tention is given to the technology of cadmium. A plan already is being activated to extend the coverage in the Gmelin's Handbuch for the decade 1950–1960, with publication of new volumes to start about three years from now.

Gmelin's Handbuch should be the nucleus of the inorganic chemical collection in every academic library. Students should be introduced to it as early as possible and encouraged to use it, rather than placing full reliance on abridged handbooks and textbooks. Likewise it should be made the inorganic keystone in every industrial scientific library, and industrial chemists should take advantage of the wealth of reliable information it affords.

We chemists owe a great debt to Dr. Pietsch and the Gmelin Institut for the production of this most excellent reference work. The project deserves generous support by the widespread purchase of the Handbuch and by other means so that the Eighth Edition can be completed and the work of producing supplementary volumes for the 1950–1960 decade can be expedited. This reviewer can think of no better investment of funds to further science.

DEPARTMENT OF CHEMISTRY
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ITHACA, NEW YORK

Metallurgy of the Rarer Metals. Number 7. Beryllium. By G. E. DARWIN, M.A., A. Inst. P., A.I.M., and J. H. BUDDERY, B.Sc., Ph.D., A.R.C.S., D.I.C. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1960. ix + 392 pp. 14.5 + 22.5 cm. Price, $13.50.

Previous volumes in this series have covered chromium, zirconium, manganese, titanium, molybdenum, and tantalum and niobium. The present volume on beryllium maintains the same high standards as the earlier ones. Ten years ago chromium was considered to be "inherently brittle." The first volume in this series, "Chromium" by A. H. Sully (1954), helped to dispel this aspersion. While the brittleness of chromium remains a fabrication problem, it is now known that high-purity chromium can be made in forms that are ductile from sub-zero temperatures upward, and that the ductility at room temperature can be quite high. Nitrogen, particularly in the surface layer, is now known to be the main embrittling impurity [*cf. Metallurg. Revs.*, 4, #16, 434 (1959)]. The question as to whether impurities cause the poor ductility of beryllium remains unanswered, and according to the author of this Volume 7, will continue to be raised until really pure metal has been prepared and tested.

The development of beryllium metal in tonnage quantities goes back to 1942 when its use in nuclear reactors was desired because of its low capture cross section for thermal neutrons, its high elastic modulus and its good thermal conductivity. This development was impeded by the poor mechanical properties it exhibited, although it has been used extensively in reactor components that are not subjected to high stresses. That there is some hope of overcoming the brittleness of beryllium, just as this was accomplished with chromium, is seen in a statement quoted from page 145: "Difficulties in the fabrication of beryllium shapes are being overcome and the present emphasis is on improved mechanical properties. Joining technology is one step behind..." Much remains to be done to improve production and fabrication processes, to lower the impurity content, and to make finished shapes while retaining optimum strength and fatigue characteristics. In addition to use in nuclear reactors, beryllium has been considered favorably for space vehicle applications because of its low density, corrosion resistance, and high strength-to-weight ratio. In spite of the great interest in beryllium, production of beryl ore (roughly 5% Be) reached a figure of only 12,000 tons a year in 1956. The 1959 production of metal in the United States was only about 70 tons, with a price ranging from $50 to $200 a pound, depending on the form. From these facts, it can be surmised that beryllium can never become a large tonnage metal.

Besides the production, fabrication and a correlation of resultant mechanical properties of beryllium metal, this book summarizes the preparation of beryllium oxide from beryl and the fabrication of beryllia ceramic shapes; the physical, nuclear and chemical properties of the element; and the characteristics of its alloys, both those in which it is a major as well as those in which it is a minor component. The discussion is concluded with a ten-page review of the toxicity of beryllium compounds and methods to control the very serious hazards presented in large scale operations involving beryllium.

Like the other volumes in this series, Volume 7 consists essentially of an annotated bibliography with interpolated comments to bind it into a coherent whole. The result is a very readable, concise, and up-to-date (into 1959) review of one of the potentially most important structural metals of the space age.

ORDNANCE MATERIALS RESEARCH OFFICE
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Optische Daten zur Bestimmung anorganisher Substanzen mit dem Polariastionsmikroskop. Mit einer Einführung in die kristall-optischen Arbeitsmethoden. By Dr. ERNST KORDES, o. Professor für Strukturchemie an der Universität Bonn. Verlag Chemie, G.m.b.H., Pappelallee 3, Weinheim/Bergstr., Germany. 1960. xi + 191 pp. 17.5 × 24.5 cm. Price, DM. 43.—.

This book is intended for those who use the polarizing microscope for the identification of inorganic substances, especially in powder form. There is a concise description of the methods of chemical microscopy, beautifully illustrated by two color plates.

The outstanding features of the book are the tables and charts which greatly facilitate systematic identification of unknown materials. Approximately 1300 inorganic compounds are arranged in two principal ways: as a table of substances and tables of constants.

In the table of substances, there are separate listings for substances that are optically isotropic, uniaxial positive, uniaxial negative, uniaxial with unknown sign of the double refraction, biaxial positive, biaxial negative, and biaxial with unknown sign of the double refraction. The arrangement is in order of increasing value of the highest refractive index. The table lists the name and formula of the substance, a key number for use in other tables and diagrams, color, crystal system, refractive indices, density and references to the literature.

The tables of constants list data as determined with the polarizing microscope as follows: refractivity, magnitude and sign of the double refraction, color and pleochroism, and the formula and key number of the substance. These tables have the same arrangement as the table of substances except that each anisotropic substance is listed in two tables, once in a table of increasing refraction for the extraordinary ray, and once for increasing refraction for the ordinary ray.

The diagrams give, in graphic form, plots of double refraction *vs.* refractive index for the various anisotropic substances, and plots of density *vs.* refractive index.

There is a list of mineral names and an alphabetical formula index.

The practicing microscopist will find this book of great value, and institutions that offer instruction in microscopy may well use it to supplement standard text-books.

In addition, this volume so increases the usefulness of the polarizing microscope as an analytical tool that many who are now unfamiliar with this technique may be encouraged to use this versatile micro-method.

DEPARTMENT OF CHEMISTRY
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Solid State Physics. Advances in Research and Applications. Volume 10. Edited by FREDERICK SEITZ, Department of Physics, Univ. of Illinois, Urbana, Illinois, and DAVID TURNBULL, General Electric Research Laboratory, Schenectady, New York. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1960. xv + 516 pp. 16 × 23.5 cm. Price, $12.00.

Almost half of this volume is devoted to an article by M. R. Schafroth entitled "Theoretical Aspects of Superconductivity." The earlier sections of Dr. Schafroth's review constitute a terse but lucid exposition of the problems to be faced in developing a general theory of superconductivity and an account of early efforts at their solution.