delineated, nor are quantitative comparisons given with other types of rubber. Compatibility and solubility data, as well as the treatment of butyl vulcanization, will disappoint rubber technologists. Molecular weight–intrinsic viscosity relations for the polymers are not presented. Older patent references to some halogenated polymers are included, but no discussion of the recently important brominated and chlorinated butyls.

The printing is good and there are few typographical errors. There is an author index and a rather inadequate subject index. The idea of abbreviating company names in footnotes is a good one, but the system here leads to EIPNC for du Pont and MSGIMC for Montecatini.

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Polythene: The Technology and Uses of Ethylene Polymers, 2nd Ed., edited by A. RENFREW and PHILLIP MORGAN. Interscience, New York; Iliffe, London, 1960. xxi + 781 pp. $25.75.

This book, like the first edition (1957), is separated into three parts: Manufacture and Properties; Processing Techniques; Applications. The present edition is substantially enlarged, bringing the chapters in the first edition up to date and introducing additional chapters covering more recent developments. The new material includes a review of high density polymerization processes, a discussion of the copolymer field, and sections on vacuum forming and reprocessing.

Each chapter is written by a man or men who are well versed in the topic under consideration, with the sections covering structure and properties being particularly well handled. In a book covering such a broad scope each section must be treated in limited detail; however, in most cases the material included reviews the topic at hand very well and many references are given for those interested in more detail. A survey of the references cited in those areas with which the reviewer is more familiar indicates that they cover the literature quite comprehensively up to and through much of 1959. As with all books where a great many authors contribute there is, of course, some overlapping and duplication of material, in most cases from a somewhat different viewpoint. The editors appear to have cross-referenced these overlapping areas well so that it is possible to easily locate all the material included on a given subject.

It is the evident purpose of the book to survey the whole field of polyethylene and it is the reviewer's opinion that this purpose is well accomplished. The book should be of interest to both those who are not experts in the field but have occasional need of information about polyethylene, and to the expert who needs a well referenced text in those areas of polyethylene technology which are outside his particular specialty.

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Nature and Properties of Engineering Materials. Z. D. JASTRZEBSKI. Wiley, New York–London, 1959, xvii + 571 pp. $11.00.

It is a challenge to every new generation of teachers to reassess and update methods and materials used in the college curriculum. To meet this challenge, Dr. Zbigniew D. Jastrzebski, professor of chemical engineering at Lafayette College, has written an informative college textbook on materials. As a description of the theoretical principles which form a common basis for understanding the properties and behavior of matter, his book would be difficult to better. The author brings to the task a considerable knowledge of all the engineering sciences including concepts in modern (nuclear) physics and a valuable experience in teaching.

In 1955, Dr. Jastrzebski had occasion to submit a syllabus for a course called the nature and properties of engineering materials. This memo proposed the inclusion of such a course in his college's curriculum and contained the following statements:

"The great variety of materials now available for use by an engineer makes it extremely difficult to cover satisfactorily this immense and constantly expanding field when treated in a more or less descriptive way. I believe that the best approach to the study of engineering materials should be based on a thorough understanding of fundamental principles combined with practical aspects of their application. Recent developments in the theory of solid state, atomic and molecular structure of matter, and nuclear physics make it possible to provide a broad and comprehensive picture of the nature and properties of engineering materials. The course, when taught in this manner, will eliminate obsolete subject matter and provide a sound basis for practical reasoning. This approach will also encourage the student to think why and how any particular material is used rather than what it is used for."

Shortly thereafter the course became a reality and as a consequence this book was published.

Dr. Jastrzebski's book is divided into 12 chapters. Beginning with an introduction to the Bohr atom, it goes on to describe the elements of the atomic and electronic structure of matter. Chapter 1 also explains the interatomic and intermolecular (Van der Waal) forces and their relationship to the structural characteristics of both crystalline and amorphous materials.

Chapter 2, colloids and organic high polymers, presents a physicochemical description of colloidal materials and emulsions. Specific polymeric materials, their molecular structure, and the mechanics of polymerization are described. This is followed by a discourse, in Chapter 3, on the phenomena of diffusion and crystalline nucleation, phase transformation in solids, and phase equilibria between liquids and solids. Chapter 4 describes the mechanical behavior and structural characteristics of solids. Elasticity, plasticity, and flow characteristics are described in terms of the main types of engineering materials; a discussion of strength and other properties follows. Also included is a short discussion of radiation damage to mechanical properties of materials.

Chapters 5 and 6 are readable, up-to-date surveys of manufacturing processes for metallic and ceramic materials. Included are discussions on the reduction of metals from their principal ores, the alloying of metals, and the production of cermets. Chapter 7 describes electrical and mag-

netic properties of materials from the viewpoint of solid state physics. In recent years, this study has made the most significant contribution to the development of new materials for electronic devices. In this chapter, the underlying differences between insulators and semi-conductors are also explained. Chapter 8, thermal properties, describes heat resistance and thermal conductivity of matter, and a number of applications of thermal insulating materials. Chapter 9 on corrosion introduces the reader to this subject through a description of electrochemical methods. Polarization and potential differences are described. This chapter also includes the latest information on microbiological corrosion by sulfate-reducing and sulfur-forming bacteria. Methods for the prevention of corrosion are also discussed. Chapter 10 explains the phenomena of friction, wear, and lubrication in terms of surface chemistry and mechanics. Asperites (surface high points) are considered in the study of sliding and rolling friction.

Chapter 11 is a brief survey of the principles of joining similar or dissimilar materials by welding, brazing, cementing, and other well-known methods. Half the chapter is given over to descriptions of inorganic cementing and concrete. The last chapter, closely related to the chapter on corrosion, describes protective coatings. It includes plating of various substrates and the organic and inorganic coating materials.

Because this is a working textbook, each chapter ends with suggested reading matter. A short bibliography extends in depth the subject matter of each chapter. Also included for the student's use are study questions pertaining to the text.

In the entire book, only one statement can be questioned and that one, only in the light of very recent developments. It occurs in section 1.15 Carbon: "Transformation of graphite to diamond seems to be theoretically feasible at high pressures, but so far no successful results have been obtained in practice."

Dr. Jastrzebski's book is highly recommended as a text for other educators, and is a valuable reference for the professional engineer, laboratory technician, inventor, and designer.

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Engineering Design with Rubber. A. R. PAYNE and J. R. SCOTT. Maclaren, London; Interscience, New York, 1960. ix + 256 pp. $8.00.

This book deals with the properties, testing, and design of rubber as a material for engineering. The mechanical engineer will find the book applicable to his work regardless of his specific specialization. Likewise, the civil, the automotive, the electrical, and the chemical engineer will all find the book useful for reference because rubber is employed in their particular fields on account of its unique mechanical properties in addition to other advantageous characteristics.

The book is based on symposia conducted by the Research Association of British Rubber Manufacturers in 1958 for the purpose of bridging the wide gap that commonly exists between the rubber technologist and the mechanical engineer. The papers that were presented at the symposia have been rewritten and rounded out in the light of the extensive discussions at the symposia. Extensive lists of references provided at the end of most chapters greatly enhance the value of the book as a text book and reference work. Unfortunately, practically no supplementary references are given for the chapter on the rubberlike state where sources of additional information would be welcomed by readers outside the field of rubber technology. The references to journal articles are cited in the way dictated by most publishers by giving only the names of the authors and the place of publication. The reviewer would find the citations more useful if the titles also were given.

Because the book was developed for and in conjunction with practicing engineers, it deals with many everyday problems and contains, for example, helpful information about making rubber models, the use of which may afford a quicker and easier solution to many design problems than extensive calculations.

The book contains ten chapters—three are by or in collaboration with other authors—but all have been well integrated into a well rounded treatment.

An introductory chapter on the rubberlike state lays a sound foundation for the understanding of the physical properties of rubber. Two chapters deal with properties of rubber—one is on the dynamic and time related properties, and the second is on all other properties. These are followed by two chapters dealing with test methods for the two groups of properties. Then there are chapters on force-deformation relationships and resonance and transmissibility. The three concluding chapters deal with the practical design and use of rubber in engineering, including a very helpful sketch of the mode of collaboration between the engineer and the rubber technologist. Brief appendices deal with British and U. S. standard test methods, standards for natural and synthetic rubber compounds, and finally with a qualitative description of the properties of natural and synthetic rubber. If a second edition of the book should be issued, the reviewer would suggest citing pertinent ISO specifications as well.

Because of the variety of sources from which the tables, graphs, and other illustrative material have been drawn, there is no consistency in the units employed in the book, metric and English units being used indiscriminately. This, also, could be corrected in a second edition.

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High Speed Testing, Vol. 1. A. G. H. DIETZ and F. R. EIRICH, Eds. Interscience, New York–London, 1960. vii + 112 pp. $5.00.

In this small volume is published the first in a series of symposia on high speed testing. Held at Boston on December 8, 1958, it was sponsored by the Plas-Tech Equipment Corp. of Natick, Mass. with A. G. H. Dietz and Frederick R. Eirich as Co-Chairmen. Devoted entirely to high speed testing, this interesting and informative symposium contains