BOOK SECTION

New Publications

The Anti-Corrosion Manual, published by Scientific Surveys Ltd, London, 4th ed, 1962, 454 pages, £ 3 sh 3.

Anodic Oxidation of Aluminium and Its Alloys, published by the Aluminium Development Association, London, Information Bulletin No. 14, 2nd ed, 188 pages, 8sh 6d.

Diffuse Coatings on Iron and Steel, by N. S. Gorbunov, published by the USSR Academy of Sciences, English translation, Office of Technical Services, U.S. Dept. of Commerce, Washington D.C,, 165 pages, $ 1.75.

The Principles of Electrochemistry, by D. A. MacInnes, published by Dover Publications Inc, New York, 1961, 478 pages, $ 2.35.

Electrochemistry of Molten and Solid Electrolytes: Transactions (Trudy) of the Institute of Electrochemistry No. 1, translation from Russian, published by Consultants Bureau Enterprises Inc., New York, 1961, 106 pages, $ 17.50.

Finishing Handbook and Directory 1962, published by Sawell Publications Ltd, London, 37sh 6d.

The Metallurgy of Tin, by D. V. Belyayev, translated from Russian by J. J. Cornish, edited by H. T. Protheroe, published by Pergamon Press, Oxford, 1962, 110 pages (approx), 42sh (approx).

Physical Chemistry, by G. H. Duffey, published by McGraw-Hill Publishing Co. Ltd, London, 1962, 527 pages, 68 sh.

Electroplating Engineering Handbook, by A. K. Graham (Ed), published by Reinhold Publishing Corp., New York, 1962, 2nd edition, 747 pages, $ 18.50.

Metallic Corrosion, First International Congress, published by Butterworth and Co. (Publishers) Ltd, 1962, 712 pages, £ 10 sh 10.

Electrochemical reactions — The Electrochemical Methods of Analysis, by G. Charlot, J. Bodoz-Lambling and B. Tremillon, published by Elsevier Publishing Co, Amsterdam, 1962, 371 pages, Df 1.40.

Ion Association, by C. W. Davies, published by Butterworth & Co. Ltd., London, 1962, 190 pages, 40 sh.

Materials of Construction for Chemical Plant, by I. L. Hepner (Ed), published by Leonard Hill (Books) Ltd, London, 1962, 204 pages, 45sh.

Proceedings of the Sixth International Galvanizing Conference 1961, published by European General Galvanizers Association Secretariat Zinc Development Association, London, 75sh.

The Electrochemistry of Semiconductors, Physical Chemistry Series, Vol. X, by P. J. Holmes (Ed), published by Academic Press, London and New York, 1962, 396 pages, 84 sh.

Electrolytes, Proceedings of an International Symposium held in 1959, by B. Pesce (Ed), published by Pergamon Press, Oxford, 1962, 360 pages, 100 sh.

Corrosion-Mechanical Strength of Metals, by L. A. Glikman, translated by J. S. Shapiro, published by Butterworths, London in association with D.S.I.R., 1962, 172 pages, 50 sh.

Ionization Constants of Acids and Bases, A Laboratory Manual, by A. Albert and E. P. Serjeant, published by Methuen and Co. Ltd, London, 1962, 179 pages, 21 sh.

Pubications Received

Crerar Metals Abstracts, Vol. 10, No. 5, 1961; No. 6–10, 1962, The John Crerar Library, Chicago

Nonequilibrium Thermodynamics, by D. D. Fitts, published by McGraw-Hill Book Co. Inc., New York—San Francisco—Toronto—London, 1962, 173 pages, $ 7.95.

Corrosion Technology, Vol. 9, No. 4–7, 1962, Technology Publications Ltd, London.

Corrosion Prevention and Control, Vol. 9, No. 4–7, 1962, Scientific Surveys Ltd., London.

Industrial Finishing, Vol. 14, No. 166–169, 1962, Arrow Press Ltd., London.

Metal Finishing Journal, Vol. 8, No. 88–91, 1962 Industrial Newspapers (Fuel and Metallurgical) Ltd., London.

Science and Appliance, Vol. 26, No. 4–6, 1962, The Ohio State University Research Foundation, Columbus, Ohio, U.S.A.

Defence Science Journal, Vol. 12, No. 2, 3, 1962, Defence Research and Development Organization, New Delhi.

Battelle Technical Review, Vol. 11, No. 4-6, 1962, Battelle Memorial Institute, Columbus, Ohio, U.S.A.

C.S.I.R. News, Vol. 12, No. 9–16, 1962, New Delhi.

Materials Protection, Vol. 1, No. 3–6, 1962, NACE, Houston, U.S.A.

Corrosion, Vol. 18, No. 3-6, 1962, NACE, Houston, U.S.A.

Metal Finishing, Vol. 60, No. 4–7, 1962, Metals and Plastics Publications, Inc., Westwood, N.J., U.S.A.

Insodoc List Current Scientific Literature, Vol. 9, No. 10–16, 1962, New Delhi.

Zinc Abstracts, Vol. 20, No. 2–6, 1962, ZDA, London.

Australasian Corrosion Engineering, Vol. 6, No. No. 4–6, 1962, Australasian Corrosion Association, North Sydney N.S.W.

Australian Chemical Engineering, Vol. 3, No. 4–6, 1962, North Sydney, N.S.W.

Journal of the Electrochemical Society of Japan, Vol. 29, No. 2-4, 1961, Tokyo.

Electroplating and Metal Finishing, Vol. 15, No. 5–7, 1962, Teddington, Middx, England.

R and D Digest, Vol. 2, No. 2, 3, 1962, Scientific Information Bureau, Defence Science Laboratory, Delhi.

Florida Engineering News, Vol. 4, No. 2, 1962, Engineering and Industrial Experiment Station, Gainesville, Florida, U.S.A.

Electro Technology, Vol. 5, No. 4 — Special Radar Issue, pages 242 plus LXXXI; No. 5, 6, 1961, Society of Electronic Engineers, Bangalore.

The Nickel Bulletin, Vol. 35, No. 2-6, 1962, The International Nickel Co. (Mond) Ltd., London.

Review of Metal Literature, Vol. 19, No. 4–6, 1962, American Society for Metals, Novelty, Ohio, U.S.A.

Unesco Bulletin, No. 11, June 1962, South Asia Science Co-operation Office, New Delhi.

Technology of Electrodeposition, by A. T. Vagramyan and Z. A. Solov'eva, translated from Russian by A. Behr, published by Robert Draper Ltd., Teddington, Middx, England, 1961, 398 pages, 90 sh.

Corrosion Abstracts, Vol. 3, No. 1, 1962, Corrosion Committee of the Royal Swedish Academy of Engineering Sciences, distributed by Almqvist and Wiksell, Stockholm.

ISI Bulletin, Vol. 14, No. 3, 4, 1962, New Delhi.

Surface Phenomena in Metals and Alloys, by V. K. Semenchenko, translated from Russian by N. G. Anderson, edited by R. Kennedy, published by Pergamon Press, Oxford-London-New York-Paris, 1961, 466 pages, £ 5 sh 5.

Journal of the Indian Institute of Science, Vol. 44, No. 3, 1962, Bangalore.

Australian Journal of Applied Science, Vol. 13, No. 2, 1962, CSIRO, East Melbourne.

Engineering Progress at the University of Florida, Vol. 15, No. 12, 1961; Vol. 16, No 2-4, 1962, Florida Engineering and Industrial Experiment Station, Gainseville, Florida, U.S.A.

Chemical Age of India, Vol. 3, 4, 1962, Technical Press Publications, Bombay.

International Atomic Energy Agency Bulletin, Vol. 4, No. 3, 1962, IAEA, Vienna, Austria.

Anodic Oxidation of Aluminium and Its Alloys, published by the Alminium Development Association, London, Information Bulletin 14, new ed, 1961, 187 pages, 8 sh 6 d.

Advances in Electrochemistry and Electrochemical Engineering, Vol. 1, Electrochemistry, by P. Delahay (Ed), published by John Wiley and Sons, Interscience Divison, 1961, 326 pages, $ 12.

Electrochemistry of Fused Salts, by I.U.K. Delimarskii and B. F. Markov, 1961, translated from 1960 Russian edition by A. Peiperl, published by the Sigma Press, Publishers, Washington D.C., 338 pages, $ 12.50.

Philips Light Bulletin, Vol. 9, No. 1, 1962, Philips India Ltd, Calcutta.

Encyclopaedia of Chemical Labeling, by I. Meilan and E. Mellan, published by Chemical Publishing Co., Inc., New York, 1961, 111 pages, $ 8.75.

International and Metric Units of Measurement, by M. H. Green, published by Chemical Publishing Co., Inc., New York, 1961, 116 pages, $ 6.

Inco-Mond Nickel, No. 1, 2, 1962, The International Nickel Co. (Mond) Ltd., London.

Quarterly Bulletin of Steel Statistics for Europe, Vol. 12, No. 4, 1962, Economic Commision for Europe, United Nations, Geneva.

Copper, No. 15, 1962, Copper Development Association, London.

British Patents, Group 36, The Patent Office, London.

Finishing News, Vol. 1, No. 8, 1962, Scientific Surveys Ltd., London.

Cobalt, No. 15, 1962, Centre D'Information Du Cobalt, Brussels.

Wiggin Nickel Alloys, No. 65, 1962, Henry Wiggin and Co., Ltd., Birmingham.

BOOK REVIEWS

Nonequilibrium Thermodynamics, *by* D. D. FITTS, published *by* McGRAW-Hill Book Co. Inc., New York, 1962, 192 pages, $7.95.

In the widest sense thermodynamics deals with the properties of matter in so far as they are affected by temperature. The subject of classical thermodynamics concerns itself to systems in equilibrium and has attracted lot of attention, and a number of excellent treatises have appeared during the last century. However, non-equilibrium thermodynamics which seeks to extend classical thermodynamics to include systems in which transport processes are taking place, is of recent origin and a rather abstruse literature of the subject has developed, and there are few books on the subject. Therefore, the present text by Donald D. Fitts on this subject is to be welcomed.

The book may be divided into two parts. The first part develops the general theory of non-equilibrium thermodynamics in five chapters viz., the system, the hydrodynamic equations, the assumption of local equilibrium, the phenomenological relations and the transport equations. The second part is devoted to the application of the theory developed in the first half, and consists of six chapters dealing with the transport of heat, electrochemical systems, diffusion in isothermal systems, thermal diffusion, sedimentation and centrifugation and chemical reaction. Wherever possible, the author has given references to original literature and suggestions for further reading.

At the beginning of the text a full list of symbols has been given and at the end useful appendices on dyadics, Onsagar theory, relaxation in viscoelestic media, inertial forces and viscous systems have been presented. The book does not deal with transport phenomena in the solid state though historically W. Thomson (Lord Kelvin) stumbled into non-equilibrium thermodynamics in his studies on thermoelectric effect which is a solid state transport phenomena.

The book is well written, the presentation is clear and concise, and a person who is familiar with classical thermodynamics and whose mathematical attainments cover elementary calculus, vector analysis and tensors should be able to follow the book on his own. Students of advanced chemical engineering should find it very valuable indeed in studying the recent approach to chemical engineering subjects. Chemistry students would also benefit considerably by a study of this volume in as much as it leads to broadening the basic ideas of thermodynamics which were learnt in the class room.

— N.R.K.

Anodic Oxidation of Aluminium and Its Alloys, published by the Aluminium Development Association, London, Information Bulletin 14, new edition, 1961, 187 pages, 8sh 6d.

This excellent monograph by the ADA is a thorough revision of the matter covered in the earlier publications. Anodizing is a very important surface finishing process today, and the publishers deserve to be congratulated for issuing a fairly comprehensive bulletin such as this.

The matter has been divided into various sections: principles, factors involved, the shop, preparation of material, different processes; colouring, sealing stripping, testing, properties and maintenance. The appendices furnish very useful information on the theory, control methods, bibliography etc. As stated in the foreward this is not intended to be a text-book but as a reference guide to industrial finishers, metallurgists, electrochemists and engineers. The presentation is excellent, with adequate illustrations by way of figures and tables. One, however, is apt to get a feeling that hard anodizing — which is such a valuable modern technological tool, has not been sufficiently dealt with. The inclusion of the bibliography certainly adds to the usefulness of the publication. This concise volume is a 'must' for all those concerned with anodic oxidation of aluminium.

— T.L.R.

International and Metric Units of Measurement, *by* MARVIN H. GRIEN, published by Chemical Publishing Co., Inc., New York, 1961, 116 pages, $6.

This book brings to us the recent changes in standards made universal by international agreement. Thus, the units based upon the Mendenhall Order, which served as the basis for United States customary units, have been replaced by the International units. There are sixteen chapters covering different fields like angular measure,

area, atomic energy units, density and concentration, electrical units, energy, flow, force, length, magnetic units, mass, power, pressure, time, velocity and volume. There are fifty tables and an exhaustive index. Comparison of International and United States customary units are also covered. This comprehensive systematic report will bring up to date our knowledge of units of measurement. Care has been taken to check and recheck the values. The cost of the book is rather high. The get up is excellent. This book will be a welcome addition to any library of science or technology.

— J. S.

Technology of Electrodeposition, *by* A. T. VAGRAMYAN and Z. A. SOLOV 'EVA, Moscow 1959, translated by A. BEER, pubished by ROBERT Draper Ltd., Teddington, England, 1961, 398 pages, 90 sh.

This is an English translation of the Russian version of 'Methods for the investigation of Process of Electrodeposition of Metals' published in the U.S.S R. and brought up to date by the authors at the special request of the publishers. The authors have selected important aspects of the electrodeposition process and the principal properties of electrodeposits, and have presented an up to date summary of the knowledge of these and of available methods of investigation.

The book consists of two parts—fundamentals of electrodeposition and electrodeposists—properties and control. In this book the technology of the electrodeposition of metals is mainly concerned with electrodeposition from aqueous solution. The first part consists of four chapters. In the first chapter methods of studying the rates of electrode reactions are discussed. Among the various methods of studying the kinetics of electrode process, the use of radio-active tracers for studying the mechanism of electrode processes in the electrodeposition of metals is comparatively new but it is claimed to be extremely promising. With the aid of radio-active tracers, it has proved possible to explore the possibility of depositing rare metals like tungsten, molybdenum etc., in large quantities from aqueous solutions. Methods using alternating or pulsating currents are also discussed. The second chapter covers the effect of surface-active materials on the process of the electrodeposition of metals. The nature of the surface-active material and the nature of molecular bonds have a considerable effect on the adsorptive capacity of the additive. Plating with different types of alte nating current—symmetrical, (sinusoidal, linear or other wave shape), asymmetrical, pulsating and reversing or variable direction — are discus wis edt reference to the marked influence on electrodeposits. The last chapter in this section deals with alloy plating. Methods of adjusting deposition potentials of alloys and rate of discharge of simultaneously reduced ions are discussed in detail. The last chapter in this section deals with electrodeposition of tungsten and molybdenum alloys.

The second part deals with the properties and control of electrodeposits and has been divided into six chapters. Brighteners of electrodeposits form the subject matter of chapter five, with reference to the method of determination of brighteners, factors influencing brightness like thickness of deposit, current density and brightener. Theory of bright plating and the combined process of plating and electropolishing are discussed. An apparatus for studying the brightness of electrodeposits during deposition has been described. The next chapter is on methods of studying hydrogen adsorption, factors affecting hydrogen adsorption and the mechanism of hydrogen adsorption in electrodeposits. Among the mechanical properties of electrodeposit, internal stress, hardness and brittlement are described in the next chapter. Various methods of measuring these and the factors concerned are also described. The authors give in the next two chapters various methods of measuring adhesion and porosity and conditions which have marked influence on them. Current distribution and throwing power in electrodeposition is dealt with in great detail in the last chapter. Factors affecting the achievement of a uniform distribution of current over the surface of an electrode are brought out in a lucid manner.

The book is illustrated profusely and a number of charts are included. It is clearly printed and the get up is excellent. Each chapter ends with a reference. An index has been provided. This is a useful addition to the books on the subject of electrodeposition, as this aspect of the electrodeposit has not been dealt with so thoroughly. The publishers have to be congratulated on their bold attempt in undertaking to translate the work from the Russian language. This is their second or third venture in this connection. This publication can be safely recommended both to the electrochemists and to the platers, as it contains a mine of information essential to the understanding and control of the electroplating process and of deposit properties.

— S. K.

Surface Phenomena in Metals and Alloys, *by* V. K. SEMENCHENKO, edited by R. KENNEDY, published by Pergamon Press, Oxford, 1961, 466 pages, £ 5 sh 5.

This translation from Russian is a welcome addition to the field of surface phenomena. The author is a well known authority in this subject for over two decades. Special emphasis has been given to surface tension and adsorption, as manifested chiefly by pure metals and alloys. The book is divided into eleven chapters. Chapter one deals with one-component systems. Chapter two deals exclusively with experimental methods of determination of surface tension. The third chapter outlines the experimental results of the determination of the surface tension of pure metals. The thermodynamics of surface phenomena in two-component solutions and mixtures and the molecular statistical theory in solutions follow in the third chapter. The surface tension of metallic solutions, general features of surface phenomena in crystals, effect of impurities and finally the theory of surface tension of metals, are covered in the remaining chapters.

The nicely brought out book, in addition, contains a large number of data presented in tables in the appendices. The technique of litho-photography is seen in this book to perfection. Research workers in the field of solid state and metallurgy will find this volume very valuable. Exhaustive literature survey is found in this book. The cost is very high. On the whole it is really a commendable publication.

— J. S.

Advances in Electrochemistry and Electrochemical Engineering, Vol. 1, Electrochemistry, *by* P. DELAHAY (Ed), published by Interscience Division, John Wiley and Sons, New York, 1961, 326 pages, $ 12.

This series has been planned to bridge the gulf between electrochemistry and electrochemical engineering. Volume 1 on electrochemistry discusses 5 modern topics : structure of the double layer, hydrogen overvoltage and adsorption, oxygen overvoltage, semiconductor electrode reactions, and fast electrode processes. Each chapter has been contributed by a specialist in the field, including Prof. Frumkin.

The presentation of the matter is excellent, and the mathematical approach, which is so essential for a proper understanding of physico-chemical problems, is well taken care of. In each chapter there are tables and figures, and an up-to-date list of references. There is an index in the end. The book is moderately priced. The publishers and the editorial board deserve to be congratulated for this outstanding monograph which will doubtless be indispensable to electrochemists and physical chemists.

— T. L. R.

Electrochemistry of Fused Salts *by* IU. K. DELIMARSKII and B. F. MARKOV, 1961, translated from 1960 Russian edition by A. PEIPERL, published by the Sigma Press, Publishers, Washington D.C., 338 pages, $ 12.50.

The English translation of the book ' Electrochemistry of Fused Salts ' by IU. K. Delimarskii and B. F Markov fulfils the long felt need for a comprehensive treatment on the fundamental aspects of fused salt electrochemistry. The book is full of information regarding the electrical conductance, ionic transfer, galvanic cells, decomposition potentials, electrode potentials, solubility of metals, and the metal-fused salt equilibrium, electrolysis, polarisation and electrode pocesses. A small account of polarography of fused salts is also included in the last chapter. This book contains very extensive list of references pertaining to the subject up to 1960. It is really valuable to those who want to pursue the fundamental aspects in fused salt electrochemistry.

In the eight chapters a very wide field is covered. Chapter I gives the introductory material and presents a survey of the existing methods of electrical conduction measurements. Surprisingly in this chapter the experimental details have not been covered although the references at the end of the chapter serve to get adequate details on this aspect. Extensive use of thermodynamics has been made throughout the book with a view to correlate the different results obtained by various workers in the field.

The authors of this book are to be congratulated for correlating the different data obtained by various authors and for the lucid discussion of the mechanism involved.

— U. H. N. and S.V.