devoted to a chemical element. The order is according to the atomic number; the volume begins with hydrogen (At. No. 1) and closes with lawrencium (At. No. 103). Future editions doubtless will include still higher members that as yet have not been produced artificially or found on earth or in the heavens. The text discusses primarily the elements themselves and in most cases also a few important compounds. In each instance the information brought to the reader includes: discovery, derivation and reason for the name, frequency of occurrence, principal physical and chemical properties, scientific and technical applications, etc. The line diagrams clearly elucidate the processes employed in the isolation of the element from its accompanying materials or compounds.

This information is presented in a very readable way and the recital is interspersed with apt anecdotes which catch and hold the reader's attention. The reviewer found it hard to put the book down. A good sized periodic chart and a table of the shell structures of each atomic species are supplied as loose sheets that are housed in a rear pocket. Though the type size is small it is perfectly legible and the whole volume has an attractive appearance.

Like many books produced behind the Iron Curtain, this too is marred(?) by the inclusion of references in which the Americans are somewhat sneeringly shown to have employed chemical phenomena in chemical warfare with no mention of perhaps such indefensible practices by other nations, who either had or wished they had similar weapons at their disposal. Also no opportunity is overlooked to point out the achievements of Soviet or Russian scientists. However, this is a minor fault in comparison with the general excellence of the book.

Every chemistry instructor who reads German should acquire this book. He will find in it many items that will spice his discussions and broaden his outlook. The reviewer is enthusiastic about this very informative work and recommends it highly. Finally, you cannot beat the price, which in comparison with current publishers' demands is astonishingly low.

Ralph E. Oesper
University of Cincinnati
Cincinnati, Ohio 45221

Industrial Toxicology

Lawrence T. Fairhall, United States Public Health Service. 2nd ed. (Facsimile of the 1957 edition.) Hafner Publishing Co., New York, 1969. xii + 376 pp. 18.5 × 26 cm. $12.

The 1969 reprinting of the Second Edition published in 1957 reflects the wide circulation and the extensive usage of this standard toxicological reference manual. It offers to the user pertinent and succinctly presented information on 79 inorganic substances and 180 organic substances commonly encountered in industrial situations.

As to the body of material contained in this book—for those unfamiliar with the contents of previous editions and printings—there will be found physical properties, use oriented hazards associated with these properties, industrial use and significance, toxicity data and/or information, mechanism of action (when known), and air sampling and analytical procedures for these 259 substances of industrial importance. In addition to the toxicity data, which is presented very concisely, the user will find information on symptomatology and hematological, biochemical, and physiological procedures for determining or ascertaining human exposure to a particular substance. Also, an attempt has been made to present cases of known human exposures to certain substances which is of considerable value in establishing industrial hygiene control programs for industrial processes using these various substances.

This standard manual is an excellent source of reference material for students who are interested in any of the health sciences, particularly in those many diversified professions which are concerned with protecting the health of the industrial worker and the consumer.

On a "reading time" basis, this reference book offers a maximal amount of reliable information with a minimal time expenditure, and, in this respect, offers an advantage over some of the other books available on this subject.

James E. Long
Manager, Toxicology
3M Company
St. Paul, Minnesota

Chemical Rockets: and Flame and Explosives Technology

Richard T. Holzmann, American Institute of Aeronautics and Astronautics, Washington, D. C. Marcel Dekker, New York, 1969. ix + 499 pp. Figs. and tables. 16 × 23.5 cm. $25.75.

Despite the Madison Avenue pitch by the publisher on the dust cover and the author in his preface, this book is primarily an up-to-date review of rocket and missile technology and not a scientific or technical treatise. It consists of seven chapters and three appendices.

The chapters on the developments in liquid and solid propellant technology are up-to-date and fairly comprehensive. The chapter on The Importance of Thermochemistry—touted as one of the book's strong points—is perhaps the worst. The "critical review of synthetic chemistry"—claimed by the publisher—is non-existent. In fact, the words "synthesis" and "synthetic" do not even appear in the subject index. Appendix B promises a comparison between flame technology and propellent technology. No comparison is drawn—or, if it is, it is obscured in subtlety. The comparison between explosives and propellant technology in Appendix C, however, is much more overt.

There is no question but that the author is an expert in certain of the areas about which he writes. Unfortunately, he attempted to cover too many varied topics in the space of 432 pages. One quickly gets the impression on reading "Chemical Rockets" that the author wrote hurriedly on whatever topic happened to enter his mind. As the result, the book is poorly organized, carelessly written, superficial in parts, somewhat repetitive in some places and technically inaccurate in others. For example: specific impulse is first mentioned on page 2 but it is not defined nor is the symbol given. Starting on page 9, the symbol I_{sp} appears and continues to appear without identification until page 234, Table 17. Here, the novice may suspect an identity between I_{sp} and specific impulse. The symbol I_{std} is undefined; the "L^* phenomenon" is first mentioned on page 5, used several times thereafter but not defined until page 144.

In the chapter on thermochemistry (p. 260), the author incorrectly defines q_r, in the equation $ds = dq_r/T$, as the "reversible *energy* change at constant temperature," instead of heat change. $P(?)$ is defined as the temperature (°?) of the system. In several other places q is defined as the "energy" rather than the heat absorbed. The Clausius-Clapyron equation is referred to but not given. In equation 4–8, the author gives the relation between the free energy change and the equilibrium constant as $dF = RTd \ln K$ and thereby commits three errors in a single equation! These errors indicate that the normal care one expects in scientific writing was not exercised.

The author does not mention for whom the book is intended. It is too cursory to be of much value to one who seeks to gain a working knowledge of the internal ballistics of rocket engines or of propellant chemistry. The rather extensive bibliography might come in handy to the expert. The book's greatest appeal, however, would seem to be to the busy executive who wants to acquire a veneer of jargon so as to talk a good game of rocketry. At the price of $25.75, better technical books on the subject are available.

Chas. E. Waring
University of Connecticut
Storrs, Conn. 06268

Practical Technical Writing

Ritchie R. Ward. Alfred A. Knopf, New York, 1968. xii + 264 pp. Figs. and tables. 14.5 × 21.5 cm. $5.50.

Ritchie Ward and his able contributors have put together a high-grade book on technical writing. It recognizes two-way character in the aging bromide that sloppy writing comes from sloppy thinking, and traces the return route to sounder thinking through clearer writing. With due attention to Gunning's Fog Index, contributors D. O. Webb and Dalbir Bindra analyze the merits and limitations of this and other readability formulas.