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## The Need to Improve the Image of Chemistry

For most of the public, the word “chemical” now elicits antipathy and fear. This response has been fostered by the media that sometimes behave as if they were more interested in ratings or circulation than in conveying balanced facts. People seem to want to experience being alarmed, but more than a form of scary entertainment is involved—perhaps the future of this country. Chemistry is a discipline central and essential to the other natural sciences, most of technology, and much of medicine. In the future global competition, a country not tops in chemistry is destined to be second-rate or worse.

If current public attitudes toward chemistry persist, they will have a destructive effect on the quality and numbers of those who enter this crucial profession. When young people choose their life's work, they weigh a number of factors. These include potential for providing rewards of money, power, prestige, and esthetic or intellectual satisfaction. In comparison with some other activities such as law, politics, or management, chemistry is not an obvious path to money or power. The present low estate of the prestige of chemistry does not encourage choice of it. A further factor is that science courses are among the most demanding at universities. It is not surprising that the number of baccalaureates in chemistry is declining. Only a small fraction of the freshmen who begin as chemistry majors stay with it. In the absence of enhanced motivations to pursue chemistry, the losses will persist and worsen.

Exaggerations in the media of dangers of chemicals are at least in part an indirect consequence of subsidiary factors, some of which have long prevailed. For example, the quality of the teaching of chemistry in the secondary schools has on average been mediocre. Though well intentioned, the courses have seemed designed to kill interest in chemistry and even raise antipathies to it. Most of the textbooks, with the exception of *ChemCom*, contain little that is obviously relevant to students' lives, experience, or interests.

A crucial need for reform in teaching is to be found in beginning chemistry courses at universities. This was one of the important matters covered in the spring meeting of the American Chemical Society in Boston. A report on science education matters discussed there occupied 17 pages of a recent issue of *Chemical and Engineering News*.<sup>\*</sup> The quality of the courses for nonchemistry majors came under special criticism. The courses are conducted in large classes, and there is little opportunity for students to interact with professors. The lectures were described as boring and containing little relevant material. Rarely discussed are the really interesting chemistry-related issues prominent in the media. The extent and quality of laboratory experience was criticized. Actually, the nonmajors constitute a very large fraction of the total number of students whom chemistry professors teach. When these students have a poor experience, their comments to classmates influence attitudes throughout the campus, leading to lasting poor public relations.

A few of the comments by chemistry professors at the Boston meeting follow: Stephen J. Hawkes of Oregon State in speaking of the content of a course in general chemistry said, “The first question that should be asked about anything that students have to learn is why should they know that.” That is a good question relevant to teaching in general. Joseph J. Lagowski of the University of Texas at Austin commented on the quality of chemistry instruction accorded nonmajors that is performed as a service function to other departments: “. . . we don't do it well. And then we are unhappy because our discipline is going down the tubes.” Glenn A. Crosby of Washington State University spoke of the desirability of including in lectures for undergraduates the chemistry of the many phenomena such as acid rain and drugs that are receiving attention in media. He lamented the absence of such discussions that would interest the students. He stated, “. . . we should be teaching chemistry for what it is, something that without the knowledge of it, one cannot live in psychological comfort in the last half of the 20th century and certainly not in the 21st.”

The poor public image that chemistry now has will not disappear quickly. However, some of its deleterious effects can be blunted if the profession heeds criticisms of some of its members and makes a thoughtful but revolutionary revitalization of its curricula. Chemistry can be made interesting and exciting, with esthetic and intellectual appeal. The goal of teachers should be nothing less.—PHILIP H. ABELSON

<sup>\*</sup>J. Krieger, *Chem Eng. News* **68**, 27 (1990).