

Who Chooses Sci-Tech Librarianship?

Jill M. Hackenberg

Why and how do librarians and graduate students decide to enter the field of sci-tech librarianship? A survey was created and distributed using e-mail discussion groups to answer this question. Factors relevant in this decision were solicited from both practicing sci-tech librarians and library school students. The three hundred eleven respondents included personal opinions and anecdotes in their replies. Topics discussed included the influence of a sci-tech background on job performance and professional association membership. In addition, some questions dealt with perceived expectations about sci-tech librarianship and their outcomes. Most of the respondents had come into sci-tech library positions with some type of background.



Articles on sci-tech librarians frequently focus on the shortage of librarians for sci-tech positions who actually have some type of science background. Barbara I. Dewey reported that “there exists a critical shortage of librarians with science backgrounds needed to fill all available positions.”¹ The standard thinking from the literature, going as far back as 1968, has been that “in general, lack of background is a handicap” and that “The ideal candidate ... would be a graduate in appropriate sciences who is also a qualified librarian.”^{2,3} But is this still accurate? Do librarians in sci-tech libraries continue to have minimal, if no, science background? Ellis Mount’s 1975 study also found that 54 percent of sci-tech librarians do not have degrees in “appropriate sciences.”⁴ His statement assumed that a degree is the best preparation one could have to

become a sci-tech librarian. But how does other experience or background influence the practicing librarian? In a 1984 article, Kathleen Haselbauer admitted that “a science degree, which immediately implies specialization, cannot possibly prepare one to be proficient in the many and varied disciplines being taught.”⁵ A 1985 survey of science librarians found that although only 32 percent had degrees in sci-tech areas, 51 percent had some collegiate science training.⁶

When hiring for sci-tech library positions, studies show that organizations feel that “it is probably wiser to hire an applicant with the desired science academic background than one without this qualification.”⁷ If one does come into a position with this type of knowledge, does it help, and in what ways? Does having a sci-tech background influence a student to apply for jobs in these areas? What

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about students who have no science background? Do they tend to shy away from applying for sci-tech jobs? Dewey's study of job postings for science positions noted that "there are not enough (librarians) with science degrees to go around."⁸ Based on her statement, what happened to those without a background who were hired as sci-tech librarians? How did they feel when starting their job, and what factors influenced their decision to accept a job that required something that they could not offer? Few studies have been done that examine the reasons why sci-tech librarians decided to enter this field. This study builds on previous research into sci-tech librarianship but also looks at job expectations and factors that have played a role in the choice of this career.

Purpose of the Survey

A survey was developed and administered with the purpose of collecting data on how librarians and students decide to enter the field of sci-tech librarianship. Factors relevant in this decision were solicited. In addition, the survey included open-ended questions designed to obtain personal opinions and anecdotes on how each person entered the field. The influence of a sci-tech background on job performance also was explored. Other questions dealt with perceived expectations about sci-tech librarianship and their outcomes.

Survey Instrument

The survey instrument described in this research was pilot-tested by five persons: two librarians and three library school students. It was modified based on their suggestions.

Data Collection

Survey instruments were distributed via e-mail the week of May 10, 1999, to eight discussion groups. These groups, which are listed below, were targeted for the survey because of their scientific emphasis and focus on the practicing librarian:

STS-L	ACRL, Science and Technology Section
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CHMINF-L	Chemical Information Sources
ELDNet-L	ASEE, Engineering Libraries Division
SLAPAM-L	SLA, Physics-Astronomy-Mathematics Division
SLA-ENG	SLA, Engineering Division
SLA-AERO	SLA, Engineering Division, Aerospace Section
SLA-DPER	SLA, Petroleum and Energy Resources Division
SLA-ST	SLA, Sci -Tech Division

In addition, student discussion lists at schools that offer an MLS program were targeted, specifically to obtain a student's perspective. These e-mail groups represent universities throughout the United States whose student bodies are of various sizes. These schools include:

- SUNY-Buffalo
- University of California, Los Angeles
- University of Illinois at Urbana-Champaign
- University of Maryland at College Park
- University of North Carolina at Chapel Hill
- University of Pittsburgh
- University of Tennessee, Knoxville
- University of Texas at Austin

For the purposes of this survey, sci-tech included biology, chemistry, engineering, physics, astronomy, mathematics, geography, geology, and computer science and excluded medicine, pharmacy, nursing, and psychology. Those with experience in academic, corporate, public, government, and special libraries were invited to respond. The persons who replied to the survey participated by choice and thus represent a self-selected group. From the results, it appeared that some users forwarded the survey to e-mail discussion groups other than the ones listed above, which was indicated by the headers of many of the e-mail replies. This would mean many more persons had an opportunity to reply. Although respondents were given three weeks to fill out and return the

survey, the majority returned their replies within four days. The majority of the surveys were returned via e-mail, two were faxed, and one was airmailed.

To analyze the data, the Statistical Package for the Social Sciences (SPSS) was employed. Data from the surveys were coded into SPSS. Frequency tabulations and basic tables were produced to obtain descriptive measures of the replies.

Results

User Demographics

Table 1 shows that of the 311 replies received, 294 (94.5%) were from practicing librarians. Only 9 (2.9%) were from students. A "Both" category was added for the 8 respondents (2.6%) who were both librarians and students. With regard to gender, 236 of the respondents (75.9%) were female and 75 (24.1%) were male, as shown in table 2.

Motivation for Job Choice

Question 3 addressed the reasons why a person chose to become a sci-tech librarian. Users were asked: Prior to your first sci-tech position, did you know you wanted to be a sci-tech librarian? Respondents were asked to answer yes or no and, if needed, to give some explanation. They then were asked to select their reasons for choosing sci-tech librarianship from among five options, with the sixth option being "other." The results for each section of this question are summarized in figure 1. Totals add up to more than 100 percent because multiple responses were allowed. Some respondents replied both yes and no to this question, checking many factors in each category. All of their replies were recorded, regardless of the number of reasons checked. "Other" replies are described

TABLE 1
Demographics

	No.	%
Librarian	294	94.5
Student	9	2.9
Both	8	2.6
Total	311	100.0

at the end of this section. For all yes replies together, 169 (54.3%) noted that they intended to become sci-tech librarians. For all no responses, 109 (35.0%) did not originally intend to become sci-tech librarians.

These results can be compared to the replies from question 4: What type of librarian did you want to be before your first library job? Many different areas of librarianship were listed, including: children's librarian, systems librarian, archivist, cataloger, young adult librarian, public librarian, and serials librarian, to name a few. Of course, corporate and sci-tech also were mentioned. Seven (2.3%) of the respondents did not know where they wanted to work, and eighteen (5.8%) did not reply to the question.

It is interesting to note the large number of librarians who did not intend to become sci-tech librarians (35.0%). The most frequent reason given for this seems to be the need for any job in any type of library (22.5%). This may be connected to Rachel Singer Gordon and Sarah Nesbeitt's finding that "a significant number of librarians, 28%, successfully switched from one library type to another." This was reported in their 1999 study of librarians' attitudes about job satisfaction and state of the profession.⁹ One quarter of the librarians in this study moved from either public or academic to special libraries. This finding also may explain how many librarians without science backgrounds end up in sci-tech libraries.¹⁰

Respondents who answered yes and no to question 3 add up to 89.3 percent. Ninety-seven (30.2%) persons chose "Other" as their answer to question 3. They then noted in their own words how they came to be in their current position.

TABLE 2
Gender

	No.	%
Female	236	75.9
Male	75	24.1
Total	311	100.0

FIGURE 1
Yes and No Responses to Question 3

3. Prior to your first sci-tech position, did you know you wanted to be a sci-tech librarian?

3a. IF YES, what were the reasons for this decision? (Mark all that apply.)

N	Percentage	
146	46.9%	__ I had a background in the sciences
89	28.6%	__ I had an interest/hobby in the sciences
42	13.5%	__ I heard it's easier to get a library job
22	7.1%	__ I heard there are higher salaries
15	4.8%	__ I heard it was easier to relocate and find a good job quickly

For all "Yes" replies together, 169 (54.3%) noted that they intended to become sci-tech libraries.

3b. IF NO, and you did not originally intend to work in a sci-tech library, what factors caused you to change your mind? (Mark all that apply.)

N	Percentage	
70	22.5%	__ I needed a job, in any library
42	13.5%	__ I had a background in the sciences
32	10.3%	__ I had an interest/hobby in the sciences
29	9.3%	__ I had an internship in a sci-tech library
7	2.3%	__ I heard it's easier to get a library job
9	2.9%	__ I heard there are higher salaries
4	1.3%	__ I heard it was easier to relocate and find a good job quickly

The majority stated that they fell into it due to special circumstances or had worked previously for the organization in another capacity and then took a position in the library due to vacancy or a desire for a job change at that location, for example. Some of the respondents' comments include:

- "With the drastic budget cuts at our university (libraries always get it first, you know!) and the loss of our librarian, I assumed the volunteer job of keeping the library running."
- "I was a research assistant and heard about a job opportunity at the local library, applied and got the job."
- "Wanted a career with a broader view of science than simply working in a lab as a technician. My intent was to work as a librarian for awhile and then go back to grad school in the sciences, but other aspects of life intervened and I've now been a librarian for 20+ years."
- "I started out as a science teacher.

Then I became a school librarian. From this position, I became an academic librarian."

- "After spending a summer doing research in a chemistry lab, I decided that, while the continual purification and re-running of experiments did not appeal to me, the library research really excited my fancy."
- "I knew I didn't want to teach, and I was service oriented."
- "Took a sabbatical. When I came back, I was asked to be the sciences bibliographer because the search had failed to obtain a person for the position."

Scientific Background

Almost 60 percent of the respondents stated that they had had some type of scientific background before starting their positions as sci-tech librarians (questions 3a and 3b; N = 186). If two replies from question 3 are combined, "I had a background in the sciences" and "I had an interest/ hobby in the sciences," the results

show that 221 (71.1%) came into their jobs with this type of knowledge. Question 5 asked respondents whether this background was helpful in their library positions. The majority (216, or 69.5%) said, "Yes, it was helpful," compared to four respondents (1.3%) who said it was not helpful. This response is to be expected because any subject background in a particular area usually is useful to the librarian in a position using that subject knowledge. Numerous comments concerning the helpfulness of their background/interest were received concerning this question. Most of them were positive, as follows:

- "Users are more psychologically comfortable discussing needs with people who share similar or the same background. In research institutions there is also the prestige factor."

- "Very. It helps to establish credibility both with colleagues and with faculty I work with. Plus, I make more money."

- "Yes very much so, both in terms of subject knowledge and in understanding the academic science culture."

- "The science background has been invaluable for both reference and collection development activities. Also, it has given me an additional level of respect from the faculty in my subject areas."

"Definitely," "extremely," "yes, very much," "critical," "essential," and "immensely" were some of the overall summarizing comments for this section. Many users noted that they felt more comfortable and familiar with scientific terminology and that their knowledge helped them communicate with clients/patrons. Others thought that understanding the scientific method and knowing how scientists think were helpful. Some comments implied that having the background makes a difference in the hiring process:

- "Yes, very much. When I graduated, I had two job offers on the same day because of the background in physical science/engineering."

- "Absolutely. I am the subject specialist. If I did not already know the lingo, the databases, the journals, etc., my job

would be impossible. Subject knowledge was a requirement for the job."

- "Yes. It provided me a specialty within general library environments (public and university). As an aerospace solo librarian, it now gives me credibility with my users since I can communicate with them about their information needs. Having the sci-tech background also opened some doors for my first jobs since, apparently, hard science backgrounds are rare in libraries."

- "Yes, very much so. We need to have a second master's degree in a subject specialty to be even considered for an academic library."

- "Somewhat. It provides a common vocabulary and confidence, but people without a background often pick this up pretty easily. I think it's most important for getting the job in the first place."

- "My undergraduate work (physics/geology) is highly applicable to my current job. In fact, [it's] one of the main reasons I was hired. I'm a strong believer in relevant subject degrees for librarians."

Others commented on the effect in their jobs of not having a scientific background jobs:

- "No sci-tech background at all—often believe that it would be helpful, but my patrons are really great about explaining the chemistry, etc."

- "I don't have a sci-tech degree or background, and there are times when I wish I did so I could discuss subject matter with more confidence. I also think it would give me more clout with some of the more 'difficult' science faculty."

- "I do not have a life science background, although I feel strongly that a degree or experience in biology would be useful for someone with my job."

- "I didn't have sci-tech, but I had a Ph.D., which the research faculty liked. Meant I could understand the research process and their problems."

- "I have no sci-tech background, but it definitely would have helped if I had done some research in chemistry or engineering. I would have been aware of the pitfalls in hunting down certain types of info."

- "I do not have a sci-tech background, but it would be helpful in my job. I would counsel anyone who is interested in sci-tech library work to get an undergraduate degree in a science discipline. In fact, I would counsel anyone interested in librarianship to get a subject degree first. I was not given good advice by my undergraduate college counselors."

- "I do not have a sci-tech background but have found that that has had no bearing on my ability as a librarian or on my acceptance by the science community."

Thoughts before Entering the Field

Question 6 asked respondents to describe their thoughts before entering into sci-tech librarian positions: What were your thoughts/opinions about what science librarianship was all about? Question 6a asked whether their thoughts subsequently proved to be true: Practitioners, were these proven to be true in your experience?

Most users replied to their questions with some type of comment. Their comments seemed to break down into seven main themes:

- concern that a person needs to have some type of scientific knowledge coming into the position (twenty-three comments, mainly from individuals with little or no previous background);

- concern that the job would be more "difficult" or "harder" than working in another type of library, mainly due to the "complicated" vocabulary and narrowness of the sci-tech fields (fourteen comments);

- concern that the job would be "boring or dull" (six comments);

- gratification that the librarians feel they can "make a big difference" and work in "exciting, cutting-edge" areas of research and knowledge (fifteen comments);

- disappointment that "close working relationships with researchers and scientists" are not to be found (eighteen comments);
- happiness that any science back-

ground or knowledge they brought into their jobs is "being utilized" (twenty-one comments);

- no concern at all, feeling that it would "not be different from any other type of library setting" (twenty-four comments).

In summary, it seems that experiences with this type of work vary according to the type of library in which a person works. Often those who looked forward to using their personal knowledge were in positions that did not allow them to put it to use; some mentioned that they "attend lots of meetings and do clerical-type things." Others initially worried about coming in without a background and found that basic reference skills are a must in answering questions in any field ("It's easy to pick it up as you go along"), although the "learning curve was steep at first." In academic positions, librarians said that faculty could be both "prickly" and "helpful" and that serving undergraduate populations does not require additional scientific education that may be needed in other areas. Corporate librarians said that database searching, rather than reference questions, had started to dominate their daily work; and some wished they were better respected in their workplaces.

TABLE 3
E-mail Domain

	No.	%
.edu (educational)	187	60.1
.com (commercial)	64	20.6
.ca (Canada)	20	6.4
.gov (governmental)	9	2.9
.au (Australia)	6	1.9
.net (network)	6	1.9
.org (organization)	6	1.9
.mil (military)	5	1.6
.us (United States)	3	1.0
.nz (New Zealand)	2	0.6
.fi (Finland)	1	0.3
.ie (Ireland)	1	0.3
.nl (Netherlands)	1	0.3
Total	311	100.0

TABLE 4
Graduate School Attended

	No.	%		No.	%
In Canada	26	8.4	San Jose State	4	1.3
Illinois	22	7.1	Tennessee, Knoxville	4	1.3
SUNY, Buffalo	17	5.5	In Australia	4	1.3
Maryland	12	3.9	Alabama	3	1
Michigan	12	3.9	Missouri	3	1
Washington	10	3.2	Oregon	3	1
Simmons	9	2.9	South Carolina	3	1
Texas, Austin	9	2.9	Catholic	3	1
Indiana	8	2.6	Vanderbilt	3	1
Hawaii	7	2.3	Iowa	3	1
Arizona	7	2.3	Pratt Institute	2	0.6
North Carolina	7	2.3	North Texas	2	0.6
Syracuse	7	2.3	USC	2	0.6
UCLA	7	2.3	Long Island	2	0.6
Columbia	7	2.3	North Carolina Central	2	0.6
Emporia State	7	2.3	In New Zealand	2	0.6
Kent State	6	1.9	Sam Houston State	1	0.3
UC, Berkeley	6	1.9	St. Johns	1	0.3
Western Michigan	6	1.9	SUNY, Albany	1	0.3
Kentucky	5	1.6	Texas Woman's	1	0.3
Pittsburgh	5	1.6	Wayne State	1	0.3
Rhode Island	5	1.6	Denver	1	0.3
Rutgers	5	1.6	SUNY, Geneseo	1	0.3
Wisconsin	5	1.6	Dominican	1	0.3
Case Western Reserve	5	1.6	Rosary	1	0.3
Drexel	5	1.6	Brigham Young	1	0.3
Florida State	4	1.3	CSU, Fullerton	1	0.3
Louisiana State	4	1.3	In India	1	0.3
Oklahoma	4	1.3			

Internet Domains Represented

Each reply was categorized according to the domain name in the "From:" portion of the respondent's e-mail address. In total, thirteen domains were listed, as noted in table 3. A majority, 60.1 percent (N = 187) had .edu domains. This indicates that the majority of the librarians and students who responded to the survey were working in a sci-tech capacity, but most likely in an academic rather than a corporate environment. However, the growing trend among Internet mail users, at least in the United States, to open a personal account on a popular service such as Hotmail or Yahoo may have distorted the results. Some of these users could make

up the population of 20.6 percent (N = 64) using .com domains.

Graduate School Attended

Table 4 indicates the library schools that respondents listed as having attended in response to question 7. Respondents listed a total of fifty-three colleges and universities in the United States, as well as schools in Australia, Canada, India, and New Zealand. The University of Illinois was the one university listed most frequently. Schools mentioned in countries other than the United States are grouped according to country ("In Canada," for example). Fifteen respondents did not note a school in response to this question; therefore, it may

be assumed that these respondents did not hold an MLS degree.

The next question asked whether the degree program at the respondents' colleges and universities offered a course in sci-tech librarianship. A total of 234 (75.2%) respondents indicated that this type of course was offered, but only 178 (57.2%) said that they actually took the course. Some respondents offered comments on this question, including:

- "(The course) was taught by a faculty member who had never worked in a sci-tech environment."
- "I didn't take it as I had no intention of being a science librarian."
- "My advisor told me with my background it would be a waste of my time."
- "Yes, it was an excellent course."
- "No, (didn't take it) I had my internship, which was 1000% better."
- "No, because I never intended on doing reference."

This survey found that almost 60 percent of respondents came into their sci-tech positions with some type of science background.

The statistics and comments indicate a desire among students to enroll in this kind of course, but a lack of interest among some students in taking the course while pursuing their degree, perhaps because of plans to enter another aspect of library work.

Professional Memberships

Question 10 solicited information about membership in professional organizations. Six options were listed, along with an "other" category and a request to note what these other groups were. The results were amazing. The respondents listed a total of 103 different professional organizations. The top ten are listed in table 5. The Special Libraries Association was listed most frequently, with 187 respondents (60.1%) belonging to this international organization. Many state and regional organizations, such as the Texas Library Association (TLA), are on the list. Others are for university professionals or are honorary societies. A wide range of subject areas was represented, the most frequent being that of engineering, with 38 respondents (12.2%) in the American Society for Engineering Education (ASEE). Other subject-oriented groups included those for textiles, geosciences, chemistry, agriculture, medical librarianship, competitive intelligence, math, patents, horticulture, computing, serials, archives, maps, petroleum, geography, physics education, metals, army libraries, drug information, zoos, aeronautics, and women in the sci-tech fields.

The number of organizations that serve practitioners is impressive. In whatever area a librarian may be working, there probably is an organization of people who are like-minded and seek to communicate with others in the same area.

TABLE 5
Association Memberships; Top 10

No.	%	Acronym	Name
187	60.1	SLA	Special Libraries Association
113	36.3	ALA	American Library Association
84	27.0	ACRL	Association of College and Research Libraries
38	12.2	ASEE	American Society for Engineering Education
24	7.7	ACS	American Chemical Society
22	7.0	ASIS	American Society for Information Science
14	4.5	GIS	Geoscience Information Society
12	3.8	LITA	Library and Information Technology Association
10	3.2	CLA	Canadian Library Association
8	2.5	USAIN	U.S. Agricultural Information Network

Conclusion

This survey found that almost 60 percent of respondents came into their sci-tech positions with some type of science background. The majority of these noted that in many cases this background or experience has been essential to them in their work. For those who came into sci-tech librarianship without a sci-tech background, some found that the learning curve was a bit steep, whereas others felt their lack of background presented no obstacle at all in their jobs. These differences could be due to a variation in depth of sci-tech knowledge and job duties. A surprising 35 percent never intended to become sci-tech librarians, and 30 percent reported special circumstances that led them to take sci-tech positions. Based on the responses, it appears that sci-tech librarians frequently pursue other positions or careers before choosing sci-tech librarianship. Viewpoints about career choice and job experiences were solicited and summarized. Respondents were asked about their expectations regarding sci-tech librarianship prior to their first positions, with many noting it would be "more difficult" than other types of librarianship and others thinking it would be "no different from any other type of library." Users were enthusiastic about replying and commenting on this topic. They felt comfortable (in this setting) telling the researcher about both their joys and disappointments with their jobs.

The group was asked which graduate school they attended and whether a course covering sci-tech librarianship was offered. Seventy-five percent indicated that a course was offered, but only 57 percent said they took it. Some of those who did take the course discussed whether it was helpful in their careers. A question about membership in professional associations yielded a list of more than a hundred professional organizations.

Suggestions for Further Research

Although this study was successful in obtaining respondents' feelings and opinions about how they became sci-tech librarians and their experiences in their professional

positions, many questions linger that could be addressed by further study.

For example, the frequency of a second master's degree in a science subject area and its impact in the work environment could be explored. Alternatively, some sci-tech librarians have no MLS but do have some type of subject background and/or degree. What are the implications of both of these situations for these librarians, their work, and their patrons? If, in fact, a librarian has no prior sci-tech knowledge but does have many years of experience, does this on-the-job experience somehow "make up" for a degree or background? For those who have been practicing sci-tech librarians for a decade or more, what changes have they observed in the field over the years? Do they see changes in the way librarians are trained to handle sci-tech reference questions or trends in requirements for employment or overall general preparedness on the part of entry-level librarians? Do librarians who received an MLS many years ago rely on continuing education or other, similar postgraduate courses to sharpen their skills and increase their knowledge? Asking questions regarding undergraduate degree, age, and ethnicity could reveal more about the demographics of the body of practicing sci-tech librarians. Other influences could be explored in more detail, such as the influence of family members, school or public librarians, active use of the library as a child, or previous job experience in a sci-tech library prior to pursuing the MLS degree. The effects on library school students of being mentored by current sci-tech librarians could be another factor to investigate.

Soliciting the opinions of sci-tech library directors could reveal whether a relationship exists between sci-tech background or experience and job performance. When hiring, do the directors of sci-tech libraries routinely require an undergraduate or master's degree in appropriate fields? The directors could be asked if this requirement is important for employment in their particular library or overall for the field. This question also

could be answered by reviewing position descriptions for sci-tech librarians.

It was noted that 57 percent of this study's respondents said they took a sci-tech course as part of their MLS program. Is this type of course generally offered across the board in U.S. and Canadian MLS graduate programs? Is it useful only in certain cases, such as when the student has no on-the-job experience in a sci-tech library or when the person who took science courses years ago could benefit from a refresher course? In what circumstances would such a course be ill advised—in cases where the professor has no working experience in a sci-tech library, the student has an undergraduate or graduate degree in the sciences, or the student currently works or previously worked in a sci-tech

library? Are these concerns minuscule compared with the need to educate library students well in all areas of librarianship, including serials management, reference work, cataloging, budgeting, database searching, bibliographic instruction, and reference tools? Studies into the usefulness of subject-focused courses such as sci-tech or medical librarianship could be undertaken and comparisons made among such courses offered at different colleges and universities. In light of the current situation, where there appears to be an extremely low number of MLS students with sci-tech degrees or backgrounds, further study of this population would be beneficial and may help graduate schools with the recruitment and preparation of sci-tech librarians in the future.¹¹

Notes

1. Barbara I. Dewey, "Science Background Required—Others Need Not Apply: A Study of the Science Librarian Hiring Crisis," *ASIS 86: Proceedings of the 49th ASIS Annual Meeting* (Medford, N.J.: Learned Information, 1986), 64–68.

2. Ellis Mount, *University Science and Engineering Libraries: Their Operation, Collections and Facilities* (Westport, Conn.: Greenwood Pr., 1975), 5.

3. The Library Association, Committee on Scientific Library Services, *Scientific Library Services* (London: The Library Association, 1968), 17.

4. Mount, *University Science and Engineering Libraries*.

5. Kathleen Haselbauer, "The Making of a Science Librarian," *Science & Technology Libraries* 3/4 (spring/summer 1984): 111–16.

6. Mount, *University Science and Engineering Libraries*, 2nd ed. (Westport, Conn.: Greenwood Pr., 1985), 50.

7. Robert G Krupp, "What Education Is Best?" *Science & Technology Libraries* 3/4 (spring/summer 1984): 105–10.

8. Dewey, "Science Background Required."

9. Rachel Singer Gordon and Sarah Nesbeitt, "Who We Are, Where We're Going," *Library Journal* 124 (May 15, 1999): 36–39.

10. Mount, *University Science and Engineering Libraries*.

11. Richard C. Pearson and T. D. Webb, "The New Librarians: How Prepared Are They?" *Library Journal* 113 (Sept. 1, 1988): 132–34.