreasonable to expect him to pursue independent work. If our educational system cannot be relied upon to encourage individual initiative in the pursuit of knowledge, then its value is, indeed, difficult to prove.

To summarize: The graduate program that we have here briefly outlined is based upon four major assumptions with regard to the intellectual equipment needed by the chemical librarian—or any other special librarian. We are convinced that the well-trained student must acquire:

1. A general education that will prepare him for participation in the life of his community and make him a good citizen both nationally and internationally;

2. A sound competence in a substantive field or cluster of related fields;

3. An understanding of how knowledge is generated and used, with particular reference to the dissemination and use of recorded knowledge and the role of the library in these processes of generation and dissemination;

4. An appropriate reserve of technical equipment — the tools of his trade, if you will — that will equip him to perform his appropriate tasks with effectiveness and dispatch, for the librarian must be a good workman as well as a scholar.

Recruitment for Library Schools

Assuming the development of an effective program of formal education for the chemical librarian, how can promising students be attracted to its offerings and the occupational opportunities it makes available? This is a problem that has been largely neglected in the past, and to which serious thought must be devoted in the future.

Here one is indeed confronted by a vicious circle. College chemistry majors have not been attracted to librarianship for the simple reason that the library schools have offered them little that was worthy of their interests and abilities, and the library schools have neglected the opportunities for specialization in science because most of their candidates were, and still are, recruited from the ranks of the humanities.

Obviously, this circle must be broken. The solution lies in enlarging the scope of professional education, not in substituting one discipline for another. To assert that the sciences are worthy of increased attention in the future is not to imply that the humanities should be neglected.

The problem is to be solved, then, through a simultaneous development of basic curriculum planning and vigorous recruitment programs. Library schools and college chemistry departments alike have failed to comprehend the opportunities for chemistry majors in chemical librarianship, and only recently has

industry begun to realize the importance of the chemical librarian to economic success. A sound program of recruitment, therefore, must be the product of joint effort — of cooperation among the departments of chemistry, the library schools, and industry itself.

From departments of chemistry this cooperation demands a greater awareness of the opportunities that librarianship has to offer — especially to young women who have majored in chemistry and related sciences, but for whom (excepting the fortunate individual who gives promise of becoming another Mme. Curie) the professional opportunities have heretofore been limited to elementary instruction in chemistry, usually in girls' schools, or to laboratory assistantships with their deadly round of technical routines. Vocational guidance could, perhaps, also be of assistance here, but the writer admits to a prejudice that leads him to place more faith in one good chemistry professor than in all the vocational guidance authorities in the business.

Admittedly, library schools have been negligent in their failure to recognize the opportunities that the sciences, and particularly chemistry, offer the librarian, and they must seriously turn their attention to a more active and more realistic recruiting program. But far more damaging has been their general failure to look critically at the weaknesses of the traditional curriculum, and then to embark upon a thorough and comprehensive study of the kind of education that science librarians need. Curriculum study and revision, then, is their first order of business, and they are well advised to pursue it with vigor and dispatch.

Certainly it is encouraging that industrial management is growing increasingly aware of the value of the expert in graphic records and the contribution which he can make to the success of any research program. With the library schools supplying properly trained personnel, such awareness on the part of industry is not likely to diminish. Already industry has widely recognized the value of the subsidy, the scholarship, and the grant-in-aid as instruments for improving the quality of recruits to its research and managerial staffs. Such financial assistance to library school students could, if properly administered, return to industry savings far greater than the original expenditure. Moreover, the discussion at the meeting of the Chemical Education Division in Cincinnati last spring made it apparent that industry is beginning to recognize that librarianship must be made professionally attractive through improvement in salaries, working conditions, and status.

The realization of such a program as has here been sketched only in broadest terms is not to be achieved through the efforts of a single individual or group. There must be a leadership that will assume the initiative. The responsibility for such leadership rests squarely with the library schools. It is we who must demonstrate our faith in librarianship. As we do so, and I believe we can and will, I predict in the field of recruitment the support and cooperation of both industrial management and the profession of chemistry, without which our plans, however well-intentioned and sincere, cannot achieve success.

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The Chemist, The Library, and The Laboratory

MILDRED C. REBSTOCK
Research Department, Parke, Davis & Company, Detroit, Michigan

MOST PHARMACEUTICAL scientists will today agree that their research libraries are in effect examples of "the well-equipped and happily staffed organization". Nor is the point of view entirely due to a "take the library for granted" attitude. Indeed, scientists are not inclined to take anything for granted that is as essential to success in research as the library is. They are also aware that the library is not just a collection of books and journals. They recognize that there is a creative personality behind it, one who at times seems almost a fairy godmother "whose wish is theirs to command". Many a research man has been happily surprised to find his librarian ready and able to supply information or help in an area that he thought was outside her "line of duty". Experiences like these add substantially to the stature of the librarian and show how presumptuous it would be to state categorically what should be expected of the library staff.

Certainly the basic prerequisites of common courtesy, a professional knowledge of library operational principles, and a familiarity with the available scientific literature are fundamental requirements as Dr. Gilman pointed out in a paper on this subject.[1] But, as Dr. Gilman also intimates, who of us is able to define what the creative potentialities of the individual librarian may be in the actual practice of her art? To try to do this would be analogous to a situation in which an organic chemist set out to instruct a physician in the treatment of a case of tuberculosis. Although the chemist may have a better understanding of the molecular properties of the tuberculo-active drugs than the physician, it is difficult, if not impossible, for him to appreciate how the skill and art of the physician contribute to the healing of the patient. At best he can only recall the art and skill that went into the research in the laboratory leading to the development of these drugs and by this analogy to his own experience gain appreciation of the creative aspects of the physician's profession.

Nature of Scientific Invention

It is almost superfluous to say that the majority of research scientists find an adequate scientific library is as essential to a successful research program as the research laboratory. Nevertheless, this statement is in direct contradiction to the distorted notion about the scientific profession that much popularized science seems bent on establishing in the minds of the public. Here the role of the scientist in the laboratory is played up and his dependence on the efforts of his predecessors and contemporaries is largely ignored. It is unfortunately becoming a commonplace to see the man in the white lab coat portrayed as an eccentric individual whose only concern is a maze of tubes, flasks, and the other paraphernalia of the laboratory — an individual whose actions outside this "glass tower" are likely to be embarrassingly naive at

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times and to reveal an almost innocent ignorance of everything else. The popular notion that invention is a kind of mystic revelation out of the blue is another misconception.

The real point is that science moves from the known to the nearly known and not from the known to the unknown. Another way of saying this is that the story of scientific progress has for its chapter headings a related sequel of events. The "flash of genius" which legalistic terminology requires as a criterion for invention is not a mystic revelation about something completely foreign to the scientist's experience.

Invention mostly involves a reordering of known facts into a new frame of reference. These facts may be ancient, or recently derived from one's own experiments or from work reported in the scientific literature, or more than likely they come from a combination of these sources. There is, of course, a qualitative difference in the kind and complexity of the organizational insights that constitutes the new pattern. This difference sets the great scientist apart from the mediocre investigator. In other words, certain scientific insights are possible to a large part of the scientific population, while other insights require a more elastic mentality.

Another factor important in the inventive process is related to the personal interests of the research scientist. It has frequently happened that a scientist interested in two diverse areas of knowledge or two scientists working in different fields have been able to draw from this association insights that have had far reaching practical consequences.

The story of cortisone is an example. Dr. P. S. Hench, a physician in the Mayo Clinic, observed that arthritic women during pregnancy often show a remarkable remission of symptoms. A consideration of the endocrine problem with Dr. E. C. Kendall, the renowned adrenal hormone biochemist, gave rise to the idea that the substance we now know as cortisone might be effective in the treatment of arthritis. Dr. Kendall was able to supply the rare hormone material for the initial clinical tests. The outstanding success of these studies is common knowledge.

In essence, the scientific mind is a prepared mind. Briefly, its characteristics are: (1) an intense interest in a particular area of experience; (2) a knowledge of what has been thought and done with the problem before; (3) a working acquaintance with the principles of the experimental method; (4) a native creative ability — the ability to organize diverse facts into a meaningful pattern; (5) a mind capable of strict intellectual honesty — one having the courage to subject its fondest hypotheses to the most rigorous tests it can devise.

Keeping Abreast of Literature

Some of the precise dilemmas confronting the individual research man in his dealings with the scientific literature should be considered. First there is the problem of keeping up with the literature. This involves not only the literature pertinent to the work that is in progress in the laboratory, but also keeping informed about the developments in individual major fields of specialization. Most of us also like to have a general idea about what is happening in that part of the world of science outside of our own bailiwick.

Because of the rate at which scientific literature has been accumulating lately, the individual reseearch man is finding it increasingly difficult to keep himself even decently informed in his own major field. It is no idle charge that the scientific population is faced with the possibility of becoming a group of narrow specialists. Unless something is done, this state of affairs may be detrimental to our future scientific well-being since many outstanding scientific advances are three dimensional — cut-

ting across the traditional boundaries between the sciences as well as more deeply into them.

In a recent article in *Science*,[2] Dr. Conrad Zirkle discusses among other things the subject of "buried scientific knowledge"—a potentially serious problem unless some new means can be found for keeping the scientific literature in bounds. To illustrate what is meant by "buried knowledge" the story of the Mendel papers, which are today recognized as the foundation for the modern science of genetics, is recalled. Although this work was published in 1865, it was not until thirty-five years later that the scientific world really became aware of its existence and real significance. Dr. Zirkle points out that other instances of buried knowledge have occurred with the accumulation of the scientific literature up to the present time, in spite of the steps that have bee ntaken to prevent this from happening.

Historically, these measures have included the setting up of professional scientific organizations. As a result of the associations of scientists at meetings and through the media of society publications, an effective exchange of information has occurred. The abstract journals have also proved invaluable, and the special science libraries are most important of all.

The steps taken by these and other organizations in the past when the need for new measures arose, were generally successful, but the present record flood of scientific literature threatens again to burst the dikes unless new ways can be found to strengthen them. Aside from purely mechanical considerations, the problem of keeping the literature in bounds is complicated by a more elusive personal factor. For this reason it is likely that no perfect solution will ever be found. It is for this reason also that the steps taken in the past have not been entirely effective.

In the final analysis, the significance of any piece of information will not be recognized until the mind having the right experience and interest comes along to perceive it, or some situation develops that makes it imperative to bring such material to light, as, for instance, the polio problem provoked a concerted effort to find out how that disease could be controlled. Granted this limitation, there is no reason to feel that the situation is hopeless. Just as in the past steps were taken to enable prepared minds to come to grips with pertinent information, so we, too, can anticipate the evolvement of effective methods of dealing with this problem.

Suggested Methods of Control

Some of the suggestions offered and the steps already taken in this direction are provocative. Dr. Ralph Cleland, a botanist at Indiana University, suggests in an article in the same issue of *Science*[3] that scientific journals, instead of publishing full length papers as is current practice, present instead concise, yet comprehensive abstracts of the author's work. This practice would make for publishing economy since the size of the journals would be substantially reduced. It would also help the scientific investigator to keep abreast of the latest advances. To provide the full-length accounts needed by those working in the field or desiring that information, Dr. Cleland suggests that microfilm or microcard presentations would be effective. The libraries could be provided with this material, on a subscription basis, at the same time that the journals carried the abbreviated articles.

In practice certain pharmaceutical libraries have been providing staff members with an abstract service for some time. At Parke, Davis & Company the library publishes weekly abstracts of the current articles and patents which are pertinent to the firm's interests. A

consideration of the mechanics behind this service provides an excellent illustration of one way that the research man can cooperate with the library.

Individuals on the scientific staff are responsible for selecting and abstracting the articles that seem pertinent in the two or three journals that are sent to them routinely for this purpose. The abstracts are returned to the library promptly and published on ten by twelve inch sheets perforated into three by five inch sections. Each section contains a complete reference to an article and short account of the contents and can be readily detached for incorporation in the research man's file if he so desires. Of course the new journals are conveniently placed on a special table in the library for perusal and study, and copies are circulated to the desks of interested staff members.

Another course which many of us feel would help control the volume of the scientific literature involves the use of more restraint on the part of authors and editors alike in deciding what is really worth publishing. There has been a tendency, particularly in some academic circles, to evaluate a man by the number of papers he publishes rather than by the quality of his work. Thus while Professor John Doe publishes 138 papers during his twenty years at X University, the fact is not always recognized that this material could have been presented in an even twenty papers without significant loss of essential data, and with the advantages inherent in a well-organized, clear, and concise presentation. In such a presentation, the real significance of the work is more easily grasped and practical applications that might not be evident when material is published in helter skelter fashion come to light.

A very promising approach has to do with the potential adaptation of machines of the IBM and Remington Univac type to the problems of indexing and correlating information for the research worker. These machines are now routinely employed in the business operations of many industrial organizations. In some cases they have been introduced into the laboratory where problems involving the handling of extensive data are found. More pertinent to the interests of the library is the fact that since 1945 work has been directed in a few quarters to the development of mechanical devices for keeping track of the scientific literature. This work is reviewed in an article appropriately entitled "New Tools for Resurrection of Knowledge" published in *Chemical and Engineering News* last year.[4]

Pure and Applied Research

Another practical problem the library faces in dealing with research people is that different specialists — like chemical engineers, process development people, and fundamental science research men — have different literature needs and as a result use the library facilities in a variety of ways. An interesting article appeared recently in *Industrial and Engineering Chemistry*[5] in which a study to ascertain the precise information needs of different groups of the scientific population is reported.

To obtain information, Dr. Saul Herner, a physicist on the Johns Hopkins staff, presented a detailed questionnaire to 606 representative fellow staff members. In breaking down the problem, research was considered under the conventional categories of pure and applied, employing the definitions given by Dr. Vannevar Bush. According to Dr. Bush, pure research has as its primary goal the "creation" of new knowledge, while the aim of applied research is the application of existing knowledge or the "creation" of new knowledge for possible application to specific useful products or goods.

In the sense of this definition none of us working in industrial, public health,

or practical research institutes does pure research. We all have our eyes on practical goals. Nevertheless, we often find it necessary to do the kind of research that would be considered pure research in another setting because it seeks to uncover information not otherwise available, but essential for the solution of our own practical problems. Although the average pharmaceutical research man may not go as deeply into a single subject as his academic brother, he is likely to work on a much wider range of topics during his career. This broad experience can be a blessing in that often the research man can brilliantly transfer experiences in solving a problem in one field to the solution of a new problem. Such transfers might not occur to one who has "put all his eggs in one basket".

On the other hand, the individual who can follow out seemingly impractical leads in a problem because he wants to obtain as complete a picture as possible of a particular area of one of the sciences, may make discoveries having far-reaching practical consequences that were not evident until such leads had been developed.

Literature-search Chemists

A frequent change in research perspectives poses the need for more literature searches — a situation that has resulted in the creation of a staff position for the literature-search chemist in many organizations. Differences of opinion about the usefulness of such individuals may be partly resolved by considering the nature of the problem with which the research man is dealing.

If he can clearly define the objectives and the precise boundaries of his problem to the literature-search chemist, the two are likely to have a profitable relationship. Perhaps the research man needs acetylphenylthiophene as a starting material in a synthetic sequence. In this kind of problem the literature-search chemist could be very helpful by furnishing references and pertinent information about prior methods of preparation of the compound.

But there are other problems which cannot be so clearly defined and here the research man finds it pays to make his own search. While the standard abstract journals are useful in introducing the pertinent literature, all of us know that when we read the original papers, we pick up references to significant material that never appear in the indexes under headings that would seem pertinent. On other occasions the research man can read as much between the lines of an article as he finds in the article itself. A seemingly insignificant bit of information may suggest just the approach for which he is looking.

What has been said admittedly represents a very sketchy treatment of some of the problems confronting the research man using scientific literature. It has been emphasized that the supplying of certain informational needs through the facilities of the library is as basic to continued scientific progress as is the work in the research laboratory. All of us in the laboratory are impressed with the creative role our librarians have played in meeting such problems in the past and we look more than ever to these indispensible members of our research teams for future guidance.

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Research Management Looks at the Technical Library

W. F. WALDECK
Director, Research and Development Division, Wyandotte Chemicals Corporation, Wyandotte, Michigan

TODAY'S INDUSTRIAL research laboratory is a highly complicated machine made up of specialized parts integrated for a stated purpose. In that organization the library is very much more than an assembly of pertinent books — it is an absolutely vital part of a complete mechanism which is just as specifically organized to turn out research results as General Motors is a mechanism for turning out cars.

Research projects almost invariably start with a survey of the available information. It has been calculated that, as an extreme, as much as one-third of the entire cost of a research project may lie in the gathering and interpretation of the literature pertaining to the subject. It is only natural, therefore, that management should take a close look at the library, its functioning, its problems, and its possibilities.

Much of what I have to say is colored by the experience and requirements of my own company. In order to provide a proper frame of reference for my remarks, let me describe very briefly the company and its research division. Wyandotte Chemicals Corporation, with its major plants some ten miles south of Detroit on the Detroit River, is a sixty-five year old organization which manufactures heavy industrial chemicals, the most important being soda ash, caustic soda, chlorine, ethylene glycol, and specialized cleaning compounds. Research as an organized activity was started in 1937 and has grown to the point where the research and development division consists of about 200 people of whom seventy-five or eighty are of professional status. In accordance with the work of the company, the research division is divided into laboratories or departments covering organic, inorganic, chemical engineering, analytical, food industries, industrial, laundry and textile, nucleonics, contract, and production research.

Our library, under the leadership of Dr. Eleanor Denton, who has been with the research division almost since its start, is organized not only to serve the laboratories I have mentioned but also the various sales, technical service, manufacturing, and engineering departments. The basic problem facing our library, and I am sure most other libraries of its kind throughout the world, is the proper assimilation of the increasing flood of knowledge that pertains to our activities.

Let me give you a brief picture of what that flood consists. In the United States there are now 3,600 scientific and technical publications. In 1954 *Chemical Abstracts* made over 67,000 abstracts. Since 1907, when the abstract service started, one and two-thirds million abstracts have been produced. At present 5,500 scientific periodicals in thirty-one languages are

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scanned and the output of abstracts doubles every ten years. While part of the increase in scientific articles can be ascribed to the more generous publication policies of industrial and institutional laboratories, the major cause for the increase is due to the very great increase in the number of people doing scientific work. In 1951 there were almost 150,000 chemists and chemical engineers in the United States, nearly twice as many as in 1940.

Cost of Research

Another major reason for the increase in scientific activity and publication activity is the entry of the Federal Government into the sponsorship of research on a huge scale. Prior to World War II the research activities of the Federal Government, while important, were negligible in comparison with the over-all research activity of the United States. In less than fifteen years the picture has changed so dramatically that more than half of the cost of the total scientific research being done in the United States today is paid for by the Federal Government, the actual percentage at the moment being between fifty-three and fifty-five per cent. In terms of dollars, the expenditures of the Federal Government in the field of research amounts to over two billion dollars. Half of this is expended in the greatly increased government laboratories, half of it is expended in universities, institutes, and commercial organizations like ours.

Utilization of Available Material

The full effect of this tremendous expenditure for research has not yet reached the library because a large, but unknown, percentage of the research results are classified and are not made public. As a matter of fact, the amount of information accumulated by the Government is so large that research contracts with the Government often start with the assignment of searching the Government files and libraries to find out how much the Government already knows about the subject at hand. Until recently the great bulk of the information resulting from the many billions of dollars worth of activity of the Atomic Energy Commission was kept secret. With present world trends, it appears that huge chunks of this Government stockpile of general and atomic energy information will be published.

We made a survey to see how this increasing tide of information has affected our own library. In 1945 we were receiving a total of 112 periodicals. In 1955 this number had almost exactly tripled to 338. Of the 112 periodicals received in 1945, we were binding ninety-six and keeping files of eleven unbound with an increase requirement of twenty linear feet of shelf space for the bound volumes each year. Of the 338 periodicals received in 1955, we are binding 156 and keeping permanent files of 116 unbound. We view this geometrically increasing accumulation with mixed feelings. Certainly we are glad to have available the increased information that this material represents. Certainly the merely physical problems of housing this growing collection are not too difficult. We are left with the fear, however, that we may not be able to find and interpret all the available data necessary to our requirements. The problem in compiling and correlating technical literature was publicly called a crisis in a talk by Dr. J. W. Perry a few years ago.

To cope with the problem of keeping our heads above this flood of knowledge, there are several things which we must do and are doing. In the first place, it is obvious that we must maintain and increase our abstracting and indexing services. This is already a very large undertaking. *Chemical Abstracts* now has 1,200 abstracters and fifty section heads. It is expected that soon the annual index will be larger than the entire first decennial index of 1907-

1916. Because delays in indexing can be very costly, *Chemical Abstracts* last fall undertook to find out, by means of a questionnaire, what support could be obtained for a monthly index volume. Our first inclination was not to support this somewhat expensive undertaking. However, shortly after we came to this decision, we found that we had made a considerable research expenditure on a single project that could have been saved if the monthly indices had been available. The possible savings in this one instance would have been enough to have paid for many years of monthly abstract indexes and we hastily reversed our decision.

In addition to more and better abstracts, research organizations can always use more review articles. These are invaluable in summarizing the developments in relatively large areas of knowledge.

A third method of utilizing more effectively the information that is available is the institution of company abstract leaflets. Dr. Denton started one several years ago at the request of our technical service department. This has gradually grown in scope until it covers rather effectively the entire field of research, production, and sales for one of the two divisions of our company. She has recently started another abstract leaflet for the second division. Leaflet preparation is a time-consuming chore for a librarian but one that is greatly appreciated by the rest of the organization.

Mechanical Searching

The field in which probably the most progress will be made in the control and utilization of published information is in the development and growing use of mechanical systems for searching literature. We have progressed from an initial dependence on card files to the use of devices such as punched cards, and we are presently in an era in which the mechanical sorting of information by machines like the IBM sorter is becoming commonplace. Perhaps in the future electronic machines with prodigious capacities for storing information and releasing it on demand will take over.

We live in a time in which it is possible to insert a dime in a machine and get back either a cup of hot coffee or of ice-cold Coca Cola. Certainly in such an age it is not unreasonable to look forward to the existence of a machine that will provide, within a period of minutes at the pulling of appropriate levers, a printed list of all the references pertaining to, say, the effect of the molecular weight of nonionic surface active agents on their detergency for cotton.

The recommendations of the committee investigating the virtual collapse of the Patent Office are interesting in this respect. The committee decided that the primary cause was the difficulty of adequately searching the tremendous mass of literature that must be consulted before a patent is issued. Their recommendation was to reduce published information to units that could be handled mechanically and almost instantaneously to provide the necessary references for patent searches. This is a very large undertaking and would take a number of years to accomplish. Such a system would have utility far beyond the requirements of the Patent Office and efforts in this direction should therefore receive the support of all of us.

It is important to realize that most of the mechanical techniques required for such searching activities are already at hand. The proper reduction and classification of information so that it fits one or another of the mechanical systems is primarily the function of the librarian. Melville Dewey met the challenge to the last century of librarians in 1876. Surely teams of librari-

ans and sorting specialists will meet the more complicated challenge facing this century. The difficulties of the Patent Office are a matter of very public view and concern. All of us have similar problems of assimilation and utilization that must be solved.

Unnecessary Duplication and Research

So far we have been contemplating some of the problems of digesting the information obtained by others. Of equal and growing importance is the proper utilization of information developed by our own organizations. Those who saw the play, *The Solid Gold Cadillac,* will remember that the central action of the play revolved around the glee of the managers of a gigantic corporation when they managed to bankrupt and put out of business a small competitor, and their embarrassment when a stockholder found out that the competitor put out of business was actually owned by the giant corporation.

When a research organization is young and small there is very little problem in the proper storing of the work of the group. Even if no one remembers what the work showed, everybody remembers who did the work and where the results can be found. As research organizations grow larger and more mature and the personnel changes, the possibility of carrying on research that duplicates results already obtained in the same organization once, or even twice before, becomes greater. Such duplication causes not only a great deal of intense embarrassment to the management of a research group, but is a painful waste of time. Such instances lead to the belief that for every case of unintentional duplication of prior work there must be dozens of completed research projects of the past that would be useful today if they were easily available.

The problem is a relatively simple one in the case of large, major reports which in most organizations are duly numbered, filed, and preserved. Often, however, vital information does not reach the form of major reports but exists in the form of scattered memoranda, notes, and letters. In one particular field of research which had been going on for eleven years in my own company, it was necessary for two top men, with the assistance of our librarian, to work for over a year, whenever time permitted, preparing a critical bibliography covering 1,023 items produced within the organization itself.

This problem of the organization of a group's own knowledge differs with almost every organization and the solutions may be equally varied. Some organizations have central filing systems which require that every scrap of paper produced in the organization, or coming into or going out from the group, must be filed in a central filing system. The proper operation of such a filing system quickly becomes a full time operation for one or more persons and may become too cumbersome for convenience. In other cases, separate files may be maintained at appropriate points with a general understanding as to the coverage of each file involved, and with the scope and organization of each file set up with the assistance of the librarian. In other cases, commercial firms selling office equipment and systems are sometimes called in to set up adequate systems.

We are a long way from having solved all the problems of developing what is actually a research memory. In any case, it is my conviction that the librarian is best qualified to take on this responsibility. We expect the librarian to be familiar with the sources of outside information and its proper organization to meet our needs. Surely from his familiarity with the work of the entire group and from his training and experience in the organization and classification of knowledge, he can assume the newer responsibilities of organizing the record of a research group's own work.

Biological Subject-Indexing and Information Retrieval by Means of Punched Cards

G. CONGDON WOOD

Head, Biology Group, Chemical-Biological Coordination Center, National Academy of Sciences—National Research Council, Washington, D. C.

THE PRIMARY function of the Chemical-Biological Coordination Center in Washington, D. C. is to help coordinate research in various areas of biology by providing liaison between research workers and between laboratories. This is done through extensive files of highly selective information. The Center's interests are limited to biological and chemical research concerned with the effects of specific chemicals and chemical groups on living systems and their component parts. Since this is so large a field the Center has had to restrict and define its scope more or less arbitrarily. Complete references, chemical data, and abstracts of biological experiments are entered on a code sheet. Beneath the written abstract the appropriate code terms are entered. This much of the work is done by a non-resident staff of paid abstracters. Subsequently, the coded information is punched and filed on IBM cards.

As a bibliographic service the Center provides a greater or lesser amount of raw data, and a maximum of finely subject-indexed references to specific pieces of information; that is, the card files comprise a complete subject index to all pertinent data within all articles, reports, and collections of unpublished data covered. Unlike other abstracting services, the Center does not issue bibliographic publications but rather attempts to answer specific questions for research workers. The files are for the benefit and use of all research workers in academic, industrial, government, and independent laboratories.

In some instances the questions are relatively simple ones and the answers can be tabulated quickly and easily from the code sheet files without recourse to the IBM files. In other cases an extensive IBM sorting and matching operation may be necessary. Not infrequently the resulting cards will show that we have in the file several thousand items of biological data for several hundreds of compounds. Through a system of reference numbers the cards will lead to the code sheets bearing the required references and abstracts. If the quantity of data is too large to permit tabluation by the Center's staff, it may be possible to provide a microfilm strip of the code sheets or the questioner may be invited to visit the Center to tabulate the previously sorted references and data himself.

Literature Coverage in Center

JOURNALS. Approximately sixty English language journals have been considered in the Center's coding program during the past two years. In each major division of the biological sciences, such as pharmacology, entomology, plant physiology, plant pathology, experimental biology, the most impor-

Paper presented before a joint meeting of the Biological Sciences and Hospital Divisions at the 46th Annual Convention of Special Libraries Association, Detroit, Michigan, June 14, 1955.

tant English language publications have been carefully screened to determine the top two or three from the point of view of productivity per volume of useful or significant information within the Center's sphere of interest. Thus, it is likely that up to seventy per cent or more of the most important laboratory data dealing with the effects of chemicals on insects can be obtained from three or four journals. The balance of the available information is so widely scattered that it would not be feasible to attempt complete coverage with the facilities at our command. Theoretically this material will all be scanned and assigned for abstracting and coding eventually.

MISCELLANEOUS REPORTS. A great deal of information is on file from numerous kinds of reports, usually mimeographed, which are issued by state, federal, and other agencies, and which have a limited distribution.

UNPUBLISHED DATA. A tremendous mass of unpublished research data now exists in many laboratories and personal files and whenever this material can be obtained it is added to the Center's files. For example, an experimental biologist turned a large unpublished manuscript over to us. This man worked for several years studying the effects of a large number of chemicals on cell division. His results, aside from being basically interesting in their own right, have a bearing on cancer research. Since he has gone on to a new research project, he does not have the time to publish any of his findings. He feels that the data should be available to other workers, as much to prevent duplication of effort as for their intrinsic worth.

Again, arrangements are being made with the U. S. Food and Drug Administration whereby their files of toxicity and toxicological data, resulting from their own experimental work, will be made available to the Center. Another similar project is the abstracting and coding of unpublished plant growth regulating effects for several hundred compounds from the files of the U. S. Bureau of Plant Industry in Beltsville, Maryland.

THE CENTER'S SCREENING PROGRAM. In addition to its literature coverage, the Center sponsors a chemical screening program carried out by thirty-odd laboratories in nonprofit institutions. Essentially, the Center attempts to locate and make available to these laboratories new chemicals which will then be screened against a broad spectrum of biological tests. In this way, for example, a compound developed by a manufacturer as an insecticide and found to be valueless for this purpose may be tested for fungicidal, bactericidal, herbicidal, rodenticidal, and other biological properties. These data are returned to the Center where they are coded and filed. On occasion, it has happened that a compound discarded after a series of negative tests with one intent has proved to be highly active for some totally different purpose. In many cases these data are not published anywhere but in the Center's own publication, *Summary Tables of Biological Tests.*

POLICY OF COVERAGE. Journals may be dropped or added at any time, as changing editorial policies and research trends may suggest. Only whole volumes are assigned for abstracting and a careful record is maintained of all journals covered. Coverage is also influenced by our own internal changes of policy. At one time there was a rigid rule excluding all field data in the agricultural sciences and all clinical data in the medical sciences. This rule has been somewhat relaxed to permit abstracting and coding of certain classes of both field data and clinical data. Immediately the question comes to mind as to whether or not, and to what extent, we should go back through the journals

already covered to pick up those items which had been excluded, but which we now would like to have in the file.

Subject Analysis

CODE SHEET FILES. In the master code sheet files the basic filing unit is the individual chemical, rather than the author or article. Each compound is filed according to its chemical serial number. Under a given number are found, in chronological order, all of the references and abstracts which the Center has ever entered for that compound.

ABSTRACTING. The abstract prepared on one of the Center's code sheet is not a simple one based on the title, introduction, or summary of an article. Rather it includes the exact experimental results recorded and coded with extreme accuracy according to the Center's biology code and detailed instructions for its use. Information must always be recorded so as to permit coding by use of available terms and techniques. All of the Center's abstracters are paid, professional personnel, most of whom have a Ph.D. in the subject they cover. Their initial training in our abstracting and coding techniques takes approximately six months.

If a particular paper deals with the effects of 200 compounds on five different organisms according to two different test techniques, 2,000 separate items of information are possible. In the IBM card files each item may be searched for independently, in combination with other items in the same article, or in combination with items from widely differing sources, both published and unpublished. On the other hand, there may be but a single item in a whole paper of interest to the Center. For example, the statement "a five per cent DDT spray killed eighty per cent of 500 houseflies within twenty-four hours" may be the only item abstracted and coded from a fifteen page article.

To call attention to the complexity and detail of the Center's biology code, I recently calculated that approximately 2.75×10^{24} different statements can be made about the effects of a given chemical on a mouse. This is so because of the possible permutations and combinations of the code definitions, corresponding to index subject headings, which are arranged under twenty-six fields of information. At the present time the largest field of the biology code is that of specific biological responses. There are approximately 700 code terms in this field.

PREFILING. Recovery of data through use of the IBM files is greatly facilitated by prefiling all cards in from a minimum of three to a maximum of eight filing fields of biological information. Thus, if the required chemicals are known, all biology cards for these chemicals can be selected from the chemical serial number file. If information is required only for the laboratory mouse, all cards containing data on mice will be together and can be manually selected from the taxonomy file. If information is requested on acute toxicity of certain compounds, all the cards containing acute toxicity data, on whatever organism, will be together. Any group of cards so selected will then be far more amenable to whatever additional IBM operations may be necessary than if the entire file had to be used. At present, there are about 160,000 items of biological information in the file.

Although I have referred frequently to our biology code, the Center has an analogous chemistry code, and a chemical IBM file. A particular chemical name is not coded as such, but will appear on the chemistry card as a collection of code symbols representing molecular groups and the number of times each occurs in the compound. In the so-called chemistry rotated file, if a compound contains five structural

components there will be five cards, with each component in turn coded in the number one position. In answering many of the more complex questions it is often necessary to search the chemistry rotated file for the required chemical specifications, and then match the resulting cards against those selected analogous chemistry code and a chemfrom the appropriate biology file. While it is not possible to assign a code symbol to each individual chemical for searching purposes, every specific compound on file does have a serial number, which has several uses. For example, the master code sheet file is arranged in chemical serial number order.

Currency of Coverage

SERIAL PUBLICATIONS. The Center is at present attempting to abstract and file pertinent information from its selective journal list for the period from 1946 to date. This period has been selected on the grounds that, first, the most recent information is apt to be of greatest interest to research workers, and, second, the rapid increase in publication of chemical-biological papers began shortly after the end of World War II. When this body of the literature has been completed, we plan to add additional journals to the list and carry our over-all coverage back ten years at a time.

UNPUBLISHED DATA. Our self-imposed rules are sufficiently flexible to permit adding unpublished data to the files whenever they become available.

SCREENING DATA. Data obtained through the screening program sponsored by the Center are added to the file as rapidly as they can be cleared and processed. These data provide a relatively up-to-date index of chemicals which have been tested for biological activity. Subsequent appearance of the tests in the *Summary Tables of Biological Tests,* which has only a limited distribution, generally constitutes the first publication of the data. Some, but not all, of the data may appear later in chemical or biological journals.

Limitations and Difficulties

A number of theoretical limitations and practical difficulties are inherent in the Center's approach to indexing and abstracting. Since all abstracts must be reduced to code form for IBM punching and since what corresponds to a subject heading list is actually a code dictionary, we are constantly faced with problems of synonymy and homonymy. For example, in the medical sciences the condition chlorosis is characterized by a green color, whereas in the botanical sciences the same term connotes a relative absence of color.

The area covered by the Center's activities is highly specialized, closely defined, and extremely small compared to the totality of chemical and biological research and literature. Decisions must be made weekly, or even daily, as to whether a given article, or item of information within an article, falls within our sphere of work. The extent of our literature coverage has been dictated by a budget far less than adequate to bring our list of serial publications covered up to the number of other abstracting services. The kind of abstracting involved is such that the addition of one or two new journals for regular coverage may well entail the hiring of an additional abstracter, plus an increase in the amount of work required from at least one other member of the coding and abstracting staff, and an appreciable increase in routine administrative and other procedures on the part of at least one professional biology staff member and one technical assistant. The added load may also be felt by the chemists and the IBM staff.

Another difficulty is apparent in what has been called the "irrationally distributed data" in the field of chemical-bi-

ological relationships. That is, in very broad terms, for some thousands of compounds for which one item of data each has been filed, there may be hundreds of compounds with several hundred items each.

The difficulties mentioned to this point have had to do primarily with the input of data into our files. However, in recent months certain limitations in the use of the files have come to our attention. Since the IBM files must be sorted, merged, and matched by mechanical equipment, rather than by electronic devices, it is becoming increasingly difficult to handle large blocks of data. To offset this situation our only recourse at present is to establish duplicate files for particular purposes.

Comparison of Indexing Methods

The Center has given a good deal of thought to its over-all function with relation to the other major chemical and biological abstracting services. Three specific points can be adduced in justification of the Center's apparently small journal coverage. First, we welcome — even solicit — negative data from all possible sources. The bulk of such data is, for reasons of space and economy, seldom accepted by editors of the regular scientific publications. Great quantities of negative data have been added to the Center's files during the past years, principally obtained through the screening program sponsored by the Center. This information is valuable to those searching the litrature for basic chemical-biological relationships.

Secondly, in part as a concomitant of having negative as well as positive data on file and in part as a result of the mechanical techniques used for seeking specific items of research data, either individually or in combination, it is possible to search the files for correlations between chemical structure and biological activity. Correlation studies by conventional bibliographic methods may require months of tracking down and studying reviews, bibliographies, and specific references, whereas in this case the correlation of particular groups of subject matter may be sought completely out of context and with no regard to the source, although once the required information is found the source will always be readily available.

Finally, the Center's piecemeal approach to filing data permits it to maintain an IBM card index broken down by subject matter to a much finer degree than is possible with the other abstracting services. This statement is not a criticism, as it is made possible only by our self-limited scope of subject matter and literature coverage.

Since the Center's objectives are somewhat different from those of the other services, it seems appropriate to examine our indexing system more closely. By considering the material in the table, a number of interesting points will emerge.

For example, the *Bibliography of Agriculture* indexes approximately 4.5 items per publication covered per year, compared to about seventy-three items per title for the *Current List*, and thirty for the CBCC. This seems quite startling until we remember that *Bibliography of Agriculture's* main function is to call attention to the largest possible number of articles pertaining to agricultural subjects in the world literature. From a practical point of view this can only be done by listing titles without detailed abstracts. Obviously, in such a diverse mass of literature a highly selective approach to the articles listed must be used. On the other hand, the *Current List*, in limiting its coverage to medical ciences and literature, finds that nearly every article is pertinent and applies its selective process at the journal level.

In *Chemical Abstracts, Biological Abstracts,* the *Current List,* and the *Bibli-*

Indexing Parameters of Five Chemical and Biological Abstracting Services

	Serial Publications	*Items (Articles)*	*Items/Title /Year*	*Abstracts Per Item*	*Index Entries Per Abstract*	*Index Entries Per Item*
CA	6,500	80,000	12.3	1	7.0+	7.0+
BA	2,447	30,000	12.3	1	2.7—	2.7—
CLML	1,500	109,000	72.7	1	2.5+	2.5+
BOA	22,000	100,000	4.5	1	1.8	1.8
CBCC	38	1,140	30.0	21	20.0±	420.0±

CA—*Chemical Abstracts;* BA—*Biological Abstracts;* CLML—*Current List of Medical Literature;* BOA—*Bibliography of Agriculture;* CBCC—*Chemical-Biological Coordination Center.*

Note: Figures given cannot be regarded as exact in all cases.

ography of Agriculture the individual article is the unit for listing and there is only one abstract per item. In the case of the Center's files, the article itself is of secondary importance and each article is broken down into individual units of pertinent information. This has resulted in a coverage of twenty-one abstracts per item.

When it comes to the number of index entries per abstract (indexing density), recent estimates show figures of 7+ for *Chemical Abstracts,* approximately 2.7 for *Biological Abstracts,* 2.5 for the *Current List,* and 1.8 for *Bibliography of Agriculture.* In each of these cases a few of the most pertinent words or phrases describing the content of the article are selected from the title, the introduction, or the summary of the paper. In the case of the CBCC, however, every piece of data which fits our specifications for coverage ends up on a separate IBM card and, since each card can be recovered independently of all the others, it must be considered a separate index entry. Thus, it is possible for a given piece of data to have index entries under such headings as "name of the secondary compound", "name or type of solvent", "name of the test organism", "sex, stage, and experimental condition of the organisms used", or others. The 1,140 articles abstracted, coded, and filed during 1954 produced a total of almost 24,000 distinguishable pieces of data (or abstracts). This gave an average of approximately twenty index entries per abstract. To carry the comparison to its logical conclusion, multiply the number of abstracts per item by the number of index entries per abstract. It then develops that for the material covered during 1954 we had an average of 420 index entries per article.

Summary and Conclusion

To summarize briefly, it seems clear that the marked differences between the indexing practiced by the CBCC and that of the other abstracting services are in great part the direct result of the purposes to which the respective files and indices are put. In our case, it is possible to obtain a large proportion of the highly significant and important research data in a specialized field of chemistry and biology in a limited number of journals. Mechanical techniques permit us to recover from our files information at various levels of specificity, to provide answers to specific questions submitted by research workers. No attempt is ever made to claim complete coverage of any given subject. On the other hand, the other four services strive for relative completeness, depending on the magnitude of the area being covered, and there are practical limits to the degree of abstracting and indexing which they want or are able to do.

INTERNATIONAL CONGRESS OF LIBRARIES AND DOCUMENTATION CENTRES: *A Report on the Brussels Meetings, September 11-18, 1955*

FOR THOSE INTERESTED in the better dissemination of information on a world-wide basis, perhaps the most important fact demonstrated by the recent Congress of Libraries and Documentation Centres and the special meetings associated with it, was that approximately 1,500 persons from about forty-four countries were sufficiently interested in these problems to attend the meetings. When one realizes that many people attended at a considerable sacrifice of time and often their own money, their wish to improve their professional services and their dedication to its objectives, becomes very evident.

During the closing session of the Congress, Professor P. Bourgeois said it had not been the purpose of those planning the Congress to present large numbers of resolutions, but that while many had been formulated, not all had been accepted, nor should the success of the Congress be judged by the number or type of resolutions passed. He felt, however, that a study of the findings recorded in the many sectional reports of the Congress would indicate a basis for a common ground for future work and cooperation in librarianship and documentation at the international level for several years. These findings are published and should be of interest to all librarians.*

* *International Congress of Libraries and Documentation Centres, Brussels, September 11-18, 1955,* may be ordered from Martinus Nijhoff, 9 Lange Voorhout, The Hague, Netherlands. Volume I contains preliminary reports and Volumes IIA and IIB contain papers presented to the General Congress and other international meetings. Contents are in English and/or French.

New Organizations

Another feature which distinguished this Congress was the large attendance of special librarians representing various professions. The music librarians had organized several years ago as The International Association of Music Librarians and were co-sponsors of the Congress with the International Federation of Library Associations (IFLA) and the International Federation of Documentation (FID).

The International Association of Agricultural Librarians and Documentalists was founded in Ghent, Belgium, on September 10, 1955, with Chester Mohrhardt, librarian of the U. S. Department of Agriculture Library, as President, and Dr. von Frauendorfer, of Austria, as Vice-President. This group had been working on their constitution for two years and decided that while they wished to be an independent organization they wanted to become members of FID and IFLA. Their applications for membership were accepted by both organizations at their respective council meetings.

The medical librarians met in Brussels on September 10 for a "Journée Médicale" and decided to organize as rapidly as possible an International Association of Medical Libraries and Documentation Centres. A committee, appointed in London in 1953, was instructed to proceed to draw up a constitution and to study future relationships of the new groups with other existing international organizations.

A Federation for Technical University Libraries and a Federation of Theological Libraries were organized, both

as sections of IFLA. An association of the Jewish Libraries in Europe is another special group.

Relationship of Organizations

One of the plenary sessions of the Congress was devoted to the question of the relationships with and between these various new organizations. The danger of too many small groups was pointed out and it was the consensus of opinion that they should be created *only* in response to a professional need and where large numbers of libraries exist in a given specialty.

A resolution was presented recommending that every specialized group establish contact with IFLA and FID in order to avoid duplication of effort, and that their councils be kept informed of all activities undertaken. It is significant that the new agricultural and medical groups included "documentation centers," indicating their belief that although documentation may be considered a special branch of library service using special techniques, it should be as closely associated with other aspects of librarianship as possible. This was emphasized many times during various meetings of the Congress.

Internationally Recognized Problems

In attempting to analyze common denominators running through the multitude of meetings and special programs of the Congress, certain problems seemed to be recognized universally.

1. *The need to complete bibliographies at both national and international levels, in general and special subjects.*

The Congress "recommended that the United Nations and each of its specialized agencies should take leadership to aid in the coordination of subject bibliography within their repective subject fields."

2. *Need for a better program of education for librarianship, especially in regard to preparation for library specialization, including documentation.*

The music librarians, for example, reported they felt two kinds of training should be considered: (a) "For musicians and musicologists with the view to their technical training as librarians; (b) For librarians with the view to their specialized musical and musicological training."

During one of the FID meetings it was suggested that "the national documentation groups keep in as close contact as possible with the library schools in order to arrive at a mutual understanding regarding the educational needs of the librarian on the one hand and those persons working as documentalists." It was suggested that Mr. Ernst Rickli, Secretary of the Swiss Association of Documentation,* gather information regarding existing courses in documentation in different countries.

3. *Maintaining and promoting the flow of material and information between countries.*

It was pointed out that certain factors constitute barriers to this:

(a) High cost of books and journals.

(b) Cost of transporting such items.

(c) Language. This barrier to the flow of information someone thought could well form the theme of an entire Congress. Authors should be urged to write in only a few of the well-known languages for publication of research and educational material. A summary in some second well-known language as a pre-requirement for publication was also suggested.

4. *Conservation and preservation of collections.*

Two pertinent resolutions were presented: (a) One by the Committee on the Conservation of Documents stated:

"The Congress hopes that in every country — when not already existing — should be created a commission of experts which should be appointed to give all necessary advice, general direc-

* His address is Biblioethek der General Direktion P T T, Berne, Switzerland.

tions and documentation concerning all questions about the storing, conservation and the restoration of the manuscripts and printed documents which are to be preserved in public as well as in private depots."

(b) Another resolution presented by the Committee on Documentary Reproduction, reads:

"The Congress conscious of the duty we have to transfer to future generations the treasures of the libraries which not only constitute a national patrimony but also an intellectual patrimony for the entire humanity, conscious of the responsibility of nations, towns and all trusteeship authorities for libraries, demand that in addition to the protective measures for the preservation of this cultural patrimony during war, an insurance by means of their photographic reproduction, should be effected against every possible destruction even in peace time of the treasures of the libraries.

"For this purpose the Congress wishes that all measures should be taken by the responsible authorities and the necessary funds made available—if this is not yet the case — to permit these reproductions.

"The Congress recommends that interested international organizations establish a relation in regard to this matter, with UNESCO."

5. *To give advice and assistance to the library movement in countries in which library service is still not fully developed.*

The Committee on Public Resources offered this resolution: "The International Congress of Libraries and Documentation Centres, convinced of the essential part which libraries have to play in the cultural and economic development of nations, recommends that public authorities establish systematic library organization according to the needs of the country."

The service which UNESCO has rendered to the library movement and to bibliographic enterprises in many countries was recognized and appreciation of their efforts was expressed frequently during the meetings.

Organization of Congress

It might be of interest to point out a few of the difficulties faced by the Belgian committee for the organization of the Congress. One problem was that of language; it was estimated that thirty different languages were represented at the meetings. Simultaneous earphone translation in English and French was provided by the Free University of Brussels, not only in the large assembly hall, but in several of the smaller rooms as well. Those conference rooms not equipped with phones had translators available if required. Another excellent service was the provision of sufficient space, secretarial assistance, and equipment necessary to reproduce all of the reports and resolutions of each day's meetings. This required the continuous cooperation of the presidents and rapporteurs of each section and of the secretaries and presidents of IFLA and FID.

In spite of the fact that librarians had been urgently requested to send in their registrations and application forms early in the summer, almost half of these registrations were received during the last month before the Congress opened, many only a few days before. This meant a tremendous amount of last minute work for the committee and ensuing confusion as plans for social functions were revised. The Congress was handled in a most democratic manner and the committee did a remarkable job of splitting up schedules for trips and entertainment in such a way that all could attend something.

EILEEN R. CUNNINGHAM
Special Libraries Association Delegate to the Congress
Librarian, Vanderbilt School of Medicine, Nashville, Tennessee

Report of the Nominating Committee

1955-1956

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

President

KATHARINE L. KINDER
Johns-Manville Research Center
Manville, New Jersey

First Vice-President and President-Elect

ALBERTA L. BROWN
The Upjohn Company
Kalamazoo, Michigan

DOROTHY A. THOMPSON
Ontario College of Education
University of Toronto
Toronto, Ontario, Canada

Second Vice-President

MRS. MILDRED H. BRODE
David Taylor Model Basin
Washington 8, D. C.

RUTH NIELANDER
Lumbermens Mutual Casualty Co.
Chicago 40, Illinois

Secretary (Two Years)

MRS. KATHERINE JANIS
International Nickel Company, Inc.
New York 5, New York

ELEANOR V. WRIGHT
Engineering Division
Chrysler Corporation
Detroit 31, Michigan

Treasurer (Two Years)

WILLIAM S. DOWNEY
Socony-Mobil Oil Company
New York 4, New York

CARROLL C. MORELAND
Biddle Law Library
University of Pennsylvania
Philadelphia 4, Penna.

Directors (Three Years)

(Elect One)

PAULINE HUTCHISON
Canada Life Assurance Company
Toronto 1, Ontario, Canada

MRS. CATHERINE D. MACK
Corning Glass Works
Corning, New York

(Elect One)

DR. ARCH C. GERLACH
Map Division
Library of Congress
Washington 25, D. C.

BERNARD LANE
Hanford Atomic Products Operation
General Electric Company
Richland, Washington

Respectfully submitted: GENEVIEVE FORD, Chairman; JO ANN AUFDENKAMP, L. VERONA BEKKEDAL, DOROTHY SKAU, LAURA MARQUIS.

Members continuing to serve on the Executive Board for 1956-1957 will be Immediate Past-President, CHESTER M. LEWIS, and Directors SARA M. PRICE, DR. ELSE L. SCHULZE, ELIZABETH B. FRY, and DR. JERROLD ORNE.

Further nominations may be made upon written petition of ten voting members in good standing. Such petitions, accompanied by written acceptances of the nominees, must be filed with the Executive Secretary of Special Libraries Association at Association Headquarters not later than three months prior to the Annual Meeting.

KENNETH H. FAGERHAUGH
Carnegie Institute of Technology

Dear SLA Members:

Plans are shaping up for the 47th Annual Convention of the Special Libraries Association which will be held at the William Penn Hotel in Pittsburgh, June 3-7, 1956. To the best of our abilities, we of the Pittsburgh Chapter will make your visit an educational and enjoyable one. To those of you who attended the 1938 Convention we extend a particular invitation because, although that wasn't long ago, so many things have changed you will hardly recognize us. To all others, a warm welcome! We feel you will be most favorably impressed with Pittsburgh in June.

We are planning a sociable Sunday with exhibits open by mid-afternoon and a get-acquainted buffet for Sunday evening, offering plenty of time to renew friendships and make new acquaintances.

Tours are planned to interesting libraries and special collections as well as visits to steel plants, the Heinz 57 Varieties plant, and the School of Printing Management at Carnegie Tech. Other plans are still a bit nebulous.

A post-convention program on documentation will be held on Friday, June 8.

More about Pittsburgh and the Convention will appear in future issues of SPECIAL LIBRARIES, but mark your calendar now for the first week of June.

Sincerely,
KENNETH H. FAGERHAUGH, *Chairman*
SLA Convention, 1956

HAVE YOU HEARD . . .

Conference on Recorded Knowledge

The School of Library Science and the Center for Documentation and Communication Research at Western Reserve University, Cleveland, Ohio, sponsored a Conference on the Practical Utilization of Recorded Knowledge — Past and Future on January 16-18. The three day conference, of which SLA was a co-sponsor, featured speeches and panel discussions on the international and practical utilization of recorded knowledge, aspects of the decision-making process, cooperative information processing, the role of language in the communication of recorded knowledge, and the education of future librarians and documentalists. SLA members who delivered major addresses or took part in the panel discussions were SLA President, Chester M. Lewis, *New York Times;* SLA Treasurer, Burton W. Adkinson, Library of Congress; Jesse H. Shera, Dean, and Helen Focke, Professor, School of Library Science at Western Reserve; James W. Perry, Director, and Margaret E. Egan, Research Associate, Center for Documentation and Communication Research; Herman H. Henkle, The John Crerar Library; Ralph R. Shaw, Graduate School of Library Science, Rutgers University; and Winifred Sewell, Squibb Institute for Medical Research.

* * *

Paper and Textile Section Organizes

During last year's Convention in Detroit, SLA members associated with paper and textile industries formally organized a Paper and Textile Section as a sub-division of the Science-Technology Division. At the first meeting held on June 15, 1955, David R. Weiser, of the Champion Paper and Fibre Company, Hamilton, Ohio, was elected chairman of the new section; Donald I. Marr, of the St. Regis Paper Company, Deferiet, New York, was elected vice-chairman; and Mrs. Gertrude Weisz, of the Industrial Rayon Corporation, Cleveland, Ohio, was elected secretary-treasurer. In October the section boasted a total of thirty-nine members and issued its first publication, *P. and T. News,* an informative four page newsletter.

The group is making arrangements for the reproduction of various paper journals on microcards and is forming a committee to work on the revisions of the paper and textile classifications of the Dewey Decimal System and Universal Decimal Classification. Other projects under consideration include the compilation of a uniform subject headings list, contributions to the SLA translation pool at The John Crerar Library, methods of exchanging duplicate periodicals, and the collection of bulletins published by paper and textile libraries for an exhibit at the Annual Convention in Pittsburgh.

* * *

Library on Man's Place in Nature

The New York University-Bellevue Medical Center, in March 1955, pioneered in a new area of education with the establishment of a special library called the Library on Man's Place in Nature. The library was organized because the rapid advances of technical knowledge in medical and related fields left medical students and their instructors very little opportunity to keep informed on the humanistic and philosophic implications of modern science. The library's collection includes selected current books and journals dealing with cosmogony, physics, philosophy, semantics, comparative religion, social anthropology, and related subjects, as well as books of historical significance in these fields.

The library serves the staffs and students of the International Medical Center, College of Medicine, and the Post-Graduate School but in no way duplicates the technical library of the Medical Center. Regular seminars in areas of timely interest are held and the library also hopes to establish regular lectureships to bring distinguished speakers to the Center. Helen Bayne, who has been librarian in the Medical School Library since 1929, is the curator of the new library and has also been appointed the archivist and research librarian to the Medical Center.

* * *

Twentieth Anniversary

The Union Library Catalogue of the Philadelphia Metropolitan Area recently completed its first twenty years of service to its community. The event was highlighted at the twenty-first annual meeting held at the Free Library of Philadelphia on January 12. Emerson Greenway, of the Free Library of Philadelphia and a member of the Union Library Catalogue's Board of Directors, delivered the principal address entitled "After Twenty Years". Another SLA member, Dr. Charles W. David, who was one of the original incorporators of the Catalogue, is at present serving as chairman of the Board. The organization acts as a clearing house of information on the books and resources of some two hundred and five public, university, college, government, and special libraries located in the 250 square mile area around Philadelphia. Its staff also administers a basic collection of reference tools and bibliographies, keeps in active contact with special, public, and academic libraries in the vicinity, gives advice on matters of individual or cooperative library interest, prepares limited subject bibliographies in nontechnical fields, locates microfilm material, arranges exchanges of duplicate materials, and performs many other services.

Special Librarianship Panel

The Southern California Chapter devoted its November 29, 1955 meeting to a panel discussion of education for special librarianship. Edwin Castagna, of the Long Beach Public Library, acted as moderator. Dr. Martha T. Boaz, Director, University of Southern California Library School, told how library schools are training librarians for the special library field; Mrs. Johanna Allerding Tallman, Engineering Library at the University of California at Los Angeles, described the education and preparation necessary for the work; Mr. C. T. Petrie, personnel department of Lockheed Missile Systems, stressed the background and qualifications that management considers prime requisites for special librarians; and Mrs. Esther C. Waldron, chief librarian and coordinator of library services at Los Angeles City College, outlined the undergraduate training required for special librarianship. High school and college counselors were invited to attend the meeting in the hope that they would become more aware of the many choices of subjects and interests which special librarianship offers students.

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Professorial Lecturers Named

Acting Dean Rice Estes announced in November 1955 that Rose Boots and Robert L. Kingery have been selected as professorial lecturers at the Library School of Pratt Institute, Brooklyn, New York. Miss Boots is the librarian of McGraw-Hill Publishing Company and a contributor to professional journals. Mr. Kingery, who is on the reference staff of the New York Public Library and is the author of a number of how-to-do-it and guidance books including *Opportunities in Library Careers*, has lectured at New Haven State Teachers College and New York University. He has also served as a consultant in library science to Florida State University.

Library Architecture

The December 1, 1955 issue of *Library Journal* (volume 80, number 21) is devoted to the architectural problems of planning, constructing, and utilizing different types of libraries. Some twenty-three articles, all illustrated with floor plans, drawings, or photographs, cover various architectural features of representative college, university, public, state, national, and special libraries. Two of the three articles dealing with special libraries were prepared by SLA members. Helen M. Holt describes some forty years of growth of the Texas Medical Center Library which resulted, in 1954, in the construction of the Jesse H. Jones Library in Houston, Texas. Dr. Jerrold Orne, Director of the Air University Library, discusses the layout and plans for his new library now under construction at Maxwell Air Force Base, Montgomery, Alabama.

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Career Institute

"Librarianship as a Career" was the subject of a career institute sponsored by the young adult division of the Brooklyn Public Library on December 6, 1955. About one hundred high school students who had expressed interest in becoming librarians attended the all-day program during which all types of libraries and library work were described. SLA President-elect Katharine Kinder spoke to the students on "Special Libraries".

* * *

New Documentation Courses

The School of Library Science at Western Reserve University, Cleveland, Ohio, will introduce two new courses in specializes phases of documentation. These courses, offered for the first time in any library school, will cover: "Machine Literature Searching", to be given during the spring semester starting February 6, 1956, and the summer session beginning June 18, 1956; and "Language Engineering", to be given during the 1956 spring semester.

Microcard Foundation

The Microcard Foundation of Middletown, Connecticut, recently announced a new affiliation with the University of Wisconsin Press. Microcards for many books and periodicals may now be ordered from the Microcard Foundation, Box 2145, Madison 5, Wisconsin.

Among new microcard publications are *The Bookplates of William Fowler Hopson* by SLA author, Francis W. Allen, and *The Nation.* The former, a descriptive checklist, originally consisted of seventy typed pages but when microprinted the entire content was fitted onto two three by five inch cards. Mr. Allen, who is a librarian at Western Michigan College of Education in Kalamazoo, Michigan, believes that microprinting solves the problems of high publishing costs for authors and purchasers of specialized interest books.

* * *

Scholarship Fund-Raising Ideas

In response to a plea from the Scholarship and Student Loan Fund Committee for additional contributions to the Scholarship Fund, a number of Chapters utilized their Christmas meetings for fund-raising. The Greater St. Louis Chapter eliminated its usual gift exchange and asked members instead to donate fifty cents to the Scholarship Fund. In Tennessee, the customary white elephant exchange at the Oak Ridge Chapter's Christmas party became an auction and the proceeds were given to the Scholarship Fund.

* * *

House Magazine Institute Workshop

Five groups of East Coast industrial editors attending the Annual Workshop of the House Magazine Institute, held in New York City on November 18, 1955, heard three members of SLA's New York Chaptèr conduct a round-table discussion on "How to Dig Up the Facts". The group concentrated on aspects of where to go and how to ask

for information, especially in relation to the three types of special libraries which they represented. Nathalie Frank, Geyer Advertising, explained the library of a private company; Elizabeth Ferguson, Institute of Life Insurance, talked about a library representing a business field but geared to public service; and Romana Javitz ,picture collection, New York Public Library, discussed the special services of a public library.

* * *

Retirement

K. GENEVIEVE FORD, librarian of the Titanium Division of the National Lead Company, South Amboy, New Jersey, retired on December 1, 1955, after thirty-six years of service with the firm.

Before heading and developing the technical library of the Titanium Division, Miss Ford wrote for and edited several house organs of the National Lead Company and served as executive secretary for a number of the firm's officers and plant managers. In addition to her many and varied company activities, Miss Ford has been an active member of SLA since 1927. She served as chairman of the Public Relations Committee for 1952-1954, is the immediate past-president of the New Jersey Chapter, and at present is chairman of the Association's Nominating Committee.

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In Memoriam

JOSEPHINE BRYAN, head of the business division and first assistant in the documents department of the Denver Public Library, died during the summer of 1955.

She was a graduate of the University of Denver and there received her B.S. degree in library science. Miss Bryan was a charter member of SLA's Colorado Chapter.

* * *

REINHOLD T. PUSCH, senior librarian of the editorial library of the *American Weekly*, a Hearst Publishing Company publication, died in New York City on December 15, 1955.

Letters to the Editor

I am writing to you in regard to the account of the joint meeting of the California and San Francisco Bay Region Chapters which appeared in SPECIAL LIBRARIES, Nov. 1955, page 407.

We were delighted to have the story appear, but we were sorry to see that the names of the two speakers from our Chapter were omitted. They were Mr. George R. Luckett, associate professor and head librarian of the U. S. Naval Postgraduate School, Monterey, and Mr. Roy J. Nielsen, head of the Library Branch of the U. S. Naval Radiological Defense Laboratory, San Francisco.

BEVERLY HICKOK, *Librarian*
Institute of Transportation and Traffic
Engineering Library
Richmond, California

* * *

We would like to solicit from your readers information about publications on punched cards and ingenious or unusual applications of punched cards to technical and scientific problems.

J. W. Perry and I are working on a second edition of *Punched Cards: Their Applications to Science and Industry*, published by Reinhold Publishing Corporation in 1951. We want to bring the punched card bibliography up to date and include references and notes about interesting applications.

Many thanks to you and to your readers who will be able to cooperate.

ROBERT S. CASEY
W. A. Sheaffer Pen Company
Fort Madison, Iowa

THE *INDEX* TO THE 1955 ISSUES OF *SPECIAL LIBRARIES*, VOLUME 46, WILL BE PUBLISHED IN FEBRUARY 1956.

OFF THE PRESS . . .

NEW SERIALS

Nuclear Science and Engineering

The American Nuclear Society has announced that the first issue of its official organ, *Nuclear Science and Engineering*, will be available in February 1956. This journal will be devoted to theoretical and experimental papers on such subjects as nuclear reactor design, construction, and operation; interaction of nuclear radiations and matter; basic phenomena in performance of nuclear fuels; production, uses, and disposal of radioactive materials; nuclear instruments research and development; and similar topics.

Dr. J. G. Beckerley of the Well Surveying Corporation, Houston, Texas, is serving as editor and Dr. Francis T. Miles of the Brookhaven National Laboratory, Long Island, New York, as associate editor. They will be assisted by a publications committee and an editorial advisory board of scientists. Subscriptions, $10.00 per year, should be sent to Academic Press, Inc., 125 East 23 St., New York 10, N. Y.

Contemporary Psychology: A Journal of Reviews

In January 1956 the American Psychological Association begins the publication of a new monthly journal, *Contemporary Psychology: A Journal of Reviews*. The purpose of the journal is to provide critical reviews of books in the broad field of psychology and related sciences and to consolidate in one publication the specialized reviews which formerly appeared in other APA journals: *Psychological Bulletin, Journal of Abnormal and Social Psychology*, and *Journal of Consulting Psychology*.

Edwin G. Boring of Harvard University is the editor and Adolph Manoil of Park College, Parkville, Missouri, the film editor. A group of twenty-six specialists in the various areas of psychology are serving as consultants. United States subscriptions are $8.00 a year; foreign, $8.50; single copies, $1.00 each. Subscriptions should be sent to American Psychological Association, 1333 Sixteenth St., N.W., Washington 6, D.C.

The Chronicle of United Nations Activities

When the Tenth General Assembly of the United Nations convened at UN Headquarters in New York in September 1955, a weekly report entitled *The Chronicle of United Nations Activities* began publication. An independent publication with no official connection with the United Nations, it is a news service devoted exclusively to the activities of the General Assembly, Security Council, working committees, and specialized agencies of the United Nations. The report is published every Friday and includes a monthly index as well as two index cumulations during the year. Subscription rates vary and are furnished upon request. Jerome S. Rosenbaum and Jordan L. Linfield are the editors. Further information may be obtained from *The Chronicle* offices at 253 West 58 Street, New York 19, N. Y.

Canadian Aeronautical Journal

The Canadian Aeronautical Institute has replaced its *C.A.I. Log* with the *Canadian Aeronautical Journal*. The first issue of the new magazine appeared in April 1955 and contained, as do later issues, three or four technical articles and news of the activities of the Institute and its branches. Published ten times a year, the journal has an annual subscription rate of $4.00. Orders may be sent to the Canadian Aeronautical Institute, 304 Laurier Avenue North, Ottawa, Ontario.

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SLA PUBLICATION NEWS

The *Sci-Tech News* of September 1955 carried a notice about the *SLA Monograph No. 1* but erroneously stated that the price was $1.00. The correct price of the Monograph is $3.00.

* * *

Copies of Jean P. Wesner's paper, "Training of Nonprofessional Staff", which appeared in the December 1955 issue of SPECIAL LIBRARIES may be obtained, as long as the supply lasts, from SLA Headquarters at 31 East 10 Street, New York 3, New York. The article is free of charge and contains three sample tests and a complete bibliography.

CLASSIFIED ADVERTISING

Positions open and wanted — 50 cents per line; minimum charge $1.50. Copy must be received by 10th of month preceding month of publication. Address Executive Secretary, Special Libraries Association, 31 E. 10 St., New York 3, N. Y.

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CLEVELAND PUBLIC LIBRARY: Business librarian for position of head of Business Information Bureau. Requirements include a degree in library science, good experience, administrative ability, broad knowledge of business literature and its allied fields, interest in making outside contacts and proficiency in public speaking. Maximum salary on appointment $5160. Annual increments of $120 up to $5640. Write Personnel Supervisor, Cleveland Public Library, Cleveland 14, Ohio.

DENVER PUBLIC LIBRARY has positions open in the following classifications for its new library building. Applications are being considered now for appointment in March 1956.

Librarian I: General assignments in public subject departments, branch libraries, technical processes. No supervisory responsibility. Fifth year library school degree, no experience required. Salary $3516.

Librarian II: Specialized assignments in public subject departments; college majors in business, economics, films, maps, political science, sociology particularly needed. No supervisory responsibility. Fifth year library school degree, at least three years' professional experience required. Salary $3672. Advancement to Librarian III with supervisory responsibility, at $4200, possible for outstanding performance.

Librarian III: Documents Librarian to head Documents Division in Sociology and Business Department, doing reference work and supervisory processing of documents. Fifth year library school degree and considerable experience with government and state documents required. Salary $4200.

All positions offer 5 day week, 17 working days' vacation per year, sick leave, social secuity. Apply Miss Margaret Ward, Library Personnel Officer, Denver Public Library, Denver 2, Colorado.

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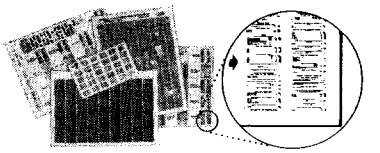
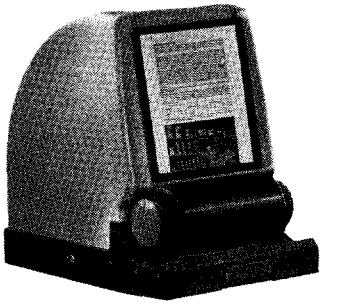


microprint, *n.* A graphic image on an opaque base, printed in reduced size by photography or a photomechanical process and usually viewed with a suitable enlarging device.*



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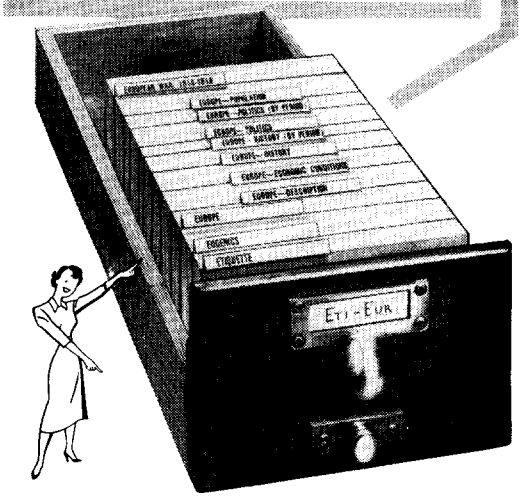

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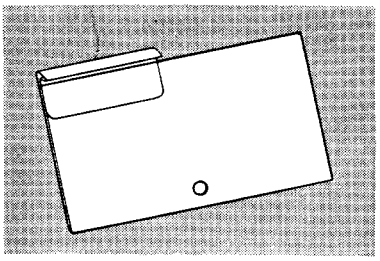
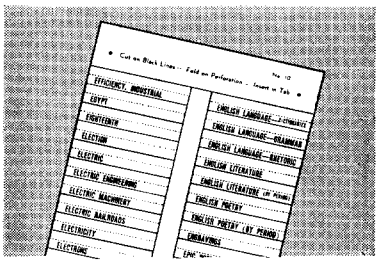


TILTED TAB GUIDES have transparent cellulose acetate tabs tilted at a 45% angle for easy reading. Even when cards are slanted forward there is sufficient clearance under the tabs so catalog cards will not cling to the guides.



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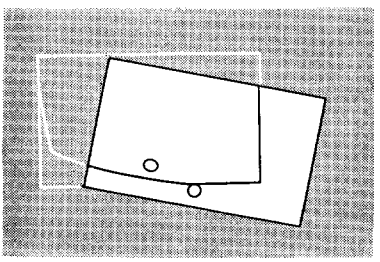

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