
Special Libraries

EUGENE B. JACKSON

A SPECIAL LIBRARY is engaged in activities serving the technical information needs of a special clientele which departs from standard library procedures and uses nonconventional sources and methods as necessary to fill those needs. Like documentation, it is an active not a passive service. In 1961 it differs from documentation by requiring a lesser level of subject matter competence and by a tendency to use existing literature and sources. The trends detailed in the article will show that by 1980 it will be impossible to distinguish between a special library and a documentation service.

Eight years have passed since special libraries were scrutinized in depth in this journal's October 1952 issue under the editorship of H. H. Henkle.¹ It is well worth rereading today. In fact, that issue forms a second prerequisite with the Hauser-Taitel article on the implications of the 1960 Census for evaluating the present projection of the special library to 1980.² The concurrent stories on the large public library, the university library, documentation and serials form the most obvious overlaps, but the very real difficulty of precisely defining "special clientele" and "special library" could mean the presence of implications and portents in the others that await the reader's discovery.

Among the postwar national developments affecting special libraries are the expanding national economy illustrated by the increase in the gross national product, the increase in per cent of gross national product devoted to research and development, the increase in the number of scientists and other professionals, the swelling of graduate school enrollments, the splintering of research fields, the splintering of the literature reporting the advances in those fields, the emergence of the research report and government-backed information dissemination

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TABLE I
Research and Development
Per Cent of Sales Made Up of New Products
 (Products not made four years earlier)

<i>Industry</i>	<i>1960 Actual</i>	<i>1964 Expected</i>
Transportation Equipment (Aircraft, Ships, Railroad)	35%	29%
Machinery	14	23
Chemicals	16	20
Electrical Machinery	12	16
Fabricated Metals (Including Instruments)	17	13
Stone, Clay and Glass	9	13
Food and Beverages	6	12
Paper and Pulp	9	12
Autos, Trucks and Parts	10	11
Nonferrous Metals	8	11
Miscellaneous Manufacturing	6	11
Textiles	9	10
Iron and Steel	5	7
Rubber	2	7
Petroleum and Coal Products	2	5
All Manufacturing	10%	14%

SOURCE: McGraw-Hill Department of Economics.

TABLE II
Research and Development Spending: 1961

	<i>Military Products</i>	<i>Commercial Products</i>
Paper and Allied Products	0%	100%
Food and Kindred Products	0	100
Textile and Apparel	1	99
Chemicals	3	97
Stone, Clay and Glass	3	97
Petroleum Products	4	96
Machinery	6	94
Rubber Products	9	91
Primary Metals	11	89
Other Manufacturing	17	83
Electrical Equipment	30	70
Instruments (Professional and Scientific)	32	68
Aircraft and Parts	91	9
All Manufacturing	43%	57%

SOURCE: McGraw-Hill Department of Economics.

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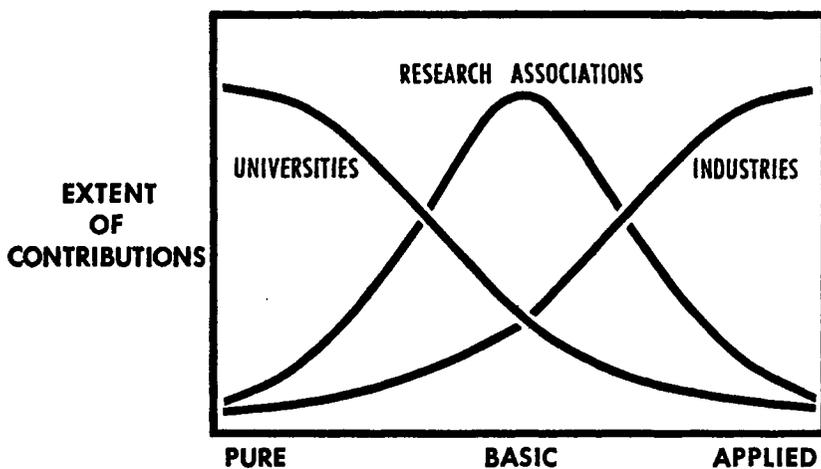
services to facilitate their use, the diversification of industry, the emergence of nonprofit research institutes and university-oriented industrial parks, the introduction of computers and machine methods to information problems, the renewed emphasis upon definitive subject analysis, the massive increases in copying methods and quantities, and the tendency of population and economy to group in metropolitan areas.

Based upon output per man hour, employment, and weekly hours worked, the total growth has increased at the average rate of 3.6 per cent a year (or from some 300 billions of 1959 dollars in the immediate postwar period to some 475 billions of 1959 dollars in 1959). Of great significance is the rise in research and development spending from one per cent of the gross national product in 1947 (\$2 billion) to 2.5 per cent currently (around \$12 billion).⁸

The government is providing about half the funds for research and development and expending about 15 per cent of the total. Industry is spending about three-fourths of the total and providing three-eighths of the funds. Some of the results of these expenditures are shown in Table I. The split between commercial and military products of research and development spending follows in Table II.

FIGURE I

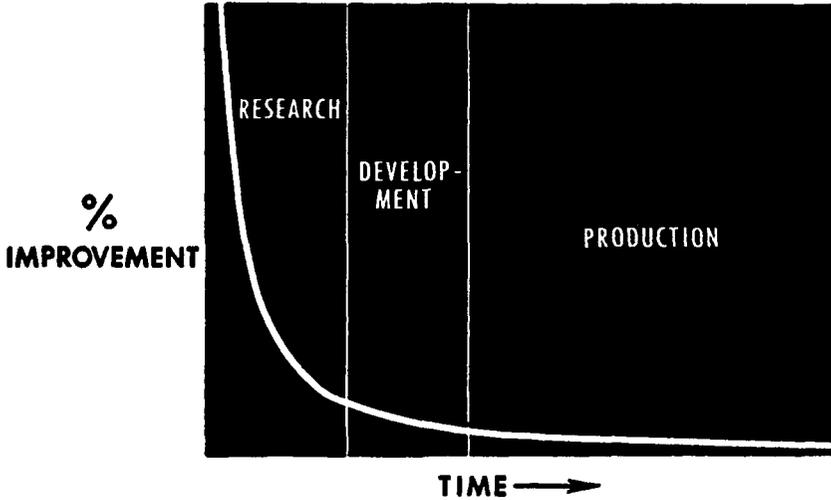
EXTENT AND TYPES OF SCIENTIFIC CONTRIBUTIONS



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FIGURE II

RESEARCH CONTRIBUTION



On a per technical man basis, the expenditure is in the neighborhood of \$30,000–\$40,000 per year. The range of size of agencies doing the research and development will vary from as few as 5 or 6 professionals to several hundreds in the larger organizations. The quickening tempo at which this work is being carried out is illustrated by the contrast between the 112 years necessary for photography to graduate from scientific discovery to a commercial product and the five years necessary for the transistor to make the same journey. Pure, basic, and applied contributions are coming in varying proportions from essentially all types of research activities (see Figure I).

In New York State alone, research and development is a billion dollar “business” (having doubled since 1954), including over 1,000 commercial and private research and testing laboratories that require the services of 30,000 professional scientists and engineers, 19,000 technicians, and 22,000 supporting personnel.⁴ The efforts of these individuals could be diagrammed for research as shown in Figure II and for development as shown in Figure III.

Another illustration of the explosive growth of research and development is that the mailing lists for research reports of the U.S. National Aeronautics and Space Agency increased 35 per cent be-

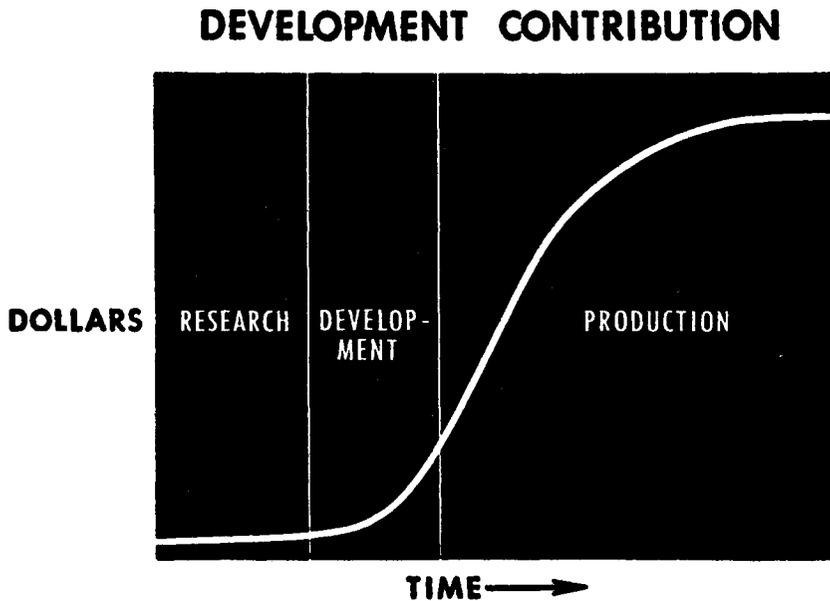
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tween the autumn of 1959 and that of 1960. On September 1, 1960, it had 3,174 addresses, of which 30 per cent were such important contributors as to merit the receipt of material with a military security classification of "confidential."

The U.S. Bureau of Labor Statistics reported that the civilian labor force grew by 2.6 million from October 1957 to an October 1960 total of 71.1 million. The increase for business and professional persons was from 6.6 million to 7.7 million. The U.S. National Science Foundation has identified 69,919 of the 1958 figure as scientists and engineers engaged in research and development in colleges and universities. In that same year 4,840 doctor's degrees, 16,500 master's and 77,800 bachelor's were granted in science and engineering.

Just how many special libraries there are supporting the national research and development effort and other parts of the national economy is a very good question. The first serious attempt, and one using a very broad definition of a special library, is currently underway by A. Kruzas. A part of the study is the listing of names and titles of professional persons involved in those activities, a fair indication of the number of persons presently engaged in special librar-

FIGURE III



ianship. The best current estimate of 10,000 persons so engaged is lent credence by a tabulation of some 9,300 persons enrolled in library associations exclusive of elements of the A.L.A. and state associations.

The prevailing interdisciplinary team approach to the solution of research problems permitted a congressional committee to chart the interrelationships of forty-five areas of physical sciences and forty-one of life sciences.

At the same time that synthesizing has been going on, specialization of the "flea on eyelid of the elephant" type has continued apace. Both of these tendencies have been the excuse for new journals and uncounted monographs as well. Meetings ranging from casual huddles to international symposia have been recorded, and in some cases re-recorded. The research report mentioned earlier has been a favorite vehicle for this. Advances in reproduction equipment and processes have so freed these reports from the limitations of conventional publication that an essentially anarchistic state of formats exists.

A simple listing of the agencies set-up to cope with the dissemination and utilization of these materials would fill pages. (In the course of preparation of such a list for the N.A.T.O. Science Advisor this spring, over 75 defense-funded documentation agencies were uncovered.)

An announcement in the daily press by an American airplane autopilot manufacturer that he will enter the prefabricated housing field in Europe shows the tendency for industrial firms in the 1960's to diversify, to set sales records including narrowed profit margins, to obtain raw materials on a global basis, and to market throughout the free world. At the same time on another subject front, governmental relationships and international alliances are of a scope and complexity as to be almost beyond comprehension, where the urgent need for masses of accurate information located speedily has led to the development of an information retrieval system that can store 99 million micro-reduced documents in its memory and find any one in moments.⁵

It is even possible to be on friendly terms with computers today. In fact, publicity on a set of mathematical tables issued recently by a university press included the note that the author considered the university's computer to be his full co-author of the tables.

The trends looking toward 1980 that will affect special libraries include the following: a doubling of the gross national product; a

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geometric increase in research and development; an increase in the proportion of special librarians to research workers; the entrance of more technical persons into special librarianship; a broader and deeper spectrum of education for the field; an increasing tendency of the population, governmental units, and industry toward accumulation into metropolitan aggregates; major increases in college and university enrollments; the inauguration of university library service to nearby "research parks"; the differentiation of public library service to individuals from that rendered to organizations; continued growth of government-related informational agencies with pioneering responsibilities. Then will follow a picture of the major functions—acquisition, processing, dissemination, and utilization—of the special library as they will exist in 1980.

Hauser and Taitel state that the gross national product will be doubled by 1980, a projection which implies that the people will be able to afford the kind of library service they need. This projection would mean that the 1980 gross national product would approximate 1,000 billions of 1959 dollars, as compared with 1970 projections of other authorities varying from \$724 billion to \$837 billion. Hauser and Taitel see a 37 per cent increase of the population in these 20 years to 246 million persons. N.I.C.B. points out that these millions will include a significant increase in the number of young men—and more jobs will require higher skills. They project the capital required by 1970 to be between 892 and 1,023 billions of 1959 dollars, averaging out between \$11,600 and \$13,300 per worker. It is predicted by Resources for the Future, Inc., that all energy needed for the 1975 gross national product of \$857 billion can be produced domestically and at essentially today's costs (in constant dollars).⁶ This estimate excludes any production by atomic-energy means.

It is seen that by 1969 four per cent of the gross national product will be devoted to research and development, or about \$28 billion (N.I.C.B.), of which the U.S. National Science Foundation recently said that \$8.2 billion would be needed for the development of scientific brain power. At the same rates of increase to 1980, the respective totals would be \$40 billion for research and development and \$12 billion for scientific education (equal to the total for all research and development in 1959).

There is ample evidence in such works as Bogue⁷ and the New York Metropolitan Region Study⁸ to support the Hauser-Taitel predictions on the tendency toward "Metropolitanization" by 1980 of

the population, governmental units, and industry. Looking still further ahead, J. P. Pickard has predicted that by the year 2000, 85 per cent of the country's 320 million people will live in urban areas. This is the most important phenomenon for special libraries, both because of their identification with companies (as pointed out by Henkle in the issue mentioned earlier), and because of the high correlation between metropolitan areas and Special Libraries Association membership addresses. Further, that the New York Metropolitan Region ("one-tenth of a nation") is uniquely important to S.L.A. is shown by the fact that it has consistently been the residence of 25-29 per cent of the membership in the last decade, and no major change in this proportion is to be seen.

In her presentations, Miss Winifred Sewell, S.L.A. President 1960-61, used the figure of 30,000 special librarians being needed for 1970. This seems a most reasonable prediction in view of the increase in the proportion of special librarians to research workers that will be dictated by the greatly increased volume of technical literature, the progressive need for more detailed information, and the compressed time cycles faced by research programs.

The greater compilations of information work will increase its stature and will bring more subject matter people into the field. The new study by Cohan and Craven⁹ advances the proposition that there will be a profession of science information specialists. An advisory panel to the study lists twelve duties of the specialists as administering; locating materials; selecting materials; acquiring materials; descriptive cataloging; subject analyzing, which includes classifying/subject headings and indexing; abstracting and/or annotating; performing reference work; literature searching/bibliography; transmitting and copying; translating; and converting into machinable form. Other newer elements include developing of information systems, investigating of machine applications, information interpreting, researching with information, and information scouting.

This study recommends a liberal education with a major in science and a development of language competence. It outlines a new curriculum for a graduate school of science information specialists, special librarians, linguists, and the administrators who evolve from one of the three preceding. The curriculum which it recommends looks very similar to the heart of today's library school curriculum with a strong emphasis upon subject bibliography, inadequate attention to abstracting and cataloging, rather less emphasis upon administration, plus

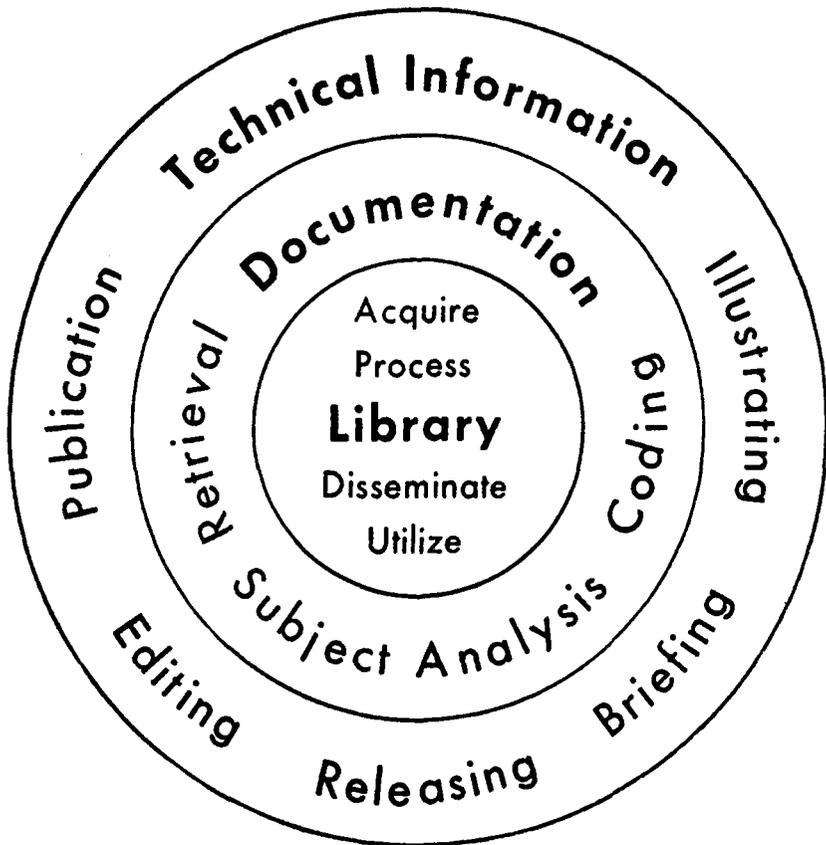
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more work in machine methods than the usual library school offers. An additional element is reports preparation and publication.

Cohan and Craven see the possibility of two doctoral programs, one in "systems development," which could be rephrased as the application of operations research principles to information problems, and one in "literature science," which appears similar to present library school programs with emphasis upon reference.

It should be pointed out that many of the assertions of this study would fit into the framework of a complete technical information service. Such an activity would utilize records of *past* findings to indi-

FIGURE IV
A TECHNICAL INFORMATION SERVICE



cate *present* situation and likely routes toward *future* goals. The elements of such a service could be diagrammed as in Figure IV.

It seems clear that there will be a spectrum of individuals attracted to the special library field with all gradations between

pure librarian→*pure documentalist*→*pure subject specialist*

and that in addition to formal programs such as described in the Cohan-Craven study, there will need to be short courses on campus and intensive courses off campus for indoctrination in depth and on site.

This plan would necessitate task forces of instructors and here the educational experience of computer manufacturers could well be drawn upon. Their programs cover all levels of sophistication from the one-day session through two-week residences at their home office for customers through managing of international symposia. The task force mentioned above could follow a circuit among the research activities carrying the "gospel" of efficient literature service and assisting in its realization. One educational function of the task force would be to assist community colleges in preparing technicians for entry into the subprofessional level of special librarianship. They would also be able to earmark individuals with such capability that should be encouraged to undertake formal residence study in special librarianship, perhaps on leave from the employing organization. The feedback of these task forces to their home university should insure the vitality and pertinence of the residence instruction.

If the 30,000 special librarians of 1970 have swollen to 60,000 by 1980, that total would equal the number of scientists and engineers in research and development in colleges and universities in 1958. It does give one pause. Even if this figure is rejected as unrealistic, it does dramatize the urgent need for a quantum step forward in library education.

D. B. Baker's predictions on the growth of chemical literature¹⁰ point out that it is unrealistic to expect continuous exponential growth indefinitely. He notes that "With existing tools improved and new information services, documentation workers will have relatively little difficulty in handling effectively the increasing scientific information over this decade [1970], provided the support in manpower and finances is adequate."¹⁰ It might be pointed out that the last phrase is particularly unhelpful because the same statement could have been

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made by the supervising architect of the pyramids in a memorandum to the reigning Pharaoh.

Critically important in the next decade is the expansion of effort in the application of computers to information retrieval problems.¹⁰ This increase will result in the need for a greater number of special librarians rather than fewer. Widespread experience with data processing installations is that, as the complexity of the equipment secured increases, more and more highly skilled persons are required to effectively utilize the capacity. In view of the preceding, the assertion is made that there will not be fewer than 40,000 special librarians in 1980 and not more than 60,000.

Special librarianship can expect that the next two decades will see the rise of many distinguished special librarians in the college and university field. Of necessity there will be more departmental libraries and those of higher caliber because of the enrollments mentioned elsewhere and the introduction of research earlier in the academic life and its continuation past the doctoral level.

In 1980 there will be university-managed and industry-sponsored special libraries that are arising and will arise in the vicinity of the principal universities. Their advanced use of new methods of bibliographic control, information retrieval, and data exchange will make their operations indistinguishable from those of special libraries of outstanding profit-making organizations in the same subject fields.

As all research relies increasingly upon the literature, if only because of skyrocketing costs of physical equipment, then the library service available to the research park must be fully equivalent to all other advantages of locating in the university community, or the total purpose for locating in that environment will not be realized.

Significant assessments will be made on the participating organization in research parks not only for the financing of day-to-day operations of facilities, especially set up for their benefit, but also for the total enrichment of the university library resources. Research report collections and materials information centers can no longer be orphans, but must be integrated into the overall university library program. While the accepted participation by university libraries in union list of serials type projects and similar *external* cooperative ventures are commendable, equally urgent is the *internal* union list of all informational materials, research reports or whatever, that are physically located in the university environment. Practices developed by special librarians at the universities must be seriously examined

by the library administration as to their applicability to the total information inventory of the university.

Public library service to individuals will be strongly affected by the metropolitanization factors mentioned repeatedly in this issue. There will be a steadily diminishing influx of readers into subject departments. Yet here is the heart of the vital special librarianship segment of public librarianship. Services to organizations, however, are going to increase exponentially.

A telling survey made in the subject department of the Detroit Public Library between November 22 and December 22, 1960, showed that 1,288 telephone calls were received from organizations and special librarians during which 701 reference questions were asked and the loan of 1,458 items requested. During the same period only 122 requests were made by personal visits of representatives of organizations. During this survey a total of 241 organizations used the library, 22 per cent of which were from outside the city limits. Further, 129 of these organizations were not included on the standing list of 400 entities having company card privileges.¹¹

A proposal is currently being considered by a fund-granting organization for a demonstration project on total information service to an industrialized metropolitan area. It seems so typical of what will be in existence in 1970-80 that it is considered here in some detail. The specific aim of the project would be to create a metropolitan intelligence facility which would (1) provide the ultimate in the location, evaluation, and dissemination of factual materials, (2) foster the maximum utilization of this facility by present and potential users, (3) prove by demonstration the overall value of this facility to the individual, to his organization, and to the community, (4) determine the actual costs of establishing and maintaining such a facility and formulate an equitable financial basis for its continuation by its participating parts, and (5) secure continuing and active support from its participants and beneficiaries.

Within the framework of the metropolitan library there would be a special staff of highly selected, competent reference and literature specialists including a project director, a field specialist, experienced reference librarians, and clerical assistance. They would make total use of existing resources of the public library. That is, they would identify and locate all possible research tools within the library and in the area so that they may be utilized in reference and interloan work; establish lines of communication with major reference facilities

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outside the immediate area as a source of loan and photocopies; develop specialized informational files and union lists to augment or to bridge gaps in existing sources; create a current file of individual specialists, both within the area and out, who because of their knowledge and/or experience are able to provide information which because of currency or rarity is not readily available; issue a periodic list of library and area acquisitions and/or a bulletin which would function to keep all participants informed of current developments; and investigate and develop newer techniques of information retrieval so as to speed reference requests.

This special staff would augment area resources by the identification of specific needs and by the initiation of remedial procurement and would identify specific and general needs of the library and of the area by constant monitoring and analysis of incoming requests and of their disposition; establish a search and selection procedure for acquisitions which will supplement that of the library and which will endeavor to anticipate area requirements; and would create a joint acquisition procedure whereby unnecessary duplication of expensive or little-used materials might be avoided but which would assure full use of these materials to the total area.

Determining by consultation with experts reasonable and realistic costs for all levels and types of service and developing patterns for adequately and equitably assessing these costs, this staff would establish by approved actuarial methods realistic cost data which would permit the project to be self-sustaining.

By continuous interaction with users, the special staff would survey in depth their real and potential needs and motivate partial- or non-users to full participation. An experienced Field Specialist would determine by survey techniques the necessary and potential service required by individual participants and would establish other useful lines of contact. The value and use of the project to create larger area participation would be demonstrated to the partial- or non-using organizations.

In support of the project would be a public library with one million volumes in ten subject departments, another one million volumes in two university libraries, untold open literature in 55 special libraries, and a grand total of 181 professional librarians. Such a project would do a total information job for small organizations and cooperate with and support special libraries of the largest organizations by the effective marshalling of the total metropolitan-area information

sources. In view of this study and related competence, it is clear that by 1980 services to organizations which are "nucleated" about central research project offices of metropolitan area public libraries, while tax supported, will be supplemented by reimbursement for services rendered.

Pioneering in machine systems and formats beyond the financial resources of others will be the prime contribution of government-related information agencies to special librarianship to 1980.

The acquisition function in 1980 will feature cooperative procurement of materials on an industry-wide basis and metropolitan-area basis, and will include purchase of machine tapes, raw data tables, card decks, and massive numbers of photocopies.

Cooperative efforts on the metropolitan-area, industry-wide, and subject-wide basis of conventional materials will characterize the processing function in 1980 with considerable increase in at-source processing including even some proprietary materials on a reimbursable basis.

Utilization of "prepackaged" mats and tapes with readily-inserted local modifications will characterize the dissemination function in 1980. Additional steps will be taken assisting the dissemination medium in approaching that ideal in effectiveness—"man-to-man."¹²

The utilization function of 1980 will include remote consultation of central metropolitan-area or industry-wide information sources. There will be utilization of more transitory and marginal information and exploitation of unique local resources.

By 1980, special librarianship will be in its 71st year as a profession (or 82nd if based upon the founding of the Medical Library Association). It will have absorbed many elements from documentation. A merger will have taken place, but the surviving member will not need a broader charter than the S.L.A. objective of "Putting Knowledge to Work." It can look back proudly on a past filled with accomplishment, innovations, and leadership and forward to a full partnership on the team conquering ignorance, and misunderstanding.

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