BOOK SECTION

New Publications

The Fundamentals of Electrochemistry and Electrodeposition, by S. Glasstone, published by Franklin Pub, Co., Palisade, N. J., U.S.A. 2nd ed, 1960, 90 pages, $ 3.20

The Physical Examination of Metals, by B. Chalmers and A. G. Quarrell (Ed), published by Edward Arnold (Publishers) Ltd., London, 917 pages, £8 sh8.

Handbook of Metal Protection by W. Wiederholt and J. Elze, in German, published by Wissenschaftliche Verlagsgesellscheft M.B.H. Stuttgart, Germany, 1960, 900 pages, D.M. 78.

Silicon Carbide: A High Temperature Semiconductor, by J R.O' Connor and J. Smiltons, published by Pergamon Press Ltd., London, 1960, 521 pages, 90sh.

Industrial Electric Furnaces and Appliances, by V. Paschkis and J. Persson, published by Interscience Publishers, New York, 2nd ed $ 24.

The Nature of the Chemical Bond and the Structure of Molecules and Crystals: An Introduction to Modern Structural Chemistry, by L. Pauling, Published by Oxford University Press, London, third ed, 1960, 644 pages, 60 sh.

The Use of Organic Reagents in Inorganic Analysis, by A. I. Busev and N. G. Polianskii, translated by J. T. Greaves, published by Pergamon Press Ltd., Oxford, 1960, 76 pages, 21 sh.

Advances in Analytical Chemistry and Instrumentation, Vol. I, by C. N. Reilley (Ed), published by Interscience Publishers, New York, 1960, 445 pages, $ 12.

Oxidation-Reduction Reactions in Ionizing Solvents, Discussions of the Faraday Society, No. 29, published by the Faraday Society, London, 1960, 260 pages, 50 sh.

Proceedings, Short Course on Process Industry Corrosion, by V. D. Miller (Ed), published by the National Association of Corrosion Engineers, Houston, U. S. A., 1960, 448 pages, $ 25.

High Purity Water Corrosion of Metals, by N. E. Hamner (Ed), published by the National Association of Corrosion Engineers, Houston, U.S.A., 1960, 100 pages, $9.

Common Corrosion Damage to Metals and Its Prevention, by G. Schikorr, published by Konrad Wittner, Stuttgart, Germany, in German, 1960, 146 pages.

A Survey of Nickel and Chromium Recovery in the Electroplating Industry, by E. P. Harris, published by the Department of Scientific and Industrial Research, London, 1960, 44 pages.

The Practical Anodising of Aluminium, by W. E. Hubner and A. Schiltknecht, English translation by W. Lewis, published by Macdonald and Evans, London, 1960, 250 pages, 55 sh.

Publications Received

Corrosion, Vol. 16, No, 10-12, 1960; Vol. 17, No. 1, 1961, NACE, Houston, U.S.A.

Metal Finishing, Vol. 58, No. 10—12, 1960; Vol. 59, No. 1, 1961, Metals and Plastics Publications Inc., Westwood, N. J., U.S.A.

Battelle Technical Review, Vol. 9, No. 11, 12, 1960; Vol. 10, No. 1, 1961, Battelle Memorial Institute, Columbus, Ohio, U.S.A.

C.S.I.R. News, Vol. 10, No. 23, 24, 1960; Vol. 11, No. 1, 3, 4, 1961, C. S. I. R., New Delhi

Z. D. A. Ab tracts, Vol. 18, No. 10-12, 1960, Z.D.A., London.

Science and Engineering, Vol. 13, No. 9-10, 11-12, 1960, ISE, Calcutta.

Review of Metal Literature, Vol. 17, No. 10-12, 1960, American Society for Metals, Novelty, Ohio, U.S.A.

Industrial Finishing, Vol. 12, No. 149, 150, 1960; Vol. 13, No. 151, 1961, Arrow Press, London.

Corrosion Prevention and Control, Vol. 7, No. 11, 12; 1960, Vol. 8, No. 1, 1961, London.

Insdoc List Current Scientific Literature, Vol. 7, No. 24, 1960; Vol. 8, No. 1-4, 1961, Insdoc, New Delhi.

Anti-Corrosion Manual, 1960 Ed, published by Corrosion Prevention and Control, London, 404 pages, £ 3.

Corrosion Technology, Vol. 7, No. 11, 12, 1960; Vol. 8, No. 1, 1961, Leonard Hill, London.

British Patents, Group 36, London.

Chemical Age of India, Vol. 11, No. 4, 1960. Technical Press Publications, Bombay.

Electroplating and Metal Finishing, Vol. 13, No. 12, 1960; Vol. 14, No. 1, 2, 1961, Robert Draper Ltd., Teddington, Middx, England.

Journal of the Electrochemical Society of Japan, Vol. 28, No. 1-3, 1960, Overseased, ECS of Japan, Tokyo.

Electroplating, India, Vol. 2, No. 3, 1960, Bombay.

Science and Appliance, Vol. 24, No. 9, 10, 1960 Vol. 25, No. 1, 1961, Ohio State University Research Foundation, Columbus, Ohio, U.S.A.

The Nickel Bulletin, Vol. 33, No. 10, 11, 1960, The Mond Nickel Co. Ltd., London.

Journal of the Indian Institute of Science, Vol. 43, No. 1, 1961, Bangalore.

SNTL Technical Digest, Vol. 11, No. 9, 10' 1960, Prague.

Australian Corrosion Engineering, Vol. 4, No. 8-11, 1960, Australian Association for Corrosion Prevention, North Sydney.

Australian Journal of Applied Science, Vol. 11, No. 4, 1960, CSIRO, East Melbourne.

Engineering Progress at the University of Florida' Vol. 14, No. 10, 1960, Florida Engineering and Industrial Experiment Station, Gainseville, Florida, U.S.A.

Florida Engineering News, Vol. 2, No. 4, 1960, Florida Engineering and Industrial Experiment Station.

Wiggin Nickel Alloys, No. 59, Henry Wiggin and Co., Ltd., Birmingham.

Metal Finishing Journal, Vol. 6, No. 71-73, 1960, Industrial Newspapers (Fuel and Metallurgical) Ltd., London.

Cobalt, No. 9, 1960, Centre D'Information Du Cobalt, Brussels.

International Atomic Energy Agency Bulletin, Vol. 3, No. 1, 1961, IAEA, Wien, Austria.

Design for Metal Finishing, published by the Institute of Metal Finishing, London, 1960, 16 pages.

Inco-Mond Magazine, No. 16, The Mond Nickel Co. Ltd., London.

Crerar Metals Abstracts, Vol. 9, No. 1-3, 1960, The John Crerar Library, Chicago.

Notes on the Film-Corrosion in Action, published by the Mond Nickel Co. Ltd., London, 18 pages.

ISI Bulletin, Vol. 13, No. 1, 1961, New Delhi.

BOOK REVIEWS

Energy Exchange in Interactions between Ions and Molecules, *by* V. N. KONDRATIEV, published by the Royal Institute of Chemistry, London, Lectures—Monographs and Reports 1960, No. 3, 16 pages, 4 sh.

In this lecture, Professor Kondratiev has mainly discussed the mass-spectroscopic investigations on processes of energy exchange in interactions between ions and molecules. The processes of charge transfer (symmetrical and unsymmetrical) have been considered in detail with particular emphasis on the resonance nature of charge transfer. The resonance nature of charge exchange explains the differences in collision cross sections. The dissociation of molecules or molecular ions may also occur along with simple charge transfer processes. Dissociative ionization corresponds to the transition of molecules to an unstable excited state, this process being similar to charge transfer involving electronic excitation. The charge exchange between atomic ions and CO_2, H_2O, H_2S, NH_3, CH_4 and N_2O molecules have been dealt with. Detection of free radicals appearing in reactions and under electric discharge is found to be very important for interpretation of results. The peculiarities of charge transfer in polyatomic systems have been pointed out. A polyatomic system has many degrees of freedom to which energy may be imparted and the collision time may thus be considerably longer. That is, the collision of polyatomic ions and molecules may yield a long-lived complex, owing to the temporary distribution of excess energy among its vibrational degrees of freedom. The collision time may attain very high values even for a few vibrational degrees of freedom. Here charge exchange is obviously a two-stage process. In the first stage an intermediate complex moving at the speed of the centre of gravity is formed, and in the second stage, the complex decomposes. The theory of charge transfer is however still in its infancy.

The author then considers the energy exchange in the interaction between ions and molecules. All ion-molecular reactions hitherto studied are exothermic. The activated complexes here possess a number of vibrational degree of freedom and the lifetime depends on the distribution of excess energy between vibrational degrees of freedom. If the energy is concentrated in certain bonds, the decomposition of the complex results in an ion-molecular reaction or in charge transfer. The latter process yields stable secondary ions, or ions disintegrating to fragmentary

products. The mode of decomposition of the complex is mainly governed by its energy.

The reverse endothermic ion-molecular reactions have not been noticed, possibly because of competing exothermic or thermoneutral reactions. The isolated data presently available do not permit any definite conclusions and extensive investigations are necessary. The numerous exothermic ion-molecular reactions studied, have made it possible to develop a new method for measuring molecular energy constants. For example, the proton affinity of water, hydrocarbons and alcohols have been determined recently.

The charge exchange processes and ion-molecular reactions are very important for the elucidation of the mechanism of ion-molecular interactions and other theoretical problems. Ion molecular reactions are fast even at very low temperatures. Chemically active hot particles often result from energy exchange in ion-molecular reactions and charge transfer processes. Such reactions are becoming more and more important in thermochemistry, catalysis etc.

This interesting field has been summarized in an excellent manner by the author, and is strongly recommended to physical chemists and others.

—C.N.R.R.

Design for Metal Finishing, published by the Institute of Metal Finishing, London, 1960, 16 pages, 5 sh.

This booklet has been published by the Institute of Metal Finishing with a view to emphasising the importance of correct design in the finishing of metal articles by polishing, electroplating or painting. 'Design that takes into account not only the function of the article and its method of fabrication, but also the requirements of the finishing processes, always results in a more serviceable and usually a less costly product'. This publication has been brought out to guide engineers and designers with respect to the essentials of these metal finishing processes as they relate to design. It is divided into three major sections: Design for Polishing — Design for Plating — Design for Painting.

Mechanical polishing on a buffing wheel, or on an automatic equipment is the normal method of polishing. Non-mechanical polishing or brightening can be adopted in the case of certain metals, though the same finish as is achieved by mechanical process cannot be attained. Design recommendations are made to aid polishing with excellent illustrations to avoid sharp edges, inaccessible areas, large flat areas etc. and to adopt suitable modifications in design. In the section on design for plating, the process of plating is dealt with, starting from the principle of plating, preparation of the surface, equipment etc. Recommended designs, suitable for plating with illustrations emphasising points to be avoided and points to be considered, are indicated. The table on minimum thickness of plating usually applied on various metals and alloys for different purposes will be a good guide to the designer. The processes of painting like the nature of the process, preparation of the surface and the paint application are described in the section on the design for painting. The recommendation of designs suitable for spraying, dipping, and barrel painting are enumerated separately.

In the post-script the publishers have stated that the design recommendations described in the booklet should serve to show that ease of finishing ought not to be sacrificed to ease of fabrication. The list of standards from which the technical data have been compiled to give the recommendation on design are indicated at the end of the booklet.

The booklet is very attractively produced with bold and clear printing and with profuse illustrations. This is an interesting and bold attempt on the part of the Institute of Metal Finishing. They have tried to collate and present the requirements of the finishing processes, in a lucid and concise manner, which should be taken into account while designing the fabrication of the articles, with a view to ensuring that they can be finished in a simple and effective manner without sacrificing the designer's main intentions.

—S. K.

Anti-Corrosion Manual, 1960 Edition, published by Corrosion Prevention and Control, London, 404 pages, £ 3.

This volume is the third of a series brought out by 'Corrosion Prevention and Control' in order to provide information on all aspects of corrosion. The manual is broadly divided into ten divisions: (1) corrosion in industry, (2) resistant materials and their applications, (3) preparatory treatments for protective coatings, (4) protective coatings, (5) spray painting methods, (6) pipe coatings and tapes, (7) protective packaging, (8) water treatment for corrosion control, (9) corrosion testing and (10) cathodic protection. In addition it contains British Standards and an index.

The present edition has been completely revised and enlarged thus making the manual more up-to-date. Under the section 'Corrosion in Industry' new articles on 'degreasing' 'che-

mical descaling', 'mechanical descaling' and 'chromate and phosphate treatments' are extremely welcome. The article on 'resin based paints' in the fields of coatings is also new. Inhibitors in food manufacturing and in water treatment, have also been covered, thus making this edition more comprehensive than previous ones. It is refreshing to find for the first time in such a publication a mathematical analysis of the problems involved in internal cathodic protection.

This book is abundant with tables covering important data which are very useful for personnel engaged in the field of corrosion prevention. The publishers are to be congratulated not only for keeping pace with the voluminous data produced, but also for seeing to it that this is not merely a dictionary of data but a very useful handbook for the corrosion technologist.

—J. S.

Recent Studies in Boron Chemistry, *by* H. G. HEAL, published by the Royal Institute of Chemistry, London, Lectures—Monograph and Reports 1960-No 1, 39 pages, 5 sh.

About a dozen reviews on the different aspects of boron chemistry have appeared in recent years, showing the importance of this flourishing branch of chemistry. Nevertheless the present monograph serves something new, which is not covered in other reviews. This publication is devoted mainly to the ionic compounds of boron. Amongst the topics covered are: the fluoboric acids and their salts; chloro-and bromo-compounds of boron; the subhalides of boron; the boron hydrides-their technical importance and the recent methods of preparation; boranates-their importance, preparation and properties; triaryl and trialkyl boron anions and the boronium salts. The monograph is excellently illustrated with important examples from the recent literature up to January 1960. Nearly 260 useful references are provided towards the end. This publication will be very useful to those who are engaged in this rapidly advancing and technically important field of boron chemistry.

—C.C.P.