

questions. Tisza's papers on lambda transitions and the phase rule should excite interest, even among biochemists. There are many reports on thermal, magnetic and electric properties, but relatively few on spectra at low temperatures. The volume ends with a section on nuclear orientation and parity.

Nicholas Kurti was presented at the conference with the first Fritz London Award for distinguished research at low temperatures; this was especially appropriate in the light of his current pioneering work in opening up the temperature range below 10^{-4} degrees Kelvin. Although his address on this occasion has already been published elsewhere, one regrets that a summary was not included since his work is a real cryogenic milestone.

There is appended at the end of the volume a list of those who attended the conference, a group photograph and a resolution on the conservation of helium gas.

DEPARTMENT OF CHEMISTRY
THE JOHNS HOPKINS UNIVERSITY DONALD H. ANDREWS
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Proceedings of the Eighth Meeting of the International Committee of Electrochemical Thermodynamics and Kinetics (C.I.T.C.E.), Madrid, 1956. T. P. HOAR, Editor. Butterworth and Co. (Canada) Ltd., ix + 497 pp. 16.5 × 25 cm. Price, \$19.00.

Review of this volume poses a problem which has now become fairly common. This is not a book in the usual sense of detailed coverage of a fairly narrow, specific area, or of a somewhat shallower but integrated coverage of a broader area. Instead it is as its subtitle says the proceedings of a meeting held in Madrid in 1956. To review the twenty-three more or less original articles which appear in the volume would be equivalent to reviewing an issue of THIS JOURNAL, for instance. The papers are on a variety of topics including experimental methods in electrochemistry, electrochemical kinetics, electrochemical thermodynamics, corrosion and batteries. Some are better than others, some might not have appeared had they been subjected to the usual critical review of original papers. They became available more than two years after they were presented and undoubtedly some of the material has already appeared in journals throughout the world. One unfortunate aspect of the book is the number of intriguing titles in the table of contents which lead only to abstracts, summaries, random thoughts, or very brief notes. An especially disappointing item is the section labeled, "Electrochemistry of Semi-Conductors" which consists of a page and a half note on optical absorption by semi-conductors and their use in photo-elements plus a seven-line written discussion on an entirely different topic.

Many of the papers (8) are concerned largely with what have come to be known best as potential- pH diagrams. This includes one paper on the standard potential for the couple S_6^{--}/S_4^{--} and two in which potential- pH diagrams are used to describe the reactions of iron, zinc, and magnesium under certain conditions. A paper by Okamoto and co-workers on the "rapid" polarization technique, and by Ibl on mass transfer during electrolysis are quite interesting, as is a paper by Hills and co-workers on electrochemical techniques in fused salts up to 1000° . Some of the papers in the section on electrochemical kinetics should be read if their content is not available elsewhere. For example, the paper on the impedance of a platinum anode by Llopis and Colom, and the one on the oxygen electrode in alkaline solution by Hoar, are of interest.

In addition to the papers there are quite a few pages devoted to reports of the Commissions of CITCE. Most of this material is made up of routine statements of things done or to be done by committees, individuals, or the like. The report of the Commission on Electrochemical Nomenclature and Definitions, however, is provocative and may be the most fruitful portion of the whole Proceedings. Even this, though, does not alter the doubt as to the need for this volume since such material deserves greater circulation than is provided in this way.

The most effective argument normally made for publishing a Proceeding is as a means of providing a suitable place for the discussion which follows each paper presented. In the present case the argument is of little consequence be-

cause there is a total of not more than ten pages of discussion in the nearly 500 pages of the book. Much of this meager amount is not of more than passing interest. Mechanically the volume is good, the format is pleasing, the print legible, the errors relatively few and the figures satisfactory. The text is in either German, French or English.

Such criticism as is contained in this review is not aimed at the meeting itself, which provides a useful forum for a gathering of electrochemists from all over the world, but at the form of the Proceedings which is unnecessarily expensive, ponderous, and delayed.

DEPARTMENT OF CHEMISTRY
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Präparative Organische Photochemie. By ALEXANDER SCHÖNBERG, Professor an der Universität Kairo. Mit Einem Beitrag von GÜNTHER OTTO SCHENCK, Professor an der Universität Göttingen. Allgemeine Gesichtspunkte für die Präparative Durchführung Photochemischer Reaktionen. Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf, Germany. 1958. xii + 274 pp. 16 × 23.5 cm. Price, DM 58.—.

Recent years have seen an increasing interest on the part of organic chemists in the field of preparative photochemistry. The appearance of a major work on this subject will be welcomed not only by workers in this field but by organic chemists in general who wish to become more familiar with the potentialities of photochemistry as an agent in organic synthesis. The author is well known for the contributions to this subject which have originated from his laboratories at the University of Cairo during the past fifteen years.

No claim is made in this book to furnishing a complete survey of all organic photochemical reactions. The aim has been to assemble in a systematic manner those reactions which have at present, or may be expected to have in the future, preparative value. The result is a well documented and critically selected compilation of reactions, written specifically for the organic chemist, with detailed experimental procedures for each type of synthesis described. No mention is made of rates or of purely kinetic studies, while mechanisms, though often presented, are usually given without elaboration or detailed comment. The synthesis of polymers is not discussed.

A short contribution by G. O. Schenck summarizes very briefly some of the theoretical aspects of photochemistry which have a bearing on the subject and contains information on light sources which are available in Europe as well as useful descriptions of glass apparatus for preparative work.

The main impression gained by this reviewer is of the thoroughness with which the literature has been covered. Approximately 300 syntheses are described in detail, while further data are summarized in tabular form. Literature up to October of 1957 has been included. Author and subject indexes appear to be comprehensive while useful cross-references are provided in the text and at the end of appropriate chapters.

ATLANTIC REGIONAL LABORATORY
NATIONAL RESEARCH COUNCIL C. R. MASSON
HALIFAX, N. S., CANADA

Gmelins Handbuch der Anorganischen Chemie. Achte Völlig Neu Bearbeitete Auflage. Germanium. Ergänzungsband. System-Nummer 45. E. H. ERICH PIETSCH, Editor. Verlag Chemie, G.m.b.H., (172) Weinheim/Bergstr., Pappelallee 3, Germany. 1958. xlv + 576 pp. 17.5 × 25.5 cm. Price, Kart. DM 332.—; Geb. DM 337.—.

This, the large supplement to the small 1931 volume on germanium, has the "now-familiar style and organization" of the other *Handbuch* volumes. Like them, it is costly, magnificent, encyclopedic, monumental—"the 'Bible' of the inorganic chemist." To this compendium of opinions expressed by previous reviewers of *Gmelin*, let me add the equally applicable words of one who had a way with words: "Infinite riches in a little room." Riches thus com-

pressed require the exercise of good judgment for their proper use.

Plainly, the reviewer of a *Gmelin* volume devoted mainly to chemistry is in difficulty—almost everything he can say has been said before. The present case is different. Germanium happens to be the first of the two elements that are making history as semiconductors. The book under review deals principally (pp. 132-454) with solid-state physics. Does the *Gmelin-Institut für Anorganische Chemie und Grenzgebiete* consider solid-state physics a *Grenzgebiet*? In any case, two colleagues expert in this field share my high opinion of what the *Institut* has done therein. The arrangement of the table of contents, a little puzzling on first glance, was clearly adopted because the overriding importance of the electrical properties of germanium could not have been foreseen when the 62-page *Hauptband* (sic!) appeared in 1931.

Where is inorganic chemistry going? Will it become the handmaiden of solid-state physics and similar disciplines? Which is more important, materials or processes? These are not idle questions, though it is idle to attempt answering them now. They are related to the *Grenzgebiet* problem raised above. Let us consider: Very roughly, 62 pages of "chemistry" in 1931 have grown to 254 pages in 1958. There have been added 322 pages on electrical properties, which cover the literature only to the end of 1954 although isolated later references appear. Work on germanium as a semi-conductor is still extensive. Beyond germanium, there is silicon; beyond silicon, a great many semi-conducting compounds. Where will it end?

Let us hope our friends the physicists will put the present volume to good use. If they do this, and refrain from compiling the same information for themselves, perhaps physicists and inorganic chemists will become so well acquainted that the questions of the previous paragraph will answer themselves.

RESEARCH LABORATORY
GENERAL ELECTRIC COMPANY HERMAN A. LIEBHAFSKY
SCHENECTADY, NEW YORK

Effect of Surface on the Behaviour of Metals. Lectures Delivered at the Institution of Metallurgists Refresher Course, 1957. The Institution of Metallurgists. Philosophical Library, Inc., 15 East 50 Street, New York 16, N. Y. 1958. vii + 100 pp. 14 × 22 cm. Price, \$10.00.

This small book comprises material originally presented in the form of lectures dealing with the effect of surface on the behavior of metals. These lectures were delivered for the Institution of Metallurgists at Llandudno during the annual refresher course in 1957. The first chapter by G. L. J. Bailey, entitled "Methods of Preparation and Examination of Surfaces," is concerned mainly with methods for studying the shape, composition and structure of surfaces both on a microscopic and atomic scale. Among other methods recent improvements in field-emission microscopes by Müller to yield resolutions of better than 3 Å. are cited, and also developments in the electron probe microanalyser. Beilby's flow theory of polish is considered to be considerably weakened by studies of Samuels on abrasion, polishing and etching which are discussed. The second chapter by T. P. Hoar, entitled the "Influence of Surface Treatments on the Chemical Behavior of Metals," stresses the importance of anodic processes occurring at the metal surface. The effects of mechanical work, and of electrochemical and chemical films of oxide, sulfide, and oxygen in passivation are considered. It is emphasized that pure surfaces are not obtained by electropolishing which can leave a protective film on the metal surface. The third chapter by F. T. Barwell entitled "Relationship between Surface Condition, Friction and Wear" deals with the nature of frictional contact and the effect on it of temperature, and gases such as oxygen, hydrogen sulfide, water vapor, etc. Fretting corrosion, pitting, scuffing and wear of cutting tools, plain bearings and engine cylinder bore corrosion are briefly considered. Effects of artificially produced surface films of oxide, sulfide and phosphate are also discussed. Recent research has involved studies of the Russell Effect, The Kramer Effect, and Rehinder Effect. The last chapter, by R. W. B. Stephens, entitled "Influence of Surface on the Physical

Properties of Metals" makes a more mathematical approach to the nature and concept of a surface and presents a brief account of the free electron theory of metals. The importance of optical methods in surface investigation is stressed including polarimetric methods, and studies of the anomalous skin effect. The use of moiré fringe patterns in electron micrographs for the observation of dislocations is illustrated. Other subjects which receive attention are: electrical resistance, thermal properties, thermal contact coefficient, thermal accommodation coefficient, magnetic properties, thermomagnetic properties, galvanometric effects, and diffusion.

Because of the wide range of topics covered the treatment although for the most part excellent is of necessity brief. However, a good bibliography is appended to each chapter indicating where more detailed treatment is to be found. As is natural much of the material presented is of British origin although early work by Langmuir, and more recent studies by Gomer are cited. However, the excellent work of Gwathmey and associates is not mentioned. A number of excellent plates enhance the value of this text. It is believed that the audience to which this small book is addressed, and also others interested in the nature and properties of metallic surfaces, will find it a stimulating account of progress and recent advances in its field.

DEPARTMENT OF CHEMISTRY
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W. W. RUSSELL

Fortschritte der Chemie Organischer Naturstoffe (Progress in the Chemistry of Organic Natural Products). Edited by L. ZECHMEISTER. Springer-Verlag, Mölkerbastei 5, Wien 1, Austria. 1958. vi + 244 pp. 16 × 23.5 cm. Price, \$9.75.

This volume of the *Fortschritte*, one of two appearing at the same time, contains four essays, several of which are devoted largely to the work of a single group. Schlubach has surveyed the painstaking work at the Hamburg Staatsinstitut on the isolation and analysis of the polyfructosans of grasses, and summarizes the significance of carbohydrate metabolism in the problem of food production. Zechmeister presents a collection of miscellaneous studies on the dehydrogenation and isomerization of carotenoids, much of the material being taken from recent work in his laboratories. A description of the X-ray structural analysis of B₁₂ by Dorothy Crowfoot Hodgkins gives an insight of this approach to complex structural problems, although the reader unfamiliar with the interpretation of electron density projections may have some difficulty in following the development of the structure. The very detailed and comprehensive account of the chemistry of podophyllum constituents by Hartwell and Schrecker is most representative of the definitive and critical reviews of a widely diverse literature for which this series is notable.

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JAMES A. MOORE

Pregl-Roth Quantitative Organische Mikroanalyse. Sicbente, vollkommen neu bearbeitete und erweiterte Auflage. By DR. H. ROTH, Badische Anilin- und Soda-Fabrik AG, Ludwigshafen A. Rhein Landwirtschaftliche Versuchsstation Limburgerhof/Pfalz. Springer-Verlag, Mölkerbastei 5, Wien 1, Austria. 1958. xiii + 361 pp. 15.5 × 23.5 cm. Price, \$11.85.

The seventh edition of the excellent book by Dr. Roth will make a valuable addition to libraries. It has been written in the same style as the previous editions. The book is divided into four sections.

The first section includes general information regarding microchemical balances, their use, and the auxiliary tools for handling and weighing samples and objects. Included here are also the preparation of standard solutions and the preparation of samples for analysis.

The second section of the book is devoted to the determination of the elements in the following order: carbon, hydrogen, oxygen, nitrogen, halogens, sulfur, selenium,