Book Reviews

Kobalt, Teil A Ergänzungsband, 8 Auflage, Gmelins Handbuch der Anorganischen Chemie. [Cobalt, Part A Supplement Volume, 8th Edition, Gmelins Handbook of Inorganic Chemistry.] Verlag Chemie, G.m.b.H., Weinheim/Bergstrasse, 1961. lxii + 886 pp., 188 graphs. 17 × 24.5 cm. In German. Price, $139.00 (clothbound).

Some idea of the increased information available in this 1961 supplement of System 58 (the code designation for the chemistry of cobalt used by Gmelin) is gained from the fact that there are over 300 more pages in the supplement volume than that published as the 8th Edition in 1932. The data for the bulk of the bibliography has been cut at 1949; however, several topics which have surged to the fore in inorganic research and technology have literature references as recent as 1961. The reviewer was unable to evaluate more than a few such areas such as solid state systems of the intermetallic type, carbonyls, and some non-ammine complexes. Major reviews of recent (*ca.* 1960) origin are included in the introductory bibliography which preceeds each major section.

An outstanding addition to the supplement is the use of double columns in the table of contents, with the topics listed in German on the left and in English on the right. Also throughout the text all major headings have an English translation in the margin. All of the *Systems* now coming out as supplements have this form. It is difficult to conceive of a reader sufficiently interested in Gmelin data yet not being able to read major headings in German.

Recent trends in structure, extra-terrestial materials, and nuclear phenomena are reflected in considerable information being found on spectrographic states of cobalt, cobalt as a constituent of meteorites (not found or only briefly mentioned in the 1932 edition), and isotope tables. A host of properties of the element and its ions that were given no more than a mention previously have been given respectable bibliographies, such as polarizability, magnetic properties, ground states, atomic and ionic radii, X-ray spectrum, gaseous and solution potentials. The interest in the solid state is evident in there being some 94 pages, or more than 10% of the volume, being devoted to intermetallic and alloy systems. A case in point is the cobalt–antimony system. The expansion is from 2.5 to 12 pages, and the specific alloy $CoSb_2$ is treated in 3 pages instead of 15 lines. The lattice structure figures for all alloys are exceptionally well done.

The supplement does no more in the detection and estimation of cobalt than give a recent review bibliography. The editors apparently assume that the older edition is suitable for this purpose and that the treatment of the compounds of cobalt and aqueous solutions of cobalt ions in the supplement will give the desired information.

Some specific instances of recent interpretations of chemical behavior are given. A commonly observed phenomenon of the Co(II) ion in the presence of hydroxide is the rapid change in air from the deep blue to the brown precipitate. The supplement correctly explains the change in terms of CoO(OH) and the allotropic forms of the hydroxide. Such material was not found in the 1932 edition. The carbonyl section is greatly expanded from only the tri-, tetra-, and the nitrosyl carbonyl being included in the 1932 edition to a 1961 literature cut-off in the supplement on carbonyl anions, carbonyl hydrides, carbonyl nitrosyls, carbonyl halides, alkyl and aryl carbonyls, and mixed metal complex cobalt carbonyls. Some 25 pages are devoted to this pertinent topic of carbonyls and their derivatives.

The transition metal chemist interested in complex species involving ammonia and most of the basic amines must wait for the supplement to Part B. Although there is considerable information on such complexes as the cyano, oxalato, nitro, hydroxo, and a few amine bases, the ammonia ligand is not included in Part A. Complex compound nomenclature has been refined in conformance to IUPAC recommendations, however it is to the credit of the editors of both the 1932 edition and the supplement of 1961 that Stock and Stock-Werner nomenclature is used exclusively. It is of no particular credit to the teaching profession of the United States that archaic nomenclature is tolerated in texts, references, manuscripts given at professional societies, and in the classrooms. At some time we must recognize the importance of teaching and using proper nomenclature when the most important reference source in inorganic chemistry uses only Stock systems.

The readers will find some sections more abbreviated in the supplement than in the 1932 edition. Detection and estimation already have been mentioned, another case is that of the cobalt–chromium section. All references to ammine complexes are deleted in this part and supposedly material related to an item such as $[Cr(NH_3)_6][Co(NO_2)_6]$ will be in Part B. The editors obviously were often faced with problems of order. It is nearly as easy to justify the complex $[Ni(NH_3)_6][Co(CO)_4]_2$ (the last item of Part A of the supplement) under the heading carbonyl chemistry as it would be to place it with the chemistry of nickel–cobalt compounds or even in Part B with ammine complexes.

In conclusion the reader can only consider with awe and deep respect the amount of work, care, and skill that has gone into these supplement volumes. The temptation must have been great at times to re-use material and wording of the original volume. In few, if any, cases has this been done. The supplement may be considered a completely new treatment of cobalt.

Department of Chemistry
University of Minnesota
Minneapolis 14, Minnesota

Robert C. Brasted

Peroxide Reaction Mechanisms. Based on a Symposium sponsored by the Office of Ordnance Research, U. S. Army, at Brown University, Providence, Rhode Island, June 15–17, 1960. Edited by John O. Edwards, Brown University, Providence, Rhode Island. John Wiley and Sons, Inc., Interscience Division, 440 Park Avenue South, New York 16, N. Y., 1962. ix + 245 pp. 15.5 × 23.5 cm. Price, $8.00.

Articles based upon ten of the twelve talks presented at the "Peroxide Reaction Mechanisms Conference" held at Brown University, June 15–17, 1960, constitute the chapters of this book. Chapters by H. Taube and D. F. DeTar, the other two speakers, are not included.

It is inevitable that a book of this type should suffer

from lack of continuity, not only in terms of subject matter and prose style, but also in the approach taken by a particular author toward his subject. A brief consideration of each of the ten chapters illustrates the wide range of subject matter and approach encountered in this book. The first chapter, by P. D. Bartlett, entitled "Aspects of the Chemistry of Peresters," is virtually a progress report, preliminary findings being considered along with published results relating to several loosely connected problems. C. A. Bunton's chapter, "Nucleophilic Reactions of Peroxides," and M. C. R. Symon's chapter, "Photolysis of Hydrogen Peroxide in Fluid and Rigid Media," are surveys of current views in the fields under consideration, without detailed consideration of the experimental data which support these views, and with occasional comments indicating what is not known and what needs to be done. The chapter by Criegee, "Peroxide Pathways in Ozone Reactions," is a summary of published findings, based largely on a 1958 review article by Bailey in *Chemical Reviews*, with some of his own opinions added. The brief article by E. S. Shanley, "Hydrogen Peroxide," is also a review of published information on certain properties of hydrogen peroxide. The chapter by M. M. Crutchfield, "Peroxydiphosphoric Acid. The Kinetics of Hydrolysis and Decomposition," is a research paper, including an experimental section, tables of data, and a discussion of how the results pertain to the particular problems under study. The chapter by W. K. Wilmarth and A. Haim, "Mechanisms of Oxidation by Peroxydisulfate Ion," is a comprehensive, critical review of recent research, including unpublished data with detailed consideration of experimental results. The chapter by J. O. Edwards, "Nucleophilic Displacement on Oxygen in Peroxides," and the one by G. A. Russell, "Peroxide Pathways in Autoxidation," are both excellent review papers in which specific subjects are treated in such a way as to emphasize their general mechanistic implications. The chapter by M. Szwarc, "Decompositions Involving a Simultaneous Fission of Two or More Bonds," is a lucid discussion of the topic.

How useful one might find this book depends entirely upon how one generally reacts to symposia proceedings. The individual articles are well written, generally well annotated, and relatively free of errors. In Szwarc's chapter, Figures 2 and 3 should be interchanged with Figures 4 and 5, but even this leads to very little confusion, since the text leaves no doubt about which figure is being discussed. The reviewer found this book quite interesting to read, but not necessary to own.

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

MICHAEL M. MARTIN

BOOKS RECEIVED

July 1, 1962–October 1, 1962

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G. CHARLOT, J. BADOZ-LAMBLING, AND B. TRÉMILLON. "Electrochemical Reactions." American Elsevier Publishing Co., Inc., 52 Vanderbilt Avenue, New York 17, N. Y. 1962. 371 pp.

H. J. EMELÉUS AND A. G. SHARPE. "Advances in Inorganic Chemistry and Radiochemistry." Vol. 4. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1962. 318 pp.

H. FRAUENFELDER. "The Mössbauer Effect." W. A. Benjamin, Inc., 2465 Broadway, New York 25, N. Y. 1962. 336 pp.

M. LEDERER, Editor. "Chromatographic Reviews." Vol. 4. American Elsevier Publishing Co., Inc., 52 Vanderbilt Avenue, New York 17, N. Y. 1962. 177 pp.

R. T. SANDERSON. "Chemical Periodicity." Reinhold Publishing Corp., 430 Park Avenue, New York 22, N. Y. 1960. 318 pp.

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