# BOOK SECTION

**New Publications**

Lasers, by K. Patek, published by Iliffe, London, 1967, 288 pages, £ 2 5 sh. (English translation).

Paint Finishing in Industry, by A. A. B. Harvey, published by Robert Draper Ltd., Teddington, Middx, England, 2nd ed., 1967, 620 pages, 147 sh.

Extraction Metallurgy, by J. D. Gilchrist, published by Pergamon Press, Oxford, 1967, 291 pages, 25sh.

The British Iron and Steel Research Association, London, Corrosion Advice Bureau Booklets—No. 3. A Background to the Corrosion of Steel and Its Prevention; No. 4. Preventing the Corrosion of Steel in Supply Waters.

Cobalt and Cobalt Alloys, by F. R. Morral, published by Cobalt Information Center, BMI, Columbus, Ohio, third revised ed., 1967, 162 pages.

Physical Chemistry for Metallurgists, by J. Mackowiak, published by George Allen and Unwin Ltd., London, Institution of Metallurgists Modern Metallurgical Texts, Volume 2, 1967, 311 pages, 42 sh.

Guide to Uncommon Metals, by E. N. Simons, published by Fredrick Muller Ltd., London, 1967, 244 pages, 35 sh.

Edited Proceedings—Seventh International Conference on Hot Dip Galvanizing, Paris—1964, published by Pergamon Press Ltd., Oxford, 1967, £ 8.

Zinc Controls Corrosion, published by American Zinc Institute, New York, 31 pages.

A Report on Surface Treatments for Nickel and Nickel-Base Alloys, by C. M. Jackson and A. M. Hall, published by Clearing House, U.S. Dept. of Commerce, Springfield, Va, 1966, 140 pages, $ 4.

Enthone Plating-on-Plastics Handbook, published by Enthone, New Haven, Conn, U.S.A.

Copper-Zinc Alloys (Brasses and Special Brasses), published by Deutsches Kupfer-Institut E. V., Berlin, in German, 1966, 533 pages.

Properties of Copper and Its Alloys, published by Centre d' Information Cuivre Laitons Alliages, Paris, 1967, 63 pages (In French).

A Reverence Book of Chemistry, by J. H. White, published by Philosophical Library, New York, 1967, 311 pages, $ 10.

Particles and Accelerators, by R. Gouiran published by McGraw-Hill, New York, 1967, 249 pages, $ 4.95.

Fundamentals of Metal Deposition, by E. Raub and K. Muller, published by Elsevier Publishing Co., Amsterdam-London-New York, 1967, 268 pages, 125 sh.

Metallurgical Thermochemistry, by G. Kubaschewski, E. Ll. Evans and C. B. Alcock, published by Pergamon Press, London, 4th revised ed., 1967, 495 pages, 75 sh.

An Encyclopaedia of the Iron and Steel Industry, by A. K. Osborne (Compiler), published by the Technical Press Ltd., London, 2nd ed., 1967, 558 pages, 84 sh.

Intermetallic Compounds, by J. H. Westbrook (Ed.), published by John Wiley & Sons, London-Sydney, 1967, 663 pages, 235 sh.

Experimental Methods of Materials Research, by H. Herman (Ed.), published by Interscience—John Wiley, New York-London-Sydney, 1967, 316 pages, 120 sh.

Passivity and Protection of Metals against Corrosion, by N. D. Tomashov and G. P. Chernova, published by Plenum Publishing Corpn, New York, translated from Russian, 1967, 200 pages approx. $ 14.

Internal Friction in Metals and Alloys, by V. S. Postnikov, F. N. Tavadze and L. K. Gordienko, published by Plenum Publishing Corpn, New York, translated from Russian, 1967, 266 pages approx, $ 27.50.

Electroplaters' Process Control Handbook, by D. G. Foulke and F. D. Crane (Ed.), published by American Electroplaters' Society, Inc., Newark, N. J., U.S.A., 2nd Ed., 445 pages, $ 14.75.

Metallic Coating of Plastics, by W. Goldie, published by Electrochemical Publications Ltd., Pinner, Middx, England, Volume 1, 1967 and Volume 2, 1968, 67 sh. 6 d. each.

The Organic Chemistry of Tin, by W. P. Neumann, published by Ferdinand Enke Verlag, Stuttgart, 232 pages, DM 69; in German.

Analysis of Copper and Its Alloys, by W. T. Elwell and J. R. Scholes, published by Pergamon Press, Oxford, 183 pages, 50 sh.

Heat and Mass Transfer in Process Metallurgy, Proceedings of a Symposium, April 1966, London, published by the Institution of Mining and Metallurgy, London, 1967, £ 3.

Control of Pipeline Corrosion, by A. W. Peabody, published by National Associaton of Corrosion Engineers, Houston, Texas, U.S.A., 1967, 100 pages, approx., $ 6.50.

Automation and Instrumentation, by L. Dadda and U. Pellegrini (Ed.), published by Pergamon Press Ltd., London, 1967, 722 pages, £7.

A Handbook of Lattice Spacings and Structures of Metals and Alloys, Volume 2, by W. B. Pearson, published by Pergamon Press Ltd., London, 1967, 1446 pages, £ 25.

The Winning of Nickel, by J. R. Boldt, technical editor P. Queneau, published by Methuen and Co., Ltd., London, 1967.

Manual on Industrial Water and Industrial Waste Water, published by American Society for Testing and Materials, Philadelphia, No. STP 1481, $ 17.25.

Nondestructive Testing: Trends and Techniques, NASA publication SP-5082, available from U.S. Govt. Printing Office, Washington D.C., 125 pages, $ 0.55.

Symposium of Sulfamic Acid and Its Electrometallurgical Applications—Milan, Italy, May 1966, published by dalla Associazione Italiana di Metallurgia, Milan, 1967, 510 pages, $ 20.

Electrochemical Kinetics—Theoretical and Experimental Aspects, by K. J. Vetter, published by Academic Press, New York, 1967, 789 pages.

The Beryllium Metal Handbook, by H. H. Hausner (Ed.), published by General Astrometals Corpn., Yonkers, N.Y., U.S.A., 1967, 62 pages.

Ironmaking Tomorrow—Proceedings of the Conference, London, November 1966, published by the Iron and Steel Institute, London, 1967, 158 pages.

**Publications Received**

CSIR News, Vol. 17, No. 15-20, 1967, New Delhi.

British Patents, Division H1, Patent Office, London.

Patents for Inventions—Abridgments of Specifications, H1: Electric Circuit Elements, Patent Office, London.

Stainless Steel, No. 3, 1967, Stainless Steel Development Association, London.

Anti-Corrosion Methods and Materials, Vol. 14, No. 5, 7, 8, 1967, Sawell Publications Ltd., London.

Industrial Finishing, Vol. 19, No. 227-230, 1967, Arrow Press Ltd., London.

Metal Finishing Journal, Vol. 13, No. 149-152, 1967.

Aluminium Courier, No. 78, 1967, The Aluminium Federation, London.

Electroplating and Metal Finishing, Vol. 20, No. 7, 8, 1967, Robert Draper Ltd., Teddington, Middx, England.

UN Weekly Newsletter, Vol. 15, No. 35-44, 1967, UN Information Service, New Delhi.

Battelle Technical Review, Vol. 16, No. 6-9, 1967, Battelle Memorial Institute, Columbus, Ohio.

Wiggin Nickel Alloys, No. 88, 1967, Henry Wiggin & Co., Ltd., Hereford, England.

The Nickel Bulletin, Vol. 40, No. 4-7, 1967, International Nickel, London through International Nickel (India) P. Ltd., Bombay.

Corrosion Prevention and Control, Vol. 14, No. 5, 7, 1967, Scientific Surveys Ltd., London.

Electrochemistry of Semiconductors, by V. A. Myamlin and Y. V. Pleskov, published by Plenum Press, New York, translated from Russian, 1967, 430 pages, $ 19.50.

Cobalt, No. 35, 36, 1967, Cobalt Information Centre, Brussels.

ISI Bulletin, Vol. 19, No. 8-10, 1967, New Delhi.

Zinc Abstracts, Vol. 25, No. 5-8, 1967, ZDA London through Indian Lead Zinc Information Centre, Calcutta.

Chartered Engineer, Vol. 7, No. 9-11, 1967, ICE, New Delhi.

A Survey on the Stress Corrosion of Copper Based Alloys by J. A. Whittaker, sponsored by the International Copper Research Association, Inc., London, 54 pages.

An Introduction to Metallurgy, by A. H. Cottrell, published by Edward Arnold (Publishers) Ltd., London, 1967, 548 pages, 60 sh.

High-Energy Batteries, by R. Jasinski, published by Plenum Press, New York, 1967, 313 pages, $ 17.50.

Electro Technology, Vol. 10, No. 6, 1966, Society of Electronic Engineers, Bangalore.

Journal of the Electrochemical Society of Japan, Vol. 35, No. 1, 1967, Tokyo.

Corrosion, Vol. 23, No. 5, 1967, NACE, Houston.

The State of Rural Electrification in Europe during the Three-Year Period from 1 January 1963 to 1 January 1966, published by Economic Commission for Europe, United Nations, New York, 1967, 60 pages plus Annex, $1; through UN Information Service, New Delhi.

Copper, Vol. 1, No. 3, 4, 1967, Copper Development Association, London through Indian Copper Information Centre, Calcutta.

Aspects of Competition between Steel and other Materials, published by Economic Commission for Europe, United Nations, New York, 1966, 121 pages, $ 2; through UN Information Service, New Delhi.

Inco Nickel, No. 19, 1967, International Nickel, London through International Nickel (India) P. Ltd., Bombay.

Science and Engineering, Vol. 20, No. 9, 10, 1967, ISE, Calcutta.

Platinum-Engineering Properties and Uses, published by Johnson, Matthey & Co., Ltd., London, through Arora-Matthey Ltd., Calcutta.

Instrument News, Vol. 2, No. 3, 1967, CSIO, Chandigarh.

Chemical Age of India, Vol. 18, No. 9, 10, 1967, Technical Press Publications, Bombay.

American Reporter, Vol. 17, No. 20-23, 1967, US Information Service, New Delhi.

Diffusion Cladding of Metals, by G. V. Samsonov (Ed.), published by Consultants Bureau-Plenum Publishing Corpn, New York translated from Russian, 1967, 89 pages, $ 15.

Instrumentation in the Chemical and Petroleum Industries—Volume 3, by J. T. Ward (Ed.), published by Consultants Bureau—Plenum Publishing Corpn, New York, 1967, 187 pages, $12 (Proceedings of the Seventh National Chemical and Petroleum Instrumentation Symposium, 1966, San Fransisco).

Engineering Progress at the University of Florida, Vol. 21, No. 4, 7, 1967, Florida Engineering and Industrial Experiment Station, Gainesville.

Scientific Research, Vol. 2, No. 7, 8, 1967, McGraw-Hill, New York.

Vibratory Compacting — Principles and Methods, Perspectives in Power Metallurgy—Volume 2, by H. H. Hausner, P. K. Johnson and K. H. Roll (Ed.), published by Consultants Bureau—Plenum Publshing Corpn, New York, 1967, 298 pages, $ 17.50.

Analysis Instrumentation—Volume 4, by L. Fowler, R. G. Harmon and D. K. Roe (Ed.), published by Consultants Bureau—Plenum Publishing Corpn, New York, 1967, 236 pages, $ 12.50 (Proceedings of the Twelfth Annual Analysis Instrumentation Symposium, 1966, Houston).

Corrosion Bulletin, Vol. 4, No. 3, 4, 1967, CSIR, Jamshedpur.

Compass, Vol. 2, No. 3, 1967, Compass House —Journal Committee, Madras.

Australian Chemical Engineering, Vol. 8, No. 6, 1967, North Sydney, N.S.W.

Years of Space Era, Soviet Review, Vol. 4, No. 79, 1967, Information Dept. USSR Embassy in India, New Delhi.

Metal Finishing, Vol. 65, No. 7, 8, 1967, Metals and Plastics Publications Inc., Westwood, N.J., U.S.A.

Lead Abstracts, Vol. 7, No. 6-8, 1967, LDA, London through Indian Lead Zinc Information Centre, Calcutta.

Australasian Corrosion Engineering, Vol. 11, No. 6, 1967, North Sydney, N.S.W.

Galvanotechnik, Vol. 58, No. 5, 7, 8, 1967, Eugen G. Leuze Verlag, Saulgau/Wurtt.

Stainless Steel and the Chemical Industry, prepared by Climax Molybdenum Co., New York, 1966, 140 pages.

Canning Journal, No. 5, 1967, W. Canning & Co., Ltd., Birmingham.

Metals Engineering Quarterly, Vol. 7, No. 3, 1967, American Society for Metals, Metals Park, Ohio.

Radiochemical Schedule 67/68, published by Nuclear—Chicago Corpn, Des Plaines, Illinois, 84 pages.

OSU Research Review, Vol. 4, No. 1, 1967, Research Foundation, Ohio State University, Columbus.

Information News Letter, Industrial Liaison and Extension Services, Vol. 6, No. 2, 1967 CSIR, New Delhi.

International Nickel, No. 1, 1967, International Nickel Services (U.K.) Ltd., London through International Nickel (India), P. Ltd., Bombay.

Lead Cable Sheathing: The Hansson-Robertson Continuous Extruder, published by Lead Development Association, Lon on, 1966, 10 pages; through Indian Lead Zinc Information Centre, Calcutta.

Accumulator, Vol. 2, No. 4, 1967, Standard Batteries Ltd., Bombay.

Lead Acid Batteries for Mining Lamps, published by Lead Development Association, London, 1966, 11 pages; through Indian Lead Zinc Information Centre, Calcutta.

Die Galvanische Vernicklung, by R. Brugger, published by Eugen G. Leuze Verlag, Saulgau/Wurtt, Germany, 1967, 393 pages, DM 40.

## BOOK REVIEWS

**High-Energy Batteries,** by R. Jasinski, published by Plenum Press, New York, 1967, 313 pages, $ 17.50.

The book is an illustration of certain recent research papers on the basic principles of charge and discharge reaction characteristics of some of the modern inventions of unconventional battery plate systems—primary and secondary types, mostly alkaline type. It serves a good theoretical background on such battery systems with particular emphasis on high-energy batteries which are required to satisfy the electrochemical energy storage and energy conversion factor of many present-day sophisticated commercial as well as military equipments.

The author has discussed the various principles and technology of battery performance in seven chapters. The first chapter deals with electrochemistry of battery discharge. The electrochemically active materials such as plate materials, electrolytes—aqueous and non-aqueous types, their capabilities, advantages and limitations are dealt in chapters 2 to 4. Chapters 5 and 6 are concerned mainly with electrochemical and weight efficiency respectively. The next chapter deals with charging. The last chapter covers a brief summary of the state of the art of selected high-energy systems. There are comprehensive lists of 377 references and 427 patents, followed by an index in the end. The publication no doubt contains valuable information pertaining to high-energy batteries.

—B.K.B.

**A Survey on the Stress Corrosion of Copper Based Alloys,** by J. A. Whittaker, sponsored by the International Copper Research Association, Inc. London, 54 pages.

This report discusses stress corrosion cracking of copper alloys with reference to stress, corrosive environment and life, in order to provide useful design data. It covers an introduction to the subject, literature survey and a brief review of the mechanism of cracking. There are 55 references, 27 tables, 76 figures and 2 appendices. The information contained in the survey will be extremely valuable to the metallurgist, engineer, designer and industry while handling copper alloys.

—T.L.R.

**Aspects of Competition between Steel and other Materials,** published by Economic Commission for Europe, United Nations, New York, 1966. 121 pages, $ 2; through UN Information Service, New Delhi.

This monograph deals with the impact made by the use of other materials on steel and its products. The materials covered are aluminium, concrete, plastics, timber, glass, paper and paper-board, fibre-and particle-board, and asbestos-cement. The topics discussed are: (1) The structure and development of industries engaged in the competition between steel and other materials, (2) Technical and economic factors of competition between steel and other materials and the present state of competition in industrial sectors, (3) The degree of competition between steel and other materials: estimates of the present situation and future prospects and (4) Measures for improving the competitive situation of iron and steel products. Forty-six tables contain important statistics on the materials: production, properties, uses, etc. It is concluded that the iron and steel industry has to carefully watch the changes taking place in this direction, and take suitable steps to improve the competitiveness of its products. The measures suggested are: reduction of the cost of producing iron and steel, improving the quality of products, developing new types of steel and steel products, and promoting the uses.

The problem analyzed here is one of great importance in relation to the current practice in the use of materials. On the one hand, this approach might give an impetus to greater usage of steel, and on the other, develop new and competitive products from other materials. It is indeed of special significance in a country like India, which has abundant resources of aluminium and whose steel situation is not satisfactory on the whole. The report will be very thought-provoking at the government, industrial and public level.

—T.L.R.

**Stainless Steel and the Chemical Industry,** complied by the Committee of Stainless Steel Producers, published by the American Iron and Steel Institute, prepared and distributed by Climax Molybdenum Co., New York, 1966, 140 pages.

This brochure discusses under two major headings—how to get the most out of stainless steel equipment and how stainless steel is used by the chemical industry. The first section includes subjects like design, selection of materials, fabrication and maintenance. In the next section corrosion resistance, strength and toughness, unlimited design possibilities and safety are discussed. The last chapter deals with the use of stainless steel in the fertiliser industry. A list of references is included at the end.

The publication is profusely illustrated with photographs, and this enhances its utility as a guide-book. It carries a fund of technical information on standard stainless steels, and admirably serves the purpose for which it is intended, to emphasise that "stainless steel basically is not an expensive material and that it pays off in long term economy." It can be recommended as reference book to all those interested in the use of stainless steel in the chemical industry.

—S.K.

**Plating on Pastics Literature: (1) Electroplating on Plastics, (2) Cycolac EP 3510—the Thermoplastic specially Developed for Metal Plating, (3) Electroplating Cycolac EP 3510 Brand ABS Resin, (4) Part Design and the Moulding of Cylolac EP 3510 for Electroplating,** issued by Marbon Chemicals—Borg Warner, Holland—U.S.A.—U.K.; distributed by the Anchor Chemical Co., Ltd., Manchester.

The plating of plastic components is a very important field in metal finishing today, and these technical reports, articles and pamphlets provide useful information in this direction. Cyclolac EP 3510 is the first thermoplastic developed specially for plating, and the plated article has many advantages including economy and corrosion resistance.

The reports outline in detail the various steps in the plating process and also cover testing methods. The design requirements and the moulding of the plastic have been discussed. The article, electroplating on plastics, describes the industrial plating procedures and concludes that this technique has an exciting future. The publishers and distributors are to be congratulated in making available the technical knowledge in this fascinating topic.

—T.L.R.

**Plating on Plastics Handbook,** by Enthone Inc., West Haven, Conn, U.S.A. through Grauer and Weil (India) Ltd., Bombay.

This eight-page illustrated brochure points out that plating on plastics is today an important, product proven process. Enthone are active in research and development in this field. The information is here presented under: why plate on plastics, what about the plastic, molding hints and cycles for plating on ABS plastics. There are also hints on design, and examples of items on which plating has cut costs. Enthone processes or chemicals can be supplied in India by Grauer and Weil (India) Ltd., Bombay, manufacturers and suppliers of electroplating and finishing equipment and materials.

—T.L R.

**Radiochemical Schedule 67/68,** published by Nuclear-Chicago Corpn., Des Plaines, Illinois, U.S.A., 84 pages.

This brochure contains very useful information for those handling radiochemicals. It is divided into 7 sections: general information; carbon-14, tritium, P-32, S-35, Cl-36 labelled compounds; radioisotopes and other labelled compounds; radioactivity standards; liquid scintillation chemicals and supplies. A list of radiochemical information booklets available from the publishers is also given.

—T.L.R.

**Diffusion Cladding of Metals,** by G. V. Samsonov (Ed.), published by Consultants Bureau—Plenum Publishing Corpn., New York, translated from Russian, 1967, 89 pages, $ 15.

This is a special research report translated from the Russian text, published for the Materials Science Institute of the Academy of Sciences of the Ukrainian SSR in 1965 and corrected by the editor for the present edition. This publication includes all the papers read at the third seminar conducted by the Department of Physicotechnical problems of Materials Science, Academy of Sciences of the UkrSSR, 1963.

One of the most effective methods of increasing the wear resistance, hardness, surface strength and high temperature oxidation resistance of metal and alloys is the diffusion saturation of the surfaces by metals and non-metals.

This collection comprises of 16 papers relating to the diffusion saturation of metals and to coatings of refractory components. Suggested classification of methods of diffusion and theory of diffusion of metals are presented in some papers. Siliconizing and boroaluminizing form the subject matter of others. Some problems in the production of diffusion coatings on metals are described in a few papers. A new method is described for calculating parameters in a heterogenous medium.

The treatment of the subject is good. Each paper contains references to literature. This publication is intended for materials science specialists engaged in the production of new materials in various branches of industry and to the research worker.

—S.K.

**The State of Rural Electrification in Europe during the Three-Year Period from 1 January 1963 to 1 January 1966,** published by Economic Commission for Europe, United Nations, New York, through UN Information Centre, New Delhi, 1967, 60 pages plus Annex. I-IV, $ 1.

This report presents valuable information on rural electrification in Europe. The matter is covered in 8 chapters and deals with an introduction; development, progress and investment; electric power consumption; economic effects. There are 16 tables providing the statistics and four annexures including one on electricity consumption in selected forms in 10 countries.

—T.L.R.

**World Mining—Catalog, Survey and Directory Number, Volume 20, No. 7, 1967,** published by Miller Freeman Publications, Inc., San Fransisco, Australasian Edition, 262 pages.

This Directory is issued by the publishers of the well known Journal 'World Mining.' It contains world mining glossary, technological advances in 1966, world mineral production in 20 leading countries and mining developments in Europe, North and Latin America, Oceania, Caribbean, Africa, Asia and Australia. There is also a useful ore and metal buyers guide together with the catalog index of equipment and machinery. This number is certainly of value for keeping in touch with developments in mining in many parts of the world.

—T.L.R.

**Electrochemistry of Semiconductors,** by V. A. Myamlin and Y. V. Pleskov, published by Plenum Press, New York, translated from Russian, 1967, 430 pages, s 19.50.

The serious study of the electrochemistry of semiconductors is hardly more than a decade old, but several hundred papers have already appeared on this subject. This is the only book of general reference type which gives a comprehensive survey of the field of semiconductor electrochemistry both with regard to theory and experiment.

The book consists of five chapters, an introductory chapter, a chapter on the reviews on electrochemistry of semi-conductors and an appendix with a bibliography section covering the literature work up to 1965, in each chapter. The introductory chapter contains an elementary exposition of semiconductor principles, which is primarily aimed at electrochemists unfamiliar with the solid state theory. Chapter 1 deals with the first of the two problems with which the field of 'Electrochemistry of Semiconductors' is concerned, *i.e.*, the structure of the space-charge layer, while chapter 2 deals with the second problem, the role of the semiconductor current carriers in electrode reactions. These two problems are discussed at great length, and actually cover 277 pages, *i.e.*, a little over half the book. The remaining three chapters are shorter and are devoted to more specialized topics. Chapter 3 concerns about the frequency-dependence of the impedance of the electrolyte interface, and chapter 4 contains a discussion on the corrosion of semiconductors. The last chapter is devoted to an exposition of the utility of the various surface techniques for a variety of purposes in semiconductor technology.

The different reviews that have appeared in this field till 1964 have been included in the reviews chapter, while in the appendix, the paper entitled 'Most immediate problems in the electrochemistry of semiconductors' by Tyagai and Pleskov is included. The publication includes literature up to the end of 1965, and is thus suitable for physicists concerned with the surface properties of semiconductors and the production of semiconductor instruments and for electrochemists as well.

—(Miss) V.K.

**Instrumentation in the Chemical and Petroleum Industries—Volume 3,** by J. T. Ward (Ed.), published by Consultants Bureau—Plenum Publishing Corpn., New York, 1967, 187 pages, s 12.

This book is a publication of Instrument Society of America and covers the proceedings of the Seventh National Chemical and Petroleum Instrumentation Symposium, held in May 23-25, 1966 at San Francisco, California (U.S.A.).

The chemical and petroleum industries are using increasingly complex instrumentation in their plants and a symposium on instrumentation devoted to these process industries is bound to be of great value to know the current status in the field of instrumentation and process control.

There is a brief introduction by J. T. Ward followed by the keynote address titled "Management Looks at Instrumentation" by J. E. Gozline, Vice-President of Standard Oil Co., of California in which he has presented the impact of instrumentation and control on the oil industry. After this, the papers presented at the following five sessions are given: (1) The Analog computer as a process controller, (2) (2) Trends in distillation control, (3) Progress and trends in maintenance of instruments and control systems, (4) Analytical instruments and (5) The latest trends in explosion prevention.

Almost all the papers are from industry, *i.e.*, they are authored by industrial users or by suppliers of instruments, and concern primarily on the state of the art rather than the theory. The papers presented at the last session are particularly valuable in as much as they deal with the important question of intrinsic safety in design. Intrinsic safety is safety achieved by design of a system so that even under abnormal conditions it is incapable of releasing sufficient electrical energy to cause ignition. One normally regards thermocouples as perfectly safe because they generate signals of the order of a few millivolts. However, it is pointed out that this must not be construed as meeting the requirements of intrinsic safety since any fault generated in the measuring circuit can be conducted via the thermocouples located within the hazardous area. Voltages as high as 400 V. have been detected on thermo-couples associated with vacuum tube amplifiers operating under fault conditions.

We look forward to future volumes in the series to keep ourselves up-to-date in this fast growing field.

—N.R.K.

**Analysis Instrumentation—Volume 4,** by L. Fowler, R. G. Harmon and D. K. Roe (Ed.), published by Consultants Bureau—Plenum Publishing Corpn., New York, 1967, 236 pages, $ 12.50.

This is a publication of the Instrument Society of America covering the proceedings of the Twelfth Annual Analysis Instrumentation Symposium held in May 11-13, 1966, at Houston, Texas. The subject of the symposium was Trace Analysis, with particular reference to air and water pollution. The fundamental problem in the evaluation of the pollution is to determine the concentration of a variety of materials present in trace quantities. In the various papers read, methods for determination have been presented for the following: acetylene, acid, aluminium, ammonia, radio barium, boron, calcium, carbon, carbon dioxide, carbon monoxide, radio cesium, chloride, dimethly ether, ferricyanide, hydrogen, lead, magnesium, nitrate, nitrogen dioxide, nitrogen, oxygen, silicon, sulfate, sulfur dioxide and water.

The symposium was divided into nine sessions. During the plenary session two federal officers presented papers respectively on monitoring water pollution and air pollution. The subsequent discussion is also recorded. Other sessions were devoted to electrochemical methods, air pollution, chemical methods of analysis, optical methods, radiation methods of analysis, water pollution, laboratory chromatography and process chromatography.

Pollution is a menace of our present day civilization and if uncontrolled will threaten man-kind's very existence. Scientific papers giving the "state of the art" of determining polluting materials and thereby enabling effective steps being taken to control pollution are most welcome, and the Instrument Society of America deserve our gratitude for organizing a symposium of this type and publishing the proceedings to make available the information for wide dessemination.

— N.R.K.

**An Introduction to Metallurgy,** by A. H. Cottrell, published by Edward Arnold (Publishers) Ltd., London, 1967, 48 pages, 60sh.

Metallurgy is the art and science of making metals and alloys in forms and with properties suitable for practical use. Here the author has attempted to re-assert the unity of all metallurgical knowledge and link up this new science with the more traditional aspects of the subject, and has shown metallurgy as a single applied science by developing..... "the science as a continuous thread running through the subject, from atomic theory, through thermodynamics, reaction kinetics and crystal physics to elasticity and plasticity,

but stopping at all suitable places to show how the characteristic features of metals, alloys and the processes of practical treatment grow out of this science".

There are 25 chapters including prologue. Atomic nucleus, atomic structure and chemical bonding are dealt briefly in the first three chapters. In the next three chapters the elements of thermodynamics are outlined. The main principles of extraction of metals and their refining processes with suitable examples are discussed in three chapters. Iron and steel making—introduction, chemistry of iron making, different types of steel making processes, occupies one complete chapter. The kinetics of metallurgical reactions like diffusion, heat conduction, and nucleation are discussed in chapter 12. Structures and properties of metal crystals, which is the starting point for many important topics like plastic deformation, mechanical strength, diffusion, heat-treatment etc., are dealt in detail. Other topics are: the phase diagram, alloys—electronic structure, properties, uses, heat treatment; mechanical, properties, plasticity, oxidation and corrosion. At the end of each chapter references are given for further reading.

The book is written in a simple style and is well produced. Though the author has not gone deep into any one aspect of the subject, the book gives a broad view of the subject and will be of great interest and help to the beginners in this field.

—(Miss) M.S.

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(*Continued from page* 38)

**24. Brush plating techniques—**

E. Groshart (Metal Finishing, **65**, No. 9, 75, 1967). Equipment, process, solutions, control; figures and 2 references.

**25. Is it time to reconsider electroforming?—**

R. G. Dermott (Metal Progress, **92**, No. 3, 69, 1967). Success in automotive dies and mandrels, seamless pressure vessel, production experience pinpoints problems, need for progress, new standards.

**26. Data sheet: A guide to selection of minimum plating thickness for quality coatings—**

(Metal Progress, **92**, No. 3, 92, 1967).

**27. Designing stainless processing equipment. Ways to bridge the experience gap—**

T. D. Parker and J. Z. Briggs (Metal Progress, **92**, No. 3, 103, 1967). Selection criteria based on service tests, grade of stainless, design considerations, pressure vessels, heat exchangers, cladding. Three tables and figures, including data on corrosion resistance.

**28. Corrosion problems in the chemical industry. Part 2—**

R. H. Banfield (Anti-Corrosion Methods and Materials, **14**, No. 10, 12, 1967). Stainless steel filter gauzes, air-compressor after-cooler, refrigerator cooler, circulating water pumps, Bayonet filter elements—mechanical example; figures.

**29. The economics of high quality anodizing—**

(Industrial Finishing, **19**, No. 231, 46, 1967). Introduction, plant, temperature control, d.c. supply, quality and process testing equipment, cost data.

**30. Rinse water recirculation in combination with the integrated waste treatment method—**

R. Pinner (Electroplating and Metal Finishing, **20**, 280, 1967). Instrumentation, practical aspects, importance of mixing, entrapped solution, problems with barrels, cost of water recirculation; concluded with tables and figures and 41 references.

—T.L.R.