
 BOOK REVIEWS

The Chemistry of Coordination Compounds. American Chemical Society Monograph Series. No. 131. Edited by JOHN C. BAILAR, JR., Professor and Head of the Division of Inorganic Chemistry, University of Illinois. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y., 1956. x + 834 pp. 16 × 23.5 cm. Price \$18.50.

Two items connected with this book command especial attention. First, it makes its appearance at a time when interest in coordination compounds is greater than ever before and many chemists feel the need for adequate compilations of the literature. Second, it is a major endeavor by a professor and a group of his former students almost all of whom hold academic positions and are themselves conducting programs of research in the general field of coordination compounds.

Professor Bailar states in his Preface: "No attempt has been made to cover the chemistry of coordination compounds completely—to do so would require many volumes. Rather, we have attempted to select ideas which are fundamental and stimulating and applications which are both illustrative and useful. Even so, it has been necessary to omit extensive discussion of such important topics as the use of complex ions as catalysts, metal ion deactivators, methods of preparing complex ions, and the details of many physical methods which are used in the study of coordination compounds."

However, a wide range of topics is covered in the twenty-three chapters. The first chapter by Professor Bailar and D. H. Busch presents a survey of the general behavior of metal ions as coordination centers and of various types of coordinating groups toward metal ions. The discussion of the early development of the coordination theory by Professor Bailar gives an appreciation of the work which preceded that of Alfred Werner and of the difficulties which he encountered in meeting the criticisms of his contemporaries. Two chapters by R. W. Parry and R. N. Keller entitled "Modern Developments" treat (1) the electrostatic theory of coordination compounds and (2) the electron-pair bond and the structure of coordination compounds. The former is particularly valuable because it assembles considerable information all too frequently overlooked by those who discuss the theoretical implications of these compounds. The chapter on "Chelation and the Theory of Heterocyclic Ring Formation Involving Metal Ions" by R. W. Parry and that on "Large Rings" by T. D. O'Brien present the various aspects of chelate compounds which have been the subject of widespread interest over the past decade. Following a chapter by T. D. O'Brien on "General Isomerism of Complex Compounds," three chapters are devoted to stereochemistry: (1) hexavalent atoms by F. Basolo, (2) coordination number four by B. P. Block, and (3) less common coordination numbers by T. D. O'Brien. The annotated bibliography on investigations concerning coordination number four is particularly valuable. Other significant topics are covered by chapters devoted to stabilization of valence states by J. V. Quagliano and R. L. Rebertus, theories of acids and bases as applied to complex compounds by F. Basolo, olation by C. L. Rollinson, and the polyacids by H. B. Jonassen and S. Kirschner.

The coordination compounds formed by olefins and by carbon monoxide and nitric oxide are reviewed by B. E. Douglas and by J. A. Mattern and S. J. Gill, resp. Organic molecular compounds are treated by L. B. Clapp and physical methods in coordination chemistry by R. C. Brasted and W. E. Cooley. The applications of coordination compounds are considered in chapters devoted to electrodeposition (R. W. Parry and E. H. Lyons, Jr.), to analytical chemistry (J. V. Quagliano and D. H. Wilkins), to natural products (G. L. Eichhorn), dyes and pigments (R. D. Johnson and N. C. Nielsen), and water softening (R. D. Johnson and C. F. Callis). There is an extensive subject index but no author index.

In any compilation of the type of this book it is inevitable that many readers will wish that some topics had been stressed more and others less. However, there will be no

general agreement as to which topics should have been curtailed and which amplified. The user of the book must remember that, in any compilation written by a number of separate authors, some repetition of topics in various chapters and some lack of uniformity of presentation are inevitable. The rapid growth of the field of coordination compounds is attested by the fact that major contributions have been made while the book was in press.

Professor Bailar's book is the most complete book on coordination compounds available in the English language and possesses distinct advantages over the German compilations. It is a very valuable contribution and will greatly facilitate further research in an important field of chemistry which cuts across the conventional areas of inorganic, organic, physical, analytical and biological chemistry. The physical make-up of the book conforms to the usual high standards for A.C.S. monographs.

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Steric Effects in Organic Chemistry. Edited by MELVIN S. NEWMAN. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1956. vii + 710 pp. 16 × 23.5 cm. Price, \$12.50.

For many years, organic chemists have been exhorted to explain their results in terms of resonance effects, inductive effects and combinations of these under many names. Through this period, the existence of steric effects has not been denied, but they were used only when all else failed. Now we have a volume devoted largely to considerations of steric effects large and small, and we can return after reading it to a more reasonable balance between electronic and steric explanations. The table of contents reproduced below gives an idea of the range of subjects covered. (1) "Conformational Analysis," W. G. Dauben and K. S. Pitzer; (2) "Substitution at Saturated Carbon Atoms," E. L. Eliel; (3) "Steric Effects in Aromatic Substitution," G. S. Hammond and M. F. Hawthorne; (4) "Additions to Unsaturated Functions," M. S. Newman; (5) "Intramolecular Rearrangements," D. J. Cram; (6) "Olefin Forming Elimination Reactions," D. J. Cram; (7) "Cleavage Reactions of the Carbon-Carbon Bond," H. H. Wasserman; (8) "Steric Effects among the Common Organometallic Compounds," G. F. Wright; (9) "Steric Effects on Equilibrated Systems," G. S. Hammond; (10) "Molecular Complexes and Molecular Asymmetry," M. S. Newman; (11) "Steric Effects on Certain Physical Properties," L. L. Ingraham; (12) "Calculation of the Magnitude of Steric Effects," F. H. Westheimer; (13) "Separation of Polar, Steric and Resonance Effects in Reactivity," R. W. Taft, Jr.

The appeal is wide, since the background material is well covered, to an extent that many chapters are valuable even aside from considerations of steric effects. The approach varies from the rigorous and quantitative to the qualitative, and in some instances of the latter approach, one can raise the question as to whether or not steric effects are really involved. The multiple author type of book has indeed something for everyone in this case, but this is not a criticism; this reviewer found stimulating ideas frequently applicable to his own problems throughout. All readers will be tempted to comment on the missing chapter. The leading champion of steric effects in this country has been H. C. Brown and a chapter by him would have been appropriate. References to his work, however, are very frequent so that it has not been neglected.

In sum, the book is excellent and can be highly recommended.

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