

# An Investigation of the Educational Needs of Health Sciences Library Manpower:

## IV. Characteristics of Manpower in Health Sciences Libraries\*

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### ABSTRACT

A statistical description based on a mail survey of personnel in 2,099 health sciences libraries located outside of the hospital setting is reported. Respondents to the survey were divided into three groups: *professionals* (those possessing a graduate library degree); *nonprofessionals* (those not possessing a graduate library degree); and *chief librarians* (those responsible for a library's operations). Survey items dealt with education, sex, age, salary, job mobility and preference for continuing education programs.

Some 60 percent of the respondents were professionals; 40 percent were nonprofessionals. Seven hundred and twenty-eight chief librarians were identified in the population: 57 percent were professional librarians while the remainder were without a graduate library degree. Approximately  $\frac{1}{5}$  of all survey respondents were men. The age distribution for the work force tended to be bimodal, reflecting the career patterns of women and the later entry of men into librarianship. The annual salary for male professionals was calculated at \$12,732; for female professionals at \$10,044; for male nonprofessionals at \$7,878; and for female nonprofessionals at \$6,313. Male professionals were found to have the highest rates of job and geographic mobility. Conversely, female nonprofessionals were lowest in mobility. In expressing a

preference for continuing education programs in library science, professionals tended to request courses dealing with the organization of libraries, health sciences institutions and their relationships, while nonprofessionals inclined towards courses in technical processing.

### INTRODUCTION

PREVIOUS ARTICLES have described the objectives and design of a study of health sciences library manpower (1, 2) undertaken as a joint project by the University of Texas Medical School at San Antonio and the School of Library Science at Case Western Reserve University. One part of the survey, directed to libraries, elicited data describing the total health sciences library work force in terms of size, composition, location and extent of demand for additional personnel (3). Some 14,938 persons were identified as being involved—directly or indirectly, full- and part-time—in the provision of health sciences library services in 4,727 U.S. libraries. A 7 percent demand for professional librarians and a 3 percent demand for support personnel were found to exist reflecting budgeted, unfilled openings.

The present article reports the results of a second survey directed to individuals in the health sciences library work force. Some 3,581 health sciences library employees were requested

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in late 1969 to complete personal questionnaires. This population of 3,581 represented all professionals and nonprofessionals reported as employed in nonhospital, health sciences libraries and identified by name in the Survey of Health Sciences Libraries, 1969 (professional and nonprofessional being defined here in functional terms (4)). Professionals and nonprofessionals employed in health sciences libraries in hospitals were excluded since they were surveyed concurrently with this study by the American Hospital Association.

The survey instrument\*, entitled Health Sciences Library Personnel Questionnaire, was an eight-page booklet consisting of fixed-alternative questions in four areas:

- a. *Demographic Characteristics:* Age, sex.
- b. *Educational Characteristics:* Academic history; current educational activity; participation in continuing education programs in library science.
- c. *Employment Characteristics:* Salary, tenure and tasks performed in present position; previous library experience.
- d. *Staff Characteristics:* Staff growth and skills hardest to find in prospective library employees (completed by chief librarians only.)

A response rate of approximately 70 percent was achieved. Nonrespondents included 219 chief librarians and some 900 staff librarians and support personnel, located in 446 libraries.

Descriptive generalizations of professionals and nonprofessionals drawn from these data must be qualified in that the survey population of 3,581 was not chosen randomly from the total eligible population (5,666 professionals and nonprofessionals employed in nonhospital, health sciences libraries—the difference of 2,085 being accounted for by the failure of all chief librarians to identify all personnel by name). It should be noted that the analysis below reflects only the available data, and that personnel were located by sequential steps involving identification of institutions, libraries and then names of specific individuals. Inevitably, losses resulted at each step. These limitations—loss of 1,666, and loss of 419 due to postal returns, misidenti-

\* The survey instrument is published in Kronick, Rees, and Rothenberg, *Educational Needs of Health Sciences Library Manpower*, Report No. 1. It is available on request from the authors.

fications, changes of address, etc.—although significant, do not negate the positive value of the data.

Basic statistical data regarding the total work force in health sciences libraries are presented below in at least partial answer to the following fundamental questions:

- a. What are the demographic characteristics of health sciences library employees?
- b. What is the educational preparation of professionals and nonprofessionals in the work force?
- c. What are the essential characteristics of the current employment of professionals and nonprofessionals?
- d. What are the work histories of professionals and nonprofessionals in the work force?

#### DEFINITIONS

In prior survey activity, professional and nonprofessional personnel were defined in the functional terms set forth by the American Library Association in *Library Statistics: A Handbook of Concepts, Definitions and Terminology* (4). A functional definition reflects the nature of tasks performed. This definition is now replaced by one based solely upon educational achievement, since it is important to relate professional education to manpower utilization. A *professional librarian* is defined as an individual who possesses a graduate library science degree (B.S.L.S., M.S.L.S., etc.). A *nonprofessional librarian* is defined as an individual who does not hold a graduate library science degree. A third term basic to the following discussion is that of chief librarian. A *chief librarian* is an individual in charge of a library, either as a sole individual or with responsibility for the supervision of others. A chief librarian may be either a professional or a nonprofessional. The distribution of professionals, nonprofessionals and chief librarians among respondents is shown in Fig. 1.

#### DEMOGRAPHIC CHARACTERISTICS

Statistics on age and sex obtained in the survey indicate that the health sciences library work force is largely female and, among professional librarians, middle-aged. Table 1 illustrates the distribution of men and women in the professional, nonprofessional and chief librarian populations, and compares these distributions to those found for the national work force and for the total library work force. Fig.

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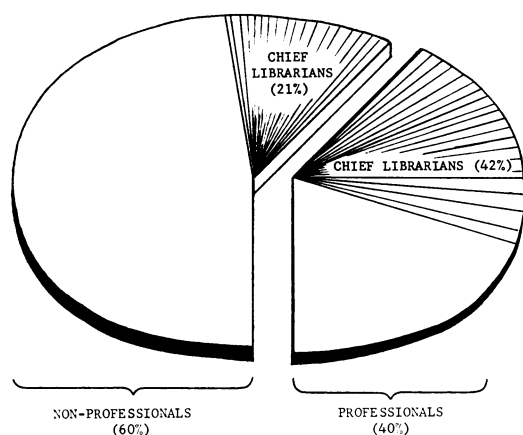


FIG. 1.—Description of Respondents to the Survey of Health Sciences Library Personnel, 1970. N = 2,461.

2 presents data regarding the age distributions in these three populations.

It is interesting to note that although health sciences librarianship is predominantly a female occupation, a higher percentage of men are found among health sciences librarians than in the total library work force. However, the percentage of men is lower in this population than among academic librarians (37 percent) and special librarians (26 percent) (5). Also of interest is the fact that the percentage of men in the chief librarian population is somewhat larger than would be expected considering their distribution in the professional and nonprofessional librarian populations.

Ages of professional librarians form a bimodal distribution. The two peaks occur in the age groups (25–29) and (40–54). A breakdown of this distribution by sex indicates that the first peak is due largely to a high proportion of women in the work force, while the second peak results from an increased proportion of men. This finding appears to reinforce the argument that women often tend to drop out of the work force after thirty due to family responsibilities, and that men tend to choose librarianship as a “second choice” career, entering the field at a later stage than do women. Data concerning the number of years elapsed between achievement of the bachelor degree and the M.S.L.S. for men and women appear to confirm the latter point. The time span between the bachelor degree and M.S.L.S. tends to be longer for men than for women. Ages of nonprofessionals also tend to

form a bimodal distribution, although this distribution is less pronounced than in the case of the professionals.

The age distribution of chief librarians indicates that almost 60 percent of all chief librarians are between the ages of forty and fifty-nine; 17 percent are over sixty years old; and only 4 percent are less than twenty-five years old.

### EDUCATIONAL ATTAINMENT

The survey data indicate that a total of 2,260 professional librarians, possessing a graduate

TABLE 1  
MALE/FEMALE RATIOS FOR PROFESSIONALS, NON-PROFESSIONALS AND CHIEF LIBRARIANS IN HEALTH SCIENCES LIBRARIES, FOR THE NATIONAL WORK FORCE AND FOR THE TOTAL LIBRARY WORK FORCE

SEX	HEALTH SCIENCES LIBRARIES			NATIONAL WORK FORCE*	TOTAL LIBRARY WORK FORCE†
	PROFESSIONAL	NON-PROFESSIONAL	CHIEF LIBRARIANS		
Male.....	21.4%	13.2%	24.0%	63%	14.2%
Female... ..	78.6%	86.8%	76.0%	37%	85.7%
Ratio.....	1:3	1:5	1:3	2:1	1:5

\* Bowker Annual of Library and Book Trade Information. New York: Bowker, 1969.

† U.S. Census of Population: 1960. Subject Report: Labor Reserves. Washington: Bureau of Census, 1966.

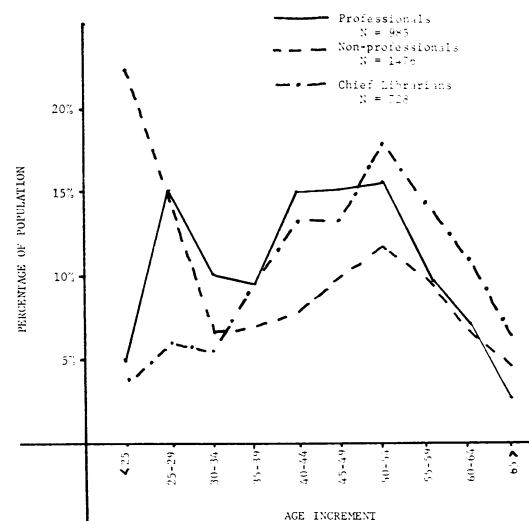


FIG. 2.—Age Distributions of Professionals, Nonprofessionals, and Chief Librarians in Responding Populations. N = 2,461.

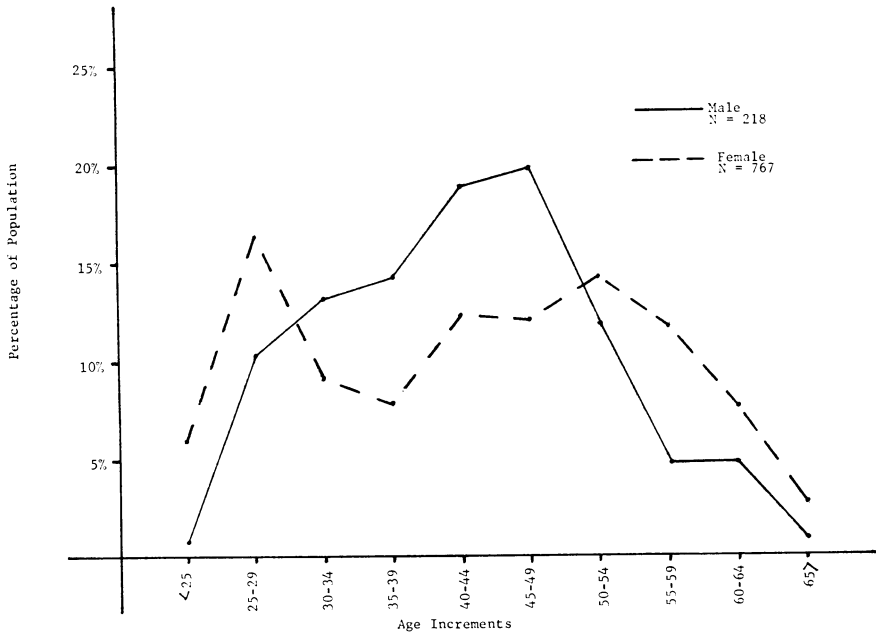


FIG. 3.—Age Distribution of Professional Librarians by Sex

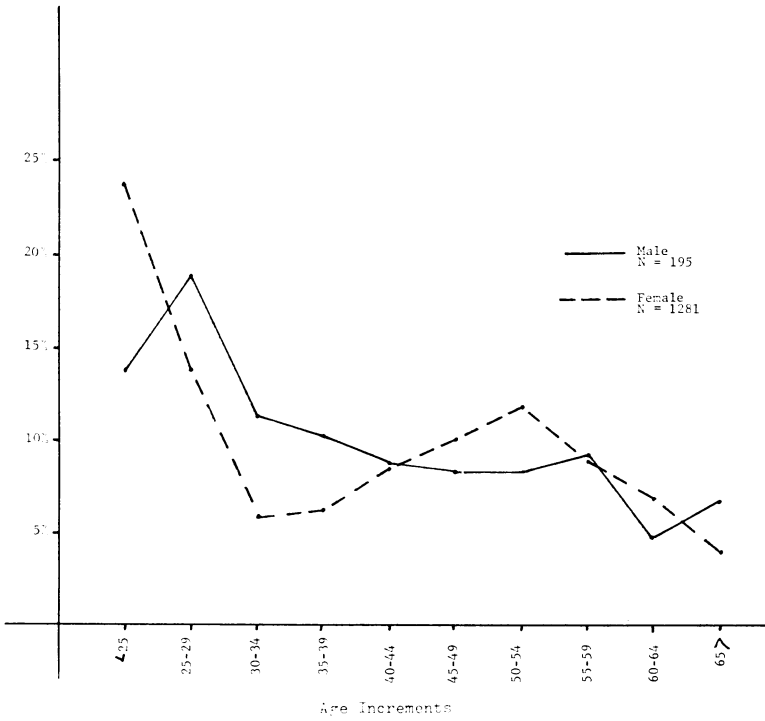


FIG. 4.—Age Distribution of Nonprofessional Library Employees by Sex

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degree in librarianship, are currently employed in health sciences libraries. Some 3 percent of this total reported Ph.D.'s in library science, with the remaining 97 percent holding the master's or bachelor's degree. The nonprofessional population, estimated at 3,400, reflects a generally high level of educational attainment. Approximately three-quarters of the group have continued their formal education beyond graduation from high school. Twenty-nine percent have completed one through three years of college; 20 percent hold bachelor's degrees; 13 percent attended graduate school; and 9.5 percent have attained graduate degrees, including a number of M.D., Ph.D., and D.D.S. degrees. The educational attainment of nonprofessionals employed in health sciences libraries is shown in Fig. 5. The data indicate that most nonprofessionals are well educated and possess the potential of performing sophisticated tasks in libraries. Their job role in relation to professionals has been investigated by means of a Job Task Index which measures the extent to which personnel, both professional and nonprofessional, perform professional tasks as defined on a graphic scale. The results of this study will be reported separately.

Professional and nonprofessional library employees reporting a college education were also asked to indicate their undergraduate majors. A large number of graduates did not have majors in either the natural or health sciences. Three-quarters of the professional librarians held bachelor's degrees in the liberal arts or social sciences, while almost the same number of the nonprofessional graduates also held degrees in the liberal arts or social sciences. Only a small percentage of each group majored in the natural or health sciences. These data have rele-

vance to the current debate concerning the preparation of employees in health sciences libraries. In view of the fact that a majority of the present work force do not have medically-related educations, is a subject-based education in the natural or health sciences necessary for health sciences librarianship? Would the provision of subject knowledge in the health sciences and cognate areas result in an improvement in library services at least equal to the educational investment?

To provide a rough measure of the extent of formal health sciences library education, respondents were asked whether they had attended a course in medical librarianship offered by a graduate library science school. Only 36 percent of the professionals and 5 percent of the nonprofessionals responded affirmatively. It appears that most respondents in these two groups function in health sciences libraries without the benefit either of specialized health sciences library education or of educational preparation in the subject content of the health sciences. The effect of these educational limitations upon job performance remains to be explored.

### NATURE OF INVOLVEMENT IN CONTINUING EDUCATION

Participation in continuing education by the survey population is of particular interest. How frequently do individuals attend continuing education programs? What factors affect their attendance at such programs? What are the expressed preferences for subject topics and how do these preferences correlate with the perceptions of chief librarians as to needed job skills?

It is apparent that frequency of attendance of continuing education programs differs significantly between professional and nonprofessional

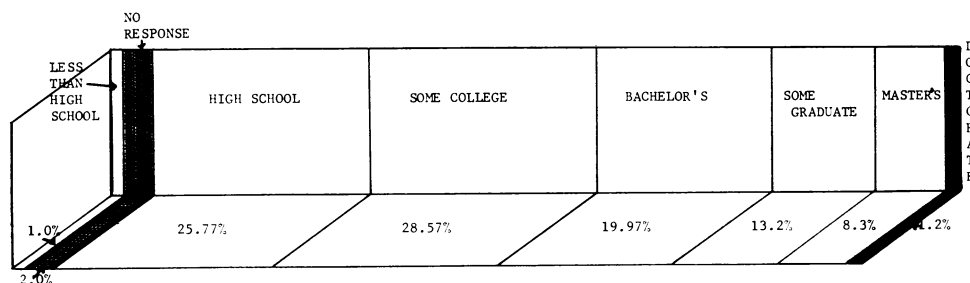


FIG. 5.—Educational Attainment of Nonprofessionals Employed in Health Science Libraries.

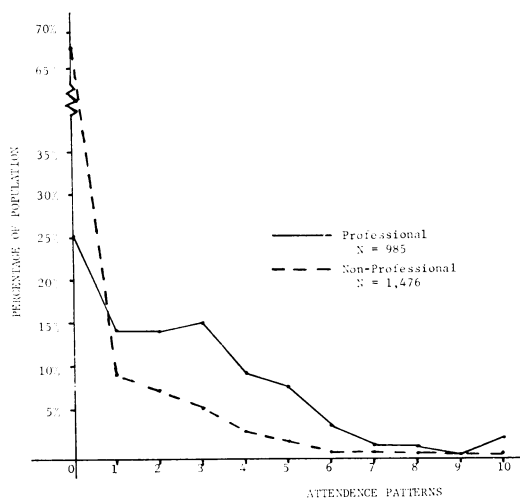


FIG. 6.—Attendance at Continuing Education Programs by Professionals and Nonprofessionals.

respondents. Seventy-five percent of the professionals, contrasted with 43 percent of the nonprofessionals, had attended one or more continuing education programs during the past five years. As the number of programs attended increases, the differences between the two groups remain significant. The frequency of respondents' attendance is illustrated in Fig. 6. The generally lower attendance record of nonprofessionals may be attributed to a number of factors, such as lack of professional motivation, inappropriateness of course offerings, and failure of libraries to provide release time and/or tuition waivers.

The effect of age and geographic location upon attendance of continuing education programs was investigated. Age and attendance correlated at .133 for professional respondents and at .202 ( $\alpha = .05$ ) for nonprofessional respondents.\* Although age has some effect upon

\* In discussing these correlations and others described throughout the analyses, it is important to note the strength of the correlations attained. Because of the large N's in the test groups, even low correlations may attain statistical significance. The question of the meaningfulness of these "significant" correlations must then be resolved. For example, the correlation between income and age for professional librarians is .345—a correlation which is significant at  $\alpha = .01$ . Although the correlation attains a significant level, it does not account for a major portion of the variance. Thus, a meaningful interpretation of the correlation is complicated, and confidence in any *ex post facto* explanation set forth is correspondingly decreased.

attendance patterns, it cannot be interpreted as a major factor. Geographic location does have a marked effect on attendance patterns for professionals, but not for nonprofessionals. Professionals in RML regions II, V, IX and XI attended continuing education courses more frequently than did professionals in other regions. It is evident that opportunities to attend continuing education programs vary from RML region to region. The effect of region is more noticeable for professionals than for nonprofessionals, perhaps because few courses are designed for the specific needs of this group.

The subject areas for continuing education programs arranged in order according to the preferences expressed by professionals and nonprofessionals are shown in Tables 2 and 3. The numbers listed for each subject topic indicate the preferential votes received. The most striking characteristic of the two lists lies in their similarity, although interesting differences in preference for continuing education subject topics appear between professionals and nonprofessionals. The ranked lists correlated at .509 ( $\alpha = .05$ ). A major difference lies in the fact that professionals favored courses dealing with the organization of libraries, health sciences institutions and their interrelationships, while nonprofessionals preferred courses dealing

TABLE 2  
EXPRESSED PREFERENCE FOR CONTINUING  
EDUCATION PROGRAMS BY PROFESSIONAL  
HEALTH SCIENCE LIBRARY PERSONNEL

PREFERRED EDUCATION PROGRAM	VOTES
1. Reference & Other Information Services	505
2. Data Processing Principles and Techniques	328
3. Systems Analysis Techniques	307
4. Material Selection and Acquisition	257
5. MEDLARS Search Procedures	243
6. Cataloging, Indexing, and Classification	231
7. Facilities & Space Planning	147
8. Use of Audiovisual Equipment	143
9. Literature of the History of Medicine	129
10. Use of Statistics in Libraries	128
11. Organization of Health Services	123
12. Scientific Terminology	110
13. Interlibrary Loan	66
14. Circulation Techniques & Procedures	59
15. Literature of Dentistry	23
16. Typing & Other Office Skills	3

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TABLE 3

EXPRESSED PREFERENCE FOR CONTINUING EDUCATION PROGRAMS BY NONPROFESSIONAL HEALTH SCIENCES LIBRARY PERSONNEL

PREFERRED EDUCATION PROGRAM	VOTES
1. Reference and Other Information Services	689
2. Cataloging, Indexing and Classification	411
3. Material Selection and Acquisition	381
4. Data Processing Principles and Techniques	319
5. Circulation Techniques and Procedures	293
6. Interlibrary Loan	242
7. MEDLARS Search Procedures	187
8. Scientific Terminology	180
9. Systems Analysis Techniques	179
10. Typing and Other Office Skills	178
11. Literature of the History of Medicine	158
12. Use of Audiovisual Equipment	153
13. Facilities and Space Planning	125
14. Organization of Health Services	103
15. Use of Statistics in Libraries	80
16. Literature of Dentistry	25

with the technical procedures of library operations. Such differences were not surprising in view of the different job involvements of the two groups.

The expressed preferences for specific subject topics in continuing education courses can be presumed to reflect a self-assessment of skill deficiencies. In this connection, it is of interest to compare the self-assessment of educational needs by employees with the perceptions of employers (chief librarians). The ranks assigned to subject topics for continuing education courses by 728 responding chief librarians are reported in Table 4. The seven subject areas receiving the highest number of votes by chief librarians were in three major areas: (a) selection, acquisition and organization of materials; (b) reference; and (c) automation. Using Spearman's coefficient of ranked correlations, it was found that the correlation between the expressed preference of professionals and the perceived needs of chief librarians was .656, while the correlation for nonprofessionals was .759. These correlations are significant at  $\alpha = .01$ . Thus, the expressed preferences of library personnel for areas of continuing education are closely correlated with the perceptions of chief librarians as to the skill deficiencies of their employees.

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The survey findings indicate that health sciences library personnel are predominantly full-time employees, who have held their present jobs for three years. (Professionals reported a median tenure in their present jobs of 3.50 years; nonprofessionals 2.82 years. Sex does not appear to be a significant factor in job tenure.) Only one percent of the professionals and 3.5 percent of the nonprofessionals are volunteers.

Salary level and its relationship to a number of other variables characterizing library employment is a topic of obvious interest. Annual income data were therefore correlated with (a) professional/nonprofessional status, (b) sex, (c) chief librarian/staff librarian status, (d) Job Task Index scores, (e) nonprofessional educational attainment, (f) staff size and (g) geographic location.

a) Professional/nonprofessional status: Salary distribution for responding professionals and nonprofessionals is illustrated in Fig. 7. Mean income for professional librarians was \$10,640 annually; for nonprofessionals, \$6,510. b) Sex: Significant differences result when sex is introduced as a variable. Amongst professional librarians, men earn an average of \$12,723 annually while women earn \$10,044 annually ( $t =$

TABLE 4

CHIEF LIBRARIANS' ASSESSMENT OF LIBRARY SKILLS MOST DIFFICULT TO FIND IN PROSPECTIVE HEALTH SCIENCE LIBRARY PERSONNEL

SKILL	VOTES
1. Cataloging, Indexing and Classification	239
2. Reference and Other Information Services	162
3. Data Processing Principles and Techniques	130
4. Systems Analysis Techniques	129
5. Material Selection and Acquisition	120
6. Scientific Terminology	109
7. MEDLARS Search Procedures	85
8. Typing and Other Office Skills	60
9. Use of Audiovisual Equipment	55
10. Use of Statistics in Libraries	46
11. Circulation Techniques and Procedures	45
12. Interlibrary Loan	30
13. Organization of Health Services	20
14. Facilities and Space Planning	18
15. Literature of the History of Medicine	17
16. Literature of Dentistry	8

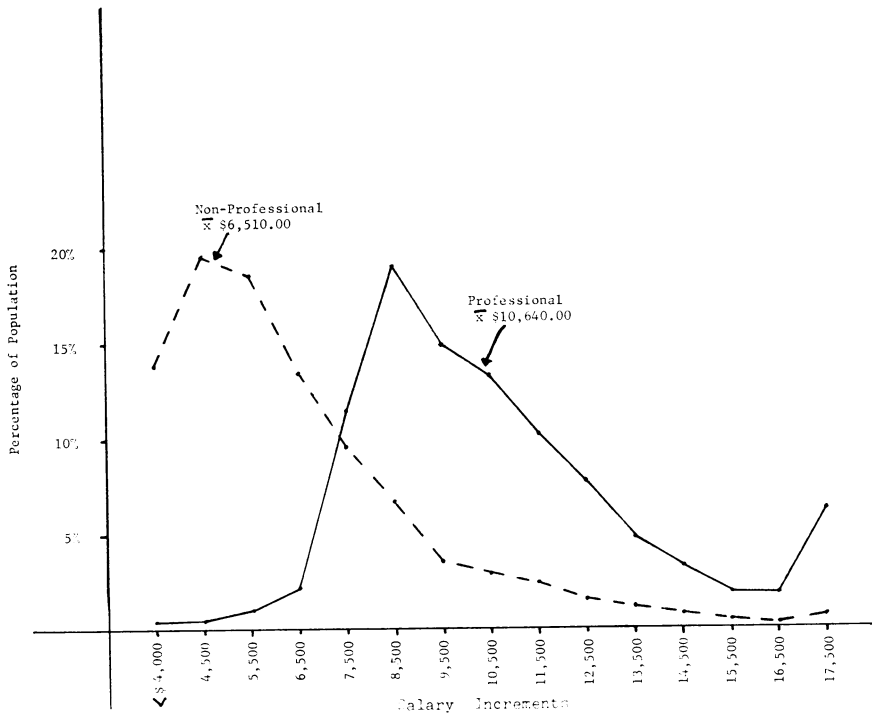


FIG. 7.—Salary Distribution for Reporting Professional and Nonprofessional Health Sciences Library Personnel.

2.97,  $\alpha = .003$ ). Similarly, men employed as nonprofessionals receive annual salaries of \$7,878 while women receive incomes averaging \$6,313 ( $t = 3.64, \alpha = .001$ ). It would appear that women receive less income for performing the same tasks.

c) Chief librarian/staff librarian status: Chief librarians tend to earn more than staff librarians, whether or not they possess a professional degree. A point-biserial correlation showed a .539 ( $\alpha = .01$ ) relationship between high salary and chief librarian status. d) Job Task Index scores: Salary level and Job Task Index scores were shown to correlate at .515 for professionals and at .464 for nonprofessionals. These correlations, although statistically significant at  $\alpha = .01$ , do not indicate a high match between salary level and job level, i.e., tasks performed. e) Nonprofessional educational attainment: Salary level was found to correlate at .447 ( $\alpha = .01$ ) with educational attainment for nonprofessional employees, indicating that many of these persons are probably performing jobs which could be filled by individuals having less education.

f) Staff size: Salary levels were correlated

with library staff size in order to ascertain whether professionals in large libraries were paid more than those in small libraries. It was supposed that professionals in large libraries perform more specialized (i.e., more professional) tasks than professionals in small libraries and that their salaries would be consequently higher. This assumption was not confirmed in that no correlation was discovered between income and staff size for professionals.

From these correlations between salary level and other variables relating to library employment some evidence exists to indicate that the manner in which manpower is utilized in health sciences libraries is far from optimal. It would appear from these correlations based upon salary and other variables that many persons are not performing jobs consistent with either their employment status as professional or nonprofessional, or with their educational attainment; that salary levels cannot be easily equated with tasks performed, and that the division of labor is no more specialized in large libraries than in small libraries. It is reasonably apparent that there is no clear distinction between the tasks per-



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formed by professionals and nonprofessionals which would indicate that employers often pay a premium for the employment of professionals at a higher rate of remuneration.

These questions warrant further study since it can be argued that many aspects of the current manpower shortage in libraries would be alleviated by more efficient utilization of available personnel.

An analysis of variance indicated that geographic location significantly affects salary level. RML regions II, IV, and VII report incomes higher than the national mean for professionals and nonprofessionals. RML region III reported an income for professionals which was higher than the national mean while incomes for nonprofessionals were lower than the national mean. Thus, variations in salary level do exist, which would allow a mobile individual to maximize his income. In order to assess the real salary gains to be obtained by moving between RML's, median salaries would have to be obtained by region controlling for work experience and cost of living variations. Mean salaries by RML regions for professionals and nonprofessionals are recorded in Table 5.

### CHARACTERISTICS OF PREVIOUS EMPLOYMENT

Sixty-one percent of the professional and 89 percent of the nonprofessional respondents reported that they had not worked in health sciences libraries prior to their present employment. Indeed, many of these individuals noted no previous work experience in any library. These data indicate that considerable on-the-job orientation is required, for both professionals and nonprofessionals, in such areas as health sciences library operations and in the literature and terminology of the health sciences.

Among the small group of professionals reporting prior work experience in health sciences libraries, about half had been employed in professional school libraries, 40 percent in hospital libraries and 12 percent in industrial settings. Only a very small number of nonprofessionals reported any work experience in health sciences libraries.

Measures of job and geographic mobility were established. Job mobility was defined as the frequency of job transfers during the last ten-year period. Geographic mobility was calculated on the basis of the number of moves during the ten-year period. The highest rate of job

TABLE 5  
SALARY BY RML REGIONS FOR PROFESSIONALS  
AND NONPROFESSIONALS

RML REGIONS	PROFESSIONALS N = 975	NON- PROFESSIONALS N = 1416
I.....	\$10,467	\$6,287
II.....	10,917	6,929
III.....	10,819	6,006
IV.....	11,721	7,855
V.....	10,377	5,816
VI.....	10,109	6,003
VII.....	10,966	6,832
VIII.....	10,279	5,904
IX.....	10,549	6,187
X.....	9,279	5,979
XI.....	10,421	6,520
National Mean...	10,638	6,509

mobility was demonstrated by male professionals and the lowest rate by female nonprofessionals. Sixty-nine percent of the male professionals held three or more jobs during the past ten years. Half of the female professionals reported three or more jobs during that time. Mobility amongst nonprofessionals was less: 48 percent of the men and 39 percent of the women had held three or more jobs over the measured period. Geographic mobility was generally low for both populations. Half of the professionals and almost three-quarters of the nonprofessionals had not moved within the past ten years.

### SUMMARY

Only basic statistical data describing select characteristics of professionals and nonprofessionals currently employed in health sciences libraries have been presented. Space limitations have precluded the presentation of the full data gathered. Detailed breakdowns of these descriptive statistics are stored on magnetic tapes and are available upon request.\*

A number of conclusions may be drawn from the data gathered:

1. The bimodal age distribution of the work force clearly illustrates the effects of the career patterns of women, who compose approximately four-fifths of all employees.

\* Available from Professor Alan M. Rees, School of Library Science, Case Western Reserve University, Cleveland, Ohio 44106.

Calculations of projected demand for manpower must account not only for expected growth in library systems and retirement at age sixty-five, but also for this "interim retirement" period at age thirty.

2. Although librarianship is a "women's career," it is evident that women are significantly underpaid when compared to men with similar educational qualifications. In addition, women are often given positions of less responsibility in libraries. These factors contribute to the softness of the professional image of librarianship.
3. Only a small proportion of the work force reported specialized education in health sciences librarianship or in the health sciences as such. If it is assumed that specialized education in these areas is required for the optimum practice of health sciences librarianship, extensive on-the-job orientation programs would be necessary for a large number of current library personnel.
4. Employee preferences for continuing education are closely matched to employer perceptions of scarce skills as identified in the survey instrument. However, based upon an analysis of the titles of courses offered during the last three MLA annual continuing education programs, it is evident that only one-half fall within the subject areas cited by employees and employers. It appears, therefore, that the focus of future MLA planning for such programs ought to take into account the preferences reported.
5. The most significant conclusion to be drawn from this study pertains to the manner in which employees are matched to library jobs. The evidence presented here, in combination with that to be presented in the discussion of the Job Task Index, points to the conclusion that many professional librarians are employed in jobs which make little, if any, use of their talents as professionals. At the same time, a significant group of nonprofessionals perform tasks normally considered to require professional training. These

findings indicate that both the organization of jobs in health sciences libraries and the manner in which employees are assigned to jobs is far from optimal. These conditions may partially account for the current feeling of a "manpower crisis" in libraries, which stems more from poor utilization than scarcity.

Two areas remain to be explored. The first is related to the Job Task Index, which represents a composite score describing the job tasks performed by an individual. A subsequent article of this series will describe the Index, its statistical characteristics, and the relationship of an individual's score to his income, educational achievement, and other characteristics. The second area, yet to be reported, is concerned with the rate of growth of library staffs, losses from the work force due to retirement, job transfers, and projected demand for manpower during the seventies. Data relating to staff growth rates were obtained during the survey. However, the manner in which these data can best be interpreted, the calculation of attrition from the work force, and the identification of other factors effecting projected manpower demand have yet to be resolved.

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