The Education of Literature Chemists*

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Three years ago the Division of Chemical Literature appointed a committee to determine what is being done in academic institutions to train students, majoring in chemistry or chemical engineering, to use the chemical literature. A year later the committee reported the results obtained in 330 replies to a questionnaire sent to some 600 institutions. One suggestion in the ensuing discussion was to hold a symposium on the training of literature chemists. Since this is an educational problem, the support of the Division of Chemical Education was sought. The present program, therefore, is the result of joint effort by the two divisions.

Every alert teacher knows the increasing difficulty of sampling adequately present chemical knowledge in any course. Likewise, every alert practicing chemist is aware of the problem of keeping up with the annual accumulation of new material. In 1961, for example, *Chemical Abstracts* published abstracts of 118,337 papers and 26,249 patents. So great is this over-all problem that Louis H. Sarett, Director of Medical Research of Merck and Company, stated recently that perhaps the most imposing task facing organic chemists in the next quarter of a century is to find and correlate what is already known in this area.

The contributors to this program come from educational institutions, industry, a government laboratory, and Chemical Abstracts Service. Thus, they represent a cross section of different kinds of interests in the use of the chemical literature. Each considers the education of literature chemists from a particular view-point.

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Creating The Chemistry Librarian*

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More and better chemistry librarians are needed now to handle the vast amount of existing chemical literature and will be needed in the future to keep up with new material that is being issued at an accelerated rate.[1] This need—which, I believe, is obvious—is pointed up by four factors. First, the starting salaries for science librarians (including those in chemistry) today are, as they were in 1955,[2] considerably higher than those for all other beginning library school graduates. In 1959 the average starting salary for beginning library school graduates was $4862,[3] while a beginning chemistry librarian could expect about $6000. In 1960 the average for beginning library school graduates was $5083,[4] while beginning chemistry librarians could expect $7000 or better. Second, the quantity of chemical literature is increasing rapidly, as can be illustrated by the number of abstracts published in *Chemical Abstracts*: 7,000 in 1907; 78,689 in 1954;[5] and 132,159 in 1960.[6] Third, adapting the techniques of mechanical information retrieval to the needs of the chemist is an immediate problem, not a hypothesis for the future. Cooperation between the librarian and the chemist in this area can be particularly fruitful, resulting in development of the most useful systems and avoidance of systems that would be unsuitable because of infrequent use and high cost. Finally, many companies have felt the need for at least minimum training for their untrained library personnel. This is illustrated by the fact that 68 librarians registered in two series of courses for beginners given by the Science–Technology Group of the Special Libraries Association's Boston Chapter in 1960. These librarians came not only from the Boston area, but from New Hampshire and Rhode Island; and one librarian even flew in from Harrisburg, Pennsylvania.[7]

Once the need for better-trained chemistry librarians is realized, the solution of this problem should be easily accomplished, provided the chemistry profession, industry, and the library schools all do their part and learn to cooperate in the solution.

Chemists first must become more aware of the potential service that can be provided by a trained chemistry librarian. The chemistry librarian, as I see it, has several major functions. As custodian of materials in the library, he will establish a circulation system that will assure the

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availability of materials in the library when needed and that will also be flexible enough to provide the researcher with the material—or a copy of it—in his laboratory or on his desk. As adminstrator of the library the librarian will plan and direct the most efficient utilization possible of the existing resources—personnel as well as the building and library materials proper. The librarian should be able to select material in all fields, with major emphasis in three areas: chemical literature; general library reference tools; and books of peripheral interest in areas outside of chemistry. In the specialized areas of chemistry, the judgement of the chemists and researchers should be utilized as much as possible. The librarian will carry out literature searches including both current awareness searches and retrospective searches, which will be expedited considerably if the person requesting the search provides the necessary information, limits both time and subject, gives sources already known, and lists key words and subject headings. The search can be carried through up to—but not necessarily including—the final evaluation, if the researcher will provide enough opportunities for feedback of results during the period of the search. The librarian may initiate special services such as table of contents services for current periodicals; abstracts in special subject areas; and annotated lists of the new books received in the library. The chemistry librarian must be aware of the latest developments in the fields of librarianship and documentation. He does this through membership in professional associations such as Special Libraries Association, the American Documentation Institute, and the American Chemical Society; and through reading the professional literature.

Faced with the large quantity of chemical literature and newly aware of the useful functions of the chemistry librarian, chemists should be able to bring some pressure to bear on industrial management to think in terms of hiring professional, trained chemistry librarians. It is true, however, that the number of such librarians is not always sufficient. This could be remedied in part by better recruiting practices. One of the most neglected areas for recruitment, I believe, is within university chemistry departments. Industry interviews thousands of students each year for industrial positions, yet little is done to make these students and their teachers aware of the need for chemistry librarians. Many students, particularly women —for whom job opportunities in the sciences are usually not as attractive as for men—may find careers in the literature of chemistry more rewarding and interesting than careers in the laboratory.[8]

Finally, we come to the role of the library school in the training of chemistry librarians. In a paper presented at a meeting of the Chemical Literature Division of the American Chemical Society in Minneapolis on September 15, 1955, Jesse H. Shera (Dean, School of Library Science, Western Reserve University) outlines a program for training of the chemistry librarian.[9] In conclusion, he called for library schools to assume leadership in implementing this program; but he also stressed the fact that without the support of both industrial management and the chemistry profession, the program would be doomed. I feel that even though some improvement has been made in library school curriculums to render them more attractive to prospective special librarians, the leadership on the part of the library schools and the support given by the chemistry profession and industrial management have been ineffective.[10]

Many library schools now have a number of courses in fields of interest to the special librarian; nevertheless, courses aimed at those interested in the physical sciences are still few. Two problems are, for the most part, responsible for this situation. First, there are not enough students with science degrees enrolling in the library schools to make teaching specialized science literature courses really worthwhile. John Sherrod, Chief of the Science and Technology Division of the Library of Congress, states that of the 1600 students graduating from library schools in 1960, only 95 held science degrees. Second, there is a lack of qualified teachers in the area of the literature of science and technology.[11] It seems that both these problems must be solved together; the solution of one will lead to the solution of the other. Certainly greater stress by industrial interviewers on the need for chemistry librarians and stronger cooperation between chemistry departments and the library schools should lead to a higher enrollment of students with science degrees in the library schools. And this, in turn, could lead to a strengthening of the library school curriculum in the area of the sciences.

There are two possible ways for alleviating the lack of qualified teachers in the area of the literature of science and technology: invitation of summer school lecturers, as was done successfully by the University of Texas Graduate Library School in the summer of 1960;[12] and invitation of qualified librarians to teach on a more or less regular basis as guest lecturers or even as regular members of the faculty. In most cases these librarians hold full-time jobs in industry or public or university libraries and, as a result, can bring the most up-to-date information to the classroom.

The chemistry librarian should have both a subject background in the field of chemistry and training in librarianship; these are best provided through a B. S. degree in chemistry and a Master's degree in library science. To recruit qualified people for the profession, stronger cooperation between industrial management, university chemistry departments, and graduate library schools will be needed. A practical step for attracting young chemists into graduate library work would be a scholarship program. Perhaps the American Chemical Society could be persuaded to follow the example of the Special Libraries Association and make some funds available for scholarship awards. (An example of the possible scope of such a program is the preliminary draft of an announcement for a training scholarship in chemical literature now under consideration by the Indiana University Chemistry Department. See Appendix).

APPENDIX

Indiana University Chemistry Department
Training Scholarship in Chemical Literature.
Training for Special Librarianship in the Field of Chemistry.

The facilities and collection of the Indiana University Chemistry Library will be used as a training center for recipients of the Indiana University Chemistry Department Training Scholarship in Chemical Literature. The study program is intended to familiarize the student with chemical literature past, present, and future and with the administration of a special library. In addition to special assignments, the student will work closely with the Chemistry Librarian, more or less as his special assistant. Thus he will have every opportunity to master the necessary techniques and acquire the background that will enable him, or her, after completing the necessary formal degree requirements, to become a qualified Chemistry Librarian.

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On the Job Training for Literature Chemists*

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In the days of Louis Pasteur, or even Paul Erlich, it was possible for the individual scientist to read all of the literature in his field (and even in several related fields), to know everything that was known of his scientific discipline, and to be in touch with all of the people in the world who might be working in his field. Thus the scientists of that day often carried on voluminous exchanges of ideas by mail or in person. I have the impression that a great deal more information was retailed in advance of publication at the end of the nineteenth century than is revealed in conversations today. In any case the growth of scientific disciplines, in both volume of detail and in complexity, has tended to steer scientists into ever narrower areas of specialization: and this at the very time that most progress seems to be made as a result of interdisciplinary approaches to problem solving. All of the above factors have tended to promote the team approach to research that is so popular today.

One might conclude from these remarks that the role of the individual creative scientist in the world today is becoming less important in research. Far from it. Many scientists pick certain aspects of research and devote their lives to it, and only this diligent application of outstanding brains could hope to see any progress in may fundamental and very difficult fields, and even in many interdisciplinary fields. In many ways fundamental research is more readily attacked by the individual scientist than by the research team, inasmuch as the type of speculation required in fundamental research often will not survive the scrutiny of a collection of scientists, however brilliant they may be. Perhaps one of the weaknesses of our system of supporting research through government or institutional grants to researchers based on concrete grant applications is that all of the really wild, potentially brilliant, ideas tend to get screened out by the panel system of evaluation of potential research projects. These remarks are not intended to be critical of the panel system of handling research grant requests, inasmuch as this is probably the only system that could deal equitably with such a machinery of research support. We can, however, quarrel with the emphasis on the project-orientated nature of research support, and we should all press in the direction of longer range support for investigators—even lifetime support of qualified people in order not to stifle the tender shoots of creativity.

How do all of these remarks relate to the education of the literature scientists? In order to discuss this subject from a common starting point we need some definitions here. First of all we should make clear that there are at least two, and possibly more, distinct types of information specialists. The first we might call the Documentation Specialists and these could be defined as the people who operate between the data processing machine, or other device, and the information specialist who readies data for machine processing. The Documentation Specialist, of course, does many other things as well, but his primary orientation is in the area of data processing rather than in one of the classical scientific disciplines. The chemical information scientist is generally another breed. He is usually an alumnus of the laboratory who had the same

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