BOOK REVIEWS

Vogel's text book of macro and semimicro qualitative inorganic analysis, Fifth Edition (1979). Revised by G. Svehla, published by Longman Group Limited, London, pp. 605, Price £ 14.95.

Vogel's books on analyses are well known to the present generation of chemists. The book on qualitative inorganic analysis was published first as early as 1937. It has been of value as a text book for undergraduates and as a book of reference to practicing analytical chemists since then.

The book has been revised four times. The last revision was nearly a quarter century ago. The present revised edition by Dr. G. Svehla of Queens University, Belfast, is therefore welcome. The theoretical part has been revised thoroughly and brought up-to-date. The text on reaction of cations and anions l as remained almost unaltered.

The book discusses all the three aspects of qualitative analysis—the theoretical basis, experimental techniques and experimental procedures. The first chapter which comprises one quarter of the book deals with the theoretical basis of qualitative analysis and covers the basic physical chemistry of chemical reactions. The second chapter discusses the experimental technique of macro, semimicro and also micro methods. This includes details of apparatus, manipulations and practical hints for those intending to set up a laboratory for the purpose.

The two subsequent chapters form one group. The third chapter discusses the reactions of common cations and the fourth the reaction of anions and thus set the stage for systematic qualitative inorganic analysis. The rest of the book deals with the qualitative analysis proper.

The fifth chapter deals with systematic qualitative analysis. The sixth chapter deals with adoptation of the knowledge of the first four chapters to the semimicro scale of operations. The seventh chapter deals with the reaction of less common ions which are entering the industrial products of late. The reactions of these are discussed and the position of them in the systematic qualitative analysis is indicated. The last chapter describes an abbreviated course of qualitative analysis which gives the systematic qualitative analysis in a condensed form which can be adopted for short-term courses.

The last part, Appendix II, gives the composition of all the reagents needed for the qualitative analysis. This part is likely to be very useful to the staff in charge of maintenance of the lab.

On the whole, the revised book is a useful addition to the libraries of colleges which offer undergraduate courses in chemistry.

The price of the book is prohibitive and is beyond the reach of an average undergraduate st .dent.

S. K. VIJAYALAKSHAMMA

The ana'ys's of biological materials edited by L. P. Butler. Published by Pergamon Press Ltd., 1979, pp. vii + 103, Price $ 25.

This title covers the proceedings of a conference held in Pretoria, South Africa, by the Spectroscopic Society of South Africa in 1977. As pointed out in the preface by the editor of this volume analytical aspects of biological materials need an increasing attention. It is essential in some cases to develop newer analytical techniques for the analysis not only of biological materials but also of others as well.

Eleven articles by the experts in the area are presented out of which nine are from the African continent and one each from England and Australia. The opening address by A. J. Brink outlines the need for such an analysis which could be useful in diagonistic medicine and its importance in current medical research. It also lists the possible future developments in space shuttle, radioactive labelling and environmental exposure. The majority of the work presented here is the analysis of trace metals in blood serum and many elements of physiological importance, using atomic absorption spectroscopy, atomic fluorescence spectroscopy, neutron activation analysis and ion microprobe analysis. The sensibility of each of the methods and sample preparation of the material are listed by the individual authors. The work reported is quite informative and authoritative. One good aspect about such a compendium of papers by different authors is that each work is supported by the motivation in their research and expertise and instrumentation techniques available in their respective laboratories. In fact, there is something about everything one wants to know about analysis of biomaterials in this volume but not enough. The latter comment does not mean that this is not a worthy one, but the editor has tried his best to put up the otherwise different works in a book form. The redeeming feature of this volume is that it tells us about what has been happening in this important area in the African continent.

The get up of the book is excellent and it is nice to see an author and subject index for a book of about 100 pages. This book would be a good addition to the libraries but very few individuals would like to own one.

V. KRISHNAN

Statistics for engineers by A. Greer. Published by Stanley Thornes (Publishers) Ltd., Cheltenham GL53 ODN, England, 1979, Pp. ix + 123, Price £ 2·85.

This is an excellent introductory book on statistics meant not only for engineers and technologists but also for junior college and senior high school students. The author has taken great pains to include a large number of examples and exercises with answers which contribute very highly to its pedagogical value.

The book is organized into eight chapters. A very useful collection of formulae is given right at the beginning. Frequency distributions and basic probability theory constitute chapters 1 and 2 respectively; the various important distributions, *viz.*, Binomial, Poisson and Normal distributions are covered in detail in chapters 3, 4 and 5. Chapter 6 deals with sampling and estimation theory; the tests of significance are described in detail in chapter 7. Regression and correlation form the last chapter.

The book contains a large number of illustrative diagrams as an aid for quick comprehension and self-study.

Certainly it is a very valuable basic working text book for a variety of courses in science, engineering, management, operations research and economics. Every high school, technical school and college library should have multiple copies of this book.

E. V. KRISHNAMURTHY

Earth shock by B. Booth and F. Fitch. Published by J. M. Dent and Sons Ltd., London. 1979, pp xii + 256, UK Price £ 6·95.

This is a book written in simple language, with a popular appeal, about the catastrophes which may afflict the earth from time to time. The book contains eight chapters. The first chapter ' The violent planet ' introduces the theme of the book, citing several historical events, that the earth may be visited by devastating catastrophes. The second chapter ' Record of the rocks ' attempts to establish from studies of the rocks that the hazards are in fact in the form of earthquakes, volcanoes, climatic changes and extraterrestrial missiles. The third chapter ' Dance of the continents ' is on the theory of continental drift. The fourth chapter ' The unstable earth ' is about past earthquakes. The fifth chapter ' Earthmelt ' discusses volcanic action. The possibilities of a return of the ice age or of the melting of the polar ice caps is the subject matter of the sixth chapter ' Frozen death or flooding '. The seventh chapter ' Extra terrestrial bombardment ' is about the meteorites which hit the earth. The eighth and final chapter ' Catastrophe or survival ' sums up the book. The book presents information on many historical events which sometimes read like science fiction. The book is well illustrated with plates and line drawings. The book will be of more interest and use to the layman than to the research worker in earth sciences.

R. NARAYANA IYENGAR

Introduction to superconductivity by Rose–Innes and E. H. Rhoderick. Published by Pergamon Press (Second edition 1978), pp. xviii + 237, Price $ 16·50.

This is the second edition of the successful introduction to superconductivity, which is extremely readable. The authors have maintained a level at which the phenomena and the theoretical concepts of superconductivity will be understood by students and scientists having only a modest knowledge of solid state physics.

As is well known the phenomenon of superconductivity—discovered in 1911 by Kamerling Onnes—defied a theoretical understanding until 1957. It had to await developments in quantum theory of solids and many body effects involving electrons in metals and the idea of attractive interaction between electrons arising from the exchange of quanta of lattice vibrations. The pairing theory of Bardeen, Cooper and Schrieffer (BCS (1957)) is perhaps one of the greatest triumphs of quantum mechanics in understanding solid state physics. That below a critical temperature the electron-fluid in a metal or alloy undergoes a phase transition to a state which shows large scale coherence and quantum effects, had far reaching consequences on basic physics along with throwing open enormous possibilities of applications.

The authors have done an admirable job in 13 chapters and two appendices. In the first 8 chapters they give a very good account of the phenomena of superconductivity—zero resistance state, perfect diamagnetism, electrodynamics and the critical magnetic field, thermodynamics of the phase transition, the intermediate state, transport currents in superconductors and the superconducting properties of small specimens using London and the Ginzburg-Landau phenomenological theories. After this the reader is exposed to the microscopic theory of the superconducting state—the concept of an energy gap, electron-lattice interaction—Cooper pairs and long range coherence, etc. Chapter 10 discusses the tunneling processes between (i) a normal metal and a superconductor and its connection with the energy gap of the superconductor (ii) two identical superconductors separated by a thin insulating layer. This gives account of the pair tunneling associated with the Josephson effect. This is followed by a detailed survey in Chapter 11 (which has been completely rewritten and updated) on the long range coherence of the electron-pairs in superconductors and the working of superconducting quantum interference devices (SQUID). This contains a physical picture of the phase of the electron-pair wave, flux quantization, weak links, a.c. Josephson effect and diffraction effects connected with squid. This is indeed a very valuable chapter.

Chapters 12 and 13 which constitute Part II of the book deal with type II superconductors and describe the concept of the mixed state, negative surface energy and the elements of the Ginzburg-Landau theory. This naturally leads to the work of Abrikosov when, on application of a magnetic field, the type II superconductor goes into a mixed state, the minimum strength of the field being H_{c1} (the lower critical field). The mixed state persists up to an upper critical field H_{c2} when the system becomes completely normal.

These chapters give a good account of subtleties of the magnetization, specific heat, and critical current of type II superconductors.

In short, this book is ideal as a first course of superconductivity for a person working to gain a physical insight of the field and covers almost all aspects.

This book is strongly recommended as an elementary text book on the subject.

K. P. SINHA

Foundations of astronomy (From big bang to black holes) by Richard Knox. Published by David and Charles, London, pp. 184, Price £ 5·95.

The field of astronomy and cosmology has been one of the oldest branches of human enquiry. Some exciting experimental discoveries in the last two decades, for example, quasars, pulsars, blackbody radiation and observational astronomy using radio, infrared, X-ray and γ-rays, have added new dimension to the mysteries of the universe. We seem to be in a better position now than ever before to answer the perennial question of the origin of the universe, *i.e.*, whether or not it had a beginning. Experiments carried out on artificial satellites are giving new information about these fundamental questions, particularly about the possible existence of black holes and expansion of the universe and hitherto unknown new entities in the depth of outer space. And new discoveries in astronomy always catch popular imagination. No wonder even laymen and young students (from schools and colleges) would like to look at the stars, galaxies and nebulae with their own eyes through amateur telescopes and learn about the current state of the subject.

The appearance of the book under review is indeed very timely and serves the purpose at the right level. The author, being an amateur astronomer, is well conversant with the problems and requirements of a beginner. He has done a splendid job in 5 chapters and additional materials covered in an Appendix along with suggestions for further reading.

In the first chapter he gives a brief historical account—from the work of Ptolemy through Copernicus, Tycho-Brahe, Kepler, Galileo, Newton to the model of the universe proposed by Einstein along with a practical description of a telescope and measurement of earth's radius, etc. In chapter 2 the Sun and each of its planets and other objects going around it are described along with simple methods to get the diameter and mass of the planets and distances of stars and galaxies, etc. Chapter 3 gives an engrossing description of various kinds of stars from red giants to white dwarfs along with some informative star charts and luminosity scale. It gives a simple account of the birth, evolution and end of a star—supernovae, neutron stars and black holes. This is followed (Chapter 4) by a fascinating account of nebulae, star clusters, galaxies and objects at the very edge of the observable universe and how universe is expanding after the big bang

(predicted by G. Gamow in 1940s) at the rate of 50 kilometres per second per mega par sec (the unit being defined in an earlier chapter for the layman) and supported by the black body radiation observed at the present epoch.

To add to the popular appeal the book ends (Chapter 5) with the question whether or not there is life elsewhere in the universe. There are strong possibilities that there should be some form of life somewhere—but we do not know whether they exist within communicable range. Thus the book covers the entire gamut of astronomy and astrophysical questions. Throughout, the level is maintained which is palatable to the layman. A reader who is seeking a deeper understanding of the modern view of the origin of the universe written in a popular language will have to turn to the book entitled 'The First Three Minutes' by Steven Weinberg.

Nevertheless, the book under review does fulfil the purpose for which it has been written i.e., an introduction to modern astronomy. The reviewer strongly recommends this book to school and college students seeking elementary level knowledge of practical and modern state of astronomy. The get up of the book is excellent with some beautiful photographs and a breath-taking colour photograph of the great nebulae in Orion on the cover resembles a huge bird with wings spread out.

K. P. SINHA

ERRATA

Year	Vol.	Page	Line	For	Read
1979	61	5	19	$u_0 \gtrsim 10^5 \text{ m/s}$	$u_0 \gtrsim 10^4 \text{ m/s}$
1979	61	5	23	$3 \text{ to } 5 \times 10^4 \text{ m/s}$	$3 \text{ to } 4 \times 10^5 \text{ m/s}$
1979	61	21	6	but $\lim\limits_{\nu \to 0} \text{im } m_{ij}(\mu)$	but $\lim\limits_{\nu \to 0} \text{im } m_{ij}(\lambda)$
1979	61	36	Last	$\sin \xi X \sin \xi X = 0$	$\sin \zeta X \sin \xi X = 0$
1979	61	37	2	$\xi^2 = \lambda - \tfrac{1}{2}\eta \cdots$	$\zeta^2 = \lambda - \tfrac{1}{2}\eta \cdots$
1979	61	38	Fourth from the bottom (Formula 9.7')	$\leq \sum\limits_{s=1}^{n} [\{\lambda - \tfrac{1}{2} \triangle_{1s}(x)\}^{1/2} + \{\lambda - \tfrac{1}{2} \triangle_{1s}(x)\}^{1/2}] \times \dfrac{\delta_s}{\pi} - 2n$	$\leq \sum\limits_{s=1}^{n} [\{\lambda - \tfrac{1}{2} \triangle_{1s}(x)\}^{1/2} + \{\lambda - \tfrac{1}{2}\eta_{1s}(x)\}^{1/2}] \times \dfrac{\delta_s}{\pi} + 2n$
1979	61	39	Ninth from the bottom	$I(\lambda) = \dfrac{1}{\pi} \int\limits_{X}^{0} \cdots$	$I(\lambda) = \dfrac{1}{\pi} \int\limits_{0}^{X} \cdots$
1979	61	40	Seventh from the bottom	$I(\lambda) = \dfrac{1}{\pi} \mid\int\limits_{X}^{0} \cdots$	$I(\lambda) = \dfrac{1}{\pi} \int\limits_{0}^{X} \cdots$
1979	61	139	Caption of Fig. 1	Caption of Fig. 1	Caption of Fig. 2 (Page 140)
1979	61	140	Caption of Fig. 2	Caption of Fig. 2	Caption of Fig. 1 (Page 139)