

notably diethylthiocarbamate and alkyl xanthates, are used for gravimetric and for photometric determination of indium.

Methods based on reduction of indium(III) are principally in the field of polarography; in the presence of accompanying elements, laborious prior chemical concentration and separation methods are required. The only satisfactory electrodeposition method is by internal electrolysis.

The text of this work concludes with a chapter on emission spectrographic and X-ray spectrographic methods, and a very brief chapter on radioactive methods.

In his preface, Professor Busev states, "The book is intended for a wide circle of analytical chemists in research and works laboratories and in universities, technical colleges and schools. It may also make it easier to use the results obtained, and may help in formulating and solving new problems in the analytical chemistry of indium." That there are, indeed, new problems in the analytical chemistry of indium may be indicated by the appearance, during the past one or two years, of many articles dealing with this subject. It seems likely that the use of indium arsenide and indium antimonide crystals as current-activated (injection) lasers may be a contributing factor in the increased interest in indium chemistry.

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**Infrared Spectra of Inorganic and Coordination Compounds.** By KAZUO NAKAMOTO, Associate Professor of Chemistry, Illinois Institute of Technology. John Wiley and Sons, Inc., 440 Park Avenue, S., New York 16, N. Y. 1963. 328 pp. 23.5 × 15.5 cm. Price, \$9.50.

In attempting to evaluate any book, the reviewer should ask himself for whom the volume will be most useful. With respect to Dr. Nakamoto's book, the answer to such a question is less than obvious even though the volume was written to fill a well defined and too-long-neglected lack in the literature of inorganic vibrational spectra. The first section begins with the Bohr frequency condition and works very quickly through symmetry and group theory to normal coordinate analysis and band assignments. The organization here is good and the section will serve as a satisfactory review for the practicing spectroscopist. By the same token, however, the apparent simplicity is deceptive and the newcomer to the field may easily find himself more glib than adept. This difficulty is compensated for by extensive referencing to a rather solid bibliography along with a good group of appendixes. These include: (1) the usual point group and character tables, (2) 7.5 pages of questionable value containing results from a simple arithmetic equation, (3) the F and G matrix elements of some typical molecules, (4) some detailed group frequency charts for metal complexes and inorganic groups and ions, and (5) a detailed normal coordinate analysis of a complex molecule. The unique collection of these latter three into one volume is probably well worth the price of the entire volume.

The main purpose for which this book is written is fulfilled by the remaining half, an extensive compilation of infrared studies of inorganic and coordination compounds. This literature survey strikes a very nice balance between the detail necessary for accuracy and the brevity necessary for clarity. The majority of the nearly 900 references listed is from the English language publications, but this apparently was not a restriction in the work and many significant articles in foreign language journals are included for completeness.

Trivial points could be made in criticism. For example, it is disconcerting to find a typographical error in the sixth line of the book—one's confidence in the proofreading of the more technical sections is shaken by such a thing. Mathematical notation (*e.g.*, Eq. 3.1 of Section I) could be made more in accord with the usual practices. But, generally speaking, these things do not detract from the clarity of thought or lucidity of style and organization which characterize the book.

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**Biochemical Systematics.** By RALPH F. ALSTON and B. L. TURNER. Prentice-Hall, Inc., Englewood Cliffs, New Jersey. 1963. 404 pp. 15.5 × 23.5 cm. Price, \$13.25 trade.

The authors in their preface state, "Although hundreds of thousands of words have already been written about biochemical systematics its actual impact upon formal systematics is still trivial. So far, no significant taxonomic dispositions of higher plants rest primarily upon biochemical criteria. We consider that an important objective of this book is to develop more fully an appreciation of the diversity of applications of biochemistry to systematics." It can be stated that their objective certainly seems to have been achieved. This volume is divided into sixteen chapters in which numbers 5 to 15 inclusive treat of the role that chemical constituents of plants play and may play in plant classification. It is evident that the authors, who are taxonomists by training, have an awareness of chemistry which is still rare in men devoted to the biological disciplines.

Following an introductory chapter which outlines the broad goals, there is one devoted to "Taxonomic Principles" which should be studied by all chemists who hope to make a contribution to "Plant Taxonomy"—which is the title of the next chapter. These two chapters deserve the attention of even those taxonomists who are primarily interested in morphology.

The chapters which treat of the chemical constituents point to the useful aspects as well as to the limitations of their use in taxonomy. Virtually all classes of organic components that can conceivably have a bearing on the subject are discussed. With the possible exception of the betacyanins no class of compounds has yet emerged which can be regarded as giving unquestionable answers to present taxonomic difficulties. Nevertheless, the pertinent literature is adequately reviewed and hints and suggestions for further work abound. Nor is the review restricted to higher plants but even algae and pteridophytes are not overlooked where relevant.

To cover so much territory in one volume requires a certain amount of abbreviation, but since at all events there is no finality or pretence thereto it may serve as a basis for future work.

If criticism there be at all, it could be about documentation. Even so, the important references are given and from these it is easy to find many more.

The book is well written, the printing and the diagram and figures are well done, and the volume is highly recommended, even to those chemists who have no ambition to solve taxonomic problems.

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## BOOKS RECEIVED

September 1, 1963–October 1, 1963

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