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EDITORIAL COMMENT

Polymer Science at the Crossroads

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As many of us are aware, polymer science has undergone major changes in the last few years, particularly in the United States. The respective roles of industry, academia, and government in polymer science have undergone profound change. The centers of academic polymer research have increased from about three (Brooklyn, Akron, and Illinois) twenty years ago to approximately eight (Massachusetts, Case, Michigan, North Carolina, Notre Dame, Arizona, California, Brooklyn) today. Institutions devoted wholly to polymer research have been created (Dreyfuss, Midland Macromolecular Institute).

Companies with major polymer research programs have increased from approximately six (DuPont, Carbide, Monsanto, U. S. Rubber, Goodrich, Shell) to over thirty today. Moreover, there has been an important trend from research on general-purpose polymers, such as polystyrene, polyvinyl chloride, polymethyl methacrylate, polypropylene, and polyethylene, for sale to and upgrading by molders, extruders, converters, etc.; to polymer systems, such as photoconvertible polymers, sealants, specialty adhesives, polymer composites, degradable polymers, etc.; and specialty polymers, such as polycarbonates, polyacetals, silicones, etc.

After World War II many companies, using defense-based enterprises as a background, purchased government polymer plants and launched or expanded polymer research programs in support of these plants. Government research funds were diverted from straightforward military or defense-oriented research to research on high-temperature polymers, low-temperature rubbers, high-performance lubricants, biomedical materials, and so forth.

Business was expanding rapidly; profits were large; research staffs multiplied. It was pointed out during that period that research expenditures, if

allowed to increase at the existing rate, would exceed the national budget before the year 2000.

Nevertheless, many research people were caught off-guard when the economic retrenchment came. Research has historically been regarded by business as an "expense" of doing business, rather than a capital asset. Buildings, patents, equipment, customer good will, etc., were assets, but research was a year-to-year expense item. Thus, the research and development estate of a company was something to be dissected from year to year, totaled up, and "expensed away." Research projects were—and still are, with few exceptions—judged for life or death on an annual basis.

Published figures on the level of unemployment among chemists are inaccurate, if not downright deceptive. Many chemists are employed in unchallenging or tedious activities, hardly worthy of the lofty hopes that originally attracted them to the profession.

The low regard in which research is held today is painfully demonstrated by the dearth in higher corporate management of persons with a distinguished research background who have a real voice in corporate destiny. Indeed, the management of research and development in most corporations has become a game of musical chairs in which desperate reshufflings of people are effected in hopes of placating the business people who insist upon "change," "streamlining," "getting rid of deadwood," "reducing overhead," "increasing research efficiency," and so on.

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This sorry state has not gone unnoticed by the young. Medicine, law, and sociology are the professions now sought by the outstanding, the ambitious, and the dedicated.

Many stopgap schemes have been proposed. Increased government funding for research in water pollution and purification, mass transportation, safety, medicine, new energy sources, etc., has been proposed and, indeed, will probably be forthcoming. The American Chemical Society is belatedly showing its concern.

However, research people have looked in the past to business—and will probably always do so, in a free society—for substantial support for research having a reasonable prospect of influencing the lives of people in meaningful ways. The first meager signs are appearing that business is beginning once again to recognize its important stake in the serious question of the future of research in general, and polymer research in particular. If and when broad-gauged industrial sponsorship of research returns, responsible business and financial leaders must endeavor to see that the golden bubble does not burst again.

They may not get another chance.

George E. Ham, Editor