

confounding factors, it is frequently unclear whether a cause-effect relationship can actually be demonstrated. Investigative medicine is, with rare exceptions, only able to focus on health problems after they have been detected by other disciplines. The traditional doctor-patient relationship is not well adapted to screening large populations for chronic, subtle health impairment. In addition to the scientific areas outlined, the setting of priorities for public action, by making "optimal investment" of where to place both the *last*, as well as the *first* dollar, is clearly not easily prioritized by our existing scientific/political/economic system.

H.H. FAWCETT

High Explosives and Propellants, by S. Fordham, Second Edition 1980, Pergamon Press, Oxford, 207 pp., Price: £5.95, \$14.50.

There are not many elementary texts in English on the science and technology of explosives. Those that are available are usually military handbooks or are manuals which emphasize the products of particular manufacturers. Commonly, the books are little more than data collections on selected explosive substances or are "how to" books for pyrotechnologists or mining and demolition engineers. They present neither scientific principles nor the criteria that guide the selection of explosives for civil or military use.

High Explosives and Propellants is an exception because it starts from a few elementary principles, explains simply what factors are important in designing formulations for the different applications, and describes tests which are used to assess the relative merits of formulations. Subsequently, typical applications of the explosives are presented along with details of the accessories required to give explosives the necessary degrees of safety, timing and effectiveness. The book concludes with a short glossary of terms in common use.

It is not a "how to" book; indeed, it is prefaced with an eloquent warning against uninformed and unguided experimentation. It is intended as a text for undergraduates and technicians in the fields of industrial chemistry, mining and allied industries. The selected material emphasizes commercial (civil) high explosives and British practice, although military high explosives and propellants are discussed in a more cursory fashion.

This second edition updates the 1966 edition; virtually all the revisions address the growing interest in commercial slurry explosives and the improved fuzes for mining and blasting operations. Despite the revisions, there are few, if any, references to publications which postdate the first edition. As a consequence, several of the discussions have a somewhat out-of-date emphasis, particularly in regard to military explosives, theories of initiation, and techniques to assess explosives. In an age when the computer has found its way into almost all classrooms and technologies, the absence of any reference to programs to compute the performance of explosives and the optimal

emplacement of charges, and to the use of microelectronics in fuze components, will, unfortunately, do nothing to sharpen the interest of young students in this very old technology.

These omissions do not otherwise detract from a well written, lucid and technically comprehensive text that is very suitable as an introduction to the subject. The honors student may well find the narrative style, with occasional historical flashbacks, a change of pace. At the same time, it is sufficiently erudite to provide insights into the underlying science. Those in, or about to enter, the mining, quarrying and civil engineering fields will find that the book provides an adequate introductory knowledge of the principles and practice of explosives formulation and utilization. Those interested in military explosives may also obtain an interesting introduction by delving into Mr. Fordham's book, but will need to supplement the material in order to appreciate numerous modern applications of the materials in ordnance and aeronautical engineering, and to understand recent trends in formulation and manufacturing technology.

RAYMOND F. WALKER

Hazardous Waste Options, 16 mm sound color movie, 28 minutes, made by Stuart Finley, Inc. 3428 Mansfield Rd., Falls Church, VA 22041, 1981.

The attention which hazardous chemical wastes has received in recent years, including the RCRA and "superfund" legislation which is just now being implemented, has created an awareness in some circles that something should be done to more effectively deal with the wastes from chemically related operations. This film, one of several which Finley has made on solid waste disposal, lists the seven options which are available, some of which may be far more economically attractive than the "release to stream" or "burial" practices of the past. Each of these seven are illustrated from visits to "real-world" operations where they are actually carried out in accordance with current regulations. The film's treatment of recycling and recovery of valuable elements of contaminated wastes, hazardous waste treatment and disposal, major hazardous waste landfills located above several hundred feet of low permeability clay, high temperature incinerators for liquids and solids with very low levels of particular discharge, land treatment systems for biodegradable hazardous wastes, deep well injection, leachate control systems and ground water monitoring, and laboratory testing, which constitute the major-portion of the film, encourage the viewer to investigate various alternatives more deeply.

It can be used in classrooms from junior high to college, group meetings, plant safety and environmental meetings and facility-siting situations. It is equivalent to a carefully planned two-week field trip to diverse facilities and is recommended as an introduction to anyone seriously interested in the management and disposal of hazardous wastes. Rental and purchase prints are available from Mr. Finley.

H.H. FAWCETT