THE PLACE OF CHEMICAL DOCUMENTATION IN THE EDUCATION OF CHEMISTS

Although there has been a considerable expansion in college and university curriculum in information science and in library science, chemical documentation is pretty much nonexistent in most Departments of Chemistry and of Chemical Engineering. This is an ironical situation in view of the emphasis these departments put on having and maintaining adequate libraries (and usually within their own departments), and in view of the expanding literature. A departmental library of chemistry and chemical technology represents an investment of hundreds of thousands of dollars and a maintenance cost of many thousand dollars. In some universities I have visited, the investment and maintenance cost of the Chemistry Department library exceeds the cost of any single laboratory in the department.

No chemistry department head would approve the purchase and maintenance of an infrared, ultraviolet, or nuclear magnetic resonance spectroscope without the assurance that students would be taught the proper use of the equipment. Yet he approves, without the same assurance, the more expensive investment and higher budget item—the departmental library. From an economics viewpoint alone, it just does not make sense to neglect the chemical literature in the education of chemists. But the chemical literature is much more than merely the fastidious preservation of the accumulated knowledge. It is the chief channel through which a chemist interacts with chemistry and with other disciplines of science. Chemical documentation is the art and science of this interaction.

The degree of interaction between a student, particularly graduate students, and the chemical literature depends to a considerable extent on how the faculty regards chemistry and the education of the students. If chemistry is thought of as a mass of facts necessary for the doing of science—that is, an art or skill—there really is little need to make the student aware of the chemical literature and of the history of the science and technology. Even for this relatively narrow view of chemistry, however, there are valid arguments for exposing the students to a dependence on the literature and to the historical aspects of the science. But chemistry is more than an art and a set of skills. It is concerned with the relationships between facts and with the systematization of facts into a body of knowledge—that is, with the knowing of science.

A student needs to be taught early in his academic career that his most basic tools are language, logic, and the literature, not test tubes, beakers, spectroscopic equipment, etc. This is not to say that the tools of the laboratory are not essential, for they are. The essential point of scientific life is that the data and facts amassed by one scientist in one laboratory are but a drop in the ocean of scientific data and facts. A fact becomes important when it combines with other related facts, and becomes exceedingly important when it becomes the nucleus for gathering related facts. On the other hand, a fact is meaningless if it merely repeats the known. The personal satisfaction of work in the laboratory is but a pleasant hobby unless the results of the work are compatible with and incorporated into the total body of chemical knowledge.

Ideally, the chemical literature and the historical and logical aspects of chemistry should be a part of every subject in the chemistry curriculum. Until a generation or so ago, the better teachers of chemistry taught chemistry by this mode, and many chemistry curricula included one to three credit courses in chemical literature and in the history of chemistry. As the amount of information and knowledge increased, peripheral subjects have been crowded out of the curriculum to allow more time and attention to be given to the new information and knowledge. Unfortunately, the problem of increasing knowledge was met by more specialization at the expense of background knowledge, theoretical roots, and fundamentals. We sometimes forget that the most valuable specialist is also a good nonspecialist, and because of this dual nature he is capable of understanding the problems and limitations of other specialized areas which might impinge upon his own.

The literature, history, and philosophy of chemistry need to be brought into the education of chemists. They are needed by the budding chemist if he is to mature into a scientist. But, even more important for the moment, the faculty members themselves need mechanisms for maintaining an awareness of the evolving literature and for retrieving from the total literature. Research in many universities is becoming more and more like the team approach practiced in industrial environments. It may be time for the university team leader, supervisor, or manager to ask for an information scientist as a member of the team. But where will the information scientist come from if the universities do not prepare their graduates for this kind of assignment? One step in this direction may be graduate assistants in chemical documentation. These graduate assistants would be equal to all others except their assignments would be in literature control and management rather than in laboratory monitoring and in correcting test papers. At least it is worth a try.

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