

presumably as a matter of deliberate taxonomic policy, no sub-species.

The greater part of the genus was revised by Goncharov, a lesser but nevertheless important part by A. G. Borisova, and other smaller portions by other authors.

The translation by Dr. N. Landau appears to be efficient and clear, and his undaunted perseverance in ploughing through so many specific descriptions, mostly not written in a particularly enlivening style, is praiseworthy.

J. P. M. BRENNAN

The Biochemical Genetics of Vertebrates Except Man
By I. E. Lush. (North-Holland Research Monographs. Frontiers of Biology, Vol. 3.) Pp. viii + 118. (Amsterdam: North-Holland Publishing Company, 1966.) 36s.

THIS monograph, the third in the series "Frontiers of Biology", is devoted to a tabulation of the biochemical variations uncovered so far in mammals, birds and fishes. The author has assembled a large quantity of material, and made interesting reading out of a text which, from its necessary form of presentation, might have been tedious. The subjects discussed in some detail include genetic variations in transferrin, haemoglobin, γ -globulin, esterase, amylase, lactate dehydrogenase and pyrimidine catabolism, to name only a few. This is the first time that an attempt has been made to collect and summarize this material from a widely scattered literature. The concluding chapter includes a clear concise treatise on deletion and duplication in vertebrate biochemical genetics, and the quaternary structure of proteins.

The treatment on the whole is descriptive rather than analytical. One of the most dynamic sciences at the moment is the investigation of the chemical nature and behaviour of the hereditary unit. This publication will serve as a convenient source of reference, not only to biochemists and geneticists interested in this field, but to all researchers who are just awakening to the realization of the powerful research tool and the potentialities afforded by biochemical variants. H. M. MURPHY

Radioactive Pharmaceuticals

Edited by Gould A. Andrews, Ralph M. Kniseley, and Henry N. Wagner, jun. (Proceedings of a Symposium held at the Oak Ridge Institute of Nuclear Studies, November 1-4, 1965.) (U.S. Atomic Energy Commission/Division of Technical Information.) Pp. viii + 728. (Springfield, Virginia: Clearinghouse for Federal Scientific and Technical Information, N.B.S., U.S. Department of Commerce, 1966.) \$5.

THE publication of these proceedings comes at a time of particularly rapid growth of the use of radioactive materials in medicine. The purpose of the symposium was to summarize and correlate the recent advances in the development of radioactive pharmaceuticals for use in clinical medicine and biological research. It succeeds admirably. The symposium title *Radioactive Pharmaceuticals* itself acknowledges the technical advances and the change of status which have occurred in the 28 years since thyroid function was first demonstrated with radioactive iodine. To some extent it may also mislead, since a radioactive pharmaceutical is usually administered to provide information, commonly of organ function, rather than to elicit a specific pharmacological response. The papers in these proceedings are accordingly largely devoted to the discussion of radioactive materials used in diagnosis: their production, their characteristics and the techniques for using them. Their applications in radiotherapy are not included.

Recently developed radiopharmaceuticals figure prominently and provide a convincing illustration of the more sophisticated diagnostic techniques now being achieved. The instrumental aspects are not reported in the proceed-

ings though the consequences of concurrent developments in equipment for external body scanning are everywhere apparent.

The forty papers range widely through biochemistry, pharmacology, radionuclide production, nuclear medicine and the radiopharmaceutical industry. The more critical outlook of both suppliers and users of radioactive pharmaceuticals is reflected in the number of papers concerned with quality control and licensing regulations.

The proceedings provide not only a record of what was a well timed and eminently successful symposium, but a valuable reference for all whose work brings them into contact with nuclear medicine. C. C. EVANS

Strong Solids

By A. Kelly. (Monographs on the Physics and Chemistry of Materials.) Pp. xv + 212. (Oxford: Clarendon Press; London: Oxford University Press, 1966.) 42s. net.

DR. KELLY has written a book quite unlike any other at present available. He has undertaken a single-minded treatment of a central question: what determines the ideal strength of solids, and what steps can be taken to approach this in practice as nearly as possible.

The first chapter shows how the ideal fracture and shear strengths can be calculated, and what physical parameters must be controlled to maximize them. Next, Dr. Kelly summarizes the fracture promoting properties of cracks, and goes on to expound very selectively some relevant properties of dislocations, in particular the forces binding them to the lattice. An illuminating chapter on presently available strong alloys, including recently developed forms of high strength steel, is followed by a long chapter on the dynamics of fibre reinforced composites. A final chapter is concerned with the practical methods of making these.

The last two chapters include much very recent material, a good deal of it arising from the work of the author and his associates. They constitute the most readable and up to date survey of the reinforcement of plastics and metals by strong fibres. The early chapters deal with older subject matter, yet make stimulating reading, because the author has firmly resisted the temptation to spread his subject matter; he has not hesitated to use without proof formulae in the theory of elasticity or in dislocation geometry, for instance, but has incorporated them in the flow of his argument in such a way that its physical basis is always clear. Also he has been unusually careful to map out his plan of campaign at the start of each chapter, and at each stage to explain exactly what he is aiming at.

The book is up to the very high standards of the Clarendon Press. Apart from a slip near the foot of page 118 and a mysterious footnote on page 150, I found no errors. The book is recommended without hesitation to students of metallurgy, materials science and mechanical engineering, and to their teachers. R. W. CAHN

Nonlinear Electron-Wave Interaction Phenomena

By Joseph E. Rowe. (Electrical Science: a Series of Monographs and Texts.) Pp. xiv + 591. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1965.) 144s.

THE subject of this book is the non-linear analysis of the interaction between streams of charged particles and propagating electromagnetic waves. The theoretical foundations are laid with mathematical rigour in the first part of the book, while the remainder is devoted to the detailed application of the theories to various O and M type microwave tubes, and to some related techniques and problems. It is essentially a very full and systematic theoretical analysis of microwave tubes in which the theory has been developed with sufficient generality to be of

interest and use in other areas. One such area—beam plasma interactions—is dealt with in Chapter 12.

Particularly satisfying features of the book are its depth and the way in which problems are given alternative treatments together with critical discussions. These qualities are important in view of the fact that the book is written as a research monograph at a level appropriate to advanced graduate students. Knowledge of linear theory is assumed. The treatment is almost entirely theoretical, and one seldom finds experimental evidence in support of the theories developed. A consequence of dealing with non-linear equations is the difficulty of obtaining analytic solutions. There are therefore, as one would hope and expect, a large number of figures presenting computer results. The problem of gaining physical insight from such results is recognized, and is tackled with some success.

This book, which is well referenced and adequately indexed, is written with authority derived from wide research and teaching experience, and constitutes a valuable and readable contribution to the literature on microwave tubes.

I. B. BOTT

Thermal Neutron Scattering

Edited by P. A. Egelstaff. Pp. xv + 523. (London: Academic Press, Inc. (London), Ltd.; New York: Academic Press, Inc., 1965.) 115s.

THE investigation of molecules, of liquids and of solids by thermal neutron scattering rests on the idea that the intensities of scattered particles which have lost energy and momentum are a measure of the density and corresponding spatial and time Fourier components of scattering power. The measurement of these intensities involves refined techniques of mechanical or diffractive velocity determination, and requires reactor sources, moderators, and scintillator detectors or proportional counters. This volume surveys the development of the subject since the great advances in technique during the fifties made it a productive field of study. Although there are fourteen different authors, the unity of presentation is unusually good and as a consequence the book serves as an introduction to the subject that will be of value to the non-specialist molecular or solid state physicist. For the specialist, the volume will also be valuable, as the field is not over-endowed with review literature.

J. B. HASTED

Beginning Geology

By H. H. Read and Janet Watson. Pp. 246. (London: Macmillan and Co., Ltd., and George Allen and Unwin, Ltd.; New York: St. Martin's Press, 1966.) 30s. net.

ALTHOUGH the layman can probably appreciate geology more easily than almost any other science, geologists (with a few notable exceptions) are notoriously bad at transmitting the essence of their subject to the uninitiated. Read and Watson's writings admirably fill this gap in communication. Unfortunately, their book is aimed primarily at schoolchildren, so that the style is sometimes reminiscent of a patronizing matey teacher. Otherwise, I have nothing but praise for this book. The scope of the book is the field of geology; this is comprehensively covered, while the treatment, though simple, is deep, and fairly complex concepts (often not dealt with adequately in supposedly more advanced text-books) are presented. The choice of examples—so important in any phenomenological science—is judicious, as is the choice of diagrams and photographs, while the layout both pleases and aids assimilation of the contents. Illustrations are drawn to a large extent from the British Isles, but the book is not nearly as chauvinistic as many others in this respect. Even if it were not so reasonably priced, this book would still be a worthwhile buy for those who are "beginning geology".

A. M. MARSHALL

OBITUARIES

Sir Denis Browne

SIR DENIS BROWNE, who died on January 9, can be called the father of paediatric surgery.

In his native Australia he was educated at King's School, Paramatta, New South Wales, and at the University of Sydney, where he obtained his M.B. He served during the First World War with the Australian Army Medical Corps. Afterwards he came to England and obtained his F.R.C.S. Most of his working life was spent at the Hospital for Sick Children, Great Ormond Street, where he was houseman, registrar and consultant. During the Second World War he was the leader of a surgical team in a casualty clearing station in the basement of the hospital. Browne's surgical interests ranged from genito-urinary surgery to orthopaedics, for which he developed and modified instruments, appliances and operations. He developed many instruments, including a needleholder, dissectors, plastic shears and tonsil forceps, and appliances which reflect his interest in the treatment of congenital deformities. There are splints for the treatment of club foot and harnesses for the correction of spinal deformities and congenital dislocation of the hip. He led the treatment of this last condition by means of closed reduction and manipulation. He perfected the technique for the manipulative treatment of talipes equinus—a form of club foot—and repaired hare lip and cleft palate. In other fields of child surgery his inventions included a transthoracic approach and incision to correct congenital heart deformities, and an operation for undescended testicle.

Among the awards which Browne received for his services to paediatrics was the Dawson Williams Prize, and he was an honorary member of the French Society of Urology. His other activities included his four terms as president of the British Association of Paediatric Surgeons and membership of the B.B.C. General Advisory Council. He was also an expert shot; he preferred to ride in taxis, and would never own a car.

Dr. William Meggers

WILLIAM FREDERICK MEGGERS died of a heart attack on November 19, 1966, aged 78. In 1958 he had retired as chief of the spectroscopy section of the U.S. National Bureau of Standards, which he joined in 1914 as a laboratory assistant, with a B.A. from Ripon College, an M.A. from Wisconsin and a Ph.D. from Johns Hopkins University, all in physics.

His early work, carried out with C. G. Peters, produced measurements of the refractive index of air which were used for more than 25 years. Later he worked on the determination of atomic energy levels for the analysis of spectra, which he did very well and in very great detail. Meggers also utilized the neutrons from atomic reactors to transmute gold to a single isotope of mercury, which he used to produce his mercury 198 lamp. This lamp gives off a green spectral line so pure that its wavelength can be determined to one part in one billion. The wavelength of this light has served as a working standard of measurement in spectroscopy and metrology throughout the world. Meggers was also among the first to observe atomic spectra in the infra-red region.

Meggers was active on a number of committees concerned with spectroscopy, and in 1949–51 he was president of the Optical Society of America, which gave him its two highest awards. He also received medals from the Franklin Institute of Pennsylvania, the Department of Commerce and the University of Liège. After his retirement, Meggers remained as a guest worker at the National Bureau of Standards, and continued to contribute to research in atomic spectroscopy.