BOOK SECTION

New Publications

Metallurgical Developments in High Alloy Steels, published by the Iron and Steel Institute, London, 1964, 262 pages.

Year Book of Surface Technology 1965, by W. Wiederholt, published by Metal-Verlag G. m.B.H., Germany, in German, 1964, 568 pages.

Amperometric Titrations, by J.T. Stock, published by Interscience Publishers Inc., New York, 1965, 730, pages, $25.

A Review of the Chemistry of Tin (II) Compounds, by J. D. Donaldson, published by Tin Research Institute, Greenford, Middx, England, TRI Publ. No. 348.

The Uses of Vacuum in Metallurgy, translated from the Russian by E. Bishop, published by Oliver and Boyd, Edinburgh, 1964, 320 pages, 21 sh.

Nuclear Problems in Advanced Physical Chemistry, by J. H. Wolfenden, R. E. Richards, and E. E. Richards, published by Oxford University Press, London, 2nd ed, 1964, 258 pages, 30 sh.

Comprehensive Analytical Chemistry, by C.L. Wilson, D. W. Wilson and C. R. N. Strouts, Vol. II A—Electrical Methods, published by Elsevier Publishing Co., Amsterdam — London—New York, 1964, 268 pages, 60 sh.

Physical Chemistry for Metallurgists, by J. Mackowiak, Modern Metallurgical Texts, Vol. 2, published for the Institution of Metallurgists by Allen and Unwin, London, 42 sh.

Physical Methods in Inorganic Chemistry, by R.S. Drago, published by Reinhold College Textbook Department, New York, 1965 448 pages, $ 14.50.

Titration in Non-aqueous Solvents, by J. Kucharsky and L. Safarik, published by American Elsevier Publishing Co., New York, 1965, 286 pages, $ 12.50.

Effluent Treatment in the Copper and Copper Alloy Industries, by E.J. Whistance and E.C. Mantle, prepared by the British Non-Ferrous Metals Research Association at the request of the International Wrought Non-Ferrous Metals Council, 1965, 280 pages, £ 10 sh. 4.

Metal Surfaces, published by American Society for Metals, Metals Park, Ohio, 1964, 408 pages, $14.95.

Science of Materials, by T. J. Lewis and P. E. Secker, published by G. G. Harrap and Co, London — Toronto — Wellington — Sydney, 1965, 256 pages, 27sh 6d.

Symposium on Automation in Metal Finishing, published by the Institute of Metal Finishing, London, 1965, 32 pages, 16sh.

Currentless Metal Plating of Printed Circuits, published by Eugen G. Leuze Verlag, Saulgau, Wurrrembert, Germany, 1964, 53 pages, in German.

Chemistry for Engineers, by E. Cartmell, published by Butterworths, London, 2nd ed, 172 pages, $5.25.

Thermonuclear Power, by T.S. Green, published by Philosophical Library, 168 pages, $10.

Fuel Cell Systems, published by American Chemical Society, Washington D.C., Advances in Chemical Industry Series No. 47, 1965, 360 pages, $8.

Publications Received

Electroplating and Metal Finishing, Vol. 18, No. 4-6, 1965, Robert Draper Ltd, Teddington, Middx, England.

Industrial Finishing, Vol. 17, No. 202-204, 1965, Arrow Press Ltd., London.

Lead Abstracts, Vol. 5, No. 2, 4, 1965, LDA, London through Indian Lead Zinc Information Centre, Calcutta.

Corrosion Technology, Vol. 12, No. 4-6, 1965, Grampian Press Ltd., London.

Wiggin Nickel Alloys, No. 80, 81, 1965, Henry Wiggin & Co. Ltd., Birmingham.

Chartered Engineer, Vol. 5, No. 6-8, Institution of Chartered Engineers, New Delhi.

Chemical Age of India, Vol. 16, No. 5-7, 1965, Technical Press Publications, Bombay.

Metal Finishing Vol. 63, No. 4-6, 1965, Metals

and Plastics Publications Inc, Westwood, N.J., U.S.A.

Review of Metal Literature, Vol. 22, No. 3-6, 1965, ASM, Metals Park, Ohio.

Battelle Technical Review, Vol. 14, No. 4-7, 1965, Battelle Memorial Institute, Columbus, Ohio.

British Patents Division H1, Patent Office, London.

The Nature and Chemistry of Hig Polymers, by K. F. O'Driscoll, published by Chapman & Hall Ltd., London, 1965, 111 pages, 10sh 6d.

Insdoc List—Current Scientific Literature, Vol. 12, No. 11-16, 1965, New Delhi.

Corrosion Prevention and Control, Vol. 12, No. 4-6, 1965, Scientific Surveys Ltd., London.

CSIR News, Vol. 15, No. 10-15, 1965, New Delhi.

Metal Finishing Journal, Vol. 11, No. 124-126, 1965, Fuel and Metallurgical Journals Ltd., London.

United Nations Weekly Newsletter, Vol. 13, No. 22-35, 1965, UN Information Service, New Delhi.

ISI Bulletin, Vol. 17, No. 3, 4-8, 1965, New Delhi.

Corrosion, Vol. 21, No. 3-5, 1965, NACE, Houston.

Materials Protection, Vol. 4, No. 4-6, 1965, NACE, Houston.

Journal of the Electrochemical Society of Japan, Vol. 32, No. 3, 4, 1964, Tokyo.

Science and Engineering, Vol. 18, No, 5-7, 1965, ISE, Calcutta.

Electro-Technology, Vol. 9, No. 1, 2, 1965, Society of Electronic Engineers, Bangalore.

Patents for Inventions—Abridgments of Specifications, 960,001-9 0,000, H1-Electric Circuit Elements, Patent Office, London.

Zinc Abstracts, Vol. 23, No. 3, 4, 1965, ZDA, London, through Indian Lead Zinc Information Centre, Calcutta.

Corrosion Bulletin, Vol. 2, No. 3, 1965, Corrosion Advisory Bureau, CSIR, Jamshedpur.

Automation in the Iron and Steel Industry, published by Economic Commission for Europe, United Nations, New York, 1965, 49 pages, $0.50.

Inco-Nickel, No. 11, 1965, International Nickel Ltd., London.

Tin in Social and Economic History, by E. S. Hedges, published by Edward Arnold (Publishers) Ltd, London, 1964, 194 pages, 40sh.

The Nickel Bulletin, Vol. No. 38, 3-5, 1965, International Nickel Ltd, London, through Nickel Information Bureau (P) Ltd., Bombay.

Australian Journal of Applied Science, Vol. 15, No. 4, 1964, CSIRO, Melbourne.

Selected Topics in Modern Chemistry—(1) R. K. Murmann: Inorganic Complex Compounds, (2) V. H. Cheldelin and R. W. Newburgh: The Chemistry of Some Life Processes, (3) W. F. Kieffer: The Mole Concept in Chemistry, (4) M. J. Vold and R. D. Vold: Colloid Chemistry, (5) R. T. Overman: Basic Concepts of Nuclear Chemistry, published by Chapman and Hall Ltd., London, 1965, 10sh 6d each.

The Chemistry of Diamond-like Semiconductors, by N. A. Goryunova, edited by J. C. Anderson, translated by Scripta Technica Inc, published by Chapman and Hall Ltd., London, 1965, 236 pages, 50sh.

OSU Research Review, Vol. 1, No. 8, 9, 1965, Office of Research and the Research Foundation, The Ohio State University, Columbus, Ohio.

Annual Report 1964-65, Council of Scientific and Industrial Research, New Delhi, 1965, 208 pages.

Florida Engineering News, Vol. 7, No. 2, 1965, Engineering and Industrial Experiment Station, Gainseville.

Problems in the Design and Operation of Thermal Power Stations, Vol. III, published by Economic Commission for Europe, United Nations, New York, 1965, 33 pages, $0.35.

The Future Development Potential of Reservoir Storage and Firm Hydro-Electric Capacity in Europe, published by Economic Commission for Europe, United Nations, New York, 1965, 37 pages plus annex, $0.75.

Journal of the Indian Institute of Science, Vol. 47, No. 3, 1965, Bangalore.

Australasian Corrosion Engineering, Vol, 9. No. 5-7, 1965, North Nydney, N.S.W.

Cobalt, No. 27, 1965, Cobalt Information Centre, Brussels.

Australian Chemical Engineering, Vol. 6, No. 5, 6, 1965, North Sydney, N.S.W.

Rapid Detection of Cations and Anions, by G. Charlot, authorized translation by R. E. Oesper, published by Chemical Publishing Co., Inc., New York, 1965, 107 pages, $5.

The Electric Power Situation in Europe in 1963/1964 and Its Future Prospects, published by Economic Commission for Europe, United Nations, New York, 1965, 40 pages, $0.50.

Half-Yearly Bulletin of Electric Energy Statistics for Europe, Vol. 10. No. 1, 1965, United Nations, Geneva.

Science Reporter, Vol. 2, No. 2, 1965, CSIR, New Delhi.

BOOK REVIEWS

Selected Topics in Modern Chemistry—(1) R.K. Murmann: Inorganic Complex Compounds, 120 pages, (2) M. J. Vold and R. D. Vold: Colloid Chemistry, 118 pages, (3) R. T. Overman: Basic Concepts of Nuclear Chemistry, 116 pages, published *by* Chapman and Hall Ltd., London, 1965, 10sh 6d each.

Under the able editorship of Prof. Harry H. Sisler and Prof. Calvin A. Vander Werf, a series of 15 booklets is being published covering a variety of topics in Modern Chemistry by the well-known publishers, Chapman & Hall during 1965. The above mentioned three booklets belong to this series, each one written by competent authorities who have made their own original contributions to their respective fields. In about six chapters spread over 100 and odd pages, each one of the booklets covers the specific topic in a stimulating manner from the basic concepts to the present day understanding of the subject matter in the field. It is, therefore, possible for a beginner to follow the field of specialisation, and these volumes will also be useful for an expert as they present a good survey of the recent developments. These volumes deserve a place in the library of any centre of teaching and research. One can very much profit by the possession of the entire series in this general scheme.

— A. R. V.

Automation in the Iron and Steel Industry, published *by* Economic Commission for Europe, United Nations, New York, 1965, 49 pages, $0.50.

This report by the ECE Steel Committee reviews the position of automation in the iron and steel industry in various countries. Beginning with an introduction it covers general aspects of the application of automation or computers to the iron and steel industry; coke manufacture and iron-making; steel-making; rolling of semi-finished steel, plates and sections; wide-strip mills; other operations in iron—and steel-making; economic and social effects of automation; conclusion. There is a bibliography containing 103 recent references in the end. It is concluded that rapid progress is likely to be made by both iron and steel works engineers and by the manufacturers of automation equipment under the compulsive demand for increased productivity which exists in all countries. This concise review will no doubt be of great use to all those who wish to keep pace with the rapid progress in the field of automation in the iron and steel industry.

— T. L. R.

Type 316 for Elevated-Temperature Power-Plant Applications, *by* H. S. Blumberg, published by Climax Molybdenum Co., New York, 1965, 51 pages.

This booklet deals with type 316 austenitic chromium—molybdenum-nickel stainless steel in modern high-temperature steam power plants. Recent information has been made available under introduction, summary, properties required for steam power plant service, service behaviour of type 316, properties and fabrication of type 316, and 47 references. There are 14 tables and 8 figures. The data furnished here will be of interest not only in power equipment, but also for possible application in other media where corrosion and stress at higher temperatures has to be taken care of.

— T. L. R.

Tin in Social and Economic History, *by* Ernest S. Hedges, published by Edward Arnold (Publishers) Ltd., London, 1964, 194 pages, 40 sh.

The aim of this book is to show how the availability and knowledge of tin, one of the very few metals known to early man, have influenced the course of his way of life through the ages. The book consists of eleven chapters. The first two chapters are concerned with different aspects of trade in tin. The author has described the steps leading to the international control of tin trade developed during the course of about forty years. Scientific research sponsored by the tin producers is discussed. The author argues how the spread of technological education and the increasingly important part played by the technologists has influenced the economics of the tin industry. The chapters on tin coinage and importance of pewter are interesting. The author describes pewter as follows: "In the sense that 22-carat gold is gold and that sterling silver is silver, so pewter is tin". Modern pewter contains 92 per cent of tin. The details given in the chapter on ceremonial observances are fascinating. Tin in decorative arts and in music forms the subject matter of two chapters. The place of tin in the industrial world is brought out by describing the use of tin in the manufacture of automobiles

and telecommunication equipments. In the penultimate chapter the author deals with the most important use of tin, in good preservation. The final chapter describes current research on new uses of tin which may have social significance in the future. An index is included apart from a number of illustrations. This book provides a new approach to social history appealing to the general reader as well as scientists. The publication makes a very favourable impression as a comprehensive account of the impact of tin on the social and economic life of man and will be useful to the metallurgists and technologists.

— S. K.

Problems in the Design and Operation of Thermal Power Stations, Vol. III, published *by* Economic Commision for Europe, United Nations, New York, 1965, 33 pages, $ 0.35.

This volume is the third of the series publishing the reports approved by the *ad hoc* group of experts set up by the Committee on Electric Power of the Economic Commission for Europe. It consists of 2 parts: (1) The use of solid fuels with a low volatile content in electric power stations and (2) Utilization of coal of low calorific value, particularly in pulverized form, in thermal power stations.

— T. L. R.

Chemical Bonding and the Geometry of the Molecules, *by* G. E. Ryschkewitsch, published by Chapman and Hall Ltd., London, 1965, 116 pages, 10sh 6d.

In this little book the author gives the reader a lucid exposition of the world of atoms, molecules, ions and crystals. Chemistry like every other branch of science is advancing so rapidly, that an enthusiastic student should not be required to wait until he has reached a high level of mathematical sophistication, to comprehend the modern structural concepts and ideas. This book not only meets the challenge but also tries to achieve a certain measure of intellectual stimulation in exposing the reader to the spirit of modern chemical research.

In the first chapter the author has traced the origins of the constitution of the atom provided by electrolysis, the radioactive decay and the periodic arrangement of the elements by atomic numbers. In the second chapter the electronic structure of the atom as it developed from the simple electrostatic theory, quantum nature of electromagnetic radiation, Heisenberg uncertainty principle, de Broglie's matter waves, the concept of the orbital from the idea of four quantum numbers and the Pauli Exclusion principle, are presented. In the third chapter is given a discussion of ionic bonding and of such topics as ionization potential, electron affinity, dependence of crystal geometry on ion sizes and on ion charges and the Born-Haber cycle. The fourth and last chapter deals with covalent bonding. The topics include orbital overlap, the octet rule, electron pair donation, odd electron molecules, multiple bonding, dipole moments, electronegativity, bond angles and covalent radii etc. Molecular geometrics from a consideration of electrostatic repulsion of electron pairs, the necessity for the concept of hybridization, resonance structures and electron delocalization have all been nicely explained. This book which has a list of selected readings as an appendix, and a good index, at the end, should prove to be a valuable reading to all students of general chemistry.

— S. S.

An Introduction to Molecular Kinetic Theory, *by* J. H. Hildebrand, published by Chapman and Hall Ltd., London, 1965, 105 pages, 10sh 6d.

The main aim of this little book by Professor Hildebrand who is well known in the field of physical chemistry, is to discuss the subject of gas laws and the kinetic theory more extensively than found in any standard text. The author develops the subject historically and in a refreshing manner.

In chapter one both the attempts to develop the theory of heat and to account for the properties of gases are given. Chapter two contains an account of the basic equation of the kinetic theory of gases, a lucid exposition of the Datton's partial pressure law, Avagadro's rule, the law of combining volumes, calculation of mean molecular velocities and a discussion of the change in velocity distribution with temperature. This chapter gives also a description of the relation of heat capacity ratio to molecular complexity, a discussion of isothermal and adiabatic expansion and an outline of Perrin's sedimentation gradients. This chapter contains 22 good problems at the end. The third chapter dealing with the real gases includes the Van der Waals equation, the correlation of Van der Waals parameters with the co-ordinates of the critical point, the law of rectilinear diameter, reduced equation of state, the Bertholet equation, Joule-Thompson effect, the liquification of gases, transport phenomena, mean free path, the determination of molecular diameters from

viscosity. It also includes 11 good exercises at the end. In the last chapter, application of the kinetic theory concepts to liquids, solids and solutions are given. This little book is concise, clear knowledge at its best. Any graduate student should find this book valuable for supplementary reading. A good index enhances the value of the book.

— S. S.

Electronic Structure, Properties and the Periodic Law, *by* H. H. Sisler, published by Chapman and Hall Ltd., London, 1965, 120 pages, 10sh 6d.

The rapid progress of modern science makes a constant reappraisal of teaching techniques an inevitable necessity. Nowhere is this truer than in the field of chemistry where prolific research is accumulating data which is astounding in both volume and diversity. This has raised in the minds of scientists doubts as to the advisability or even the practicability of teaching descriptive chemistry in classic form. Fortunately the theoretical aspects of the same has progressed with the experimental so that it is no longer necessary to introduce chemistry from a phenomenological point of view. The object of this book is to emphasise the principles underlying chemical behaviour rather than the phenomena themselves.

In the first chapter of this book, Sisler discusses the periodic recurrence of similar properties amongst the elements as a direct consequence of similar electronic configurations in their atoms. The author has adequately reviewed the basic concepts of the theory of the nuclear atom and of the wave mechanical theory of the atom, and has given a table showing the electronic configurations of the 98 elements. The second chapter contains a discussion of the ability of the chemist to predict the kinds of chemical bonds ensuing from two specific types of atoms, of the difference between ionic and covalent bonding and of bond hybridization, and includes a table of the various types of hybrid bond orbitals and their geometrical configuration. The third chapter is concerned with the question of predictions that can be made regarding the properties of a substance which contains a given type of bond. A two page chart summarises the characteristics of the five types of crystalline solids. In the last brief chapter, the relationship of properties with structure and position in the periodic table is illustrated with a good discussion of the binary compounds of the chemical elements with hydrogen, oxygen and the halogens. Useful diagrams and tables, a list of suggested readings at the end of each of the first three chapters, and a good index enhance the value of the book. This book can very well be recommended for supplementary reading for all graduate students in general chemistry.

—S. S.

Modern Chemical Kinetics, *by* H. Eyring and E. M. Eyring, published by Chapman and Hall Ltd., London, 1965, 114 pages, 10sh 6d.

This little book is much different from the volumes which have appeared in this paperback series of Selected Topics in Modern Chemistry, because of the fact that the subject matter treated is intended for the upper class chemistry students rather than those in earlier college years.

Eyring and Eyring have given an expert outline of some of the important devlopments during the last 30 years in this field of chemical kinetics. However, this book will be hard reading for fresh men, though in their preface the authors say that that their aim is to infect a few readers at least with the typical reaction—kineticist's enthusiasm for the subject. The first chapter gives an account of the activated state concept and sketches briefly the historical development of the subject, required for proper appreciation of the later chapters. Wilhelmy's study of the rate of inversion of sucrose and the formulation of the kinetic law for a first order reaction, Guldberg and Waages principle of Mass Action in reaction rates and chemical equilibria and the Arrhenius hypothesis all find a mention in the first chapter. The second chapter contains a discussion of potential energy surfaces in configuration space, description of the semi—empirical surface by Eyring and Polanyi, as also the modified version of the same by Sato. The statistical mechanical basis of the rate theory is given in the third chapter while the fourth chapter includes consideration of topics like the corrosion of the metal, development of the latent photographic image and the potentials across biological membranes. In chapter five is deveoped the theory of bioluminescence with its non—Arrhenius temperature dependence. The sixth and the final chapter deals with the most important of the advances in chemical kinetics i.e., the measurement of the rates of rapid reactions in solution as also the application of the theory of absolute reaction rates to fast reactions. This small book is thoroughly indexed and readings and references are found at the end of each chapter.

— S. S.

Organometallic Chemistry *by* E. G. Rochow, published by Chapman and Hall Ltd., London, 1965, 112 pages, 10sh 6d.

Organometallic chemistry, as it is in other branches of chemistry, is undergoing a rapid expansion. Though the problem of merely reporting significant advances is difficult enough, the chemist must be aware of the new lines of progress having significance. This commendable little book is an effort in that direction.

The first chapter is an introductory one wherein the term 'organometallic' is explained. In the second chapter which deals with the carbon—metal bond, the structures of ionic, and covalent organometallic compounds and the Sandwich compounds such as ferrocene have been discussed. The third chapter gives the general methods of preparation. The fourth chapter deals with some typical reactions of organo—metallic compounds. The fifth chapter describes some Sigma bonded compounds, the sixth chapter some ionic compounds, the seventh chapter some delocalised electron bonded compounds and the eighth chapter the carbonyls. In the ninth chapter is given an interesting account of the many varied applications of organometallic compounds in everyday life. A short account of the origins of chemotherapy enlivens this chapter. Other applications include trialkyl tin compounds as anti-septics, silicones as greases and elastomers and tetramethyl lead and tetramethyl lead as antiknock agents. The final chapter gives a good survey of literature sources. This fine little book from the hands of an authority on this subject should be recommended as a supplement to any standard text in a general chemistry course for chemistry students. The value of this book is enhanced by a very good index at the end.

— S. S.

Chemistry in Non-Aqueous Solvents, *by* H. H. Sisler, published by Chapman and Hall Ltd., London, 1965, 119 pages, 10sh 6d.

The publication of this little book of Sisler at a period when this branch of chemistry in non-aqueous solvents is making rapid progress, is timely and welcome. The general study of the properties of substances in non-aqueous solutions and a comparison with their behaviour in aqueous systems have contributed very considerably to our knowledge of the nature of solutions and of the reactions which take place in solution. Needless to add that Sisler treats the subject with admirable lucidity and clarity. The first chapter deals with the role of the solvent in reactions in solution. This chapter includes discussion of the importance of the effect of dielectric constant on solubility of ionic compounds and of viscosity on electrolytic conductance, the effect of chemical properties of the solvent and the levelling effect of the solvent. In the second chapter the author discusses the the chemistry in liquid ammonia. In chapter three is given a discussion of sulphuric acid as a solvent. In chapter four the author discusses the chemical reactions in liquid dinitrogen tetroxide and in liquid sulphur dioxide, in terms of Lewis definition of acids and bases. In the final chapter are given a list of a number of solvents, basic, neutral and acidic, with a few general observations about them. This book should be recommended as supplementary reading to all students of general chemistry. Useful diagrams and a good index enhance the value of this book.

— S. S.

Acids, Bases and the Chemistry of the Covalent Bond, *by* C. A. Vander werf, published by Chapman Hall Ltd., London 1965, 117 pages, 10sh 6d.

In the first chapter of this book reactions of covalent compounds are divided under two headings (1) free radical reactions, (2) polar reactions. This little book is concerned with the latter type of reactions which involve electron pair donors and electron pair acceptors. In the second chapter, the Arrhenius theory and the Bronsted-Lowry concept are both presented. Other topics discussed include relative strength of acids and bases, amphiprotic, substances, the types of meutralization reactions typical of particular protonic solvents and hydrolysis. The third chapter contains a discussion of the relationship of acidity and basicity to charge, to relative electronegativities and the ion size. In chapter four Lewis definitions for acids and bases and a discussion as to how the Lewis concept has brought about complete change in our ideas regarding the theory and practice of acid catalysis are given. Chapter five deals with base displacement reactions. These include nucleophilic substitution, elimination and nucleophilic addition reaction. The sixth and the final chapter deals with the displacement of one Lewis acid by another and discusses electrophilic displacement and additions. The author in this fine book brings home to the reader a sense of realism which helps to comprehend and appreciate the intellectual framework upon which organic chemistry is based. This book should be recommended as an invaluable supplemen-

tary text to general chemistry students and to all those students just beginning a full course in organic chemistry. Good diagrams and a complete index enhance the value of this book.

—S. S.

The Chemistry of the Lanthanides, *by* T. Moeller, published by Chapman and Hall Ltd., London, 1965, 117 pages, 10sh 6d.

As a teacher of chemistry known for his clear exposition of the subject, Moeller has presented the chemistry of lanthanides in this little book with such clarity and depth that one can stamp this book as an outstanding publication in this series. While an ordinary reader acquires a clearer understanding of the many basic relationships between structure and properties of the elements, a research worker in this field of chemistry will find this book of utmost usefulness.

In the first introductory chapter, the author traces historically the simplification of ceria and yttria which has contributed significantly to the development of new laboratory and industrial techniques and of instrumental methods of analysis. Important among the latter are those of emission and absorption spectroscopy without which, test of purity and homogenity would have been impossible. The author goes on to prove that the name 'rare earth' is an unfortunate one because of their abundance as many of the commoner elements are, and prefers the term 'lanthanides'. An account leading to discovery of the isotope of the element 61, later termed Promethium, from an ion exchange separation using materials obtained at Oak Ridge in 1947 has also been given. In chapter two the author discusses the electronic configuration of the lanthanides, some indirect consequences of the electronic configuration like the oxidation states, the lanthanide contraction and the magnetic characteristics. In chapter three which deals with oxidation states the author details the general chemistry of the lanthanides. The topics discussed include the physical and chemical characteristic of the lanthanide metals (oxidation state—Zero), of the characteristic oxidation state + 3, and of the 'anomalous' oxidation states + 2 and + 4. The fourth chapter deals with the occurrence and recovery of the lanthanides from mineral sources and with the various methods of separation like fractional crystallization, fractional precipitation, fractional thermal decomposition of salts, ion exchange and selective oxidation or reduction. This chapter also gives a nice account of the applications of lanthanides. The topics under this heading include their application (1) as alloys, like M sch-metal used as an excellent scavenger for oxygen or sulphur in metal systems, (2) in ceramic industry, as coloring agents for glass (praseodymium and neodymium oxides), in the prepa ation of high refraction, low dispersion optical glass (lanthanum oxide), and for efficient g'ass polishing compositions (cerium IV oxide), (3) as catalysts for hydrogenation, dehydrogenation and oxidation of various organic compounds, (4) as microwave devices (3 Ln_2O_3 $5Fe_2O_3$), (5) as semi conductors or thermoelectrics (rare earth selenides and tellurides), (6) as ceramic capacitors (rare earth titanates and stannates) and (7) as control, shielding and flux suppressing devices.

The fifth and the final chapter gives a concise account of the chemistry of the actinides, in terms of their history, electronic configurations, magnetic and light absorption characteristics and some factual information about the actinum-uranium and transuranium elements. Selected readings at the end of each chapter, useful figures and tables and a fine index at the end of this book enhance the value of this book. This book should be recommended as a supplementary text to all graduate students of general chemistry.

— S. S.

The Chemistry of Some Life Processes, *by* V.H. Cheldelin and R. W. Newburgh, published by Chapman and Hall Ltd., London, 1965, 120 pages, 10sh 6d.

This small book attempts to give a sample of what life is in chemical terms—in short advertises what the professional biochemist presently thinks and claims as some notable achievements toward elucidation of chemical processes of life. It should prove stimulating to the general reader who is eager to know what is 'cooking' in some areas of biochemical research. The book, however, contains a few obvious misprints (*e.g.*, formula of NAD, page 85; E_g for E_e, page 100). The formula $C_x(H_2O)_{x-1}$ on page 8 is rather misleading without mentioning what x is.

— P.L.N.R.

The Mole Concept in Chemistry, *by* W. F. Kieffer, published by Chapman and Hall Ltd., London, 1965, 118 pages, 10sh 6d.

How automatically the working chemist bases his practical methods on the mole concept and

(*Continued on Page* 95)

and Japan 5 per cent of the total. Nuclear power stations are in operation in USSR, U.S.A., U.K., France, West Germany, Belgium, Canada, Italy, Japan and Sweden.—UN Weekly Newsletter, Vol. 13, No. 35, 4, 1965.

Engineering and Mining Guide Book

The June 1965 issue of Engineering and Mining Journal contains the 1965 Guidebook Section: articles on processing, exploration, mining and marketing minerals; USA smelter directory; geological surveys of the world; buying directory under product classification and manufacturers' index.

Technical Books—U.S.A.

The US Information Service arranged the exhibition "Technical Books—U S.A." at New Delhi for 20 days during September 1965. It consisted of about 7.000 books and 325 professional journals in all the principal areas of science and technology.

Stainless Steel Road Tankers

The Search for higher rates of utilization of road tankers with emphasis on operational flexibility has led to a widespread use of nickel stainless steels for an immense range of transport tasks. Not only are they very often the only materials capable of maintaining the rigid standards of cleanliness required but, due to their strength and corrosion resistance, they outlast tanks made of other metals. The publication "Stainless Steel Road Tankers" issued by International Nickel and available from Nickel Information Bureau P. Ltd., Bombay, contains a survey of different types of stainless steel road tankers operating in 8 countries.

Nickel Boride in the Fuel Cell

It has been recently shown that, in a fuel cell, a performance only slightly less satisfactory than that of the noble metals can be obtained with "Teflon"—bonded nickel boride supported on a nickel screen. Data have been obtained for the nickel boride anode in the hydrogen and ethylene fuel cells.— Nature, Vol. 206, 186, 1965.

—T.L.R.

(*Concluded from Page* 105)

133. Z. M. Sominskaya et al., Renii, Tr. Vses. Soveshch. po Probl. Reniya, Akad. Nauk SSSR, Inst. Met., 209 (1958); Chem. Abs., 57, 3,186 (1962).

134. E. M. Natanson, N. N. Kozachek and V. V. Bushin, Doklady Akad. Nauk S.S.S.R., **135**, 137 (1960); Chem. Abs., **56**, 263 (1962).

135. V. T. Pustovit and N. N. Gratsianskii, Met. Gornorud'n. Prom., Nauchn.-Tekhn. Sb., No. 5, 70 (1962); Chem. Abs., 58, 10,973 (1963).

(*Concluded from Page* 110)

how virtually every calculation of chemistry can thus be simplified have been vividly brought home in this small book. Apart from the introduction the practical value of mole concept is discussed in eight other chapters with captions; gases, stoichiometry, formulae, quantitative relationship in chemical reactions, properties of liquid solutions, chemical equivalents, electrochemistry, Avagadro number and calculation of molecular quantities. This book is recommended to all students and teachers of chemistry.

—P. L. N. R.