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Engineering Librarianship in the Post-war Period: Profile of an Emerging Academic Librarian Community

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1. Introduction

During the early 1940s, engineering librarians in the United States organized professional communities within the Association of College and Reference Libraries (ACRL) and the Society for the Promotion of Engineering Education (SPEE), which in 1946 was renamed the American Society for Engineering Education (ASEE) [1]. World War II curtailed the activities of both groups. After the war, however, the engineering librarian communities in ACRL and ASEE grew quickly, offering new opportunities for professional development, networking, information sharing, research, and advocacy.

This paper seeks a deeper understanding of the academic engineering librarian community in the 1940s and early 1950s through the analysis of data compiled from the *Directory of College Engineering Library Personnel* [2], published in 1949 by the Engineering School Libraries Section of ACRL and supplemented by data from other sources such as *Who's Who in Library Service* [3]. The *Directory* is a rich source of data that includes details such as position titles, degrees earned, career histories, professional memberships, and publications. Much of this information is not available from other sources.

Although an increasing number of articles and books on academic engineering librarianship were published from the 1930s onward, few discussed the roles, qualifications, or work experiences of engineering librarians. Few librarians from the period published biographies or articles about their careers and work experiences. Modern librarians know much about historical engineering information resources and how engineering libraries in the post-war period were organized, thanks to research published by librarians [4], student library handbooks [5, 6], and library annual reports [7]. However, we know very little about the librarians who selected and used the resources and staffed the libraries. This paper will explore the following questions about academic engineering librarians in the post-war period.

What was the demographic profile of engineering librarians in the late 1940s? How did engineering librarians compare to other librarians in terms of geographic region, age, education, and gender?

What professional credentials did engineering librarians possess? Did engineering librarians have similar professional credentials as other librarians? Were they more likely to have advanced degrees? Did they have degrees in engineering or a related field?

What was the status of engineering librarians within the academy? Where they considered academic staff on par with teaching faculty, professional staff, or clerical staff?

Were engineering librarians active in professional associations? Which professional associations did engineering librarians participate in?

Did engineering librarians publish or engage in scholarly work? Did they publish books and articles on engineering information resources and librarianship?

2. Librarianship in the 1940s

The 1940s was a period of significant change in librarianship. Until the 1950s, librarian education was mainly at the undergraduate level. Most librarians had a bachelor's degree in library science (BLS), or a librarian certificate earned post bachelor's after a year or so of additional training. Library school accreditation requirements were vague and not too rigorous, leading to concerns about the uneven quality of graduates. A variety of librarian training programs existed with different entrance requirements. Some schools were affiliated with universities while others operated within public and state libraries. Only a handful of programs offered advanced degrees in library science and few library school instructors had advanced degrees. In 1948, the American Library Association (ALA) passed a resolution calling for librarian education at the graduate level only. A few years later, in 1951, new accreditation standards were established for library schools. During the 1950s and early 60s, the master's in library science (MLS) became the norm for professional librarians [8].

The 1940s also saw improvements to working conditions for academic librarians. The debate about granting academic status to librarians working in colleges and universities is almost as old as modern librarianship. By the 1940s, librarians at an increasing number of institutions had been granted academic status. For example, in 1944, librarians at the University of Illinois were reclassified as academic staff on par with teaching faculty. Illinois librarians with subject expertise, including engineering librarians, were assigned the rank of assistant professor [9]. This trend continued through the 1950s as more librarians with master's degrees entered the profession [10].

3. Methodology

The *Directory* is available as a full-text resource on the HathiTrust Digital Library, a collaborative repository of digitized materials held by research libraries. Data for each librarian, library administrator, engineering faculty member, and library staff member affiliated with an academic institution was entered into a spreadsheet for further analysis. The data fields included institution ID number, last name, first name, position title, association membership, degree, degree institution, year of degree, previous positions, and publications. For individuals with multiple degrees, each degree was entered in a separate column. For example, first degree, second degree, third degree, and so on.

Given the variety of position roles and job titles, the author categorized each entry into one of five categories. The category "Engineering Librarian" was assigned to professional librarians who held the formal title of engineering librarian, worked as a librarian in an engineering library, or were embedded in an engineering school. The category "Librarian" was assigned to all other professional librarians in a non-engineering role or ambiguous position. For example, chemistry librarian, physics librarian, cataloguer, acquisitions, reference, and so on. The category "Administrator" was assigned to library administrators. For example, Director of Libraries, University/College Librarian, Dean of Libraries, and so on. The category "Faculty" was assigned to engineering professors, deans, and heads of departments who served on library advisory committees. The category "Staff" was assigned to other library staff.

4. Limitations

The information in the *Directory* was supplied voluntarily by engineering librarians and other library staff. Although the committee tasked with compiling the *Directory* attempted to verify the data, it is likely that some errors and omissions were not corrected. A few entries have ambiguous or incomplete information. For example, the University of Manitoba's Engineering Library had two staff with the title "secretary-librarian". Neither appear to have been professional librarians, so they were categorized as "Staff". Ada Chapman, a librarian at Howard University who had a BA degree from Howard but no BLS, was a "stenographer-librarian" from 1942-48. Ruth Bristol, an "associate" at MIT, worked previously as a "secretary-librarian" at the Thayer School of Engineering at Dartmouth College. She had a BA degree from Boston University but no BLS. Only data for engineering librarians, other librarians, faculty members, and library administrators were analyzed in this study.

5. The Directory of College Engineering Library Personnel

In 1948, the Executive Committee of the Engineering School Libraries Section (ESLS) of the Association of College and Reference Libraries (ACRL), which was chaired by Madeline Gibson of the Michigan College of Mining and Technology, decided to compile a directory of library staff and faculty associated with academic engineering libraries in the U.S. and Canada. Many library staff directories had been published previously but this was the first to focus on engineering libraries. The project was undertaken by a committee of three librarians: John O'Farrell, who served as chair, Ira Tumbleson, and Robert Whitford. All had been active members of the engineering librarian community since the early 1940s. John O'Farrell was the technology librarian at the City College of New York and served in 1942-43 as the first chair of the Engineering School Libraries Committee of the Society for the Promotion of Engineering Education; Ira Tumbleson was the engineering librarian at the Newark College of Engineering, now called the New Jersey Institute of Technology; and Robert Whitford was the technology-physics-chemistry librarian at the City College of New York.

The committee created two questionnaires, one for librarians and the other for engineering faculty members serving on library advisory committees. The librarian questionnaire included name, position title, academic degrees, the last two positions held, and publications. The faculty questionnaire asked for name, faculty title, academic degrees, and library advisory committee role. The committee sent the librarian questionnaire to libraries at institutions with engineering programs, including librarians who were not members of ACRL, and members of ESLS affiliated with non-academic institutions.

Approximately 637 librarians, library staff, library administrators, and faculty members from 203 American and 12 Canadian institutions submitted completed questionnaires. Twenty-five librarians at non-academic institutions who were ESLS members also responded and were included in a separate section. Although technically not academic institutions, the Engineering Societies Library in New York City and the John Crerar Library in Chicago were listed with colleges, institutes, and universities. Curiously, the Linda Hall Library, a private research library

located in Kansas City that is focused on science, engineering, and technology, was not included in the *Directory*, perhaps because it was established in 1946 [11].

Howard University, one of the oldest historically black colleges and universities (HBCU) in the U.S, was included in the *Directory*. However, other HBCUs with engineering programs, such as Morehouse College in Atlanta, are not.

The *Directory* was published in May 1949 by ACRL as Publication No. 1 of the ESLS and advertised in the November issue of the *ALA Bulletin* [12]. Copies could be purchased for $1. It is not known how many copies were sold or distributed to libraries. According to WorldCat, a union catalog of materials held by tens of thousands of libraries worldwide, approximately 30 libraries in the U.S. currently hold copies. A digitized version is also available in the HathiTrust Digital Library. In 1952, the ESLS merged with other ACRL sections to form a new group called the Pure and Applied Sciences Section (PASS). The *Directory* was not updated prior to the merger. More than two decades would pass before another directory of engineering librarians would be published in 1975 by the Engineering Libraries Division of ASEE.

6. Institutional Profiles

Institutions from fifty U.S. states and territories plus the District of Columbia were represented in the *Directory*. The states with the most institutions were New York (20), California (17), Pennsylvania (13), Ohio (12), and Illinois (11), approximately 36 percent of all institutions. Twelve Canadian institutions from eight provinces were also represented. (See Tables 1 and 2 below.)

Table 1. American Institutions by State or Territory

State	Inst.	State	Inst.	State	Inst.
Alaska	1	Kentucky	2	Nevada	1
Alabama	2	Louisiana	4	Ohio	12
Arkansas	3	Maryland	5	Oklahoma	3
Arizona	1	Massachusetts	7	Oregon	2
California	17	Maine	1	Pennsylvania	13
Colorado	5	Michigan	10	Rhode Island	2
Connecticut	3	Minnesota	1	South Carolina	2
District of Columbia	3	Missouri	4	South Dakota	2
Delaware	1	Mississippi	2	Tennessee	3
Florida	3	Montana	3	Texas	10
Georgia	1	Nebraska	1	Utah	3
Hawaii	1	North Carolina	2	Vermont	2
Iowa	2	North Dakota	2	Virginia	4
Idaho	1	New Hampshire	2	Washington	2
Illinois	11	New Jersey	4	West Virginia	2
Indiana	5	New Mexico	3	Wisconsin	2
Kansas	3	New York	20	Wyoming	1

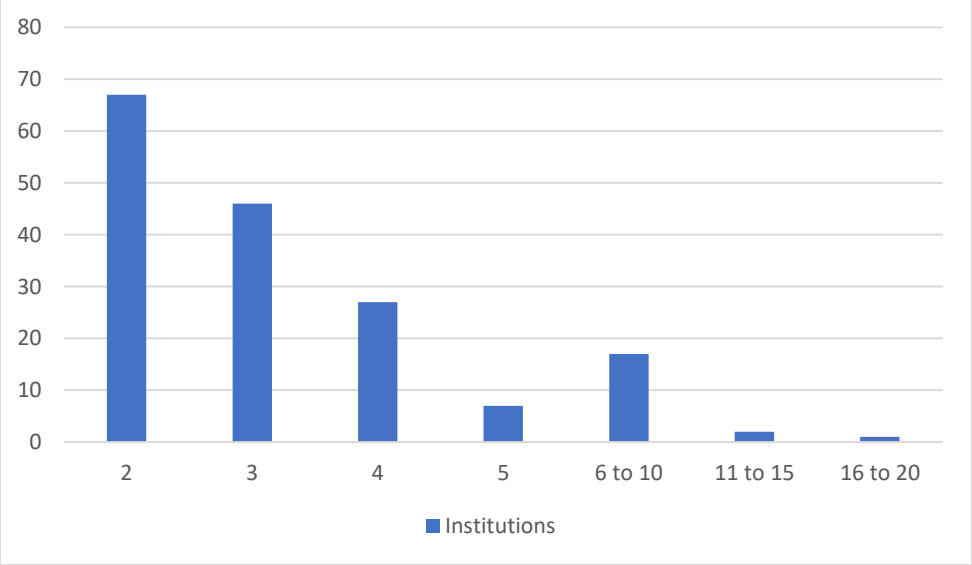
Table 2. Canadian Institutions by Province

Province	Inst.	Province	Inst.
Alberta	1	Nova Scotia	2
British Columbia	1	Ontario	3
Manitoba	1	Quebec	1
New Brunswick	2	Saskatchewan	1

Although several private universities and institutes are listed in the *Directory*, the majority of institutions were public colleges and land-grant universities. For example, California's 17 institutions included the two campuses of the University of California, four state colleges, four city colleges, and two junior colleges. Six of the institutions were affiliated with the U.S. military. These included the U.S. Air Force Institute of Technology, U.S. Coast Guard Academy, U.S. Military Academy (West Point), U.S. Naval Academy, U.S. Naval Postgraduate School, and the U.S. Naval Engineering Experiment Station.

More than half (114) of the responding institutions listed only one or two staff members. Libraries with five or more personnel totaled 27. The institution with the most personnel was the Massachusetts Institute of Technology, which listed 20 staff members including three engineering librarians. Institutions with ten or more staff include the Engineering Societies Library (12), University of British Columbia (11), University of California, Berkeley (10), California Institute of Technology (10), Case Institute of Technology (10), Georgia Institute of Technology (10), Illinois Institute of Technology (10), and Purdue University (10). These nine institutions accounted for 14.6 percent of all staff entries in the *Directory*. (See Figure 1 below.)

Figure 1. Number of Engineering Library Personnel per Institution



Of the 637 staff listed in the *Directory*, only 64 (9.9 percent) were identified as engineering librarians. Of the rest, 205 (32.2 percent) were library administrators, e.g., university/college

librarian, director of libraries, chief librarian, and the like; 158 (24.8 percent) were other librarians; 132 (20.7 percent) were engineering faculty members; and 78 (12.2 percent) were library staff.

7. Librarian Experiences in World War II

Given that World War II ended only a few years before the *Directory* was compiled, it is not surprising that many engineering library staff were veterans or had worked in positions that supported the war effort. Although men were more likely to serve in the armed forces, women also served in various roles.

U.S. Army veterans included Harry C. Bauer, Director of Libraries at the University of Washington from 1947-59. Bauer served from 1942-45 as a combat intelligence officer in the U.S. Army Air Forces and was awarded a Bronze Star, Purple Heart, and Air Medal. Howard Hovelstad, Acting Director of Libraries at the University of Maryland, served from 1943-46. John S. Mehler, Librarian, University of Alaska served from 1941-46. Charles Penrose, Assistant Professor and Librarian, Clarkson College of Technology served from 1941-45. Robert H. Muller, Librarian, Bradley University, served as the Chief Librarian, Air Weather Service, U.S. Army Air Forces from 1942-43 and in frontline service in 1944-45. Alan Covey, Assistant Head of the Engineering Library at the University of California, Berkeley, served from 1940-45. Covey left Berkeley in 1949 to pursue a career in library administration. He served as Assistant Librarian at San Francisco State College, 1949-51; Assistant Librarian at Stanford University, 1951-52; Director of Libraries at Sacramento State College, 1952-1963, and, finally, Director of Libraries at Arizona State University, 1963-71.

U.S. Navy veterans included Ronald C. Tollafield, Assistant Librarian, Case Institute of Technology, who served in the Pacific from 1943-45. Dean Stallings, Librarian at the North Dakota Agricultural College (now North Dakota State University), took a leave of absence to serve as a lieutenant in the U.S. Naval Reserves from 1944-46. Stanley West, Director of Libraries, University of Florida, served as an associate law librarian in the U.S. Navy from 1943-46. Carson Bennett, Circulation Librarian at the Alabama Polytechnic Institute (now Auburn University), served in the U.S. Coast Guard from 1942-45.

Dorothy M. Kesseli, an Assistant Librarian at the University of California, Berkeley, worked as an editor for the Interdepartmental Committee for Acquisition of Foreign Publications (IDC) in 1944-45. Established shortly after the attack on Pearl Harbor, the IDC was part of a U.S. government initiative during the war to acquire foreign newspapers, periodicals, technical publications, and books [13].

Edward Chapman, Librarian at Rensselaer Polytechnic Institute, was the chief of the Copyright Administration Section of the Office of the Alien Property Custodian (APC) from 1943-45. The APC was responsible for managing intellectual and physical property seized from citizens and residents of enemy and enemy-occupied countries. Philip Leslie, head of the Physical Sciences Library at Brown University, worked as an export control agent in the Explosives Department of DuPont in 1943-45.

Harold Bellingham, a cataloger and engineering librarian at the University of Denver, worked in the Division of Special Information, Library of Congress from 1941-43; the Latin American Division of the Office of Strategic Services (OSS) from 1943-45; the U.S. War Department in 1946; and the Department of State from 1946-47. In 1950, Bellingham became the head cataloger at the University of Iowa.

Several librarians worked at military bases, camps, and training facilities. Gertrude Baldwin, Katherine Nevitt, and Patti E. Rogers worked in the U.S. Naval Training Center Library in Great Lakes, Illinois. Nancy Raisbeck, a Junior Divisional Librarian in the Engineering Library at the University of Michigan, worked as a librarian for the U.S. Army in Illinois, England, France, and Germany from 1943-47. Caroline Paddock, an Engineering Librarian at Louisiana Polytechnic Institute (now Louisiana Tech), was Chief Camp Librarian at Fort Lewis in Washington and a regional librarian in the American Occupied Zone in Germany from 1946-47. Isabell Britton, an Assistant Librarian at MIT, worked as a librarian at Fort Devens in Massachusetts and Wright Patterson Air Force Base in Ohio. Judith Morton, an engineering librarian at the University of California, Berkeley, worked from 1943-45 in the control tower and operations office of the U.S. Marine Corps Air Station in Santa Barbara.

A few engineering library staff participated in war-related scientific research and development projects. Agnes Gallagher, an assistant librarian in the Graduate School of Engineering at Harvard University, worked as a technician in Harvard's Underwater Sound Laboratory in 1944-45 and as a library assistant in the Ordnance Research Laboratory at Penn State in 1945-46. A. S. Gaylord, Jr., the College Librarian at Texas Tech, was the head of the Industrial Laboratory Library at the Mare Island (California) Naval Yard from 1943-45. William S. Dix, Chief Librarian at the Rice Institute in Houston in 1949, worked as a research associate in the Radio Research Laboratory (RRL) at Harvard University from 1944-46. The RRL was a secret research program organized by the Office of Scientific Research and Development (OSRD). Dix received his PhD in English from the University of Chicago in 1946 and taught English courses at Rice. In 1953, he became the University Librarian at Princeton University where he spent the rest of his career, retiring in 1975. He was president of the American Library Association in 1969-70 and received numerous awards and recognitions.

Two librarians at the College of the City of New York taught science courses during the war. John O'Farrell, Technology Librarian, taught mechanical engineering and physics courses. His colleague Robert Whitford, Chemistry-Physics Librarian, taught physics courses. Whitford recounted his experience as an instructor in 1946 in an article published in the *American Journal of Physics* titled "Librarian Among the Physicists" [14]. Kenneth Morrow, the Engineering and Science Librarian at the University of Florida, also taught physics at the University of South Dakota in 1946-47.

8. Demographics, Career Histories, Professional Affiliations, and Scholarly Works

8.1 Engineering Librarians

Of the 64 engineering librarians in the *Directory*, 79 percent were women and 21 percent were men. (See the Appendix for a list of engineering librarians and their institutions.) The year of

their first degree ranged from 1905 to 1948. Engineering librarians were slightly younger than other library staff. More than 60 percent earned their first degree from 1930 forward, compared to 57.1 percent of other librarians and 39.8 percent of library administrators. Almost 29 percent completed their first degree in the 1940s. Only 10.8 percent completed their first degree prior to 1920. (See Figure 2 below.)

The first degree for 64.5 percent of engineering librarians was the BA or equivalent. Two librarians, Ralph McNay of MIT and Nancy Raisbeck of the University of Michigan, had BEd degrees. Eleven librarians, including six men, had BSc degrees. Two librarians, Frederick Volk of the University of Wisconsin and William S. Budington of Columbia University, had BSc degrees in Electrical Engineering from the University of Wisconsin and Virginia Polytechnic Institute, respectively. Interestingly, Budington's first degree was in American Literature from Williams College. George S. Bonn of Northwestern University Technological Institute had BSc and MSc degrees in Chemical Engineering from Ohio State University. Forty engineering librarians had a BLS degree and five had a certificate in librarianship. Overall, 70 percent of engineering librarians had professional degrees or certificates. The schools with the most BLS graduates were Columbia University (7), University of Illinois (7), Simmons College (6), University of Michigan (3), George Peabody College for Teachers (3), and the Drexel Institute of Technology (3). Three librarians had certificates from the University of California. (See Figure 3a below.)

Only four engineering librarians had an MLS degree. Wanda Pringle of the University of Tennessee and Paul Knapp of the University of Nebraska earned MLS degrees from the University of Illinois in 1941 and 1942, respectively. Margaret Field of Oregon State College (now University) earned her MLS from the University of California in 1934. George S. Bonn, mentioned above, earned an MLS degree from the University of Chicago in 1949. Six engineering librarians held MA degrees and one, Ruth McGlashan Lane of MIT, had an MEd degree from Harvard University. Eleven engineering librarians, about 16 percent, had advanced degrees. (See Figure 3b below.)

The career experiences of engineering librarians were quite varied. A few had worked as secretaries. Twelve had served in the armed forces or in positions supporting the war effort.

Nine engineering librarians worked as high school teachers or school librarians. Molete Josephine Morelock, the engineering librarian at the University of Missouri, was born in Ruskin, Tennessee in 1909. She completed her BA in 1929 at Murray State Teachers College and her BLS at George Peabody School for Teachers in 1943. She worked as a teacher, teacher-librarian, and principal at several high schools in Tennessee and North Carolina from 1929-43. Morelock eventually became the Coordinator of Regional Campus Libraries at Purdue University in the 1960s, where she collaborated with Ferdinand Leimkuhler on library operations research [15]. Dr. Leimkuhler was the head of Purdue's School of Industrial Engineering from 1969-74 and 1981-93. He conducted numerous library operations studies for the National Science Foundation from 1962-85 [16].

Twelve engineering librarians had prior experience in public libraries. Marguerite Chamberlain, an engineering librarian at MIT, graduated from Colby College in 1915 and taught in Maine schools from 1915-18. She completed her BLS at Simmons College in 1919 and worked in public libraries in New York, Maine, Connecticut, and Michigan before joining MIT in 1932. Margaret Gauger of Pennsylvania State College (now University), graduated from Vassar College in 1913 and earned her BLS from the Carnegie Institute of Technology in 1934. She was the supervisor of storytelling at the Carnegie Library from 1917-19 and then first assistant in the Children's Department from 1919-22.

Several engineering librarians previously worked for government agencies. Wanda Pringle, born in 1916 in St. Louis, Missouri, worked as a cataloger at the University of Illinois from 1938-43, as a professional assistant and librarian for the U.S. Public Roads Administration and the U.S. Department of Agriculture from 1943-47, and at the University of Tennessee as an engineering librarian from 1947-50 and agricultural librarian from 1950 onward. Katherine McDiarmid, a librarian in the School of Textiles at North Carolina State College of Agriculture and Engineering, was the librarian for the U.S. Waterways Experiment Station in Vicksburg, Mississippi, from 1941-44.

Seven engineering librarians had worked in industrial libraries. During the war, Jeanette Poor of Cornell University worked for the RCA Victor Division in New Jersey. Rose Lonberger, an engineering librarian at the University of Pennsylvania, also worked for RCA from 1938-47. Katherine Johnson, the engineering librarian at Stanford University, worked as a cataloger and research librarian for the United Aircraft Corporation in 1944-45.

Careers were often interrupted or cut short by marriage or family obligations. For example, in 1950, Ellen K. Theurer, an engineering librarian at the University of Michigan, resigned from her position, which she had held for almost a decade, "in order to take up the responsibilities of married life" [7].

Most engineering librarians were members of one or more professional organizations. Not surprisingly, 34.4 percent were members of the Engineering School Libraries Section of ACRL and 21.9 percent were members of the American Society for Engineering Education (ASEE). Thirteen were members of both ACRL and ASEE. Seven were members of the Special Libraries Association (SLA) and three were members of the American Chemical Society (ACS). It is impossible to determine how active engineering librarians were in professional organizations because entries do not include conferences attended or positions held.

Only 12 engineering librarians, 18.75 percent, reported published works. Johanna Allerding of the University of California, Los Angeles listed several works related to aeronautical engineering resources [17, 18]. In 1950, Allerding published an article on the role of librarians in engineering teaching and research [19]. Harold Whitford of Cooper Union wrote articles in the *Cooper Union Bulletin* on the literature of the history of engineering and the "humanistic-social stem" in engineering education [20, 21]. John O'Farrell of the City College of New York wrote articles on the literature of chemical engineering, technical trade literature, and the use of a technical library [22-24]. Ruth McGlashan Lane of MIT wrote articles on special librarianship, the history of the

Vail Library at MIT, the role of the librarian in engineering education, and standardization in library practices [25-29]. William Budington published an article in 1948 in the *Bulletin of the Medical Library Association* that drew attention to the increasing intersection between medicine and technology [30]. Frederick Volk compiled an Index to the *Engineering News Record* for 1917-22 [31].

Although she did not list any publications in her entry, Blanche Dalton of the University of California, Berkeley, published a guide to engineering literature in 1949, the first book on the topic in North America [32]. Dalton's book received positive reviews, although one noted that it omitted certain key reference works and did not cover the patent literature [33].

8.2 Engineering Faculty

Library advisory committees staffed by members of the engineering faculty were common in the 1940s. The *Directory* lists 132 engineering faculty members from 128 institutions who served on a library advisory committee. Two institutions, the University of New Mexico and the University of Pennsylvania, listed two faculty members and one, the North Carolina State College of Agriculture and Engineering, included three. Not surprisingly, given that engineering in the 1940s was an overwhelmingly male-dominated profession [34], 100 percent of library advisory committee members were men.

The academic credentials of faculty members were varied. Approximately 32 percent listed a PhD; 22 of these were awarded by seven universities: Columbia (5), Yale (5), Cornell (4), Michigan (2), Toronto (2), Washington (2), and Wisconsin (2). All fields of engineering were represented. The most common were General Engineering at 18.2 percent, Electrical Engineering at 17.4 percent, Civil Engineering at 9.8 percent, Mechanical Engineering at 9.1 percent and Chemical Engineering at 6.8 percent. There were 19 department heads, 17 deans, and 3 associate deans.

The year of their first degree ranged from 1898 to 1947. It is likely that most engineering faculty would have earned their first degree in their early 20s. This suggests that 13.2 percent were in their 60s or older; 21.5 percent were in their 50s; 30.6 percent were in their 40s; 28.1 percent were in their 30s; and only 6.6 percent under 30.

Edwin McClintock, an Associate Professor of English in the Department of Engineering at the University of Virginia, served on the library advisory committee. In the early 1950s, after taking courses in librarianship, he was appointed the first head of Virginia's new Engineering and Science Library.

8.3 Library Administrators

The *Directory* contains entries for 205 library administrators. The most common titles were College/University Librarian (67 percent) and Director of Libraries (21 percent). Most administrators, 75 percent, were men. The cohort was slightly older than other librarians. Nearly 20 percent of library administrators had received their first degree before 1920 and 39.8 percent in the 1920s. The year of their first degree ranged from 1900 to 1947. Library administrators held more advanced degrees than other librarians. Almost 20 percent had a PhD and 15.6 percent had

an MLS. Only 16.1 percent of administrators had BSc degrees and 7.3 percent had MSc degrees. One administrator, Eleanor L. Tarbell of Tri-State College (Indiana) had a BSc in Chemical Engineering.

Several library administrators had been engineering librarians or had experience working in engineering libraries. William H. Hyde, Librarian at the Illinois Institute of Technology, was the engineering librarian at Cornell University from 1939-45. Harold Lancour, a Professor of Library Science and the Assistant Director of the Library School at the University of Illinois, had been chief librarian at Cooper Union from 1938-47. Both Lancour and Hyde were active members of the engineering librarian communities in ASEE and ACRL. Eleanor L. Tarbell, mentioned above, worked in the Engineering Library at the University of Michigan in 1942-43, probably as a graduate student assistant. John Moriarty, Director of Libraries at Purdue University from 1944-71, worked as a student assistant in the Engineering Societies Library in New York City. Paul S. Balance, Librarian at Texas A&M University, was head of the Science and Technology Division of Rochester (New York) Public Library from 1936-42 and librarian of the Texas Engineers Library in 1943. Wayne Shirley, Librarian at the Pratt Institute Free Library, had previously served as the head of Pratt's Science and Technology Reference Room from 1934-38. Harry C. Bauer, Director of Libraries at the University of Washington, was the technical librarian for the Tennessee Valley Authority from 1934-42.

Library administrators were more productive scholars than other librarians. Nearly 42 percent reported one or more publications on a wide range of topics. Many of these publications were book reviews, book chapters, reports, and articles on librarianship, the history of libraries, library technology, or library administration. However, some administrators contributed works on science and engineering topics. William H. Hyde, mentioned above, wrote on engineering libraries [35-37]. Melvin J. Voigt, Chief Librarian at the Carnegie Institute of Technology, wrote an article in which he used citation analysis, or "reference counting", to identify the most important journals for engineering and agricultural research [38]. Harry C. Brauer, also mentioned above, prepared a bibliography of the Tennessee Valley Authority (TVA) in 1935 [39]. Mary E. Hoyt, Chief Librarian at the Colorado School of Mines, compiled bibliographies and indexes related to mining, several of which were published in the *Colorado School of Mines Quarterly* [40-42]. William M. Speare, Chief Librarian at the New Mexico School of Mines, contributed to a major report on the geological literature of New Mexico [43].

8.4 Other Librarians

This category included 158 librarians in various non-engineering roles. Approximately 87 percent were women and 11 percent men. Their demographic profile and education level was similar to engineering librarians, although they were slightly older. The year of their first degree ranged from 1907 to 1948. The majority, 67 percent, had a BA or BEd degree. Only 27 had a BSc degree. Approximately 70 percent had a BLS or certificate in library science, which was about the same as engineering librarians. The top library schools were Columbia University (13), University of Illinois (13), Western Reserve (9), University of Toronto (7), and Emory University (7). Nearly 7 percent of librarians had MLS degrees from the University of Michigan

(5), Columbia University (3), University of Illinois (1), University of California (1), and the University of Southern California (1).

Only sixteen librarians, 10 percent, reported publications, mostly unpublished works and few related to engineering or related fields. Carmen Wilson, assistant chief of the Technology Department at the John Crerar Library in Chicago, compiled numerous bibliographies on technical topics while working at the Northwestern University Technological Institute. Esther M. Schlundt, a reference librarian at Purdue University, compiled a list of journals in agriculture, biology, chemistry, and related subjects held in Purdue libraries.

A few librarians had previous experience in engineering libraries. Laura Kersey of the University of Louisville was the engineering librarian at the University of Tennessee from 1930-41. Gladys Hanson, a junior librarian at the University of Minnesota, worked for one year as a student assistant in UM's Engineering Library. Robert Goodrich, a reference librarian at the Engineering Societies Library, was the assistant in charge of the Astronomy, Physics, and East Engineering departmental libraries at the University of Michigan, apparently while he was working on his BLS degree.

Figure 2. Education: Year of First Degree

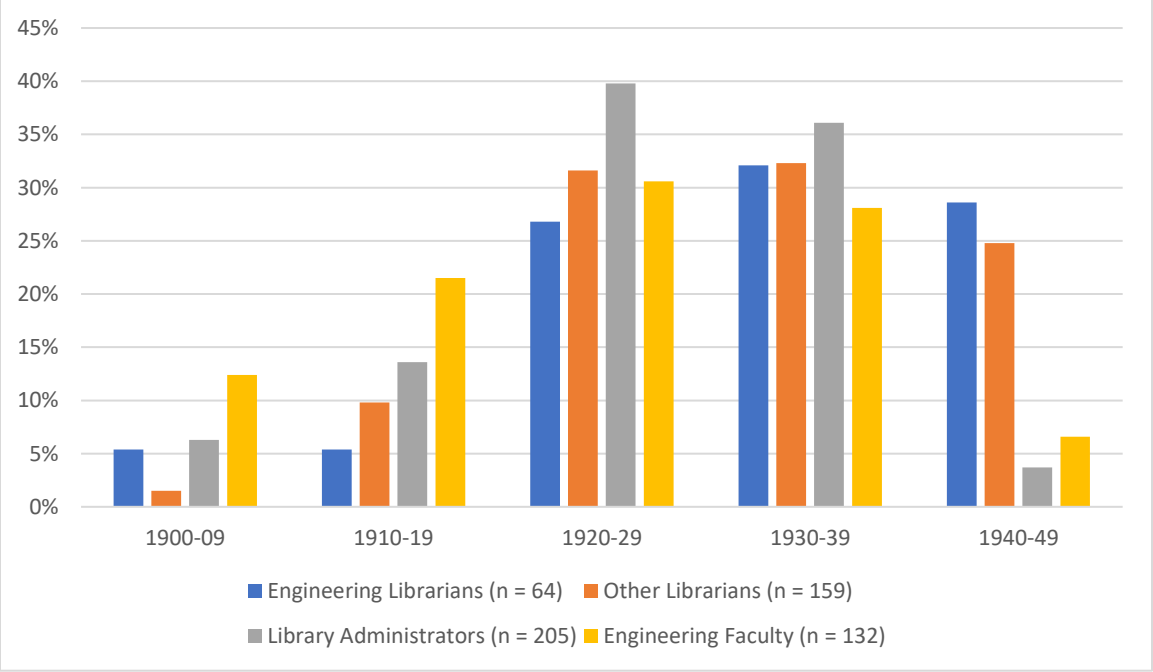


Figure 3a. Education: Undergraduate Degrees (Individuals may have more than one degree)

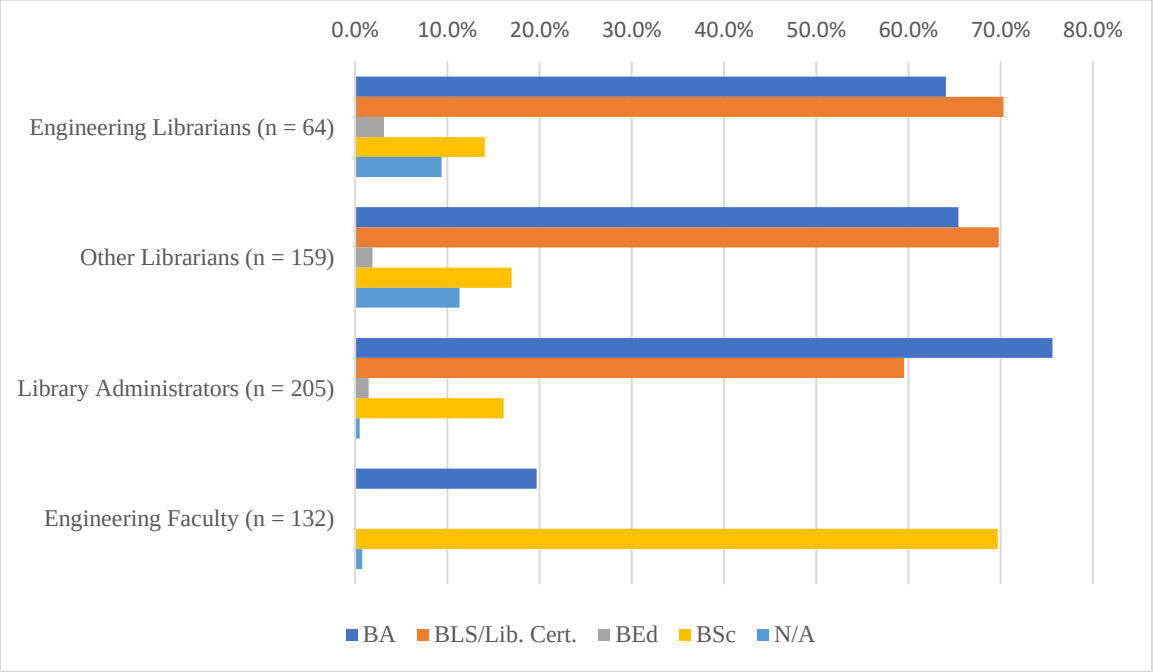
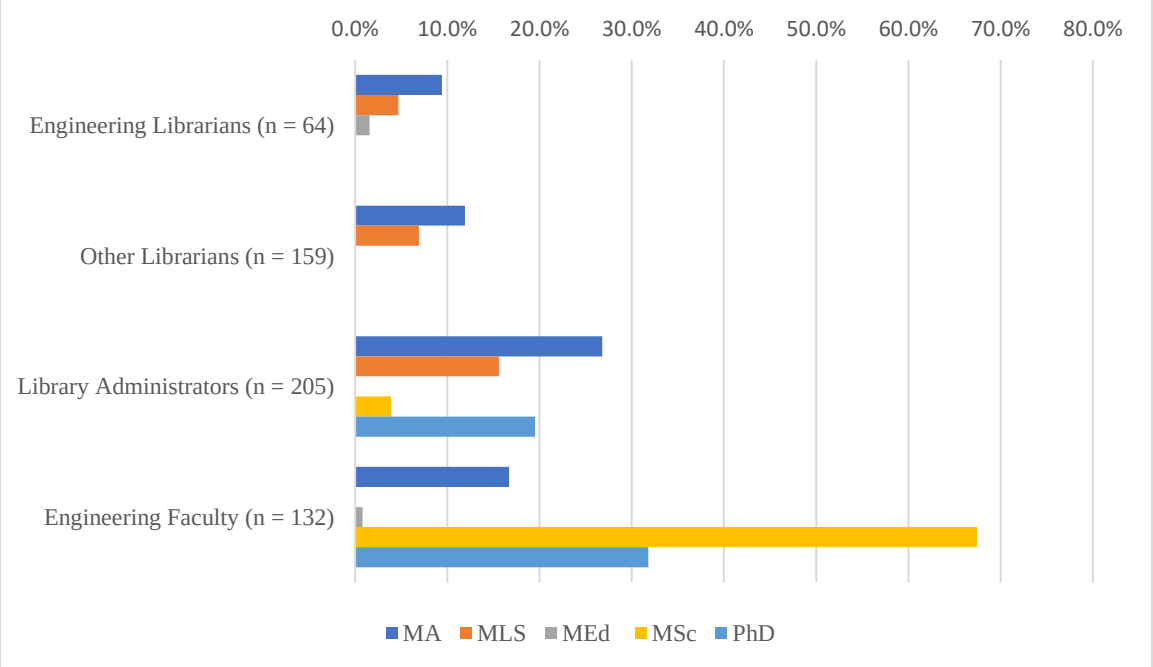


Figure 3b. Education: Graduate Degrees (Individuals may have more than one degree)



9. Discussion

The *Directory of College Engineering Library Personnel* provides a snapshot of the emerging engineering librarian community in the late 1940s and is a useful starting point for exploring the development of engineering librarianship from the postwar period to the present day. The *Directory* is comprehensive, including library staff from almost every academic institution with an engineering program in the U.S. and Canada.

Engineering librarian demographics have not changed significantly since the 1940s. In 1949, 79 percent of engineering librarians were women and 21 percent were men, based on data from the *Directory*. In a survey conducted in 1998 of science and engineering librarians, Winston [44] found that 75 percent of the respondents were women and 23.3 percent were men. In 2020, 83.2 percent of professional librarians were women [45]. Of the approximately 200 current (2022) librarian members of the Engineering Libraries Division of ASEE, about 70 percent are women and 30 percent are men [46].

The professional credentials and academic status of engineering librarians have changed significantly since the 1940s. Few engineering librarians in the 1940s had advanced degrees, the bachelor's degree or certificate in library science being the norm for professional librarians. Almost all engineering librarians working today have a master's degree in library and information science, and many are classified as academic staff at their institutions. A substantial number of current engineering librarians hold advanced degrees in addition to the MLIS.

Few librarians and library administrators in the 1940s had backgrounds in science and engineering. Engineering schools were almost exclusively male, although many began admitting women during the war to address the shortage of engineers and technicians. Some women who studied engineering in these wartime programs worked after the war as technical librarians [34]. Although the number of engineering librarians with backgrounds in engineering and related fields has increased since the 1940s, the humanities and social sciences continue to dominate. Various studies from the 1980s onward confirm this fact. In 1989, Frank and Kollen [47] noted, based on previous research by Mount [48], that approximately 50 percent of librarians working in science and engineering libraries did not have degrees in science or technical fields. In a survey of science and engineering librarians conducted in 1998, Winston [44] found that 32.2 percent of respondents had a degree in biology, chemistry, or physics, and 22.3 percent in history, English, and foreign languages; only 3.3 percent had a degree in engineering. In a 2017 survey of schools with an ALA-accredited master's degree program, Clark and Kim [49], found that the majority of librarian graduates had backgrounds in the humanities, 41 percent, and the social sciences, 22 percent. Only 11 percent of librarian graduates had STEM backgrounds.

A small number of engineering librarians in the 1940s engaged in scholarly research or published papers. This is not surprising given that few engineering librarians had advanced degrees or the time and incentive to engage in research. Likewise, only a handful of other librarians reported publications, mostly unpublished works. Library administrators during the 1940s were more likely to engage in research and publish their work, perhaps because more of them had advanced degrees and different expectations than frontline librarians. However, the increasing number of

articles written by engineering librarians in the late 1940s suggests that working conditions and professional expectations were beginning to change. It is likely that the emergence of organized engineering librarian communities in ASEE and ACRL in the 1940s encouraged more librarians to engage in research in the 1950s and beyond. Today, many engineering librarians are active researchers and publish their work in various library and engineering education journals and conference proceedings [50].

Although many engineering librarians in the late 1940s were members of ASEE and/or ACRL, the *Directory* does not provide evidence on whether they were active members. For example, it does not include conference attendance records or leadership roles within organizations. However, the engineering librarian communities in ASEE and ACRL did organize conference programs at national conferences from the late 1940s onward. Some of the papers presented at these conferences were eventually published in journals and conference proceedings. Eight engineering librarians and former engineering librarians served as chairs of the Engineering School Libraries Committee of ASEE in the 1940s and 1950s.

10. Concluding Remarks and Future Research

This study describes the academic engineering librarian community in the 1940s and early 1950s based on an analysis of a small dataset compiled from the *Directory of College Engineering Library Personnel*. Although it reveals the general characteristics of an emerging librarian community which is not well known today and highlights a few details about individual members of that community, it is an incomplete picture. Further research is required to fully understand and appreciate the contributions of engineering librarians in the mid-20th century and their influence on the development of engineering librarianship to the present day. This research will be difficult and time-consuming. Many interesting facts and stories about engineering librarians are in obscure publications, unpublished reports, archival files, and long forgotten obituaries. For example, in 1954, Hilda J. Alseth, the engineering librarian and an assistant professor of library science at the University of Illinois, retired after 35 years of service. Her entry in the *Directory* is sparse but notes that she published an article on encouraging good reading habits among engineering students in the *Journal of Engineering Education* in 1926 [51]. At first glance, it appears that Alseth had a long but unremarkable career. On her retirement, however, she was fêted at two banquets organized by the Department of Civil Engineering and the College of Engineering [52]. Almost a year after her retirement, the College of Engineering and members of the professional engineering community were still acknowledging her contributions. One tribute noted “It was her unceasing efforts and whole-hearted devotion which built for us the finest Engineering Library of any school in the country [53].” There are potentially hundreds of similar stories about engineering librarians waiting to be re-discovered.

11. Acknowledgements

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12. Appendix: Engineering Librarians and Other Library Staff from the *Directory of College Engineering Library Personnel*

Key: (1) ALA/ACRL member; (2) ASEE member; (3) officer or committee member of ACRL or ASEE; Italics: library administrator.

Brown University

- *Philip Leslie, Head, Physical Sciences Library*[1]

University of California, Berkeley

- *Donald Coney, Librarian*[1]
- Alan Covey, Assistant Head, Engineering Library
- Blanche Harris Dalton, Librarian, Engineering Library[1,2]
- Beverly Hickock, Librarian 1, Institute of Transportation and Traffic Engineering Library
- Judith C. Morton, Librarian 1, Engineering Library

University of California, Los Angeles

- Johanna E. Allerding, Librarian, Engineering Library[1,2,3]
- Catherine Alice Birch, Assistant Librarian, Engineering Library

California Institute of Technology

- Katherine G. McColgan, Aeronautics Librarian

California State Polytechnic College

- *Ainsley A. Whitman, Librarian*[1]

Carnegie Institute of Technology

- Thelma Pauline Masticola, Librarian, Engineering Library

Case Institute of Technology

- *Mary F. Pinches, Supervising Librarian*[1,2]

Clarkson College of Technology

- *Charles Penrose, Assistant Professor and Librarian*[1,2]

Clemson College

- *Cornelia Ayer Graham, Librarian*[1]

Colorado School of Mines

- *Mary E. Hoyt, Librarian*[2]

Columbia University

- William S. Budington, Engineering Librarian[1,2]

Cooper Union

- *David K. Berninghausen, Librarian and Professor of Bibliography*[1]
- Harold C. Whitford, Engineering Librarian

Cornell University

- Margaret M. Caffrey, Assistant Librarian, College of Engineering[1]
- Jeanette Poor, Librarian, College of Engineering[1,2,3]

Dartmouth University

- Abbie Harriet Metcalf, Librarian, Thayer School of Engineering[1,2]

University of Denver

- Harold Bellingham, Cataloger and Library Representative to the College of Engineering

Detroit Institute of Technology

- Nora Phyllis McDermott, Technological Librarian

Drexel Institute

- Fannie Cox Hendrie, First Assistant Librarian and Assistant Professor[1]
- *Marie Hamilton Law, Librarian, Drexel Institute and Dean, School of Library Science*[1]
- Frances Wright, Librarian[1]

Duke University

- Ethel Long Kale, Librarian, College of Engineering

Engineering Societies Library

- *Ralph H. Phelps, Director*[1]

Fenn College

- *Emil Stefanic, Acting Librarian*[1,2]

University of Florida

- Kenneth W. Morrow, Engineering and Sciences Librarian

Georgia Institute of Technology

- *Dorothy M. Crosland, Librarian*[2]

Harvard University

- Agnes Gallagher, Assistant Librarian, Graduate School of Engineering[1]

- Natalie Neill Nicholson, Librarian, Graduate School of Engineering[1,2]

University of Illinois, Chicago

- *David K. Maxfield, Librarian*[1,2]

University of Illinois, Urbana-Champaign

- Hilda Josephine Alseth, Engineering Librarian and Assistant Professor of Library Science[1,2,3]
- *Harold Lancour, Professor of Library Science and Assistant Director, Library School*[1,2,3]

Illinois Institute of Technology

- *William H. Hyde, Librarian and Professor of Library Science*[1,2,3]
- Catherine A. Simms, Reference Librarian and Instructor of Library Science[1]

Johns Hopkins University

- Elizabeth Hay Denue, Engineering Librarian[1]

University of Kentucky

- Mary Frances Pope, Engineering Librarian[1]
- *Margaret Helmsing Tuttle, Head, Department Libraries*[1]

Lewis College of Science and Technology

- Helen E. Saunders, Librarian[1]

Louisiana Polytechnic Institute

- Caroline Paddock, Engineering Librarian

Louisiana State University

- Lena Evelyn Taylor, Engineering Librarian[1]

Manhattan College

- *Brother Aurelian Thomas, Director of Libraries*[1]

Marquette University

- Ruth O. Griffin, Assistant Librarian, Engineering Library

University of Maryland (College Park)

- *Harold Rovelstad, Acting Director of Libraries*[1,2]

Massachusetts Institute of Technology

- Eleanor L. Bartlett, Stack Librarian[1]

- Ruth Aiken Bristol, Associate[1]
- Isabell N. Britton, Assistant Librarian[1]
- Marguerite Chamberlain, Eastman Librarian[1,2]
- *Margaret Paige Hazen, Assistant to the Director of Libraries*[1]
- Ruth McGlashan Lane, Vail Librarian[1,2,3]
- Ralph R. McNay, Engineering Librarian, Dewey Library
- Randi C. Richards, Walker Memorial Librarian[1]
- *William Seaver, Librarian Emeritus*[1,2]
- Mirian Sprague Smith, Reference Librarian[1]
- Sibyl Eleanor Warren, Lindgren Librarian[1]

University of Michigan

- Harriet White Arklie, Senior Divisional Librarian, East Engineering Library
- Edna Myrtle Poe, Senior Divisional Librarian, Transportation Library
- Nancy Ann Raisbeck, Junior Divisional Librarian, Engineering Library
- Ellen Katherine Theurer, Associate Divisional Librarian, Engineering Library[1,2]
- Francis Marris Williams, Junior Divisional Librarian, Transportation Library

Michigan College of Mining and Technology

- *Madeleine Gibson, Librarian*[1,2,3]
- *Florence M. McGee, Assistant Librarian and Cataloger*[1,2]

University of Minnesota

- Gertrude I. Veblen, Principal Librarian (Engineering)

Mississippi State College

- Dorothy Goode Pandolfi, Reference Assistant and Supervisor of Engineering Library
- *Donald E. Thompson, Director of Libraries*[1]

University of Missouri

- Molete Josephine Morelock, Librarian, College of Engineering[1]

Missouri School of Mines

- *Earl J. Randolph, Librarian*[1]
- Mary Carolyn Somerville, Reference Librarian[1]

Montana School of Mines

- *Loretta B. Peck, Librarian and Assistant Professor*[1]

University of Nebraska

- Paul Lavern Knapp, Divisional Librarian in Science and Technology

New Mexico College of Agriculture and Mechanic Arts

- *Elise J. Rosenwald, Circulation Assistant*[1]

New Mexico School of Mines

- *William Martin Speare, Librarian*[1]

City College of New York

- John B. O'Farrell, Technology Librarian[1,2,3]
- Robert E. Whitford, Physics-Chemistry Librarian[1,3]

New York University

- Saul Herner, Engineering Librarian

Newark College of Engineering

- *Ira Tumbleson, Librarian*[1,2,3]

North Carolina State College of Agriculture and Engineering

- Katherine McDiarmid, Librarian, School of Textiles

North Dakota Agricultural College

- Mary E. Zimmer, Librarian, Engineering Department Library

Northeastern University

- *Myra White, Librarian*[1,2]

Northwestern University Technological Institute

- George S. Bonn, Librarian[2,3]

Notre Dame University

- Mary Joan Strobel, Engineering Librarian

Oregon State College

- Margaret M. Field, Engineering Librarian[1,2]

University of Pennsylvania

- Kathryn Tighe Hartzell, Librarian, Moore School of Electrical Engineering Library
- Rose Eva Lonberger, Librarian, Towne Scientific School Library

Pennsylvania State College

- Margaret Carnegie Gauger, Engineering Librarian

Purdue University

- Eleanor L. Johnson, Librarian, Department of Physics Library[1]

- *John H. Moriarty, Director of Libraries*[1]
- Ruth Tarlton Power, Librarian, Department of Chemistry Library[1]
- Esther M. Schlundt, Reference Librarian[1]

Pratt Institute (Brooklyn, New York)

- Helen L. Hanlon, Head, Engineering Reference Department

Rensselaer Polytechnic Institute

- *Edward A. Chapman, Librarian*[1,2,3]
- Caroline Curtis Drake, Librarian[1]

Rhode Island State College

- *Francis P. Allen, Librarian and Professor of Bibliography*[2]

Rice Institute

- *William S. Dix, Librarian*[1]
- David M. Webb, Associate Librarian and Science Reference Librarian[1,2]

University of Southern California

- Isabelle Farnum, Librarian, Engineering Library

Stanford University

- Katherine E. Johnson, Engineering Librarian[2]

Syracuse University

- RuWet M. Bell, Branch Librarian, College of Applied Science

University of Tennessee

- Wanda Claire Pringle, Engineering Librarian

University of Texas

- Maguerite E. Fritz, Assistant Engineering Librarian

Texas A&M and Texas Engineers Library

- Robert Edward Betts, Engineering Librarian
- Lila M. Foss, Senior Assistant

Tri-State College

- *Eleanor Louise Tarbell, Librarian*[1]

University of Tulsa

- Jeanne F. Frost, Technology Librarian

U.S. Air Force Institute of Technology

- *Helen Margaret Tattershall, Librarian*[1]

U.S. Naval Engineering Experiment Station

- *Lois Ease Kohler, Cataloger and Reference Assistant*[1]
- Martha Morris, Librarian[1]

Utah University

- Edith Richards, Engineering Librarian[1]

University of Virginia

- N. Imogene Copps, Librarian, Department of Engineering[1]

Virginia Polytechnic Institute

- Helen Cliff Converse, Engineering Branch Librarian[1,2]

Washington University

- Gordon Stuart Baillie, Engineering Librarian

Wayne University

- Eleanor Castle Roberts, Technical Assistant Librarian, Kresge Hooker Scientific Library
- Marie Kelly Shaw, Assistant Librarian and Head, Kresge Hooker Scientific Library

University of Wisconsin

- Frederick Eugene Volk, Librarian, College of Engineering

Worcester Polytechnic Institute

- *Bonnie Blanche Schoonover, Librarian*[1,2]

University of Wyoming

- *Mary E. Marks, Librarian*[2]
- Lois Butler Payson, Half-time Assistant[1]

Yale University

- Helen Jeanette Moss, Librarian, Engineering Library

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