Service To Industry By Public Libraries

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THERE IS NO QUESTION that public library service to industrial users falls short of the desired goals of supplementing the resources maintained by industry itself. The depth and breadth of informational media required to support production, research, and development activities are generally lacking in public libraries.

Around the turn of the century, American public libraries began providing service to industry by establishing separate rooms and departments for special materials. This type of service was initiated in Pittsburgh in 1895, with Providence following suit in 1900; Cincinnati, in 1902; and Newark, in 1908. These four cities were not at that time the largest manufacturing centers in the country; in 1905, as in 1900, this distinction was reserved for New York, Chicago, and Philadelphia in that order. Three of these cities, however, ranked among the first ten. Cincinnati was seventh; Pittsburgh, eighth (although it was fifth in 1900); Newark, tenth; and Providence, seventeenth.[1] It is beyond the scope of this paper to examine the reasons why the very largest manufacturing centers were not the first to establish public library service to industry. It is probable that the presence of private libraries with important science-technology materials helped to satisfy the need for them which must surely have existed in these cities. What is significant, however, is that organized American public library service to industry was established in four of the nation's largest manufacturing centers by the end of the first decade of the twentieth century.

When it first opened in 1895, the Carnegie Library of Pittsburgh maintained a separate reading room with scientific and technical magazines and books.[2] In his first annual report, E. H. Anderson, the librarian, wrote that the goal of the room should be to provide ". . . a

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technical and scientific collection commensurate with the needs of the greatest manufacturing center in the United States."[3] The initial emphasis in this science-technology room, therefore, was on material of importance to Pittsburgh manufacturers. Many gifts were received from local manufacturers and technical men, including entire technical libraries and complete sets of journals, as well as substantial amounts of money. Andrew Carnegie donated $10,000 initially, for the purchase of technical books,[4] and later added further donations. The Library, with the advice of local technical experts, began collecting reference materials in the field, including government publications and foreign patents.[5] By 1900, the activity of the room had increased to such an extent that a Division of Technology was created and a technically trained person, Harrison W. Craver,[6] was placed in charge. In 1902, the Division became a separate department and Craver was listed as Technology Librarian.[7] Thus the Carnegie Library of Pittsburgh became the first American public library to provide a science and technology service established chiefly to serve industry.

In 1900, an Industrial Department was established in the Providence Public Library. A combined reference-circulation department, it was the first department of its kind to circulate materials.[8] At about the same time, in 1902, the Public Library of Cincinnati opened its Useful Arts Room.[9] In those days, the Useful Arts Room prepared bibliographies on technical subjects.[10] Following the lead of Pittsburgh, Providence, and Cincinnati, other public libraries also established separate science-technology rooms or departments which more or less emphasized service to industry. Newark inaugurated service in 1908; [11] Minneapolis, 1911; St. Louis, 1912; Cleveland, 1913; Los Angeles, 1914; Baltimore, 1916; [12] Detroit, 1917; and San Diego, 1919. This trend toward separate science-technology departments has continued to the present.

Because of the demand for technical information during World War II and the post-war period, the medium-sized libraries established special science-technology service areas during the 1940's. This development in the scientific-technical aspect of librarianship, as well as the growth of scientific-technical libraries of all types, particularly in England, is described by Kathleen Eggleston.[13]

Types of Public Library Service Available to Industry

To evaluate current public library service to industry, we con-

ducted a survey of sixty science-technology departments.[14] No attempt was made to be all-inclusive for certainly there are similar departments in other libraries, but a large percentage of the whole was surveyed. In 1964, sixty-seven American public libraries provided special industry-business services; [15] others may have since been established. Only three of the sixty libraries surveyed were in centers of less than 100,000 population. Forty-seven replies were received from various parts of the country. Four respondents stated that their libraries did not provide service to industry and were not qualified to answer the questions. One reply was incomplete and another was received too late to be included. Nearly all of the departments in the larger public libraries responded with complete and detailed information, while the smaller and medium-sized departments supplied fewer details.

All libraries reported that industry used their services; many types of industries are served in both research and manufacturing categories. Sixteen libraries, however, noted that their collections and services were designed for students and the general reader rather than for industry. Twenty reported that their resources and services were for industry primarily. Five indicated they were concerned equally with both groups. In Cleveland and Detroit, the collection and service are aimed at the scientist and technologist, but students above the elementary school level are also served. In New York and Pittsburgh, where the collections are of an archival nature, the material is most useful for research workers, but large groups of students and the general public also use it.

Differing degrees and kinds of service were reported by the libraries surveyed. Thirty-nine indicated they provide traditional reference and bibliographic service; two did not answer this question. The telephone predictably plays an important role in the overall reference work of most departments. Estimates given for the per cent of reference work handled by telephone ranged from 10 to 80 per cent; for sixteen libraries, the largest block, it was 50 per cent. Some of the larger institutions have separate telephone information desks to relieve the reference load upon the entire library. A few, such as Detroit and Cleveland, have special desks in their science-technology departments to answer only quick reference calls. Most libraries place time limits on telephone reference service; ten libraries have no restrictions, and twelve restrict telephone use to periods of three to five minutes. As a rule, only quick reference or factual ques-

tions are answered; when involved answers are required, the patron is asked to visit the library for the information.

Reference service beyond traditional answers to specific factual questions was reported by many of the libraries surveyed. Twenty-eight prepare brief lists of references on demand; twelve do not. Literature searching is performed by twenty-one libraries, but not by nineteen. Three libraries reported literature searching for a fee, but did not explain the service. Thirty-seven do not perform this service. Six of the libraries reporting literature searching indicated that this is of a limited nature only. A measure of personalized reference service, of the kind usually associated with special libraries, is thus provided in science-technology departments by public libraries. Some libraries which do not provide such services or do so only on a limited scale nevertheless help users to obtain them locally. The Los Angeles Public Library maintains a file of retired staff members available to do literature searching. Cleveland, Denver, Detroit, Pittsburgh, and New York permit staff members to do such work on their own time. New York permits staff members to do translating on personal time. The New York State Library's Science and Technology Department hopes to do translating when the staff is adequate. Pittsburgh, Cleveland, and Detroit maintain lists of available translators.

No formal consulting services exist. Eleven departments sometimes provide staff to advise companies on various problems associated with the technical literature. In some cases, staff members visit plants or laboratories and talk with personnel about their library problems or assist in the establishment of a technical library. In Pittsburgh and Detroit, staff members have assisted established company libraries with some of their problems, such as cataloging and classifying procedures, weeding, the preparing of abstract bulletins, and the surveying of company library needs. It seems evident that if circumstances permitted, many companies could benefit from consultation with public libraries about their technical information problems.

Reference materials of value to industry must be quickly available. To accomplish this end, many libraries have reversed the time-honored policy which prohibits the lending of periodicals and other reference materials. Twenty-two libraries lend current issues of periodicals; nineteen do not. Twenty-six lend bound volumes of periodicals; fifteen do not. Twenty-eight lend reference books; thirteen do not. Other materials available on loan from various departments include government documents, microforms, technical reports, specifications and

standards, and patents. At least two libraries issue special cards to local companies, permitting them to borrow otherwise non-circulating materials such as bound periodicals, reference books, and documents for limited periods. In 1963, Katharine Harris reported that the Detroit Public Library had issued about four hundred cards of this type with the Technology and Science Department loaning approximately 8,500 items.[16] Cincinnati reported nearly three hundred company cards; its Science and Industry Department lends approximately 2,000 reference items a year.

The practice of lending bound periodical volumes is perhaps debatable. The chief objection arises when materials out on loan are urgently needed by patrons who visit the library or call for photocopies. In Pittsburgh, for example, the special librarians in the area asked the Department not to lend its journals and reference books for this reason. In Cincinnati, this problem has not often come up. Cincinnati, and apparently Detroit, and other libraries, feel that most reference materials, except for ready reference and unusually expensive items, should be loaned. But where does one draw the line?

Copying devices are no solution to providing book-length materials; the cost would be prohibitive. To lend a needed reference item seems wiser than to forbid its loan in the expectation of a need which may never materialize. Local conditions differ, however. What works in Cincinnati may not work in Pittsburgh. It is probable that technological advances in the long distance transmission of copies will, in the not too distant future, render obsolete the practice of lending periodicals, and later even reference books.

Rapid copying devices provide a more conventional and almost universally adopted method of providing industry with reference materials. Forty-one libraries provide some type of copying device. Eighteen of the libraries keep no record of the total number of prints provided during a given period of time. Table 1 indicates the total number of prints produced by departments reporting more than one thousand per year. It is our belief that the number of photocopies produced is one of the best available indexes to the industrial use of public libraries. It should be noted that, since Cincinnati and Detroit lend reference materials heavily, the number of prints produced by their science and technology departments is not an accurate indication of the volume of reference materials provided to local industry.

Various means are used to obtain materials outside a given library system. Twenty-eight departments replied that they provide rapid

interlibrary loan service; twelve felt their service is not rapid. Three libraries obtained translations from the Special Libraries Association translation pool at the John Crerar Library in Chicago. In addition, Teletype is beginning to be used to pool the resources of distant li-

TABLE 1

Number of Photocopy Prints Per Year in Specified Public Libraries

Library	*Prints Per Year*
New York Public Library	300,000
Carnegie Library of Pittsburgh	100,000
Milwaukee Public Library	29,000
Cincinnati Public Library	25,000
Detroit Public Library	20,000
Cleveland Public Library	16,000
Queens Borough Public Library	10,000
Philadelphia Free Library	5,000
Elizabeth Public Library	5,000
Houston Public Library	3,800
Los Angeles Public Library	2,500
Newark Public Library	1,200

braries. Thirty-one of the libraries do not use it; but seven do for interlibrary loan, and one library uses it for bibliographic work. The four Pennsylvania State Regional Resource Centers use it for reference as well as interlibrary loan purposes, and another library uses it for bibliographic, reference, and interlibrary loan work. Industrial libraries throughout the country order photocopies from Pittsburgh by Teletype.

Science-Technology Collections in Public Libraries

Until long distance transmission of library materials quickly and cheaply places the information resources of the whole country at the disposal of any library which chooses to use them, the building and maintenance of rich, regional science-technology collections will be a paramount concern of public libraries which desire to serve industry. Unfortunately, the collections of few libraries surveyed meet the standards deemed necessary for good service to industry. The questionnaire asked if the department provides access to a large collection of books and journals, without trying to define the word

"large." Thirty-nine respondents thought their collections were large; two did not. The number of volumes reported, as tabulated in Table 2, however, tell a different story. These figures do not include bound periodicals in a few cases where the library's periodicals in all subject areas were shelved as a unit. A collection of books and periodicals in the neighborhood of 50,000 volumes spread over the entire range of the five and six hundreds is not a strong collection and could have little of value to offer industry. Yet the collections of more than half of the forty libraries tabulated in Table 2 are in this range.

TABLE 2

Size of Collections Held by Science-Technology Departments of Public Libraries Surveyed

Number of Volumes	*Number of Departments*
Up to 25,000	4
25,001 - 50,000	18
50,001 - 100,000	6
100,001 - 150,000	2
150,001 - 200,000	6
200,001 - 300,000	2
300,001 - 500,000	2

At the other end of the scale, only six libraries have collections of 200,000 or more volumes. The Science and Technology Division of the New York Public Library reported 450,000 reference volumes in 1960, excluding patents, which are in a separate division, and certain subjects in the biological sciences which are outside the scope of the Department's collections.[17] Pittsburgh had approximately 460,000 bound volumes, including 60,000 circulating books,[18] patents, most of the pure sciences, and some of the biological sciences. This does not include technical reports, and agriculture and home economics are not purchased by the department. Comparable collections appear in Cincinnati with 250,000 volumes, Cleveland with 250,000, and Detroit and Milwaukee each with 200,000 volumes. To gain a perspective of the potential size of science-technology collections, the figures for the size of public library collections may be compared with the figures for the Library of Congress. The 1961 annual report of the Librarian of Congress estimates the size of the Library's science-technology collection at approximately one and one-half million items

to ". . . make the Library probably the greatest center of scientific and technical information that the world has ever known."[19]

Most science-technology departments have circulating books. New York's entire collection, however, is for reference only. Some departments have only a few reference books and journals, and many circulating books. Table 3 indicates the holdings of circulating books as reported by the public libraries surveyed. While many of these circulating books are valuable for the student and general reader, they do not provide appreciable assistance to industry.

TABLE 3

Size of Circulating Book Collections Held by Science-Technology Departments of Public Libraries Surveyed

Number of Circulating Volumes	*Number of Departments*
0 - 10,000	3
10,001 - 30,000	14
30,001 - 60,000	10
60,001 - 90,000	2
90,001 and over	2

The most important single resource of any science and technology department, which determines its ability to provide adequate service to industry, is its serial collection. We cannot emphasize too strongly the value of periodicals and serials, for as several writers pointed out in 1964: "The periodical files available in a science library may well be the most accurate indication of the worth of the whole collection."[20] For serial publications in general, the Library of Congress states that "It is in serial publications that advance information and discussion are found; in them are found also the detailed records which support most scientific, legal, and historical study."[21] It is in the serial collections that large deficiencies are revealed in the material resources of most public library science departments. The major factors in evaluating the adequacy of serial collections are (a) the total number of bound volumes in the collection, (b) the per cent of this number which is serial volumes, (c) the number of serials currently received, and (d) the number of abstracts, indexes, and other bibliographic tools available for searching.

Unfortunately the questionnaire asked for periodicals only, but some of the libraries reported total serial holdings. Often these terms are used interchangeably. Actually it is not only periodicals which

are of great research value, but all serials. Some of the figures reported in Table 5, therefore, are for combined serial and periodical holdings, while others are for periodicals only. This discrepancy must be kept in mind when interpreting these figures. Time did not allow for clarification through additional correspondence.

Several of the larger collections reported 60,000 or more bound serial volumes. The largest collections were 392,000 volumes in New York, and 322,000 volumes in Pittsburgh. It would seem that a collection in the neighborhood of 50,000 or more bound serial volumes could provide a significant measure of research support for industry. J. C. Shipman, however, states that a research library can be defined as one in which 65 per cent or more of the collection of bound volumes consists of serials.[22] This is a useful figure, for it indicates emphatically the proper weight which ought to be given to serial publications in a research library. We believe that this figure can be meaningfully applied only to science-technology collections in the neighborhood of 100,000 volumes or more.

The percentage of total volumes which are bound periodical volumes ranges from 87 per cent for New York's Science and Technology Division and 70 per cent for the Science and Technology Department at Pittsburgh down to less than 10 per cent. Table 4 summarizes the estimates reported by those public libraries which answered this question.

TABLE 4

Per Cent of Total Volumes Which Are Bound Periodical Volumes

Per Cent	*Number of Libraries*
0 - 10	3
11 - 20	4
21 - 30	8
31 - 40	4
41 - 50	2
51 - 100	2

The number of titles currently received ranges from 30 to 4,200. Only eight libraries receive 1,000 serials or more. New York was high with 4,200, and Pittsburgh was second with 4,000. Table 5 gives a more complete picture of the responses received. Estimates of the number of science-technology periodicals published throughout the

world at the present time range from 55,000 to 75,000,[23] and 10,000 technical journals are abstracted by *Chemical Abstracts*.[24] Statistics for the Library of Congress science-technology serial collection provide a standard of maximum size by which the comprehensiveness of other collections can be measured: "Of serials contributing substantially to scientific knowledge, it is estimated that the Library has been receiving 12,500, believed to be the most important of those currently being published throughout the world. . . ." [25] Any collection not in the neighborhood of 1,000 titles is sadly deficient.

TABLE 5

Number of Public Library Science-Technology Departments Which Receive Specified Number of Current Periodicals

Number of Current Periodicals Received	*Number of Libraries*
Less than 200	6
200 - 399	11
400 - 599	6
600 - 799	3
800 - 999	2
1,000 - 1,499	1
1,500 - 1,999	4
2,000 - 5,000	3

Abstracts, indexes, and bibliographies provide the probes for investigating the mass of materials in periodicals, technical reports, and other serials. A library which gives service to industry must have as many of these tools available as it can afford. The major searching guides should be available in even the smallest collections. Where special subject interests exist, the more specialized abstract services will be needed. A comprehensive list of science-technology abstracting and indexing services published in 1963 [26] listed 1,855 titles originating in 40 countries, of which 365 were issued in the United States. Of the libraries which responded to our questionnaire, 21 had 10 or fewer such services, 7 had from 11 to 30 services each, 3 had from 31 to 60, 3 from 61 to 100, and 2 had 101 or more. In the New York Public Library, all indexing and abstracting services within its subject area scope are available, except for some highly specialized ones. Pittsburgh has approximately 356 in its subject areas. On the other hand, two libraries reported they had only two and one library only three of these tools.

Widespread public availability of patent specifications and drawings is an important requirement for industrial progress. Fifteen of the twenty-two United States patent depository collections are in public libraries.[27] A few public libraries also collect foreign patents. There are German patents in Milwaukee, British patents in Milwaukee and Pittsburgh, British patent abridgments in Cleveland, Detroit, and Cincinnati (which has British patents before 1958), and the *Canadian Patent Office Record* in Cincinnati, Milwaukee, Cleveland, Detroit, and Pittsburgh. The New York Public Library not only collects United States patents, but has the most complete collection of foreign patents in the country outside the United States Patent Office; however, these patents are not under the jurisdiction of the Science and Technology Division. In the western part of the country, the Los Angeles Public Library has a complete set of the United States patent specifications and drawings as well as abstracts of the German, Canadian, British, Russian, and Swiss patents; although under the administration of the Science and Technology Department, this patent collection is separately housed and staffed.

Technical report collections of various sizes were reported in twenty-one libraries but not in eighteen. Such collections are usually small and highly selective. Ten public libraries are depositories for Atomic Energy Commission (AEC) Reports.[28] Many depository libraries have collections of National Advisory Committee for Aeronautics (NACA) and National Aeronautics and Space Administration (NASA) reports. A unique public library collection of technical reports is maintained at Pittsburgh, which is the only public library of the twelve Federal Regional Technical Report Centers. In this collection are many of the non-classified reports from NASA, AEC, Department of Defense (DOD), Clearinghouse for Federal Scientific and Technical Information (CFSTI), and various other agencies. Maintained as a separate collection in the Science and Technology Department, it now totals approximately 200,000 reports. In 1961 the Library of Congress had a collection of 230,000 technical reports, described as ". . . one of the largest collections of such materials in existence, . . . an unparalleled wealth of recent scientific and technical information, much of which has never been published in any other form."[29]

Thirteen libraries indicated that they have collections of other special reference materials, but did not give estimates of their size. Collections of various standards and specifications are held by Seattle, Cincinnati, St. Louis, Detroit, Indianapolis, and Newark. A complete

depository of military specifications and standards is held in New Orleans. Cleveland, Los Angeles, Milwaukee, and Pittsburgh are listed as American public libraries with collections of British standards.[30] Dallas collects state petroleum and geological maps. Pittsburgh maintains a collection of thousands of translations of foreign language articles, indexed by author, from various government agencies and other organizations such as NASA, AEC, CFSTI, Brutcher, and the Iron and Steel Institute. Trade catalogs and directories are collected by some of the libraries.

This inventory of the literature resources for industrial research, in selected public libraries, indicates some of the materials available and the gaps existing in their collections. To support historical, retrospective, and current literature research, a library should have a large number of the world's indexing and abstracting services and a broad selection of the serials indexed. Runs of both domestic and foreign serials should be available along with technical research and development reports, patents, standards and specifications, trade catalogs, directories, government publications, maps, pamphlets, literature guides, and bibliographies. Important reference handbooks, encyclopedias, compilations, monographs, and textbooks now available from various countries should be included. Lists of specific titles in these categories can be found in the various specialized literature guides.

Above all else, however, the selection of books, journals, and other materials must be built around industry's needs and plans for future development, as Jean Taylor so incisively points out.[31] She urges a detailed, intensive study of local industry to discover its information needs and a complementary study of the collection to see how it meets these needs. The sources for book selection have been discussed many times, as well as the tools, principles, and techniques. It suffices to say that the larger the area served, the more industrialized it is, the more research and development that is carried out, then the more comprehensive the science-technology collection should become.

Cooperation at various levels can help public libraries take a giant step toward providing industry with adequate service and needed materials. "Without joint action, most American libraries probably will never be able to come up to the standard necessary to meet the needs of their constituencies."[32] The American Library Association (ALA) standards of 1956 are designed to apply to library systems which serve natural regions of the country. These regional systems are not limited to a particular city or county in the usual sense of

the term. The central library of a region, which may be the headquarters unit of a city or county or other designated type of library, is the one library in the system which is expected to meet the minimum requirements described in the standards.[33]

The idea of larger areas of service and of support for resource libraries, in line with the ALA standards, has been gaining impetus in recent years.[34] Among other states, California, Delaware, Illinois, Maryland, Massachusetts, New York, Ohio, Pennsylvania, and Wisconsin have recognized this concept. The libraries in the present study are central libraries as defined by the ALA Standards, although they may not yet be giving service beyond their own tax units to a whole region. This makes the deficiencies noted doubly disturbing, for it means that whole regions of the country are at present deprived of adequate service to industry. Twenty-six departments indicated that their primary service area is the city, and twenty named the county unit. However there were combinations of these, plus indications that eight serve entire regions and three serve their states also. One department, New York, reported it is serving an international clientele. In the smaller areas, libraries requiring service can call upon the larger technical libraries for information and materials. Homer Fletcher has described an aggressive program developed by a small library, in Ashland, Ohio, to increase service to industry; this was done, in part by drawing on the resources of the large technical collection in Cleveland.[35]

Cooperative acquisition is another means by which libraries can strengthen their resources in science and technology. The responsibility for acquisition of materials in designated subject areas is assigned to each cooperating library, with a resulting greater concentration of materials in these fields than would be possible if each library acquired materials independently. This is now being done at the state level by the four resource libraries in Pennsylvania.[36] The same plan has been carried out at the local level by the Hunt Library, Carnegie Institute of Technology and the Carnegie Library of Pittsburgh, Science and Technology Department. Harris indicates that such plans are in effect between the Detroit Public Library and the Wayne State University Library, and between the Cleveland Public Library, the Western Reserve University Library, and the Case Institute of Technology Library.[37] In all these libraries, patrons have free access to all the materials available.

Another form of library cooperation which aids industry exists be-

tween public and special libraries. Because of the extensive, more general collections maintained in some public libraries, many special libraries have been free to develop ultra-special collections. The close cooperation between the Technology Department of the Seattle Public Library and the Boeing Airplane Company, which began in 1929 and goes beyond even the usual support to local companies given by well-developed public library science-technology departments, has been described by Edith Fry.[38] The public library may prepare annotated reading lists or bibliographies, answer difficult technical reference and bibliographic questions which cannot be answered with the limited resources of the special library, and make photocopies of materials in its collection. Some or all of these services are available in areas such as Cleveland, Cincinnati, Pittsburgh, Detroit, Baltimore, and Los Angeles.[39-42] In these areas, moreover, many smaller firms find that it is not feasible to maintain special libraries of their own, as indicated by Roy D. Rates,[43] and often depend entirely on the public library for their technical information needs. Frequently, however, the companies with the ". . . largest special libraries of their own make the heaviest demands on the nearby public libraries." [44]

Need for Librarians with Scientific Background

Staff shortages, and especially the lack of professional librarians with scientific training, were among the more important problems reported in the survey. A majority of the departments, twenty-three, did not have staff members holding scientific and technical undergraduate degrees in addition to their library science degrees. Three libraries reported that their staff members all had scientific or technical degrees; two reported 66 per cent; one 50 per cent; another 40 per cent. Fourteen departments employed assistants who had scientific and technical training, often 50 per cent or 75 per cent of the departmental staff, but lacked the library science degree; twenty-seven libraries did not employ such assistants.

The area of subject specialization of science-technology staff with science degrees is important, but regarding this we have no data. However, our personal observation is that public librarians with science degrees, frequently have them in biology, which is important in medicine and agriculture, but only secondarily so in industry; a few have degrees in chemistry which is, of course, a vital industrial subject. Yet it is engineering, which has been described as applied physics, which is the mainstay of industrial progress. The overwhelm-

ing majority of American scientific and technical personnel is composed of engineers; 822,000 engineers and 335,000 scientists were employed in the United States in 1960.[45] While a limited knowledge of mathematics is not critical to the undergraduate study of chemistry and biology, mathematics is the foundation of physics and the engineering sciences. But it is probable that it is in engineering, mathematics, and physics that the fewest number of public librarians with science training have degrees. Studies of the way scientists and engineers use scientific and technical literature, moreover, show that it is the engineers and other applied scientists who know least about information resources in their fields and who need and want the most help in utilizing them.[46]

But the entire situation is not hopeless. Joseph Wheeler and Herbert Goldhor point out that the staff member in a subject department does not have to be an expert in all subjects represented in a department so long as he knows some of them. "No one can start with a deep knowledge of so many areas as a subject department includes. . . . Time and conditions forbid. He [the subject assistant] needs rather to comprehend major aspects of the field and most of all to know its literature."[47] They also provide a useful outline of ways in which a subject department assistant can extend his grasp of the materials in his field. Years ago E. H. McClelland explained how books can be intelligently selected by the librarian with only a limited knowledge of technology, for he correctly pointed out that "In the broad field of technology the knowledge of the librarian must be more or less superficial, and we cannot accurately and thoroughly assess the merits of all books in all fields."[48] Individuals without engineering degrees, but with some curiosity about engineering subjects and intensive training in technological literature, can probably provide better service to industry than those lacking such training.

Table 6 indicates the size of the professional-clerical staff of the largest science-technology departments. In the case of Milwaukee, clerical functions are handled by a central clerical pool. To furnish a further basis of comparison, Table 6 shows the number of volumes in the collection of each department and the department's rank in relation to the other libraries for this characteristic. Library services and operations, and local conditions differ, so an across-the-board comparison would be unfair. Also, the largest collections are not necessarily the most used. Nevertheless it is probable that the largest departments are understaffed rather than that the larger staffed depart-

ments are overstaffed. For the sake of increased economy and greater efficiency, more clerks should be used to free librarians for increased professional responsibilities. In the majority of cases, the staff of the science-technology department consists of two or three people. The size of the professional staffs ranges from one to thirteen, and the clerical staffs from one to twenty-two.

TABLE 6

Size and Composition of Staff and Size of Collection of Science Technology Departments in Selected Public Libraries

Library	*Total Staff*	*Number of Professionals*	*Number of Clerks*	*Number of Volumes*
Los Angeles	32	10	22	180,000 (5)*
Pittsburgh	20	12	8	460,000 (1)
Detroit	16	11	5	200,000 (4)
New York	15	13	2	450,000 (2)**
Milwaukee	12	12	0	200,000 (4)
Cincinnati	12	8	4	250,000 (3)
Cleveland	11	7	4	250,000 (3)

* Does not include the patent collection.

** Does not include the patents, circulating books, or subjects out of scope for New York's acquisition policy.

Sources of Financial Support

Since the libraries surveyed are public libraries, their primary source of financial support is tax funds. According to the questionnaire, the majority of libraries receive the largest part of their support from various city taxes. For others, most of their income is derived from county tax funds; some libraries receive state funds, and one receives federal funds. Industry provides support to seven libraries by regular gifts; four have incomes from endowment funds provided by industry. For six of these libraries, industry supplied funds for special projects; for example, the Ford Motor Company gave the Detroit Public Library substantial funds with which to furnish and equip the Technology and Science Room in the main library addition. Houston, Omaha, Detroit, Indianapolis, Philadelphia, Dallas, Buffalo, and Cleveland, among others, receive gifts from industry either regularly or for special projects.

An outstanding example of a cooperative effort by industry to provide a public library with an endowment fund is that established for

the Science-Technology Department of the Carnegie Library of Pittsburgh. This fund was raised by industry under the leadership of the Pittsburgh Section, American Chemical Society, and is now approaching $400,000.[49] Fifteen libraries stated it is library policy not to request gifts from industry. Fifteen said there is no library policy opposed to such gifts even though support is not requested. Two libraries are now attempting to secure industrial support; one depends on gifts from Friends of the Library.

We believe that it is necessary for the central library in any regional system to provide not only the necessary materials needed by industry, but also to give service in depth in order fully to exploit the value of these materials. There should be a searching and bibliographic service that goes beyond the quick reference check for a piece of factual information or verification of a bibliographic detail; ideally, it should approach the comprehensive-literature search. At the very least, a usable bibliography or list of references with brief annotations can be provided to answer many requests.

It is usually assumed that when any serious searching of the literature is required, a technical background is essential. If this is so, there is little hope that many public libraries can perform this service. McClelland,[50] and Wheeler and Goldhor[51] point out that the range of subjects in technical departments in particular and of subject departments in general is too vast for any one librarian to have more than a superficial acquaintance with all but a tiny minority of them. If the requirements for the search, however, are clearly understood between the searcher and the requester, it might be feasible for persons versed in the literature and with an elementary background provided by technical encyclopedias or textbooks to perform intensive literature searching.

Performed by library personnel, such searching is expensive. For this reason, the John Crerar Library developed a fee system for its Research Information Service which was established to perform this function.[52]At the Detroit Public Library, a similar suggestion was considered in 1947 when a plan for industry-public library cooperation was prepared by Charles Mohrhardt and Herman Henkle,[53] although not at that time acted upon. This may be the solution for some public libraries, especially in large industrial centers where the local tax support available for libraries seems to have reached a limit beyond which present-day officials are not inclined to go. In these centers, industry

is desperately in need of information and often willing to pay for good service.

However, with the introduction of State and Federal aid to public libraries, these libraries may be able to serve industry more adequately by performing such expensive but desirable, even necessary, functions. If this develops, it may be possible to provide a broader service in greater depth, as suggested by Katharine G. Harris, Eugene B. Jackson, and Robert E. Runser, who propose "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. . . ." [54]

There is some question, however, as to the value of the kind of literature searching which can be performed in libraries. In the Weinberg report, it is pointed out that ". . . retrieval of documents is not the same as retrieval of information; a technical specialist really needs the information contained in the published literature, not the published literature itself. To retrieve information, as contrasted to documents, the technical community has devised the specialized data and information center." [55] The sharp differentiation between scientific information centers and technical libraries which is postulated in the Weinberg report is more an ideal than a current reality. In Allen Kent's detailed exploration of specialized information centers, it is revealing to note that their functions and operations are often not unique and are frequently the same as those carried out by a number of science-technology libraries and public library science-technology departments.[56] As these functions vary in degree from library to library, they may vary in degree from library to information center, and from information center to information center also. Finally, because of the increasing pressure due to the knowledge explosion, if it is at all feasible for public libraries to perform some of the literature searching functions of information centers and special libraries, it is essential that they undertake to do so.

Every public library has an obligation to inform its patrons of the materials and services it has available. The most common means of doing this in science-technology departments is through issuance of lists, often annotated, to publicize new books. A majority of the departments, twenty-five, prepare such lists, as against seventeen which do not. Taylor suggests bringing an awareness of library resources to the attention of patrons by contact with pertinent local groups and

individuals through letters and attendance at meetings. She notes participation by the Cleveland Public Library in the Community Research Conference of Northeast Ohio; this organization was formed to conduct an inventory of the different kinds of research being conducted in the area as well as to find ". . . data being gathered about the area."[57] The present survey also revealed that Cleveland and Providence provide speakers for meetings and seminars about library service to industry.

In February 1965, Cincinnati sponsored the Cincinnati Machine Tool Week, to pay tribute to the machine tool industry of the Cincinnati area on the tenth anniversary of the opening of its new main library building. Personnel from the largest tool builders, as well as some users, participated in the various committees planning the event. Almost all local tool builders provided some material for the elaborate exhibit prepared by the library to explain the industry to the citizens of the area. *A Machine Tool Referral Guide,* a bibliography listing nearly four hundred information sources of interest to the machine tool industry, was prepared. These activities resulted in considerable newspaper and television coverage, as well as brief reports in many national technical magazines.

Desirable as these public relations activities are, it is questionable whether they are fully doing the job which needs to be done. Apart from statistics on photocopies and reference material lent to industry already noted, there are no quantitative data currently available on the industrial use of public libraries. Our own experience and what evidence there is shows that the heaviest industrial users of public library science-technology services appear to be company special libraries. Probably the majority of companies which need technical information, however, do not have facilities which can be properly described as special libraries. The personnel in such companies are therefore deprived of information which could be useful to them. Engineers and scientists do contact public libraries in connection with their work, but it is doubtful if even a majority who need such information do so; however, we have not discovered any studies which bear on this question. It is probable that few engineers and scientists, even in the largest cities, have any idea of the resources available to them in good, public library science-technology departments. It is not uncommon, for example, for technical men who accidentally discover the existence of patent depository collections or other specialized materials to express astonishment that a public library would maintain

such a collection. If this impression is accurate, then it is the staff of the science-technology departments themselves who are at fault for failing to inform their industrial constituents about what the library has to offer by insufficient use of library public relations offices.

Library policy should determine to a large extent the kind of service given to industry. Thirty-eight libraries indicated that it is library policy to provide good service for industry. When asked to evaluate the quality of their service, however, twenty-four libraries indicated that it is inadequate, and seventeen thought it is satisfactory. Thus, even where library policy is favorable, service falls below what most department heads feel is required. A number of science-technology departments, moreover, believe they are giving adequate service to industry, although they have very limited collections, possess few abstracts, indexes or bibliographic services, and function with one, two, or three staff members and extremely limited funds. We believe that they are unable to serve adequately their local industries. At the same time, it is interesting to note that Cleveland's Technology Department with 250,000 volumes and a staff of eleven feels that its service is not adequate.

Thirty-three libraries, furthermore, replied to the questionnaire that either in addition to or instead of the public library other institutions in their areas are providing reference or literature research service, books, journals, and other materials; two reported there are no others. University and college libraries were said to perform this service most often. Seldom are they better adapted to do so although they have had access to Federal and State funds, and often are receiving funds from industry. Being more aggressive, they have assumed part of the public library's role.

In addition, twenty-five librarians reported that industries must seek service outside their areas; twelve said that is not necessary. Replies were often qualified in regard to the frequency of recourse to outside sources: St. Louis replied: "sometimes"; Buffalo "occasionally"; and Cincinnati felt "for the most part we can supply information." Except for the very largest, few libraries can support independent research or be said to be self-sufficient.

Collections of inadequate size and unsatisfactory composition, an obvious inability to meet industrial needs locally, an abdication of public library service to other organizations, and the informed opinion of a majority of department heads themselves all point to the conclusion that service to industry in all but the largest public libraries

is far from satisfactory. Only a handful of public libraries in this country are providing materials and services which even begin to meet the needs of industry. When one adds up the public library science-technology resources of the world's richest and most industrialized country, the result is disheartening. The libraries in only twelve areas surveyed, New York excluded, serving a combined population of 32 million, have science-technology collections in excess of 100,000 volumes each.

Rose Vainstein asserts that the acquisition of science-technology materials has been neglected in this country, and cites a study which shows that few public librarians have either interest or education in science and technology. She declares that cost alone is not a restrictive factor in acquisition, since many public libraries buy expensive art books, but when combined with lack of interest and apparent lack of demand—three factors applying to science-technology materials—the result can be discouraging.[58] The arguments and evidence that Vainstein, Brown,[59] and Marston[60] present, and the evidence of the present survey, all indicate the lack of scientific education and interest on the part of many public librarians. It is probable, moreover, that there are public librarians, who do not believe that their function is to serve industry. The deficiencies revealed in this survey, the tenor of library literature, and the historical emphasis of the majority of American public libraries would seem to imply this.

The cost of library service to industry may appear to be expensive, but in most cases, as Wheeler and Goldhor point out, it probably more than pays for itself.[61] Indeed, as long ago as 1903, N. D. C. Hodges, Librarian of the Public Library of Cincinnati, made a similar statement: "From the information which comes to us of instances of those who have secured information with money value from the books, it is no exaggeration to say that this room alone [*i.e.* the Useful Arts Room] each year covers many times over the cost of the whole library to the community."[62] The economic significance of public library service to industry is not confined to the fact that it can mean profits to local companies, desirable as this is. Manufacturing industry, which is born of technology, is unquestionably one of the prime factors in the American economy. By serving industry, American public libraries have an opportunity to make a great contribution to the nation's economic well-being, if they choose to do so. Knowledge born of science and technology constitutes the material foundation of contemporary life. Taylor, in quoting James Killian, makes clear that the

library's relationship to science and technology is based on the fact, itself not duly appreciated, that "science and engineering are largely built on the published record of earlier work done throughout the world." [63] Public libraries should be hard at work thinking of ways to improve service to industry rather than struggling along giving inferior service.

Perhaps one may agree with the foregoing points and still question the necessity of public library service to industry. It may be argued that many companies are rich and can afford to provide their own libraries. But what of the smaller companies which cannot afford to do so? The issue, however, is not chiefly a question of money spent by individual companies. Few special libraries in industry can even begin to provide the rich diversity of information resources necessary to conduct the research and production activities of their parent companies. It would be gross extravagance for each of thirty or forty companies in our large industrial centers to develop independent research library collections of tens of thousands of volumes even if they could afford to do so, when it is possible for one library in the community, the public library, to provide larger facilities than any one of them could afford and to open its collections not only to the largest companies but to the smallest also. Apart from the large, institutionalized special libraries such as John Crerar, Linda Hall, and others, and perhaps a few university libraries, only the public library, in particular the central public library of a regional system as defined by the ALA, has the space to house the facilities needed and the know-how to organize and utilize any significant fraction of scientific and technical literature. The public library is the most ubiquitous and logical choice for filling the need for the large local collections necessary to serve industry by backing up the company's own library if it has one, and acting to a limited extent as a company library if the company does not have one.

Although American public library service to industry may be of age in years of existence, it is for the most part, still adolescent in scope and enthusiasm. The most important factors in its maturing will be the success which public librarians achieve in the extension of their interests to encompass the information needs of industry, in their desire to learn more about the current and potential values of science-technology information service, and in their willingness to organize public library service to meet the pressing needs of industry.

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